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Via Electronic Mail

April 29, 2026

Ms. Lisa Danek Burke
EPA Project Manager
U.S. Environmental Protection Agency
New England Region
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Re: GE-Pittsfield/Housatonic River Site
Rest of River (GECD850)
Final Remedial Design/Remedial Action Work Plan for Reach 5A

Dear Ms. Danek Burke:

In accordance with the Revised Final Permit for the Rest of River, the Final Revised Rest of River Statement of Work, and EPA's December 3, 2025 conditional approval letter for the Conceptual Remedial Design/Remedial Action (RD/RA) Work Plan for Reach 5A, GE is herewith submitting for EPA's review and approval the Final RD/RA Work Plan for Reach 5A.

The main text of this work plan and associated tables are being provided by e-mail, and a separate link to download site is being provided for the full work plan, including figures and appendices. A complete hard copy of the work plan will also be sent to you.

The Restoration Plan for Reach 5A, which includes the Restoration Corrective Measures Coordination Plan, is being submitted under separate cover.

Please let me know if you have any questions about the enclosed work plan.

Very truly yours,



Kevin G. Mooney
Senior Project Manager

Enclosure

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April 2026
Housatonic River – Rest of River

Final Remedial Design/Remedial Action Work Plan for Reach 5A

Prepared for General Electric Company
Pittsfield, Massachusetts

April 2026
Housatonic River – Rest of River

Final Remedial Design/Remedial Action Work Plan for Reach 5A

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ABBREVIATIONS

AC	activated carbon
ACU	Amendment Certification Unit
ADCP	acoustic Doppler current profiler
AEP	annual exceedance probability
A/P Lawn Properties	Actual/Potential Lawns
APR	Agricultural Preservation Restriction
ARAR	applicable or relevant and appropriate requirement
ASTM	ASTM International
BANCS	Bank Assessment for Non-point Source Consequences of Sediment
BEHI	Bank Erosion Hazard Index
bgs	below ground surface
biochar	activated biochar
Bluesky	Bluesky Geospatial Ltd
BMP	best management practice
BRA	baseline restoration assessment
Canoe Meadows	Canoe Meadows Wildlife Sanctuary
CBR	California Bearing Ratio
CCU	Cap Certification Unit
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
cfs	cubic foot per second
cm	centimeter
cm^2	square centimeter
CMR	Code of Massachusetts Regulations
Conceptual RD/RA Work Plan	*Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A*
Confluence	confluence of the East and West Branches of the Housatonic River
CQA	Construction Quality Assurance
CQAP	*Construction Quality Assurance Plan*
C.T. Male	C.T. Male Associates
CT DEEP	Connecticut Department of Energy and Environmental Protection
cy	cubic yard
DCP	dynamic cone penetrometer
DEM	digital elevation model
EA	Exposure Area

ECN	engineering change notice
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ERE	Grant of Environmental Restriction and Easement
ERE Plan	*Plan for Obtaining Environmental Restrictions and Easements and Inspecting Subject Properties*
FEMA	Federal Emergency Management Agency
Final RD/RA Work Plan	*Final Remedial Design/Remedial Action Work Plan for Reach 5A*
Final Revised OSS	*Final Revised Overall Strategy and Schedule for Implementation of the Corrective Measures*
Final Revised SOW	*Final Revised Rest of River Statement of Work*
Final Vernal Pool Work Plan	*Final Revised Vernal Pool Pilot Study Work Plan*
FSP/QAPP	*Field Sampling Plan/Quality Assurance Project Plan*
GAC	granular activated carbon
GE	General Electric Company
GHG	greenhouse gas
GIS	geographic information system
GPS	global positioning system
GWTF	Groundwater Treatment Facility (at the GE Pittsfield Facility)
H:V	horizontal to vertical (ratio)
HASP	Health and Safety Plan
HDPE	high-density polyethylene
HEC-RAS	Hydrologic Engineering Center – River Analysis System
HHRA	Human Health Risk Assessment
IMM	Inspection, Monitoring, and Maintenance
IPaC	Information for Planning and Consultation
JSA	Job Safety Analysis
kg/year	kilogram per year
lb/ft^3	pound per cubic foot
lb/sf	pound per square foot
LiDAR	Light Detection and Ranging
LWD	large woody debris
Mass Audubon	Massachusetts Audubon Society
MassDAR	Massachusetts Department of Agricultural Resources
MassDEP	Massachusetts Department of Environmental Protection
MassDFW	Massachusetts Division of Fisheries and Wildlife

MassDOT	Massachusetts Department of Transportation
MassGIS	Massachusetts Bureau of Geographic Information
mg/kg	milligram per kilogram
MGD	million gallons per day
µg	microgram
MNHESP	Massachusetts Natural Heritage and Endangered Species Program
Mod Cal	Modified California
NA	not applicable
NAVD88	North American Vertical Datum of 1988
NBS	Near-Bank Stress
NCD	Natural Channel Design
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NTE	not-to-exceed
NTU	nephelometric turbidity unit
PAC	powdered activated carbon
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
PDI	pre-design investigation
PDI Summary Report for Floodplain Residential Properties	*Pre-Design Investigation Summary Report for Reach 5A Floodplain Residential Properties*
PDI Summary Report for Non-Residential Floodplain EAs	*Pre-Design Investigation Summary Report for Reach 5A Non-Residential Floodplain Exposure Areas*
PM_{10}	particulate matter smaller than 10 micrometers in diameter
PPE	personal protective equipment
QA	quality assurance
QC	quality control
QOL	quality of life
QOL Compliance Plan	*Second Revised Quality of Life Compliance Plan*
Rail Conceptual Design Plan	*Conceptual Design Plan for Rail Transload Areas in Reaches 5 and 6*
Rare Species CMP	Rare Species Conservation and Management Plan
RBP	Rapid Bioassessment Protocol
RCMCP	*Restoration Corrective Measures Coordination Plan for Reach 5A*
RCMS	*Housatonic River – Rest of River, Revised Corrective Measures Study Report*
RCRA	Resource Conservation and Recovery Act

RCU	Riverbank Certification Unit
RD/RA	Remedial Design/Remedial Action
Restoration Plan	*Housatonic River Reach 5A Restoration Plan*
Revised AMP	*Revised Adaptive Management Plan*
Revised BRA Report	*Revised Housatonic River Reach 5A Baseline Restoration Assessment Report*
Revised Final Permit	Revised Final Resource Conservation and Recovery Act Permit Modification
Revised PDI Summary Report for Sediment/ Riverbanks	*Revised Pre-Design Investigation Summary Report for Reach 5A Sediment and Riverbanks*
Revised Phase IB CRS Report	*Revised Phase IB Cultural Resources Survey Report for Reach 5A*
Revised POP	*Revised Project Operations Plan*
Revised RPOEC	*Revised Restoration Performance Objectives and Evaluation Criteria Report*
Revised Sediment/Bank PDI Work Plan	*Revised Pre-Design Investigation Work Plan for Reach 5A Sediment and Riverbanks*
Revised T&D Plan	*Revised On-Site and Off-Site Transportation and Disposal Plan*
RFP	Request for Proposal
RME	Reasonable Maximum Exposure
ROR	Rest of River
RU	Remediation Unit
SCAP	*Sustainability and Climate Adaptation Plan*
SDC	supplemental data collection
SDC Summary Report	*Supplemental Data Collection Summary Report for Reach 5A*
SI	Supplemental Investigation
SIP	Supplemental Information Package
SOP	Standard Operating Procedure
SoQ	Statement of Qualifications
SPT	Standard Penetration Test
SSHO	Site Safety and Health Officer
Subaqueous Capping Guidance	*Guidance for In-Situ Subaqueous Capping of Contaminated Sediments*
SVOC	semi-volatile organic compound
SWAC	spatially weighted average concentration
SWPPP	Stormwater Pollution Prevention Plan
TCLP	Toxicity Characteristic Leaching Procedure
TOC	total organic carbon
Towns	Towns of Lenox, Lee, Great Barrington, Sheffield, and Stockbridge

Treatability Studies Summary Report	*Treatability Studies Summary Report for Reach 5A*
TSS	total suspended solids
TWTS	temporary water treatment system
UDF	Upland Disposal Facility
UDF Revised OMM Plan	*Upland Disposal Facility Revised Operation, Monitoring, and Maintenance Plan*
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
VOC	volatile organic compound
Whiteout	Whiteout Solutions
WWTP	wastewater treatment plant
WWUP	*Revised Water Withdrawal and Uses Plan*

Overview

Remedy Overview

The cleanup of the Housatonic River "Rest of River" is being carried out pursuant to requirements established by the U.S. Environmental Protection Agency (EPA) to address polychlorinated biphenyl (PCB) impacts in the river and its floodplain. The remediation is being implemented by the General Electric Company (GE) with oversight from EPA.

Rest of River refers to the portion of the Housatonic River located downstream of the junction of the East and West Branches (the Confluence). To manage the scope, scheduling, and sequencing of this large-scale cleanup, the Rest of River was divided into several sections, known as Remediation Units (RUs).

Reach 5A, the first Rest of River RU to be remediated, includes approximately the first five miles of river downstream of the Confluence. Cleanup activities in Reach 5A represent an important early milestone in a long-term, river-wide effort to reduce PCBs, restore natural river and floodplain functions, and protect human health and ecological resources while maintaining the character and uses of the Housatonic River. The Reach 5A remedy is designed to provide long-term protection by addressing both PCB impacts and the physical stability of the river and floodplain, including performance during high-flow and flood conditions.

This *Final Remedial Design/Remedial Action Work Plan for Reach 5A* (Final RD/RA Work Plan) presents final design details for the remedy in this portion of the river. The design reflects multiple years of assessments and planning, including field surveys, field and laboratory studies, data evaluation, and coordination with EPA, state agencies, local municipalities, landowners, and community stakeholders. EPA will continue to oversee implementation of the Reach 5A remedy throughout preparation, construction, restoration, and monitoring to ensure compliance with approved plans and achievement of protectiveness requirements.

In summary, the Reach 5A remedy includes the following key components:

- Removal of PCB-contaminated sediments from the river channel and backwaters, riverbank soils, and residential and non-residential floodplain soils with PCB concentrations above EPA-established limits;
- Placement of engineered sediment caps designed to remain protective during high-flow and flood conditions;
- Removal of sediment from certain other waterbodies within Reach 5A, namely, West Pond (located within the Massachusetts Audubon Society Canoe Meadows Wildlife Sanctuary property) and Lower Sykes Brook;

- Management of removed sediments and soils through a combination of on-site disposal (in an Upland Disposal Facility [UDF]) and off-site disposal in strict accordance with EPA requirements, with the most highly impacted materials transported out of Massachusetts for disposal under stringent federal Department of Transportation regulations;
- Enhancement and restoration of the river channel and riverbanks using geomorphologically/ecologically based Natural Channel Design principles to reduce the potential for future erosion;
- Restoration of aquatic, riverbank, and floodplain habitats following remediation; and
- Implementation of measures to protect and minimize potential impacts to listed threatened, endangered, and special concern species and, where impacts cannot be avoided, implementation of mitigation measures to benefit those species.

Approximately 200,000 cubic yards of sediment and soil are planned to be removed from the river and floodplain in Reach 5A.

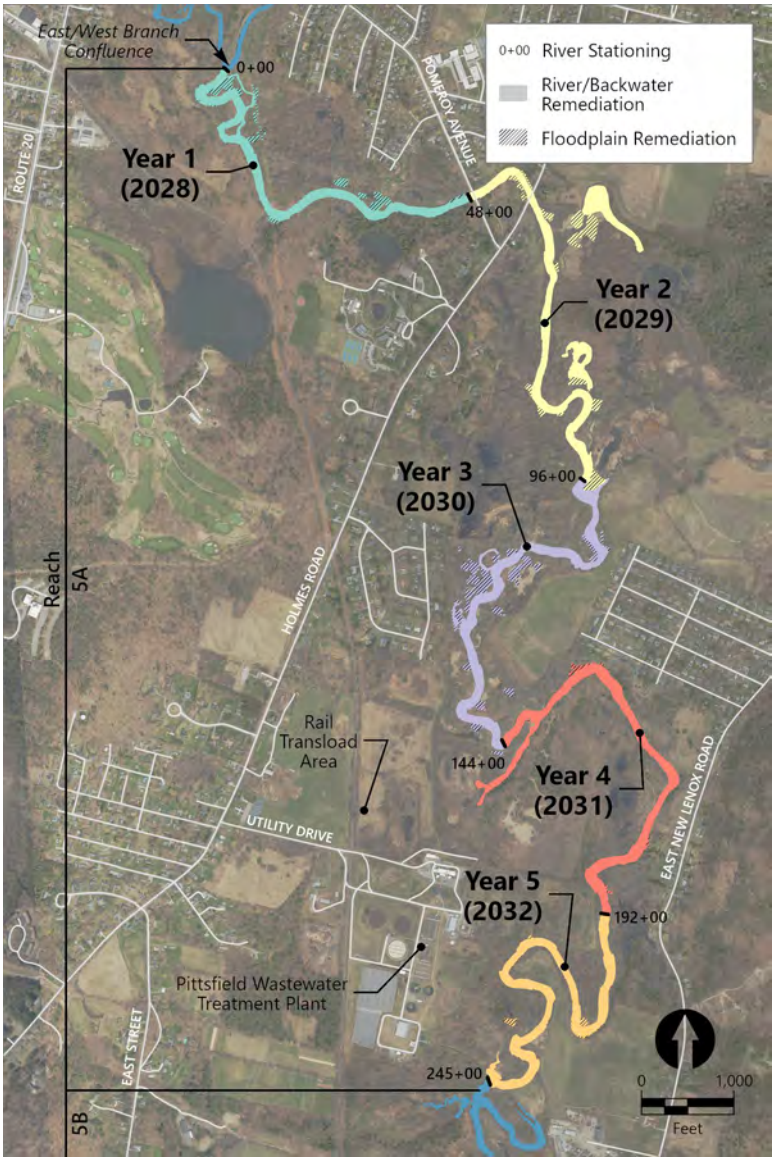
Restoration is an integral component of the Reach 5A remedy. GE has prepared a separate Restoration Plan that establishes a comprehensive framework for restoring disturbed habitats and ecological functions affected by remediation activities. The plan is designed to return the riverine and floodplain ecosystem to conditions comparable to pre-remediation baseline conditions and in many ways to improve the ecological and habitat conditions of the river and its floodplain.

The Restoration Plan addresses potential impacts from remedial construction activities, as well as temporary activities needed to support construction, including access roads and staging areas. It also identifies measures to avoid, minimize, or mitigate habitat impacts before, during, and after remediation; and it describes the actions to be taken to restore the affected habitats. After remediation and restoration activities are completed, monitoring and maintenance of remediated and restored areas will continue to ensure that the remedy remains protective and effective over the long term.

Phased Implementation Approach

Remedial activities in Reach 5A are anticipated to be implemented over a five-year period beginning in 2028, following construction of the UDF. To support efficient construction and minimize disruption, Reach 5A has been subdivided into five sequential subreaches, each approximately one mile in length and corresponding to one year of remedial activities.

This phased approach is intended to reduce impacts to river users, nearby residents, and adjacent properties, while allowing for focused coordination with landowners and the community within each remedial area. Phasing also supports adaptive management, which provides the opportunity to refine future phases of the remedial design or construction approach based on lessons learned during earlier stages of the work. Lessons learned during Year 1 and subsequent phases will be used to improve efficiency, reduce impacts, and refine remediation and restoration approaches in later years.



Reach 5A Remediation Areas by Year

Year 1 remediation will focus on the upstream portion of Reach 5A, extending from the Confluence downstream to approximately the Pomeroy Avenue Bridge in Pittsfield. While the Final RD/RA Work Plan presents the overall remedial design framework for the entirety of Reach 5A, it provides a final design-level of detail for certain elements of the design (specifically the Natural Channel Design, engineered cap, and dredge zones) only for the area planned for Year 1 remediation. Design details for these elements in the remaining portions of Reach 5A (Years 2 through 5) will be provided in future revisions or addenda to this work plan.

Focusing detailed design information on the Year 1 work area enables early regulatory review, supports timely contractor procurement, and allows remedial planning and activities to proceed efficiently while maintaining regulatory oversight and coordination with the community.

Community Health and Safety

Community health and safety, along with minimizing disruption to the surrounding community during remediation, are key elements of the Reach 5A design. To meet these objectives, the project includes the following:

- Establishment of a PCB air monitoring program to record PCB and particulate levels in the air at work areas, staging areas, rail transload areas, and the UDF and requirements to comply with protective air quality standards established by EPA for both PCBs and particulate matter;
- Implementation of measures to comply with standards for noise, odor, and lighting and to minimize those and other potential quality-of-life impacts from remedial activities, in accordance with the EPA-approved *Quality of Life Compliance Plan*;
- Development of a safety and quality culture for all project participants that emphasizes safe and quality work practices for all aspects of the project;
- Managed truck routing and maximizing the use of rail transport to reduce traffic impacts on local roadways;
- Construction of temporary internal roads and river crossings to allow project trucks to travel internally from work areas to staging areas without needing to use local roadways;
- Selection of staging area locations such that in Years 3, 4 and 5, project trucks can travel internally directly to the rail transload area at Utility Drive without needing to use local roadways;
- Temporary access controls, safety fencing, and signage to protect the public and clearly identify remedial areas;
- Advance notifications and ongoing communication regarding remedial activities and any temporary effects on recreational areas and uses through a community notification program (e.g. GE's project website, www.housatonicriverproject.com);
- Ongoing coordination with local governments, landowners, and other community stakeholders throughout remedial activities; and
- Establishment of a toll-free telephone number (866-596-3655) and online contact form (https://www.housatonicriverproject.com/contact-us) for the public to raise project-related concerns directly to GE.

Together, these measures are intended to ensure that remediation and restoration activities are conducted safely, predictably, and respectfully while maintaining transparency and responsiveness to community concerns. GE will continue to communicate with the community while remedial activities are ongoing to provide updates, address questions or concerns, and respond to changing conditions.

1 Introduction

1.1 Background

On December 16, 2020, pursuant to the 2000 Consent Decree (CD) for the GE Pittsfield/Housatonic River Site (EPA and GE 2000), the U.S. Environmental Protection Agency (EPA) issued to the General Electric Company (GE) a revised final permit modification of GE's Resource Conservation and Recovery Act (RCRA) Corrective Action Permit (Revised Final Permit) for the Housatonic Rest of River (ROR; EPA 2020). The ROR is defined as that portion of the Housatonic River and its backwaters and floodplain (excluding Actual/Potential Lawns [hereafter referred to as A/P Lawn Properties] as defined in the CD) located downstream of the confluence of the East and West Branches of the Housatonic River (the Confluence). The Revised Final Permit set forth a Remedial Action selected by EPA to address polychlorinated biphenyls (PCBs) in the ROR.

The Revised Final Permit required GE to develop and submit a Statement of Work specifying the deliverables and activities that GE will conduct to design and implement the ROR Remedial Action. In accordance with that requirement, after receipt of EPA's comments on an earlier version, GE submitted a *Final Revised Rest of River Statement of Work* on September 14, 2021 (Final Revised SOW; Anchor QEA et al. 2021), and EPA approved it on September 16, 2021. The Revised Final Permit also required GE, in Section II.H.2, to develop and submit an Overall Strategy and Schedule document to present its overall strategy for implementing the ROR Remedial Action. In response, GE submitted its *Final Revised Overall Strategy and Schedule for Implementation of the Corrective Measures* on July 5, 2022 (Final Revised OSS; Anchor QEA 2022a), and EPA approved it on July 6, 2022. As described in Section 3.2 of that document, the ROR has been segmented into six separate Remediation Units (RUs) to manage workflow and schedule for the ROR Remedial Action. Reach 5A is the first RU to be addressed because it is the most upstream reach in the ROR.

Remediation in Reach 5A will include removal and capping of sediments in the riverbed and remediation of associated backwaters, riverbank soils, and floodplain soils (including those at residential properties, non-residential floodplain areas, and vernal pools) to the extent required by the applicable Performance Standards included in the Revised Final Permit. Soil and sediment excavated from the remediation areas will be subject to disposal at an on-site Upland Disposal Facility (UDF) or at an off-site disposal facility, consistent with the requirements specified in Attachment E to the Revised Final Permit.

Section II.H.6 of the Revised Final Permit and Section 4.3.3.1 of the Final Revised SOW required GE to prepare a Conceptual Remedial Design/Remedial Action (RD/RA) Work Plan following completion of pre-design investigation (PDI) activities and related reporting for each RU. The PDI activities for Reach 5A, which separately addressed three components of this RU—floodplain residential properties, floodplain non-residential Exposure Areas (EAs), and sediments and riverbanks—were

substantially completed as of July 2023. On September 28, 2023, GE submitted a *Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A* (Conceptual RD/RA Work Plan; Anchor QEA et al. 2023) concurrently with the last PDI Summary Report for Reach 5A (*Pre-Design Investigation Summary Report for Reach 5A Sediment and Riverbanks* [Anchor QEA and AECOM 2023a]).[1] EPA conditionally approved the Conceptual RD/RA Work Plan on December 3, 2024.

Since that time, GE has been performing numerous activities to support the design of the Remedial Action for Reach 5A, including supplemental data collection (SDC) activities, treatability studies, supplemental baseline restoration assessment (BRA) surveys, rare species surveys, and cultural resource survey activities; these activities are summarized in Section 5. The schedule established in Section 11 of the Conceptual RD/RA Work Plan states that this *Final Remedial Design/Remedial Action Work Plan for Reach 5A* (Final RD/RA Work Plan) would be submitted within 60 days of the last of the EPA approvals of the deliverables listed in Section 11 of the Conceptual RD/RA Work Plan. Most of those deliverables have been approved by EPA, with the exception of the *Supplemental Data Collection Summary Report for Reach 5A* (SDC Summary Report; Anchor QEA et al. 2026) and the *Treatability Studies Summary Report for Reach 5A* (Treatability Studies Summary Report; Anchor QEA and Arcadis 2026), which were submitted to EPA for review on February 4 and 27, 2026, respectively. After discussion with EPA, in the interest of advancing the final design for Reach 5A, GE and EPA agreed this Final RD/RA Work Plan would be submitted within approximately 60 days of submittal (not approval) of the last of those deliverables (i.e., the Treatability Studies Summary Report).

1.2 Purpose and Scope of Final RD/RA Work Plan

This Final RD/RA Work Plan presents final design information for the remediation of in-river sediment, backwater sediment, sediment in certain other waterbodies, riverbank soil, floodplain soil, and vernal pools within Reach 5A of the ROR. This work plan was prepared in accordance with the requirements presented in the Revised Final Permit and in Section 4.3.3.4 of the Final Revised SOW. Specifically, this work plan and its appendices present the following information:

- Detailed design of the remediation activities;
- Summary of the results of activities conducted to support preparation of this work plan, including SDC activities, treatability studies, supplemental BRA surveys, rare species surveys, and cultural resources survey activities;
- Methods to protect significant cultural resources;
- Description of other implementation details for performance of the remedial activities;

[1] That summary report was conditionally approved by EPA on March 7, 2024. As required by that conditional approval, a *Revised Pre-Design Investigation Summary Report for Reach 5A Sediment and Riverbanks* (Revised PDI Summary Report for Sediment/Riverbanks; Anchor QEA and AECOM 2024) was submitted on May 6, 2024, and was approved by EPA on July 12, 2024.

- Details related to site preparation and development of remediation support areas;
- Description of disposal activities for dredged and excavated materials (i.e., UDF versus off-site) and material handling and transport;
- Road improvement evaluations and design;
- Details related to implementing the quality-of-life (QOL) standards and associated monitoring;
- Identification of remediation team (key personnel, roles/responsibilities, and lines of authority);
- Process for selection of a remediation contractor;
- Detailed requirements for supplemental plans to be prepared by the remediation contractor;
- Project closeout requirements;
- Anticipated contents of the Interim Remedial Action Completion Report.

As discussed with EPA, several aspects of the design require input from the selected remediation contractor based on its planned remediation methods, including sediment and soil removal and transport methods, sediment dewatering, water management, cap material handling and placement, riverbank excavations and stabilization, staging area size and locations, access routes, and work sequencing. Because a remediation contractor has not yet been selected, GE and EPA agreed that this Final RD/RA Work Plan would focus on the remediation design, including remediation depths and extents, engineered cap details, and performance requirements. It also includes a general discussion of the types of sediment/soil removal and backfill/cap placement technologies that may be used by contractors, and it addresses the items required by EPA's conditional approval of the Conceptual RD/RA Work Plan to be included in the Final RD/RA Work Plan, to the extent that that can be done at this time.

Contractor procurement activities will commence following submission of this Final RD/RA Work Plan. In addition, following receipt of EPA's comments on this Final RD/RA Work Plan, GE will revise this work plan as needed to address those comments and to incorporate other design information where warranted. Further, following selection of a remediation contractor, GE will incorporate additional design details related to remedy implementation, based on input from the selected contractor, into that future work plan revision or as part of the Supplemental Information Packages (SIPs) described in the next paragraph.

As described herein, the anticipated schedule for implementation of the remedial activities in Reach 5A is over a period of five years, beginning in 2028, after completion of the UDF (see Section 18.1). Accordingly, Reach 5A has been subdivided into five subreaches (each approximately

one mile long) corresponding to each anticipated year of construction. GE anticipates working with the selected remediation contractor to prepare two SIPs for construction of the first subreach (i.e., river Stations 0+00 to 48+00,[2] or Year 1) in Reach 5A—the first to cover site preparation work to be performed in advance of the remediation and the second to cover remediation activities. This approach will allow the site preparation work for Year 1 to commence in late 2027, with remediation activities commencing in 2028 after completion of the UDF. Additional SIPs will be prepared with input from the remediation contractor(s) for each subsequent year of construction.

This Final RD/RA Work Plan presents comprehensive remedial design information for the entirety of Reach 5A. However, as discussed with EPA, this work plan provides a final design-level of detail only for the portion of Reach 5A planned for Year 1 construction (Stations 0+00 to 48+00) for certain elements of the design, including the Natural Channel Design (sometimes abbreviated as NCD), engineered cap, and dredge prisms (described in Sections 8 and 9). The design details for these elements for the remainder of Reach 5A (i.e., river Stations 48+00 to 245+00) will be provided in a future revision of or addendum to this work plan. This phased approach that places emphasis on the portion of Reach 5A to be remediated in Year 1 reflects the iterative nature of the NCD grading design, its direct influence on the engineered cap design and dredge geometry, and the substantial modeling and analysis required to finalize these elements across the entirety of Reach 5A. Further, this approach is intended to facilitate early, focused EPA review and collaboration, reduce the potential for downstream rework, and support timely planning and contracting for Year 1 construction activities.

The segmented design and construction approach described above is supported by the adaptive management process required by the Revised Final Permit and described in GE's *Revised Adaptive Management Plan* (Revised AMP; Anchor QEA 2024). As stated in that plan, the adaptive management process to be implemented for the duration of the ROR Remedial Action will include ongoing reassessment of the design of the remediation and restoration activities, construction methods, and best management practices (BMPs). The process will be iterative, meaning that successful design elements, construction methods, equipment, and techniques that are identified early in the construction process will be continued, while those that are less successful can be identified and then refined, modified, or eliminated, as appropriate, to achieve the remedial objectives more efficiently and effectively.

Lastly, this Final RD/RA Work Plan provides a summary of the various restoration measures that will be implemented in areas that will be disturbed by remediation activities, as well as measures to minimize and mitigate adverse habitat impacts. Detailed descriptions of the various restoration activities and habitat minimization and mitigation measures are provided in the separate

[2] River stationing is defined in Section 2.1.

Housatonic River Reach 5A Restoration Plan (Restoration Plan; AECOM 2026a) that is being submitted concurrently with this Final RD/RA Work Plan. That Restoration Plan includes: (1) design details related to restoration of riverine, riverbank, backwater, Other Waterbody, floodplain, and vernal pool areas; (2) a description of measures to minimize and mitigate habitat impacts; and (3) proposed monitoring and assessment of post-restoration conditions at the restored habitat.

In addition, the Restoration Plan contains, as an appendix, a *Restoration Corrective Measures Coordination Plan for Reach 5A* (RCMCP) that summarizes measures being implemented to ensure that restoration activities are coordinated and integrated with remediation activities and to minimize the magnitude and duration of habitat disruption to the extent feasible and consistent with remediation requirements.[3] To avoid needless repetition, that plan largely references the applicable portions of the Final RD/RA Work Plan and the Restoration Plan relating to those matters.

1.3 Work Plan Organization

The remainder of this Final RD/RA Work Plan is organized into the following sections:

- Section 2 provides a description of Reach 5A.
- Section 3 summarizes the Performance Standards and other requirements applicable to the Reach 5A Remedial Action.
- Section 4 presents a discussion of applicable or relevant and appropriate requirements (ARARs) associated with Remedial Action for Reach 5A.
- Section 5 briefly summarizes the design support activities conducted to support preparation of this work plan, including PDIs, BRA activities, SDC, rare species surveys, cultural resources surveys, treatability studies, and hydraulic modeling.
- Section 6 describes the project management structure and communications, including identification of the remediation team, including key positions, their roles and responsibilities, and lines of authority.
- Section 7 describes site preparation activities and development of support areas such as staging areas and access roads; this section includes a discussion of the steps to be taken to avoid or minimize impacts to state-listed rare species.
- Section 8 provides final design details related to sediment remediation activities in Reach 5A, including sediment removal, engineered cap, backfill, amendment (where applicable), and restoration design.

[3] Section 4.3.3.5 of the Final Revised SOW provides that the RCMCP for a given RU may be submitted either as a stand-alone plan (concurrently with the Restoration Plan) or as part of the Restoration Plan for the RU. For Reach 5A, with EPA concurrence, GE has elected to include the RCMCP in the Restoration Plan as an appendix to that plan.

- Section 9 provides final design details related to riverbank remediation, stabilization, and restoration design.
- Section 10 provides final design details related to remediation of floodplain residential properties, non-residential EAs and vernal pools, including soil removal, backfilling, and restoration design.
- Section 11 briefly summarizes the measures to be conducted to mitigate habitat impacts from the remediation and supporting activities; details are provided in the separate Restoration Plan.
- Section 12 describes the staging, handling, transport, and disposal of soil, sediment, and debris removed during the Reach 5A remediation.
- Section 13 summarizes the various QOL standards that were defined in GE's *Second Revised Quality of Life Compliance Plan* (QOL Compliance Plan; Anchor QEA and Arcadis 2025) and provides details related to routine control measures, monitoring locations and methods for air, noise, odor, and lighting during construction, as well as contingency/mitigation measures for exceedances of the standards.
- Section 14 provides details related to construction monitoring consistent with the requirements of GE's *Construction Monitoring Plan*, which is Attachment G to GE's 2025 *Revised Project Operations Plan* (Revised POP; Arcadis 2025) and GE's *Construction Quality Assurance Plan* (CQAP), which is Attachment E to the Revised POP.
- Section 15 provides an update to the vulnerability assessment provided previously in the Conceptual RD/RA Work Plan based on final design.
- Section 16 summarizes identified water withdrawals and uses in Reach 5A and an evaluation of how impacts will be minimized/mitigated during implementation of the Remedial Action.
- Section 17 describes the steps GE will undertake to obtain access to properties along Reach 5A that will be required to facilitate site preparation, constructing temporary access roads, constructing staging and support areas, and remedial construction and restoration activities.
- Section 18 describes activities related to remedial construction coordination and reporting, including the anticipated implementation schedule, contractor selection and submittals, preparation of SIPs, execution of environmental deed restrictions and implementation of Conditional Solutions, construction reports, project closeout, and preparation of an Interim Remedial Action Completion Report for Reach 5A.
- Section 19 describes the process for incorporating adaptive management into the design and construction process.

- Section 20 provides a framework for a future Inspection, Monitoring, and Maintenance (IMM) Plan required by the Revised Final Permit.
- Section 21 lists the references cited in this Final RD/RA Work Plan.

The discussions in Sections 2 through 20 are supported by numerous tables, figures, and appendices included in this Final RD/RA Work Plan. The appendices are listed in the Table of Contents.

2 Description of Reach 5A

2.1 Overview

As noted in Section 1.1, the ROR consists of that portion of the Housatonic River and its backwaters and floodplain (excluding A/P Lawn Properties) located downstream of the Confluence. Within Reaches 5 and 6, which constitute the portion of the ROR between the Confluence and Woods Pond Dam, the CD defines the ROR site boundary as the floodplain area extending laterally to the 1 milligram per kilogram (mg/kg) PCB isopleth, which corresponds approximately to the 10-year floodplain.

Reach 5A (shown on Figure 2-1) encompasses approximately the first five miles of the ROR, beginning at the Confluence and extending downstream to the Pittsfield Wastewater Treatment Plant (WWTP) discharge location for the river and to the Pittsfield-Lenox municipal boundary just south of the Pittsfield WWTP for the floodplain. The river channel in this reach is free flowing, contains numerous meanders, and has riverbanks that are subject to erosion in places. The river channel in Reach 5A is approximately 4.6 miles in length and covers approximately 39 acres, the width of the river ranges from approximately 40 to 120 feet, and riverbank heights generally range from three to seven feet, with higher banks of 10 feet or more in several areas. As described in GE's *Final Morphology and Accessibility Survey Report* (AECOM and Anchor QEA 2020), Reach 5A also contains six backwater areas (shown on Figure 2-2), defined generally as quiescent areas adjacent and hydraulically connected to the main channel of the river. River stations were established for Reach 5A during the PDI for sediments and riverbanks to provide a locational reference to support the PDI, remedial design, and construction.[4] The stationing begins with Station 0+00 at the Confluence and extends to the downstream end of Reach 5A at Station 245+00 (located 24,500 feet from Station 0+00 or approximately 4.6 miles). River stations were established every approximately 100 feet along the approximate centerline of the river (as also shown on Figure 2-2).

The floodplain in Reach 5A covers approximately 367 acres and ranges in width from 100 feet at its narrowest point to approximately 2,500 feet at its widest point (BBL and QEA 2003). EPA's *Human Health Risk Assessment* (HHRA; EPA 2005a) divided the ROR floodplain into 90 EAs for the assessment of direct human contact with floodplain soils. Of those 90 EAs, 38 are located within Reach 5A, as shown on Figure 2-3. Several properties that comprise seven of those EAs (EAs 3, 8, 9, 23, 25, 28, and 30) within the Reach 5A floodplain are subject to the Residential Performance

[4] Each river station is approximately 100 feet apart along the centerline of the main river channel and has been assigned a number (e.g., Station 49+50). For each river station, the value to the left of the plus symbol in the number is in hundreds of feet from the first station, and the value to the right of the plus symbol is in feet. In Reach 5A, the first (i.e., farthest upstream) station is identified as 0+00, and the next station is identified as 1+00, which is 100 feet downstream along the channel centerline. As a further example, Station 49+50 is located approximately 4,950 feet downstream of Station 0+00 along the river centerline.

Standards in the Revised Final Permit.[5] The remaining 31 EAs within the Reach 5A floodplain are subject to the non-residential Performance Standards and are referred to herein as "non-residential EAs." In addition, in the *Housatonic River – Rest of River, Revised Corrective Measures Study Report* (RCMS; Arcadis et al. 2010), GE identified "heavily used subareas" within EAs that were identified as "frequently used" in the *Housatonic River – Rest of River, Corrective Measures Study Proposal* (Arcadis BBL and QEA 2007). These heavily used subareas are referred to as "Frequently Used Subareas" in the Revised Final Permit and in this Final RD/RA Work Plan. The Frequently Used Subareas in Reach 5A include portions of EAs 4, 12, 26, and 61.

Reach 5A also contains numerous vernal pools. GE completed an identification and evaluation of vernal pools in the Reach 5A floodplain in 2018 and 2019, with some follow-up surveys into 2020. Those investigations were conducted to identify pools that met both the biological and physical criteria for certification of vernal pools based on criteria established by the Massachusetts Natural Heritage and Endangered Species Program (MNHESP). Findings were presented in GE's *Summer/Fall 2019 and Final Report on Potential Vernal Pool Investigations* (AECOM 2020). After receiving comments from MNHESP, GE finalized its determination of areas meeting the applicable vernal pool criteria in a February 4, 2021, letter to EPA, resulting in 59 identified vernal pools in the Reach 5A floodplain (GE 2021). EPA approved that determination on March 9, 2021. The 59 confirmed vernal pools in Reach 5A are shown on Figure 2-4.[6]

2.2 River Hydraulic Characteristics

Hydrologic and hydraulic conditions in the Housatonic River in Reach 5A ultimately determine the physical and biological conditions within the river. The relationships among precipitation, runoff, infiltration, and groundwater flow determine the amount of water that the stream carries at any given time, the energy of the water to move sediment, the physicochemical processes that affect water quality, and the biological processes that the stream will support. In this respect, the watershed setting of Reach 5A is a critical factor determining its form and function.

A clear understanding of river hydraulic characteristics (i.e., flows, water surface elevations, and velocities) is essential for remedy design and implementation within Reach 5A. For example, a long-term historical record of flows measured in the Housatonic River allows for the calculation of robust flow statistics that are used (in part) as the basis of design for in-river sediments caps and riverbank grading and

[5] Those properties are Tax Parcels I6-1-42 (EA 3); J6-3-2 (EA 8); J6-2-3 (EA 9); J3-1-11, -12, -13, and -14 (EA 23); J3-2-2, -3, -4, -5, and -6 (EA 25); K3-1-2 (EA 28); and K2-1-10 (EA 30). The need for remediation at these properties is governed by the Residential Performance Standards in Table 3 of the Revised Final Permit rather than the non-residential Performance Standards in Tables 1 and 2.

[6] EPA subsequently directed GE to investigate one additional certified vernal pool located east of 5A-VP-24A and outside of but near the floodplain boundary (identified as 5A-VP-24B). That pool is also shown on Figure 2-4. As noted later in this work plan, sampling showed that the PCB concentration in that vernal pool is well below 1 mg/kg, and thus that vernal pool was not evaluated further.

stabilization treatments. During remedy implementation, hydraulic conditions in the river have the potential to cause complications. For example, during the typical summer construction season, water depths in much of Reach 5A are too shallow to support conventional barge-based operations, and in other areas water depths may be too great for standard land-based excavation equipment to operate effectively. In addition, river flows and stage heights can increase rapidly in response to precipitation events, requiring adaptive construction approaches that address equipment stability, sediment control, worker safety, and protection of partially completed remedial features. The remainder of this section provides a summary of the assessment of river hydraulic characteristics and includes a description of the various data sets that were used to develop that assessment.

The U.S. Geological Survey (USGS) maintains two flow-monitoring stations along the Housatonic River that are close to Reach 5A. One gage is located along the East Branch of the Housatonic River in Coltsville, Massachusetts (Station 01197000 – East Branch Housatonic River at Coltsville, Massachusetts); this gage is located approximately 5.5 miles upstream of the Confluence and has a long period of record from 1936 to present. A second gage was installed by USGS in September 2022 (in coordination with EPA and GE) along the Housatonic River in the vicinity of Woods Pond Dam (Station 01197145 – Housatonic River at Lenoxdale, Massachusetts); the relatively short period of record at this location precludes use for evaluation of long-term flow statistics. Table 2-1 summarizes monthly average flow rates at the Coltsville gage, and Figure 2-5 provides cumulative frequency distribution plots of the record of daily average flow rates for each month.

Table 2-1
Average Monthly Flow at USGS Coltsville Gage (1936 to 2025)

Month	Average Flow (cfs)
January	104
February	99
March	183
April	250
May	133
June	88
July	59
August	52
September	57
October	80
November	99
December	115
Annual Average	**110**

As described in Section 5.7, a hydrologic evaluation was used to calculate the recurrence intervals of various flow events. The goal of this analysis was to specify the 1% annual chance discharge, commonly referred to as the 100-year event, or base flood. This event has a 1% chance of occurring in any given year and is the standard regulatory event used by the Federal Emergency Management Agency (FEMA) for flood mapping. The hydrologic analysis also provides information on smaller and larger events that may be of interest to stream evaluations and remedial design. Table 2-2 summarizes the results of this hydrologic analysis; specifically, this table provides estimated peak flow rates within the Housatonic River at Coltsville (upstream of Reach 5A) and at the upstream end of Reach 5A (i.e., at the Confluence) for various recurrence intervals.

Table 2-2
Estimated Peak Flow Rates in the Housatonic River for Specified Recurrence Intervals

Annual % Chance	Return Period (Years)	Flow in Housatonic River (cfs)[1]	
		USGS Coltsville Gage	Confluence
0.20%	500	10,900	19,800
0.5%	200	8,700	15,800
1%	100	7,300	13,200
2%	50	6,000	10,900
5%	25	4,500	8,200
10%	10	3,600	6,500
20%	5	2,700	4,900
50%	2	1,700	3,100
99%	1	600	1,000

Note:
1. Flow values are rounded.

During the Reach 5A PDI, river-current velocities were measured at three cross-sectional sites within Reach 5A using an acoustic Doppler current profiler (ADCP), including a location at Holmes Road Bridge (Site 1), one adjacent to Joseph Drive (Site 2), and one near the Pittsfield WWTP (Site 3; see Section 5.1.2.3). Water surface elevation and current-velocity profile measurements were collected at each location under three different flow conditions—low, moderate, and high flow. For the purposes of this survey, low, moderate, and high flows were defined as, respectively, less than 100 cubic feet per second (cfs), between 100 and 300 cfs, and greater than 300 cfs, as measured at the USGS Coltsville gage. Table 2-3 summarizes the survey dates corresponding to each of the target flow ranges and the daily average flow rate observed during each event at Coltsville and at the USGS gage at Lenoxdale.

Table 2-3
Dates of ADCP Sampling Events and Corresponding Flows at Nearby USGS Gages

Event	Target Flow Range at Coltsville Gage (cfs)	Survey Start Date	Survey End Date	Observed Daily Average Flow (cfs)[1]	
				Coltsville Gage (01197000)	Lenoxdale Gage (01197145)
Low	<100	10/25/2022	10/27/2022	63	232
Moderate	100 to 300	4/11/2023	4/12/2023	169	504
High	>300	5/1/2023	5/2/2023	420	759

Note:

1. Values represent averages over survey dates.

Table 2-4 provides a summary of ADCP average and maximum current velocities and water surface elevations measured during each event at the three monitoring locations in Reach 5A (i.e., Holmes Road Bridge, adjacent to Joseph Drive, and near the Pittsfield WWTP). These measurements show a range of current velocities during these events. The upper portion of Reach 5A (Holmes Road Bridge location) tended to have the highest velocities of the three monitoring locations in Reach 5A.

Table 2-4
Mean Discharge, Water Surface Elevation, and Velocity Measurements

Location	Mean Discharge (cfs)	Water Surface Elevation (feet NAVD88)	Top Width (feet)	Wetted Area (square feet)	Mean Velocity (feet/second)	Max Velocity (feet/second)
Low Discharge—October 25 to 27, 2022						
Holmes Road Bridge	198	955.38	64	168	1.18	1.89
Adjacent to Joseph Drive	207	951.82	60	159	1.30	1.75
Near Pittsfield WWTP	194	949.80	68	304	0.64	1.30
Moderate Discharge—April 11 to 12, 2023						
Holmes Road Bridge	366	956.80	45	265	1.38	2.65
Adjacent to Joseph Drive	412	953.16	72	245	1.68	2.09
Near Pittsfield WWTP	424	950.99	79	392	1.08	1.66
High Discharge—May 1 to 2, 2023						
Holmes Road Bridge	670	958.41	63	321	2.09	3.14
Adjacent to Joseph Drive	689	954.54	85	384	1.79	2.46
Near Pittsfield WWTP	854	952.76	92	789	1.08	2.70

2.3 River Channel Geomorphology

The upper portion of the Reach 5A river channel is a slightly entrenched, meandering, gravel-dominated, riffle-pool alluvial channel, and the lower portion of the Reach 5A river channel tends to be a more sand-dominated (rather than gravel-dominated) section of the river. Specific

fluvial geomorphic characteristics are somewhat variable throughout this reach, but the reach generally has pool–run–riffle sequences, point bars, and some localized piles of large woody debris (LWD). Overall, conditions reflect a pool-influenced morphology with patchy higher-energy features (riffles/runs).

Sediment deposit reconnaissance and probing activities conducted historically identified the following three general types of sediment deposits in Reach 5A: (1) channel deposits (deposits that typically occur in parts of the riverbed that are permanently inundated during low- to moderate-flow conditions); (2) aggrading bars (small islands or mounds that are typically composed of coarse grained-material and usually occur along the convex sides of channel curves); and (3) terrace deposits (more commonly referred to as side bars, which are deposits that occur in parts of the riverbed that are usually inundated during high-flow conditions but are exposed during low to moderate flows). More than half (60%) of the sediment deposits identified historically in Reach 5A were characterized as terrace deposits, 30% were channel deposits, and 10% were aggrading bars. More contemporary surveys of channel features in Reach 5A conducted in 2022 documented the presence of 24 point bars, 17 side bars, and 11 mid-channel bars. While some of the mid-channel and side bars are indicators of an overwide channel, several of these features have been created by piles of LWD and may be transient as the debris is dispersed and moved downstream during periods of high flow. A more detailed discussion of the geomorphology of Reach 5A is provided in the Restoration Plan.

2.4 Sediment Characteristics

Geotechnical data collected historically indicate that the sediment bed in Reach 5A consists predominantly of coarse-to-fine sands with approximately 10% to 15% silt and clay (BBL and QEA 2003). This is generally consistent with sediment geotechnical data collected in 2022 and 2023 as part of the Reach 5A PDI (see Table 2-5). As presented in the *Revised Pre-Design Investigation Summary Report for Reach 5A Sediment and Riverbanks* (Revised PDI Summary Report for Sediment/Riverbanks; Anchor QEA and AECOM 2024), a total of 69 sediment samples were collected in 2022 and 2023 from the riverbed (50 samples) and backwater areas (19 samples) in and along Reach 5A for testing of grain size and moisture content, and subset of those samples was analyzed for dry bulk density and specific gravity. In addition to in situ sediment strength testing in backwater areas, laboratory testing was conducted on selected riverbed and backwater area samples for seepage-induced consolidation testing. A summary of index testing results is provided in Table 2-5. Main channel sediment samples in the Reach 5A PDI dataset consisted predominantly of sand (84% on average), with smaller fractions of gravel (9%) and fines (7%). In the backwaters, there is a higher proportion of fines (43% on average), but the majority is primarily sand (54%). This composition of sediments observed during the PDI is consistent with average grain size distribution observed historically in Reach 5A; Table 4-6 of GE's 2003 *RCRA Facility Investigation Report* (BBL and QEA 2003)

showed historically that the sediment bed in the main channel consisted of predominantly sand (79%) with smaller fractions of fines (17%) and gravel (4%). Also, riverine habitat investigations conducted in 2022 documented that nearly 10% of river substrate in Reach 5A is composed of cobble and boulders, as discussed in GE's *Revised Housatonic River Reach 5A Baseline Restoration Assessment Report* (Revised BRA Report; AECOM 2024).

The geotechnical moisture content (i.e., ratio of water contained in the pore spaces of the sample to the solid mass of particles) was measured for both main channel and backwater sediments. The average moisture content for main channel sediment samples was 26%. Moisture content is higher in backwater sediments (87% on average) with a much wider range than main channel sediments.

Table 2-5
Summary of Geotechnical Index Parameter Testing Results (Sediment)

Geotechnical Analyses		Dry Bulk Density (lb/ft^3)	Moisture Content (%)	Grain Size (% by weight)		
				Gravel	Sand	Total Fines
Main Channel Sediment	**Number of Samples**	**7**	**45**	**50**		
	Minimum	57	13	0.0	2	1
	Average	87	26	9	84	7
	Maximum	110	49	49	99	98
Backwater Sediment	**Number of Samples**	**1**	**14**	**19**		
	Minimum	35	28	0.0	22	3
	Average	35	87	3	54	43
	Maximum	35	237	23	96	78

Atterberg limit testing was also conducted to evaluate the relationship between moisture content and behavior type (state) for a given fine-grained soil. Testing was completed on all 69 PDI sediment samples (50 main channel samples and 19 backwater samples), all of which were found to be non-plastic.

3 Reach 5A Performance Standards and Corrective Measures

This section summarizes the Performance Standards and Corrective Measures in the Revised Final Permit that are applicable to the design and construction of remedial activities in Reach 5A. It is essentially the same as the description in the Conceptual RD/RA Work Plan with a couple of updates to reflect subsequent developments.

3.1 General Performance Standards

Section II.B.1 of the Revised Final Permit established general Performance Standards that are applicable to the entire ROR remedy (including Reach 5A). The Downstream Transport Performance Standard (Section 3.1.1) and the Biota Performance Standard (Section 3.1.2) include standards that will not be evaluated until several years after the Reach 5A remedial construction (and remediation in other RUs) is complete.

3.1.1 Downstream Transport Performance Standard

Section II.B.1.a of the Revised Final Permit lists the first of three general Performance Standards—Downstream Transport of PCBs. That standard specifies the future allowable PCB load passing Woods Pond Dam and Rising Pond Dam, as summarized in Table 3-1.

Table 3-1
Downstream Transport Performance Standard

Woods Pond		Rising Pond	
Average Daily Flow at Woods Pond Dam Gage (cfs)[1]	**Average Annual PCB Load (kg/year)**	**Average Daily Flow at Great Barrington USGS Gage (cfs)[1]**	**Average Annual PCB Load (kg/year)**
≤325	2.2	≤485	1.9
>325 ≤395	2.8	>485 ≤600	2.4
>395 ≤1,450	3.3	>600 ≤2,670	4.0
>1,450	NA	>2,670	NA

Note:

1. The calculated arithmetic average of the average daily flows on days when samples are collected will determine the flow bin for a given year.

An exceedance of this standard would occur if the annual average PCB load exceeds the standard for the corresponding river flow bin at either location in three or more years within any five-year period following completion of the ROR remediation activities. Details regarding measurement of compliance with the Downstream Transport Performance Standards are provided in Sections II.B.1.a.(2)(a) through (g) of the Revised Final Permit.

3.1.2 Biota Performance Standards

Section II.B.1.b of the Revised Final Permit specifies both short-term and long-term biota standards as follows:

- The Short-Term Biota Performance Standard is an average total PCB concentration of 1.5 mg/kg wet weight, skin off, in fish fillets in each reach of the river and backwaters.[7] This standard is to be achieved within 15 years of completion of construction-related activities for that reach (or if the reach is subject to monitored natural recovery upon completion of the closest upstream reach subject to active remediation). An exceedance of this standard would occur if the standard is exceeded in any two consecutive monitoring periods after the 15-year period.
- The Long-Term Biota Monitoring Performance Standard is to continue to monitor (even after the Short-Term Biota Performance Standard has been attained) the expected reduction in biota PCB concentrations and the progress toward achieving average total PCB concentrations of 0.064 mg/kg wet weight, skin off, in fish fillets in each reach of the river and associated backwaters in Massachusetts;[8] 0.00018 mg/kg wet weight, skin off, in fish fillets in each reach of the river in Connecticut;[9] and 0.075 mg/kg in duck breast tissue in all areas along the river.[10]

3.1.3 Restoration of Areas Disturbed by Remediation Activities

As provided in Section II.B.1.c.(1) of the Revised Final Permit, the Performance Standards for restoration of disturbed areas require GE to do the following: (1) implement a comprehensive program of restoration measures to address the impacts of the remediation on affected ecological resources, species, and habitats, including, but not limited to, riverbanks, riverbed, floodplain, wetland habitat, and the occurrence of threatened, endangered, or other state-listed species and their habitats; and (2) return areas disturbed by remediation activities to pre-remediation conditions (e.g., the functions, values, characteristics, vegetation, habitat, species use, and other attributes) to the extent feasible and consistent with the remediation requirements.

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[7] This standard was based on the estimate, in EPA's probabilistic risk assessment of fish consumption by humans, of the PCB concentration corresponding to a non-cancer hazard index of 1 for the Central Tendency Exposure of adults to PCBs in fish fillets.

[8] This criterion was based on the estimate, in EPA's probabilistic risk assessment of fish consumption by humans, of the PCB concentration associated with an excess cancer risk of 1×10^{-5} for the Reasonable Maximum Exposure (RME) of both young children and adults to PCBs in fish fillets.

[9] This criterion was developed by the State of Connecticut.

[10] This criterion was based on the estimate, in EPA's probabilistic risk assessment of waterfowl consumption by humans, of the PCB concentration associated with an excess cancer risk of 1×10^{-5} for the RME exposure of both young children and adults to PCBs in duck breast consumed.

3.2 Sediment

3.2.1 River Sediment

Section II.B.2.a of the Revised Final Permit provides that riverbed sediment throughout Reach 5A will be removed and that an engineered cap (Section 3.2.4) will be placed over the entire riverbed such that the final grade is generally consistent with the original grade or with modifications, as approved by EPA, considering the principles of Natural Channel Design. Removal and capping activities must generally use engineering methods employed from within the river channel or other methods approved by EPA.

3.2.2 Backwaters

The Performance Standards for backwaters are specified in Section II.B.2.d of the Revised Final Permit. These Performance Standards have separate requirements for portions of backwaters located within and outside of Core Area 1 Priority Habitat[11] and for surface (top one foot) and subsurface sediments, as follows:

- **Portions of Backwaters Located Outside Core Area 1 Habitat:** For surface sediments in areas located outside Core Area 1 habitat, sufficient sediment will be removed, including any sediment in areas with total PCB concentrations greater than or equal to 50 mg/kg, and replaced with a contiguous engineered cap to achieve a spatially weighted average concentration (SWAC) of 1 mg/kg total PCBs in each averaging area. When calculating post-remediation SWACs, a PCB concentration equal to 1% of the existing average surficial PCB concentration within a given backwater area will be used as the PCB concentration in capped areas.

  For subsurface sediments, additional sediment will be removed as needed to achieve a SWAC of 1 mg/kg total PCBs in each averaging area and depth interval in areas outside the footprint of the engineered cap necessary to meet the requirements for surface sediments described previously. As with surface sediments, when calculating post-remediation SWACs, a PCB concentration equal to 1% of the existing average surficial PCB concentration within a given backwater area will be used as the PCB concentration in capped areas.

  In lieu of engineered capping for the surface and subsurface sediment remediation described previously, the Revised Final Permit allows for the placement of backfill in areas where sediment was removed; however, the backfill cannot be factored into the spatial weighting calculations.

[11] As defined in the Revised Final Permit, Core Area 1 habitat consists of areas identified by the Massachusetts Division of Fisheries and Wildlife as areas with "the highest quality habitat for species that are most likely to be adversely impacted by PCB remediation activities," most of which species are plants because they are not mobile (Attachment B to Revised Final Permit).

- **Portions of Backwaters Located Within Core Area 1 Habitat:** For areas within Core Area 1 habitat where discrete total PCB concentrations in surface sediment are greater than or equal to 50 mg/kg, GE will remove those sediments and then place an engineered cap to original grade. In areas where surface sediment total PCB concentrations are between 1 and 50 mg/kg, an amendment (e.g., activated carbon [AC] or other comparable amendments) will be placed to reduce bioavailability.

Delineation of remediation areas needed to achieve the concentration criteria for backwaters is to be determined based on Thiessen polygons developed using data collected during pre-design sampling.

3.2.3 Other Waterbodies

In addition to the sediment-containing areas discussed above, there are certain other hydrographic features within Reach 5A that do not constitute backwaters and are not addressed in the Revised Final Permit and that EPA has directed GE to evaluate. There are five such areas in Reach 5A, including the outlet from Morewood Lake (known as Wampenum Brook), two streams flowing from east to west into the Housatonic River on and just south of the Massachusetts Audubon Society (Mass Audubon) parcel (i.e., portions of Sackett Brook and Sykes Brook), West Pond, and the intermittently flowing side channel located east of the Confluence (referred to herein as the Intermittent Side Channel). These areas are shown on Figure 2-2 and were designated as "Other Waterbodies in Reach 5A Containing Sediment" in GE's *Revised Pre-Design Investigation Work Plan for Reach 5A Sediment and Riverbanks* (Revised Sediment/Bank PDI Work Plan; Anchor QEA and AECOM 2022) and are hereafter referred to as "Other Waterbodies." Given that the Revised Final Permit did not establish specific Performance Standards or other requirements for these areas, GE has elected to evaluate most of them against the Performance Standards for backwaters described in Section 3.2.2 because they are separate from, but hydraulically connected to, the main river channel. One exception is the Intermittent Side Channel; as described in Sections 8.1.2.2.4 and 8.3.2, this channel is being eliminated by removing its hydraulic connection to the main river channel, filling it in, and restoring that area with appropriate floodplain vegetation.

3.2.4 Engineered Caps

The Performance Standards for engineered caps are described in Section II.B.2.i of the Revised Final Permit, which states that all engineered caps constructed for the ROR will include the following layers or functions:

- Mixing Layer to prevent contamination of the overlying chemical isolation layer due to mixing with underlying contaminated sediment during cap placement, taking into account geotechnical considerations, placement techniques, and other factors as appropriate;

- Chemical Isolation Layer sufficient to minimize (reduce by 99%) the flux of PCB concentrations through the isolation layer;
- Erosion Protection Layer to prevent erosion in accordance with federal and state requirements and consistent with pertinent EPA or U.S. Army Corps of Engineers (USACE) guidance;
- Geotechnical Filter Layer, as needed based on the design evaluation, to prevent mixing between the chemical isolation and erosion protection layers;
- Bioturbation Layer to prevent bioturbation from impacting underlying layers; and
- Habitat Layer to provide functions and values equivalent to the pre-existing surficial sediment substrate.

Section II.B.2.i.(2) of the Revised Final Permit provides details related to design and construction requirements for each of the cap layers described previously. These requirements are summarized as follows:

- **Mixing Layer:** The composition and thickness of the Mixing Layer will be evaluated and designed to prevent contamination of the overlying chemical isolation layer due to mixing with underlying contaminated sediment during cap placement.
- **Chemical Isolation Layer:** Modeling of the Chemical Isolation Layer will be performed using site-specific data collected during the design process, as appropriate, and in general accordance with the EPA's *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* (EPA 2005b) and *Guidance for In-Situ Subaqueous Capping of Contaminated Sediments* (Subaqueous Capping Guidance; Palermo et al. 1998). The model will consider the processes of advection, diffusion, sorption, bioturbation, surface water exchange, and sediment deposition and will be used to determine the thickness and composition (i.e., the amount of AC/total organic carbon [TOC] or equivalent sorptive amendment) required to reduce the flux of PCB concentrations through the Chemical Isolation Layer by 99%.
- **Erosion Protection Layer:** The design flow event for the Erosion Protection Layer, which is a flow event up to and including the applicable return interval event (e.g., 100-year or 500-year flow event),[12] will be calculated using up-to-date flow data, with additional considerations for the potential impacts of climate change on cap performance and appropriate measures to mitigate them. Site-specific data and modeling will be used to determine design velocities and associated bed shear stresses associated with various flow events. Other potential

[12] EPA's conditional approval of the Conceptual RD/RA Work Plan (Condition 2) required that the Final RD/RA Work Plan state the design flow event used for final design of the erosion protection layer. As described in Section 8.2, a wide range of flow conditions (not a single design flow event) were evaluated to determine critical velocities for the erosion protection layer design, up to and including a "trend-adjusted" 100-year event that was determined by analyzing flow data on 20-year rolling intervals.

erosional forces (e.g., bioturbation, wind-generated waves, debris, motorboat wakes, and ice) will also be considered, as appropriate. The stable particle sizes necessary to resist the erosive forces in Reach 5A will be computed in accordance with federal and state requirements and consistent with pertinent EPA and USACE guidance such as EPA's *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* and Subaqueous Capping Guidance (referenced above).

- **Geotechnical Filter Layer:** The use of a Geotechnical Filter Layer between the Chemical Isolation Layer material and Erosion Protection Layer material will be evaluated and may be necessary for those areas requiring cobble or larger-sized material in the Erosion Protection Layer.
- **Bioturbation Layer:** The assemblage of species, bioturbation depth profile, and abundances of dominant organisms will be evaluated to determine the need for and thickness of a bioturbation layer.
- **Habitat Layer:** The Habitat Layer will be designed such that it provides functions and values equivalent to the pre-existing surficial sediment substrate.

The Revised Final Permit also provides that under some circumstances, a single layer of material may serve more than one of the functions listed previously. The design of the engineered cap is also required to consider other factors, such as geotechnical stability and the need for overplacement allowances with additional excavation for each layer. Further, installation of the cap cannot result in a loss of flood storage capacity or an increase in water surface elevations.

The constructed engineered cap is required to be inspected, monitored, and maintained to ensure long-term protectiveness and to ensure that it continues to function as designed.

3.3 Riverbanks

Section II.B.2.a requires the removal of contaminated soil from erodible riverbanks in Reach 5A based on the following definitions:

- A bank is considered contaminated if it contains discrete total PCB concentrations greater than or equal to 5 mg/kg in the surficial one foot of soil. Delineation of bank areas exceeding this criterion is to be determined based on data to be collected during pre-design activities pursuant to the sampling requirements in Section II.B.2.a.(2) of the Revised Final Permit.
- A bank is considered erodible if the Bank Erosion Hazard Index (BEHI) and Near Bank Stress (NBS) rating is classified as "Moderate-High" or greater using the Bank Assessment for Non-point Source Consequences of Sediment (BANCS) model.

Under the Revised Final Permit, riverbank areas in Reach 5A meeting both previously described conditions are subject to removal and restoration. Specifically, excavated riverbanks will be reconstructed to minimize erosion, considering the principles of Natural Channel Design, and to result in a channel that is in dynamic equilibrium, balances flow and sediment loads, and reduces erosive forces.

In addition, Revised Final Permit Section II.B.2.a.(2)(c) provides that, for Reach 5A banks that do not require remediation based on the criteria described above, GE will evaluate the PCB data, erosion potential, adjacent floodplain removal (if any), constructability issues, and likelihood of future downstream transport at such concentrations should such banks erode and, based on these factors, will consider supplemental riverbank removal and propose any further action consistent with its evaluation.

3.4 Floodplains

3.4.1 Non-Residential Floodplain Exposure Areas

Section II.B.3.a of the Revised Final Permit describes the Performance Standards associated with floodplain soils. For each of the floodplain EAs shown on Figures 3, 3A, and 4 in the Revised Final Permit,[13] the top one foot of soil will be excavated (and backfilled to grade) to achieve either the Primary or Secondary Floodplain Performance Standards applicable to each EA, as listed in Table 1 of the Revised Final Permit.[14] In general, this remediation will be designed to meet the Primary Floodplain Performance Standards, except that in certain Core Area habitats, the remediation will achieve, at a minimum, the Secondary Floodplain Performance Standards, as discussed further below.

In addition, for each of the Frequently Used Subareas within the EAs, as shown on Figure 5 of the Revised Final Permit,[15] the top three feet of soil will be excavated (and backfilled to grade) to achieve the relevant Performance Standards for those areas, as listed in Table 2 of the Revised Final Permit.

[13] These EAs consist of the 90 direct-contact EAs that EPA identified in its HHRA, with the modification that, as provided in Section II.O of the Settlement Agreement, EA 10 has been expanded as shown in Figure 3A of the Revised Final Permit.

[14] Table 1 lists the Primary and Secondary Performance Standards for each EA based on exposure scenarios determined by EPA. The Primary Performance Standards are floodplain soil PCB concentrations associated with a residual 1×10^{-5} cancer risk or a non-cancer hazard index of 1 (as calculated by EPA based on assumed direct contact with soil), whichever is lower. The Secondary Performance Standards are floodplain soil PCB concentrations associated with a residual 1×10^{-4} cancer risk or a non-cancer hazard index of 1 (as calculated by EPA based on assumed direct contact), whichever is lower.

[15] Frequently Used Subareas are portions of the EAs that are more heavily used than other areas. Those subareas were originally defined in GE's RCMS and are generally shown in Figure 5 of the Revised Final Permit but are subject to modification, with EPA approval, based on current conditions pertaining to potential use.

Excavation in Core Area 1 habitat (other than in Frequently Used Subareas) will be avoided, except in limited areas where necessary to meet the Secondary Floodplain Performance Standards. Further, GE is to minimize impacts from remediation to the extent practicable in Core Areas 2 and 3 habitat shown in Attachment B to the Revised Final Permit); however, at a minimum, Secondary Floodplain Performance Standards will be attained in those areas.

3.4.2 Residential Properties

Section II.B.3.a.(1)(d) of the Revised Final Permit requires that soil from 22 floodplain residential properties in Reach 5A (identified in Table 5 of the Revised Final Permit) be removed and replaced as necessary to meet the Residential Performance Standards set forth in Table 3 of the Revised Final Permit.[16]

For floodplain soils within residential properties adjacent to Reaches 5 through 8, the Performance Standards applicable to the PCBs in soil are set forth in Table 3 of the Revised Final Permit. As provided in Table 3 of the Revised Final Permit, the applicable Residential Performance Standards are an average PCB concentration of 2 mg/kg in the top foot of soil and in the 1- to X-foot depth increment (where X equals the depth at which PCBs are detected at 2 mg/kg or greater, up to a maximum depth of 15 feet), with no discrete PCB concentration in the top foot of soil exceeding 10 mg/kg (the not-to-exceed [NTE] level) for parcels exceeding 0.25 acre in size.

3.4.3 Vernal Pools

Section II.B.3.b of the Revised Final Permit requires that, in addition to any remediation of vernal pools necessary to meet the Floodplain Performance Standards discussed in the previous two subsections, any such pool that contains sediment/soil exceeding a PCB SWAC of 3.3 mg/kg must be remediated. To implement this requirement, GE is to submit a plan for, and upon EPA approval conduct, a pilot study on no more than 10 vernal pools (none in Core Area 1 habitat) using either traditional excavation and restoration techniques or amendments such as AC. GE has submitted a number of work plans for this vernal pool pilot study, including an initial plan on June 8, 2023 (Anchor QEA and AECOM 2023b), conditionally approved by EPA on September 12, 2023, and a *Final Revised Vernal Pool Pilot Study Work Plan* (Final Vernal Pool Work Plan; Anchor QEA and AECOM 2025) on June 30, 2025, conditionally approved by EPA on December 22, 2025. Based on the results of the pilot study, after an appropriate monitoring period determined by EPA, EPA will determine, and GE will implement, the appropriate remediation of the vernal pools as necessary to meet the

[16] There are five additional residential parcels that were not included in the Revised Final Permit (and were not addressed previously as part of the Floodplain Current Residential Properties Downstream of the Confluence – A/P Lawn Properties) and where EPA directed GE (or GE agreed) to conduct additional sampling to confirm that PCB concentrations in soil were below the Residential Performance Standards. Therefore, there were a total of 27 residential properties required to be evaluated in Reach 5A.

Performance Standards specified in Section II.B.3.b.(1) of the Revised Final Permit, which require either achievement of a total PCB SWAC in soil of 3.3 mg/kg in the pool or an equivalent reduction in PCB bioavailability. This can be achieved through removal and replacement of soil or reduction in the bioavailability of PCBs in the pool through placement of amendments.

3.5 Inspection Monitoring and Maintenance Before and During Construction

In accordance with Section II.B.4 of the Revised Final Permit, GE will implement both a baseline and a construction monitoring program. The baseline monitoring program will include collection of PCB data in surface water, sediment, and biota (and other data) prior to the commencement of construction activities to serve as a baseline for the evaluation of the potential impacts of the remediation.[17]

The construction monitoring program will include similar types of data collection and will focus on monitoring for potential adverse impacts due to construction activities (e.g., resuspension). It will include the following: (1) measures to assess these impacts (e.g., establishing notification and action levels for PCBs measured in surface water); (2) a monitoring plan to collect these data; and (3) establishment of response actions (e.g., slowdown and evaluation of operations, stop work, and modification of operations).

3.6 Disposal of Contaminated Sediment and Soil (Including Upland Disposal Facility and Off-Site Disposal)

As described in Sections II.B.5 and II.B.6 of the Revised Final Permit, the ROR Remedial Action will use a hybrid disposal approach that includes a combination of disposal at a UDF and off-site disposal. This section summarizes the criteria and methods for determining whether material excavated during the ROR Remedial Action may be disposed of in the UDF, as provided in Attachment E to the Revised Final Permit.[18] Those requirements are as follows:

- **Sediments:** Sediments to be disposed of in the UDF must have a volume-weighted average PCB concentration of less than or equal to 25 mg/kg within a reach or subreach (in this case, Reach 5A). If the volume-weighted average PCB concentration of sediments to be removed from Reach 5A exceeds 25 mg/kg, sediments with the highest PCB concentrations will be segregated for off-site disposal until the average concentration of the remaining sediments to be removed decreases to less than 25 mg/kg for subsequent disposal at the UDF. In addition,

[17] GE submitted a *Second Revised Baseline Monitoring Plan* on January 30, 2023, which was subsequently approved by EPA on February 16, 2023. The baseline monitoring program is largely completed.

[18] The specific design Performance Standards for the UDF are provided in Section II.B.5.a.(2) of the Revised Final Permit and summarized in Section 2.1 of GE's December 2024 *UDF Revised Final Design Plan* (Arcadis 2022); those requirements are not presented herein.

any sediment represented by a three-dimensional polygon associated with a single vertical core that has an average PCB concentration greater than or equal to 100 mg/kg will be segregated for off-site disposal.

- **Floodplain Soils:** Floodplain soil to be disposed of in the UDF must have a volume-weighted average PCB concentration of less than 50 mg/kg for each EA. If the volume-weighted average PCB concentration in the soil to be removed from a given EA equals or exceeds 50 mg/kg, the soils with the highest PCB concentrations in the EA will be segregated for off-site disposal until the average concentration of the remainder of the soil to be removed in the EA decreases to less than 50 mg/kg for subsequent disposal at the UDF.
- **Riverbanks Soils:** For Reach 5A riverbanks, soil to be disposed of in the UDF must have a volume-weighted average PCB concentration of less than 50 mg/kg. If the volume-weighted average PCB concentration of riverbank soils to be removed from Reach 5A equals or exceeds 50 mg/kg, soil with the highest PCB concentrations will be segregated for off-site disposal until the average concentration of the remaining soil to be removed decreases to less than 50 mg/kg for subsequent disposal at the UDF.

The UDF will be used only for disposal of sediments and soils that were generated as part of the ROR Remedial Action and only of those sediments and soils that meet the acceptance criteria summarized above. The Revised Final Permit also prohibits the disposal of certain types of waste in the UDF—e.g., free liquids, free product, or wastes that meet the federal criteria for RCRA hazardous waste.

In addition, no material from the ROR Remedial Action may be disposed of at any other location in Berkshire County (apart from the UDF), and no material from any portion of the GE Pittsfield/Housatonic River Site other than the ROR or from other response actions under the CD may be disposed of at the UDF.

3.7 Water Withdrawals and Uses

In accordance with Section II.B.8 of the Revised Final Permit, GE will minimize and/or mitigate impacts during implementation of the Remedial Action to withdrawals and/or uses of water from the ROR by any entity. GE will achieve this Performance Standard by doing the following: (1) identifying all industrial, commercial, private, or other withdrawals and/or uses of water from the ROR; (2) identifying requirements associated with these uses (including water quality and quantity) that may be affected by implementation of the Remedial Action; and (3) proposing methods to minimize/mitigate impacts during implementation of the Remedial Action.[19]

[19] GE submitted a *Revised Water Withdrawal and Uses Plan* (WWUP; Anchor QEA 2023) on April 3, 2023, and it was approved by EPA on May 10, 2023.

4 Applicable or Relevant and Appropriate Requirements

In addition to establishing Performance Standards for the remediation to be conducted in Reach 5A (summarized in Section 3), the Revised Final Permit, in Attachment C, identifies the ARARs for the ROR Remedial Action. The ARARs that are pertinent to and were considered for the remedial design in Reach 5A are presented in Table 4-1 (in the same format as Attachment C to the Revised Final Permit), which has been modified to include the revisions required by EPA in its conditional approval of the Conceptual RD/RA Work Plan (Condition 88). That table also specifies the actions to be taken in the Reach 5A remediation to comply with these ARARs (where not waived by EPA).

Section II.E of the Revised Final Permit requires that the technical RD/RA submittals for response actions for the ROR specify additional ARARs not listed in Attachment C, if any, for such response actions. As shown in Table 4-1, one additional guidance document that was not listed in Attachment C (EPA's Subaqueous Capping Guidance) has been identified as a document "to be considered" in the Reach 5A remediation. Pursuant to Section II.B.2.i of the Revised Final Permit and as described in Section 8.2, this guidance was considered during final design of the engineered cap.

5 Design Support Activities

This section summarizes the supporting activities conducted in support of the final design for Reach 5A. This includes PDIs, SDC activities, treatability studies, supplemental BRA assessments, rare species surveys, cultural resources surveys, and development of a hydraulic model. The following sections provide a high-level summary of these various activities and data and also references to the relevant summary reports containing more detailed information.

5.1 Pre-Design Investigations

PDI activities were conducted by GE in Reach 5A from approximately 2020 through 2023 and were conducted separately to address three components of this RU—floodplain residential properties, floodplain non-residential EAs (including vernal pools), and sediments and riverbanks. First, GE conducted soil sampling at floodplain residential properties during 2020 and 2021; that sampling is documented in a *Pre-Design Investigation Summary Report for Reach 5A Floodplain Residential Properties* (PDI Summary Report for Floodplain Residential Properties; Anchor QEA 2021a) that was submitted on December 22, 2021. Next, GE conducted floodplain soil sampling at non-residential EAs during 2022 and 2023; a summary of that sampling is provided in a *Pre-Design Investigation Summary Report for Reach 5A Non-Residential Floodplain Exposure Areas* (PDI Summary Report for Non-Residential Floodplain EAs; Anchor QEA and Arcadis 2023) that was submitted on September 28, 2023 (concurrently with the Conceptual RD/RA Work Plan). GE also conducted PDI activities associated with Reach 5A sediments and riverbanks during 2022 and 2023, and those results are summarized in the Revised PDI Summary Report for Sediment/Riverbanks. These various PDI efforts included extensive PCB characterization sampling, topographic and bathymetric field surveys, riverbank erodibility surveys, surveys of river hydraulic characteristics, porewater characterization, initial geotechnical characterization sampling, groundwater seepage investigations, and surveys of shoreline structures and utilities. The remainder of this section provides a summary of those various PDI activities.

5.1.1 PCB Characterization

5.1.1.1 Sediment

PDI sediment sampling in Reach 5A was designed to support several objectives, including assessment of the extent of removal and capping or backfill required to achieve the Performance Standards for the main river channel, backwaters, and Other Waterbodies described in Section 3, and to support an assessment of disposal requirements for sediments that will be removed from these areas.

5.1.1.1.1 Main Channel Sediment

PDI sediment sampling in the main channel of Reach 5A included collection of sediment core samples along transects spaced approximately 250 linear feet apart, with three sediment cores per transect (i.e., cores located on the east side, center, and west side of the channel). Sediment samples were collected at a total of 284 locations. The targeted depth of sampling was three feet (or to the depth of actual sediment thickness based on probing if less than three feet). Sediment core recovery was generally in the range of 1.5 to 2.0 feet due to the coarse nature of the sediments in this reach. Because of this shorter recovery, GE modified the sampling approach/methodology to obtain cores with a recovery of at least three feet to better characterize PCB concentrations in the 2.0- to 3.0-foot depth interval and conducted a second round of sampling. This resampling was conducted at a subset of the original sediment core locations: 30 cores (i.e., 10 transects, with three locations per transect) distributed throughout Reach 5A using the modified sampling approach. All cores were processed in six-inch intervals, resulting in a total of 1,191 samples for PCB characterization (including the resampled sediments). In addition to this PDI sediment sampling, additional sediment samples were collected in the main river channel as part of the SDC program described in Section 5.3.1.1.

5.1.1.1.2 Backwaters

Sampling of the six backwaters in Reach 5A (BW5A-1 through BW5A-6, as shown on Figure 2-2) included collection of sediments on approximate 50-foot grids. In BW5A-1 (the only Reach 5A backwater located within Core Area 1 habitat), sediment sampling was limited to a depth of one foot based on the specific requirements for backwaters located within Core Area 1 habitat under the Revised Final Permit. In the other five backwater areas (all located outside Core Area 1 habitat), sediment sampling was performed to a depth of five feet. Each sediment core was segmented into a 0- to 1-foot interval and six-inch intervals between one and five feet (or to the bottom of the core if recovery depth was less than five feet). A total of 461 sediment samples were collected for PCB characterization from 127 locations in these six backwaters located within Reach 5A.

5.1.1.1.3 Other Waterbodies

Sediment sampling was performed in the five Other Waterbodies described in Section 3.2.3—i.e., the outlet from Morewood Lake, the Intermittent Side Channel, portions of Sackett Brook and Sykes Brook, and West Pond (Figure 2-2). West Pond was sampled on an approximate 50-foot grid to a depth of three feet. The other four areas were sampled to a depth of two feet at locations spaced approximately 100 feet apart. All cores were processed in six-inch intervals resulting in a total of 268 samples collected for PCB characterization from 75 locations.

5.1.1.2 Riverbank Soil

Riverbank soil PCB sampling was conducted to characterize the extent of riverbank soils having PCB concentrations greater than or equal to 5 mg/kg in the top one foot of soil and to support assessment of disposal requirements for riverbank soils to be removed. Surficial (0- to 12-inch) riverbank soil samples were collected at the toe, midpoint, and top of bank along transects spaced approximately 25 feet apart. The three samples collected at the toe, midpoint, and top-of-bank locations at each transect were composited into a single sample for PCB analysis. A total of 1,992 composite samples were collected for PCB characterization.

5.1.1.3 Floodplain Soil

5.1.1.3.1 Residential Properties

Floodplain soil PCB sampling was performed during the Reach 5A PDI at (or near) each of the 27 residential properties located within Reach 5A (described in Section 3.4.2; Figure 2-3). A total of 351 samples were analyzed for PCBs from cores collected within these residential properties in 2020 and 2021. Samples at all locations were collected in one-foot intervals to a total depth that varied by location, but most locations were generally sampled to a total depth of three feet; however, some locations were sampled considerably deeper than three feet.

In addition to the PDI data, sampling has been performed historically on these properties. This sampling included: (1) historical floodplain soil investigations performed by GE between 1992 and 1998; (2) floodplain soil sampling performed by EPA as part of its Supplemental Investigation (SI) between 1998 and 2002; and (3) floodplain soil PCB sampling conducted by GE during PDIs of residential properties included in the separate Removal Action Area for Floodplain Current Residential Properties Downstream of the Confluence – A/P Lawn Properties. A summary of historical sampling has been included here because the Revised Final Permit requires that, in addition to the PDI data, data collected historically (prior to 2020) by GE and EPA be included in the evaluation of current conditions on these properties. Sample counts for the various historical sampling programs and the PDI are summarized in Table 5-1.

Table 5-1
Residential Sample Program Summary

Sampling Program	Number of Samples in Reach 5A[1]
Historical GE/EPA	332
A/P Lawn Properties	230
2020/2021 PDI	351

Note:
1. Counts do not include EPA split samples.

5.1.1.3.2 Non-Residential Floodplain Exposure Areas

GE performed two rounds of soil sampling in non-residential floodplain EAs during the PDI in 2022 and 2023 to further characterize floodplain soil PCB concentrations and better define and confirm the location of the 1 mg/kg PCB isopleth. A total of 2,549 samples were analyzed for PCBs from core locations within the 31 non-residential EAs discussed in Section 2.1.[20] Cores were collected at all locations to a total depth of one foot below ground surface (bgs) and processed into 0.5-foot intervals. Additionally, cores were collected from one to three feet bgs at a subset of 89 locations within the Frequently Used Subareas (Figure 2-3) and processed into one-foot intervals.

In addition to the PDI data, several floodplain soil PCB investigations were conducted historically since the late 1980s to characterize soil PCB concentrations in the non-residential floodplain EAs. These studies included collection of the following:

- Floodplain soil PCB data collected historically by GE between 1988 and 1998;
- Floodplain soil PCB data collected by EPA during the SI (1998 to 2002);
- Soil PCB data collected by GE in 2005 to further characterize the extent of PCBs in certain portions of the floodplain; and
- Soil PCB data collected by GE between 2013 and 2015 in the PDI for A/P Lawn Properties.

As with the residential floodplain properties, a summary of historical sampling has been included here because the Revised Final Permit requires that, in addition to the PDI data, data collected historically (prior to 2022) by GE and EPA be included in the evaluation of current conditions within the non-residential EAs. Sample counts within the 31 non-residential floodplain EAs in Reach 5A for each sampling program are summarized in Table 5-2. It should be noted that this table also includes soil PCB samples collected by GE during the PDI conducted on Reach 5A residential properties in 2020/2021 (described above in Section 5.1.1.3.1) given that many of the residential properties overlap with non-residential EAs.

[20] This sample count represents samples collected within the 1 mg/kg PCB isopleth. Duplicate samples are not included in the sample count.

Table 5-2
PCB Sample Counts within the 31 Non-Residential Floodplain EAs in Reach 5A

Program	Lead Entity	Number of Samples[1]	
		0–1 Foot	1–3 Feet[2]
1998–2002 EPA SI	EPA	1,048	—
1988–1998 and 2005 GE Investigation	GE	99	—
2013–2015 PDI A/P Lawn Properties	GE	2	—
2020–2021 PDI Reach 5A Residential Floodplain Properties	GE	31	22
2022–2023 PDI Reach 5A Non-Residential Floodplain EAs	GE	2,449	100
Total		**3,629**	**122**

Notes:

1. Counts represent samples within the 1 mg/kg PCB isopleth and do not include EPA split samples. Duplicate samples were excluded from the summary.
2. Only includes samples within the Frequently Used Subareas.

5.1.1.3.2.1 Vernal Pools

As noted in Section 2.1, there are 59 confirmed vernal pools in the floodplain in Reach 5A. As part of Reach 5A non-residential floodplain PDI sampling conducted in 2022 and 2023 (described in Section 5.1.1.3.2), GE sampled those vernal pools.[21] Specifically, GE collected 371 soil cores, yielding a total of 646 samples in either 0- to 0.5-foot or 0.5- to 1-foot depth intervals. These samples are generally positioned within an approximate 50-foot grid for pools greater than approximately 0.1 acre in size, except in one large pool (5A-VP-77), where samples were positioned within an approximate 100-foot grid. For pools less than 0.1 acre, a minimum of three cores were collected and analyzed. The Reach 5A PDI dataset is supplemented by samples that were collected in vernal pools as part of the same historical floodplain soil sampling programs described in Section 5.1.1.3.2. The PCB sample counts in the Reach 5A vernal pools from these programs are shown in Table 5-3.

[21] As noted in Section 2.1, EPA also directed GE to investigate one additional certified vernal pool located east of 5A-VP-24A and outside of the floodplain boundary (identified as 5A-VP-24B). As a result, that pool was included in the PCB sampling of vernal pools in 2022. That sampling showed the concentration of PCBs within that vernal pool to be well below 1 mg/kg (spatial average concentration of 0.08 mg/kg). Therefore, this vernal pool was not evaluated further.

Table 5-3
Summary of Total PCB Sample Counts in Reach 5A Vernal Pools

Program	Lead Entity	Number of Samples in 0–1 Foot[1]
1990–1992 Massachusetts Contingency Plan Phase II Investigation	GE	4
1998–2002 EPA SI	EPA	155
2013–2015 PDI (A/P Lawn Properties)	GE	5
2020–2021 PDI (Reach 5A Residential Floodplain Properties)	GE	6
2022 PDI (Reach 5A Non-Residential Floodplain EAs)	GE	646
	Total	**816**

Note:

1. Vernal pool samples were also included in the sample counts for non-residential floodplain EAs shown in Table 5-2. Sample counts do not include EPA split samples.

5.1.2 Other PDI Activities

In addition to the PCB characterization efforts described above, the PDI included several other activities, including topographic and bathymetric field surveys, riverbank erodibility surveys, surveys of river hydraulic characteristics, porewater characterization, waste characterization sampling, initial geotechnical characterization sampling, groundwater seepage investigations, and surveys of shoreline structures and utilities. The remainder of this section provides a summary of those various PDI activities.

5.1.2.1 Topographic and Bathymetric Surveys

The PDI included detailed topographic and bathymetric surveys of the river, riverbanks, and floodplain in Reach 5A to support the remedial design. All survey work was conducted by Spicer Group, Inc., from December 2021 through May 2022 using a combination of methods and technologies. These methods and technologies included the following: (1) an aerial Light Detection and Ranging (LiDAR) survey that was conducted in December 2021 (during low-flow, leaf-off conditions) over the entire length of Reaches 5 and 6 (i.e., from the Confluence to Woods Pond Dam), extending laterally to include the approximate 100-year floodplain and nearby infrastructure (e.g., roads); (2) a focused survey of the riverbanks in Reaches 5A and 5B conducted in late April 2022 using a mobile LiDAR system mounted to a shallow draft boat that allowed for more precise mapping of riverbanks that would not have been captured by the aerial LiDAR survey; and (3) a bathymetric survey conducted in late April and early May 2022 throughout the main channel and backwaters within Reaches 5 and 6.

5.1.2.2 Riverbank Erodibility Surveys

A field assessment of BEHI and NBS was performed in 2022 as part of the PDI to evaluate the erodibility of the riverbanks relative to the Performance Standards summarized in Section 3.3. The

BEHI is a method that evaluates a stream bank's susceptibility to erosion from erosional processes based on the physical characteristics of the bank. This method integrates multiple variables that relate to combined erosional processes leading to annual erosion rates. Erosion risk is then established for a variety of BEHI variables that are then totaled to obtain an overall BEHI risk score (Total Score). The BEHI Total Score is converted to a qualitative rating descriptive of the bank erosion risk. NBS is the evaluation of potential disproportionate energy distribution of the river flow in the near-bank region (one-third of channel cross-section) associated with the bank being evaluated. Increases in NBS can accelerate stream bank erosion. Three methods were used to determine NBS ratings for each study bank segment in Reach 5A based on the *Watershed Assessment of River Stability and Sediment Supply* (Rosgen 2006). A summary of the field investigations, including the resulting BEHI and NBS ratings for each study bank segment, is presented in GE's Revised PDI Summary Report for Sediment/Riverbanks.

A total of 50,033 linear feet of riverbank in Reach 5A was assessed for BEHI and NBS. The lengths of riverbank for each combination of BEHI and NBS are summarized in Table 5-4.

Table 5-4
Summary of BEHI and NBS Assessment During 2022 PDI Surveys

NBS	BEHI (Length of Bank in Feet)						
	Very Low[1]	Low	Moderate	High	Very High	Extreme	Total
Low	96	7,544	20,666	6,657	376	0	**35,339** (71%)
Moderate	0	477	2,231	1,131	0	175	**4,014** (8%)
High	0	0	448	949	325	0	**1,722** (3%)
Very High	75	323	2,093	1,377	0	0	**3,868** (8%)
Extreme	200	1,236	1,761	1,485	408	0	**5,090** (10%)
Total	**371** (0.7%)	**9,580** (19%)	**27,199** (54%)	**11,599** (23%)	**1,109** (2%)	**175** (0.3%)	**50,033**

Note:
1. Banks with a BEHI rating of Very Low represent riverbanks that were covered with riprap.

5.1.2.3 Water Surface Elevation and Current Velocity Surveys

Water surface elevations and river-current velocities were measured at various locations throughout Reaches 5 and 6 to support development of a hydraulic model. These activities included collection of current velocity data at a total of six locations (three of which were located in Reach 5A) during three separate events (low, moderate, and high flow), and deployment of water level loggers at two locations (Holmes Road and New Lenox Road) to continuously monitor water surface elevation.

A complete summary of these data is provided in GE's Revised PDI Summary Report for Sediment/Riverbanks, and a summary of the data collected at the three locations in Reach 5A is provided in Section 2.2.

5.1.2.4 Porewater Characterization

Porewater PCB concentrations were measured at 20 locations in the main channel and backwaters of Reach 5A. For this evaluation, concentrations of freely dissolved PCBs in sediment porewater were measured ex situ using solid-phase microextraction passive samplers deployed in each of 20 bulk sediment samples collected from Reach 5A. These porewater PCB concentrations were used in conjunction with PCB and TOC results from the bulk sediment samples to calculate site-specific partition coefficients for PCBs that were used to support cap design (see Appendix H).

5.1.2.5 Waste Characterization

A subset of the PDI sediment samples collected from the main channel (described in Section 5.1.1.1.1) were used to perform initial testing for disposal characterization using the Toxicity Characteristic Leaching Procedure (TCLP). For this analysis, one composite sample was generated from sediments collected at 10 transects (distributed throughout Reach 5A) by homogenizing sediments from three discrete cores collected along each transect. The composite sample was a full-depth (0 to 3 feet) composite of all three cores along the transect. Those 10 samples were analyzed for TCLP metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, and herbicides. Those results indicate that none of the TCLP parameters was detected above the RCRA hazardous waste toxicity characteristic regulatory levels in 40 *Code of Federal Regulations* (CFR) 261.24.

5.1.2.6 Geotechnical Characterization

Initial geotechnical characterization sampling was performed in Reach 5A during the PDI that included the following: (1) vane shear testing; (2) laboratory testing of geotechnical index properties on a subset of riverbank soil and sediment samples (main channel and backwaters), including moisture content, specific gravity, Atterberg limits, particle size distribution, and dry bulk density; and (3) seepage-induced consolidation testing. This initial geotechnical investigation program, which is summarized in GE's Revised PDI Summary Report for Sediment/Riverbanks, was later supplemented by the additional geotechnical investigations performed as part of the SDC program described in Section 5.3.2.2.

5.1.2.7 Groundwater Seepage Investigations

Groundwater seepage rates in Reach 5A were quantified using two different methods. The first method was to calculate seepage rate via Darcy's Law using recorded hydraulic gradient and vertical hydraulic conductivity data. Vertical hydraulic gradient was calculated using continuous measurements of hydraulic head using pairs of piezometers (one shallow, one deep) installed at

10 locations within the river channel and backwaters for a period of approximately two to three years starting in August 2022. An initial evaluation of the data collected through September 2023 was provided in GE's Revised PDI Summary Report for Sediment/Riverbanks. Additional data collected between August 2024 and July 2025 were used to supplement that evaluation and are described in Appendix H to this Final RD/RA Work Plan.

The second method was direct measurement of seepage rates using seepage meters installed at four locations in Reach 5A. Seepage meters were deployed between June 19 and 23, 2023. A summary of those directly measured seepage rates is provided in the Revised PDI Summary Report for Sediment/Riverbanks.

5.1.2.8 Shoreline Structures and Utility Surveys

The presence of aboveground and underground utilities and shoreline structures needed to be considered during remedial design as they could affect the remedial construction work. Therefore, shoreline structures (e.g., outfalls) and utilities (e.g., sanitary sewer structures) along the Reach 5A river channel were identified during PDI activities conducted in this reach. Based on the information gathered during the PDI, the identified structures and utilities within Reach 5A were surveyed and have been incorporated into the final design.

5.2 Baseline Restoration Assessment

Section II.B.1.c.(2)(a) of the Revised Final Permit requires GE to conduct a BRA of areas that will be affected by the ROR Remedial Action. GE conducted such a BRA of Reach 5A from July 2022 through June 2023, and it submitted a *Housatonic River Reach 5A Baseline Restoration Assessment Report* in August 2023 (AECOM 2023a) and a Revised BRA Report in February 2024. The Revised BRA Report describes and assesses the pre-remediation conditions, functions, and values of river bottom, riverbank, backwater, floodplain, impoundment, and vernal pool habitats as well as the identified habitats of federally or state-listed threatened or endangered species or other state-listed species and any invasive species in the areas affected by remediation within Reach 5A.[22]

Based on BRA data collection and mapping, Reach 5A includes approximately 409 acres within the 1 mg/kg PCB isopleth, comprising the following habitat types: 39 acres of riverine habitat and 50,240 linear feet of riverbanks associated with the Housatonic River; three acres of other stream habitat (e.g., Sykes Brook and Sackett Brook); 322 acres of floodplain wetland habitat (including vernal pools and backwater habitats); and 45 acres of upland floodplain habitat, of which approximately 31 acres is managed/disturbed habitat (i.e., agriculture and cultural grasslands). To

[22] In addition to the original BRA field effort, supplemental BRA surveys were conducted in 2025 as part of the SDC program (described in Section 5.3.4) to further refine and update ecological baseline information within areas anticipated to be affected by remediation or associated support activities.

provide background for the design, additional information on each of these habitats is summarized in the remainder of this section. Rare species are discussed separately in Section 5.4.

5.2.1 Riverine Habitat

Riverine habitats in Reach 5A were characterized to document pre-remediation conditions that could be affected by remedial activities. Key BRA efforts included surveys of river channel habitat using EPA's Rapid Bioassessment Protocol (RBP) at 18 stations plus the Sykes Brook confluence, benthic macroinvertebrate sampling at five stations, fish community surveys, aquatic plant observations (including invasives where present), geomorphic/river-process characterization, and topobathymetric LiDAR.

As shown by the BRA, Reach 5A riverine habitat consists of a free-flowing, sinuous channel with well-developed pool–run–riffle sequences, point bars, and localized LWD. Overall, conditions reflect a pool-influenced morphology with patchy higher-energy features (riffles/runs) that support habitat diversity. Substrates are dominated by finer materials with interspersed gravel and limited coarse substrate, and submerged aquatic vegetation is generally sparse. These physical conditions indicate a system where flow regime and sediment transport maintain a mosaic of depositional and scour habitats across the channel and margins.

Hydrology and hydraulics drive habitat structure by controlling channel form, sediment sorting, and floodplain connectivity. LWD and undercut banks increase habitat complexity, providing cover, refuge, and feeding areas and supporting multiple trophic pathways. The mix of fine substrates and localized coarser patches supports varied benthic microhabitats, consistent with relatively high macroinvertebrate richness and associated secondary production that underpins fish and wildlife food resources. Reach 5A provides habitat for a typical warmwater riverine fish assemblage and supports diverse aquatic biota.

5.2.2 Riverbank Habitat

For the riverbanks, key BRA activities included delineation and mapping of riverbank habitat units, field-based riverbank habitat inventories at representative locations using standardized riverbank forms, riverbank delineation and topographic surveys to define top-of-bank and bottom-of-bank, screening using BEHI and NBS methods to characterize relative erosion potential along riverbank segments, bank soil/substrate characterization, and vegetation and habitat feature surveys within riverbank and associated support areas, including tree inventories, vegetation composition assessments, documentation of wildlife habitat features, delineation/mapping of concentrated invasive plant populations on riverbanks and riparian margins.

As shown by these BRA activities, riverbanks in Reach 5A generally range in height from three to seven feet, with areas of higher vertical banks ranging from eight to 12 feet. The overall character is

predominantly mature woodland, although vegetative composition varies by bank position (toe versus top of bank), hydrology, slope, and substrate. Upper banks are primarily tree-dominated, with interspersed areas of shrubs, vines, and herbaceous growth. LWD is common along the banks, and there are localized special habitat elements, including turtle hibernacula and nesting areas, bank swallow and belted kingfisher nest sites in vertical sandy banks, otter slides, beaver bank dens, rock basking sites, burrows, and tree cavities.

Riverbank substrates consist of a mix of silts and sands with minor gravel and cobble. Bank conditions include sloped and vegetated areas, vertical and exposed faces, erosional banks with slumping, and erosional but vegetated banks. Undercut banks are prevalent in Reach 5A and represent an important habitat component. Mature overhanging trees and dense shrub and herbaceous communities are widespread and contribute shading, bank stability, and wildlife foraging opportunities.

5.2.3 Backwater Habitat

There are six backwater areas identified in Reach 5A (BW5A-1 through BW5A-6). Backwater BRA activities included integration of bathymetry/LiDAR, topographic mapping, and sediment/porewater information to characterize backwater physical setting, substrate conditions, refine backwater/nearshore morphology, and support mapping and design applications in/near backwater settings; field-based backwater habitat inventories for each backwater to document hydrologic connectivity, substrate/sediment, aquatic vegetation/biota, and invasive species; water quality monitoring; and aquatic plant community observations and other biological observations.

As shown by these activities, the six designated backwaters in Reach 5A share a similar hydrologic regime characterized by ephemeral surface-water connections to the river. These areas experience backflooding during high-flow periods, followed by shallow water or near-dry conditions during summer low flows. This seasonal connectivity allows fish access during high water, with most returning to the river as levels recede, although some may become stranded during drawdown.

The backwaters generally consist of deep emergent marsh habitat on saturated, mucky mineral soils that are seasonally inundated and typically retain standing water. Substrates are flooded by low-energy waters with minimal wave action, and water depths vary seasonally. Emergent vegetation is diverse, with numerous plant species documented, including invasive and non-native species.

The backwaters generally consist of deep emergent marsh habitat on saturated, mucky mineral soils that are seasonally inundated and typically retain standing water. Substrates are flooded by low-energy waters with minimal wave action, and water depths vary seasonally. Emergent vegetation is diverse, with numerous plant species documented, including invasive and non-native species. These backwater and marsh habitats support a range of bird, mammal, amphibian, and reptile

species for foraging, shelter, and breeding. They provide nesting and foraging habitat for multiple bird species, including wading birds, which use these low-current, open-water areas for foraging.

5.2.4 Other Waterbodies' Habitat

BRA activities in Other Waterbodies included a combination of geographic information system (GIS)/desktop review with targeted field habitat assessments. The assessment focused on the Other Waterbodies that have been determined to require remediation, including West Pond, the Intermittent Side Channel, and Lower Sykes Brook confluence area.[23] West Pond was evaluated using the backwater/pond habitat form; Lower Sykes Brook was evaluated using RBP-style habitat characterization; and the Intermittent Side Channel was assessed using riverbank-form surveys because it did not hold enough water during the 2025 field season for riverine methods. Assessments were conducted on October 24, 2025, and were populated with plant community observations collected during summer/fall 2025.

These investigations showed the following:

- **West Pond:** This is a shallow floodplain pond with permanent connectivity to the Housatonic River via Sackett Brook and an additional flow path over/near beaver infrastructure, with water levels strongly influenced by beaver activity. The pond margins provide habitat complexity (woody debris, logs/roots/hummocks, rocks/crevices, and tall vegetation), supporting a variety of wildlife.
- **Intermittent Side Channel:** This is an episodically connected overflow/side-channel feature that did not maintain standing water during 2025 observations. Banks are relatively high and moderately steep with fine substrates (silt-dominant with organic material), and vegetation is heavily influenced by Japanese knotweed, with generally low observed habitat feature richness.
- **Lower Sykes Brook Confluence:** This is a low-gradient, pool-dominated depositional confluence area with fine sediments and organic muck, influenced by backwater/confluence hydraulics and a downstream constriction. Instream habitat complexity is limited (minimal coarse substrate/cover), though some woody debris occurs.

5.2.5 Floodplain Wetland and Upland Habitats

The floodplain BRA included development of GIS field layers to support mapping and field planning, delineation/mapping of floodplain habitat units and natural communities, field inventories along transects/plots using standardized forms and GPS-enabled data capture, tree inventories and vegetation composition summaries in floodplain work areas (e.g., GPS mapping of larger trees and species counts for smaller size classes), documentation of key wildlife habitat features in work areas

[23] The determination regarding the specific Other Waterbodies that require remediation is provided in Section 8.1.2.2.3.

(e.g., burrows/dens, snags/cavity trees, LWD, nesting substrates, potential turtle hibernacula, and potential bat roosting trees); and delineation/mapping of concentrated invasive plant populations.

As shown by the BRA, wetland communities comprise the majority of the floodplain (approximately 322 acres) and include wet meadow, shallow and deep marsh, shrub swamp, ponded open-water areas, tributary streams, and multiple forested wetland types. Forested wetlands represent slightly more than half of the total floodplain cover, with transitional floodplain forest as the dominant type. Upland habitats account for approximately 45 acres, primarily along the outer floodplain perimeter, and consist mainly of cultural grassland, with smaller areas of agricultural fields, upland forest, and minimal developed/disturbed land.

5.2.6 Vernal Pool Habitat

As discussed in several prior reports, the collection of data on vernal pools included: field screening of potential pools (in 2018 to 2020) and confirmation of pools meeting MNHESP vernal pool criteria; documentation of pool conditions (physical setting, substrate/soil, structure, and surrounding habitat); recording within-pool vegetation structure/composition, including invasive species observations; classification of hydroperiod and noting inlet/outlet and other hydrologic indicators; quantification of land cover/use in the surrounding areas; and collection of baseline water quality parameters and composite soil samples in a subset of pools.

As noted in Section 2.1, Reach 5A contains 59 documented vernal pools, including 45 isolated depressions and 14 within larger wetlands. Pools retain water through part of the amphibian breeding season and provide habitat for obligate vernal pool species, including wood frog (*Lithobates sylvaticus*), spotted salamander (*Ambystoma maculatum*), and fairy shrimp (*Eubranchipus vernalis*), as well as foraging and breeding habitat for other amphibians and reptiles such as northern spring peeper (*Pseudacris crucifer*), green frog (*Lithobates clamitans*), snapping turtle (*Chelydra serpentina*), painted turtle (*Chrysemys picta*), garter snake (*Thamnophis sirtalis*), American toad (*Anaxyrus americanus*), and bullfrog (*Lithobates catesbeianus*).

5.3 Supplemental Data Collection Program

GE prepared and submitted to EPA a SDC Summary Report on February 4, 2026. That report documented the results of the SDC activities performed to supplement the pre-existing PDI and BRA datasets and provide additional information to support the remedial design for Reach 5A. That SDC program included: (1) supplemental PCB characterization sampling of sediment in the main river channel and floodplain soils at non-residential and residential properties; (2) supplemental geotechnical investigations performed in sediment, riverbank, and floodplain areas; (3) collection of additional information to support the Natural Channel Design; (4) additional BRA survey activities in remediation and support areas, including specific surveys of rare species; and (5) other supplemental

survey activities, such as topographic and bathymetric surveys and riverbank surveys. A summary of the work completed is provided in the following sections.

5.3.1 Supplemental PCB Characterization

Supplemental PCB characterization data were collected under the SDC program from three areas of Reach 5A, including main channel sediments, residential floodplain soils, and non-residential floodplain soils.

5.3.1.1 Main Channel Sediments

Supplemental sediment sampling within the main channel of Reach 5A was conducted in September 2024 and included two sets of samples. First, additional sediment cores were collected approximately 50 feet upstream and downstream of four sediment core locations sampled during the PDI where those previous PDI locations had depth-weighted average PCB concentrations exceeding 100 mg/kg. The additional sediment cores collected upstream and downstream of these four locations (total of eight cores) were collected to refine the delineation of depth-weighted average PCB concentrations in these areas and had a targeted sediment recovery depth of three feet.

The second group of sediment cores were collected at 10 locations in the main channel to characterize sediments deeper than two feet within the portion of the river between Stations 50+00 and 56+00 (i.e., between the Pomeroy Avenue Bridge and the Holmes Road Bridge). During the PDI, no sediment cores deeper than two feet could be obtained in this section of the river. Because the floodplain assessment of the residential property on the inside bend in this area (i.e., on the western side of river) indicated there are potentially elevated PCB levels at depth and because there is a depositional point bar adjacent to that property (also along the western side of the river), EPA determined that deeper sampling was needed along the inside bend of the river in this area to characterize sediments to a depth of at least five feet. In total, 120 samples were collected from these 18 supplemental sediment sampling locations.

5.3.1.2 Non-Residential and Residential Floodplain Soils

Supplemental floodplain soil sampling was conducted in three non-residential EAs—EAs 19, 22, and 33. One location in EA 19 was sampled to refine the PCB characterization in that area. Two and 16 locations were sampled in EAs 22 and 33, respectively, to better delineate the 1 mg/kg PCB isopleth in those EAs. Results from the first round of sampling in EA 33 showed PCB concentrations exceeded 1 mg/kg in several areas; therefore, subsequent "step-out" soil samples were collected at 25 additional locations during two subsequent rounds of sampling.

Supplemental floodplain soil sampling was also performed at 22 locations on portions of two residential parcels (J6-3-1 and J6-2-3) located in a former right-of-way. The portions of these properties located in the right-of-way had been previously evaluated as non-residential properties in

the Conceptual RD/RA Work Plan. However, GE and EPA determined that it would be more appropriate to combine these areas with the adjacent residential parcel; thus, additional floodplain soil sampling was required to assess application of the Residential Performance Standards at these two combined properties.

5.3.2 Geotechnical and Groundwater Investigations

Geotechnical and groundwater investigations performed as part of the SDC program included an in-river geophysical survey, upland and in-river geotechnical borings, installation and monitoring of piezometers, and dynamic cone penetrometer (DCP) testing. This work was conducted using a phased approach, beginning with collection of geotechnical borings in upland and riverbank areas, DCP testing, and installation of upland and in-river piezometers in 2024, followed by the in-river geophysical survey in early 2025 and subsequent collection of in-river geotechnical borings.

5.3.2.1 Geotechnical Borings

Geotechnical borings were advanced throughout Reach 5A to characterize subsurface soil conditions and support the development of geotechnical design parameters. For the upland and riverbank areas, a total of 38 borings were advanced, including 28 riverbank borings and 10 borings in upland floodplain areas near potential access roads and staging areas. Within the river main channel, a total of 29 borings were advanced. At each location, Standard Penetration Tests (SPTs) were conducted beginning at the ground surface or mudline and continuing at five-foot intervals until termination of the boring. SPTs were performed using split-spoon samplers to obtain disturbed soil samples, and blow counts were recorded for each six-inch increment of sampler penetration in accordance with ASTM International (ASTM) standards. In intervals containing fine-grained materials, relatively undisturbed samples were collected using Shelby tube, piston (Osterberg), or Modified California (Mod Cal) samplers advanced via direct-push methods.

Select samples of recovered soils from upland and in-river geotechnical borings were sent to a geotechnical laboratory for additional testing. Tests completed included grain size analysis, Atterberg limits, specific gravity, moisture content, and other geotechnical tests used to further define geotechnical parameters of the soils throughout Reach 5A. Where undisturbed samples were collected within Shelby tubes, tests such as consolidated undrained triaxial shear or fixed and flexible wall permeability tests were completed.

5.3.2.2 Additional Geotechnical Investigations

In addition to the geotechnical borings described above, an in-river geophysical survey was conducted in March 2025 along the approximate channel centerline for the length of Reach 5A and at 33 cross-river transects. A ground-penetrating radar system and Sub-bottom Profiling System were both deployed from a small vessel. The data collected during this survey were to be used for demarcation of subsurface unit contacts, such as glacial till or bedrock and alluvium, as well as to

identify primary near-surface material characteristics and locations of anomalies (e.g., subsurface obstruction, atypical geophysical signature).

In addition, a total of 10 piezometers were installed throughout Reach 5A, including seven locations within upland riverbank areas and three locations within the river main channel. Once installed, piezometers were outfitted with data-logging pressure transducers and used to measure the change in hydraulic head. These data were then used with vertical and horizontal hydraulic conductivity data to support evaluations of seepage and dewatering requirements.

Finally, DCP testing was performed in September and October 2024, at a total of 52 locations throughout the floodplain in Reach 5A. This included 46 locations along proposed access roads and six locations within proposed staging areas. The data collected were used to identify the presence of soft or unstable conditions in these locations by measuring the tested soil's resistance to the penetration of a cone. DCP tests were completed with a hand-operated, multi-flight steel probe with a sacrificial steel conical tip and a 35-pound hammer weight. The steel probe and conical tip was advanced by manually raising the hammer 15 inches and dropping it in free fall to strike the top of the probe. Advancement of the probe was recorded in 10-centimeter (cm) increments until refusal. The number of blows to drive each 10 cm increment was recorded, and measured blow counts were then correlated to SPT-N values to estimate geotechnical parameters and calculate the California Bearing Ratio (CBR). Results from the tests were used to understand the subgrade support required for proposed staging areas and access roads throughout Reach 5A.

5.3.3 Natural Channel Design Surveys

As provided in the Revised Final Permit, reconstruction of the Reach 5A river channel and riverbanks is required to consider the principles of Natural Channel Design. Additionally, the Revised Final Permit calls for the development of a BANCS model calibrated for the Housatonic River. Section 4.1 of the SDC Summary Report provides a summary of the BANCS model calibration. Additional details related to the results of that model are provided in Section 9.1.

Geomorphic data needed to support Natural Channel Design were collected as part of the SDC fieldwork. River surveys were conducted consistent with Rosgen (2006) river geomorphology procedures, in which the Reach 5A river channel was delineated into five separate segments of identified Rosgen stream-type and valley-type field conditions. A suitable riffle was identified in each segment from which to collect data and complete required Rosgen work sheets. In addition, additional data were collected for completion of a Rosgen Level I to III assessment of each segment to support Natural Channel Design. Based on this, the upper three river reaches classify as a Rosgen C4c type channel in an unconfined lacustrine deposition valley (Valley Type VII). The lower two reaches classify as a Rosgen C5c type channel.

5.3.4 Supplemental Baseline Restoration Assessment Surveys

Supplemental BRA surveys were conducted in the main river channel and in portions of the riverbanks, backwaters, Other Waterbodies, and floodplain that will be affected by remediation and support activities. Included in those surveys were identification of tree species within areas affected by remedial activities, important wildlife habitat features within those areas, plant species composition, and identification of substantial invasive species present in those areas that may require treatment. Additionally, as part of the supplemental surveys and as required by EPA, GE conducted reconnaissance surveys in 2025 for federally and state-listed rare species in Reach 5A, focusing on areas that have suitable habitat for such species and that will be subject to remediation or support activities (and a buffer zone where warranted). These surveys were conducted in accordance with Standard Operating Procedures (SOPs) approved by EPA (AECOM 2025a–f). Results of the surveys were provided in separate survey reports (AECOM 2025g–l) and summarized in the SDC Summary Report. Those results have been taken into account in the discussion of rare species in Section 5.4.

5.3.5 Supplemental Field Surveys

Various supplemental field surveys were conducted as part of the SDC program to support the Reach 5A remedial design. These included surveys of the floodplain, river channel, riverbanks, backwater areas, and utilities and structures relevant to remediation. These surveys included traditional land survey techniques as well as aerial LiDAR survey methods.

Initial riverbank delineation and topographic survey efforts began in October 2024, and additional survey work continued through early 2026 in preparation for the upcoming remedial construction. The following sections briefly summarize the completed survey activities.

5.3.5.1 Topographic Surveys

In April 2025, Bluesky Geospatial Ltd (Bluesky) of North Adams, Massachusetts, conducted a flight using small airplane to gather scaled high-resolution aerial photography and LiDAR survey data over more than 3,000 acres of the Housatonic River and the Reach 5A, 5B, 5C, and 6 floodplain corridors. Data acquisition was conducted when Housatonic River flows were at approximately 64 cfs at the USGS Coltsville gage and prior to full “leaf-out” conditions. Following the aerial survey and data processing, Bluesky delivered high-resolution orthoimagery, planimetric drawing files, and digital elevation model (DEM) data (i.e., three-dimensional points, break lines, and one-foot contours). C.T. Male Associates (C.T. Male) of Latham, New York, used the aerial imagery and elevation mapping to conduct field ground surveys to verify the topographic data in the Reach 5A project areas.

In addition, C.T. Male performed topographic surveys of road easements, natural gas easements (including the Kinder Morgan natural gas pipeline easement and two natural gas pipelines that cross

the river near Station 100+00), site features, drainage features, aboveground utilities/structures, and overhead utility lines.

To support the design for staging areas and access routes, surveys of portions of the City of Pittsfield sanitary sewer system were conducted by C.T. Male in December 2025 and January 2026. Based on City maps, C.T. Male surveyed the sanitary sewer manholes and sewer easements and recorded data on manholes and sanitary sewer pipes (where accessible). These data were used to determine the burial depths of the pipeline along the planned access roads.

5.3.5.2 Bathymetric Surveys

In May 2025, Whiteout Solutions (Whiteout) of St. Johnsbury, Vermont, performed an unmanned aerial topobathymetric LiDAR survey using a green laser to collect underwater topographic data (to the extent practicable) along the Reach 5A river corridor to supplement initial bathymetric surveys that were conducted using conventional survey methods and improve the in-river and nearshore survey data density. This survey was performed during "leaf-off" conditions and when river flows were approximately 90 cfs as measured at the USGS Coltsville gage. In December 2025, Whiteout performed an additional aerial topobathymetric LiDAR survey in Reach 5A (in conjunction with a survey of Housatonic River Reaches 5B through 6) to address isolated data gaps in the initial survey. This supplemental survey was conducted when river flows were at approximately 60 cfs measured at the USGS Coltsville gage.

The LiDAR data were processed to produce a 0.5-foot digital terrain model (DTM) of the Reach 5A river corridor. The DTM, along with the topographic survey data discussed in Section 5.3.5.1, has been merged into a composite DEM[24] that was used to support the Reach 5A final design. Figures 5-1a through 5-1i show the Reach 5A bathymetry based on these LiDAR surveys.

5.3.5.3 Riverbank Surveys

Supplemental field surveys were performed to better define the Reach 5A riverbanks (i.e., the bottom and top of bank). GE's surveyor began initial riverbank delineation and topographic survey efforts in October 2024 utilizing traditional land survey techniques and installing wooden stakes along the top and bottom of the riverbanks in the upstream portion of Reach 5A between Stations 00+00 and 49+00 (i.e., upstream of the Pomeroy Avenue Bridge). These stake locations were reviewed by GE and EPA in November 2024 under low-flow conditions (approximately 40 cfs at the USGS Coltsville gage). During this field review, GE and EPA representatives observed that the majority of the top-of-bank delineation stakes were correctly positioned, serving as the demarcation between floodplain soil and riverbank soil. However, it was noted that most bottom-of-bank stakes were placed too high on the riverbank. These bottom-of-bank stakes were subsequently adjusted collaboratively by GE and EPA

[24] This DEM was developed based on the SOPs provided in the Revised Sediment/Bank PDI Work Plan.

to more accurately represent the sediment-bank interface. Following the field review, the adjusted bottom-of-bank stake locations and elevations were surveyed.

For the remainder of Reach 5A, GE proposed bottom-of-bank elevations based on aerial imagery and the topobathymetric LiDAR data described in Sections 5.3.5.1 and 5.3.5.2. In October through December 2025, C.T. Male installed and surveyed wooden stakes at approximately 290 locations along the proposed shoreline elevation contours in Reach 5A. GE and EPA participated in two field reviews on November 6 and 25, 2025, to determine whether the installed stakes provide an accurate representation of the shoreline extent to review and approve of the stake installations, and some stakes were moved and re-surveyed. The survey data from the shoreline survey have subsequently been used to delineate the shoreline in Reach 5A for final design.

5.4 Rare Species Information

To determine the likely presence of federally or state-listed rare species and their habitat in Reach 5A, GE conducted a number of activities. Federally listed threatened and endangered species were screened using the U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) system. State-listed species and habitats were evaluated primarily using MNHESP Species Habitat Maps provided to GE in October 2022, supplemented by MNHESP Priority Habitat mapping, to identify species potentially occurring in Reach 5A and to compare habitat requirements to documented Reach 5A conditions.

IPaC screening identified the northern long-eared bat (federally endangered), the tricolored bat (proposed for federal listing). and the monarch butterfly (proposed for federal listing) as potentially occurring in Reach 5A. These two bat species are also state listed, although they were not identified by the MNHESP Species Habitat mapping in Reach 5A. Review of the MNHESP Species Habitat maps identified the presence of 20 other state-listed species as potentially present or with habitat in Reach 5A. These included two bird species, two butterfly or moth species, five dragonfly species, 10 plant species, and one reptile species (all listed below). Collectively, the MNHESP-mapped Species Habitat for these state-listed species encompasses all of Reach 5A, and virtually all of Reach 5A falls within mapped MNHESP Priority Habitat, with only a small area near East New Lenox Road outside Priority Habitat.

As discussed in Section 5.3.4, supplemental rare species surveys were conducted in 2025 in Reach 5A, using EPA-approved SOPs, to address the rare species that had been identified. As also noted, the results of these surveys were documented in reports submitted to EPA in October through December 2025 (some of which contained Confidential Business Information).

Based on the IPaC screening, the MNHESP Species Habitat mapping, and the results of the 2025 surveys, Table 5-5 lists the rare species that have been identified as potentially present in Reach 5A.

Table 5-5
Rare Species Identified through IPaC and MNHESP Mapping or Field Surveys as Potentially Present in Reach 5A

Taxon/Survey Group	Species Name	Federal Status	State Status
Bats	Northern long-eared bat (*Myotis septentrionalis*)	E	E
	Tricolored bat/Eastern pipistrelle (*Perimyotis subflavus*)	P	E
	Indiana bat (*Myotis sodalis*)	E	E
	Silver-haired bat (*Lasionycteris noctivagans*)	NA	SC
	Eastern red bat (*Lasiurus borealis*)	NA	SC
	Hoary bat (*Lasiurus cinereus*)	NA	SC
	Small-footed bat/Eastern small-footed myotis (*Myotis leibii*)	NA	E
	Little brown bat/Little brown myotis (*Myotis lucifugus*)	NA	E
Birds	American bittern (*Botaurus lentiginosus*)	NA	E
	Common gallinule (*Gallinula galeata*)	NA	SC
Butterflies/moths	Monarch butterfly (*Danaus plexippus*)	P	NA
	Mustard white (*Pieris oleracea*)	NA	T
	Ostrich fern borer (*Papaipema* sp.)	NA	SC
Dragonflies	Rapids clubtail (*Phanogomphus quadricolor*)	NA	E
	Ocellated darner (*Boyeria grafiana*)	NA	SC
	Spine-crowned clubtail (Hylog*omphus abbreviatus*)	NA	SC
	Brook snaketail (*Ophiogomphus aspersus*)	NA	SC
	Riffle snaketail (*Ophiogomphus carolus*)	NA	T
Plants	Hairy wild rye (*Elymus villosus*)	NA	E
	Tuckerman's sedge (*Carex tuckermanii*)	NA	E
	White adder's-mouth (*Malaxis monophyllos var. brachypoda*)	NA	E
	Bristly buttercup (*Ranunculus pensylvanicus*)	NA	SC
	Frank's lovegrass (*Eragrostis frankii*)	NA	SC
	Culver's-root (*Veronicastrum virginicum*)	NA	T
	Gray's sedge (*Carex grayi*)	NA	T
	Great blue lobelia (*Lobelia siphilitica*)	NA	E
	Great laurel (*Rhododendron maximum*)	NA	T
	Matted spike-sedge (*Eleocharis intermedia*)	NA	T
	Wapato (*Sagittaria cuneata*)	NA	T
Reptile	Wood turtle (*Glyptemys insculpta*)	NA	SC

Notes:
E: endangered
P: proposed for federal listing
SC: species of special concern
T: threatened

The rare species surveys found no evidence of some of the above-listed species in Reach 5A. For example, the survey for state-listed plant species confirmed the presence of only six of the 11 above-listed plant species (AECOM 2025g). Additionally, the survey for state-listed bird species found no evidence of either American bittern or common gallinule in Reach 5A (AECOM 2025i). The survey for rare bat species detected multiple bat species, but not northern long-eared bat and eastern small-footed bat in Reach 5A (AECOM 2025k). Finally, the survey for state-listed dragonflies confirmed the presence of one state-listed species (riffle snaketail), but did not confirm other state-listed dragonfly larvae or exuvia to species level (AECOM 2025l).

Based on the rare species screening, the 2025 surveys, and discussions with MNHESP, including consideration of impact avoidance measures, the following rare species have been identified as potentially subject to a temporary "take"[25] in Reach 5A due to the remediation and supporting activities: wood turtle; several state-listed plants (namely, bristly buttercup, wapato, hairy wild rye, Frank's lovegrass, matted spike-sedge, great blue lobelia, and potentially Tuckerman's sedge); state-listed butterflies/moths associated with host plants present in work areas (i.e., mustard white butterfly and ostrich fern borer moth); and the state-listed dragonflies listed in Table 5-5. Measures to minimize impacts to these species and to mitigate the unavoidable takes are described in detail in the Restoration Plan and included in the summaries in Sections 7.4 and 11 of this plan.

5.5 Cultural Resources Assessment and Surveys

In March 2023, GE submitted a *Revised Supplemental Phase IA Cultural Resources Assessment Report* (AECOM 2023b). That report included review of background information on the environmental setting and pre- and post-contact cultural contexts for the project area and region. A preliminary assessment of the potential for each section of the archaeological Area of Potential Effects was undertaken to determine the potential for as-yet unidentified cultural resources. A model of high and low sensitivity was generated that would be utilized to prioritize future survey efforts. The report outlined future steps needed to evaluate potential impacts to potentially significant cultural resources within the project area and to comply with the substantive requirements of the National Historic Preservation Act and the Massachusetts Historical Commission Act.

An archaeological Phase IB and architectural history survey were conducted in 2024 within portions of Reach 5A that will be affected by remediation activities and were determined to have a high potential to contain cultural resources. Based on the conceptual remediation areas, staging areas, and access roads presented in the Conceptual RD/RA Work Plan, an estimated total of approximately 40 acres of remediation and staging areas and approximately 23,900 linear feet of access roads were located within high-sensitivity areas. The archaeology survey included a visual inspection of both

[25] "Take" as used here refers to definition of that term in Section 1 of the Massachusetts Endangered Species Act (MESA).

terrestrial and riverine areas of the project as well as the excavation of 1,626 shovel test pits. As described in GE's *Revised Phase IB Cultural Resources Survey Report for Reach 5A* (Revised Phase IB CRS Report; AECOM 2025), five archaeological sites were identified consisting of four post-contact sites and one pre-contact site. It was concluded that four of these sites do not meet the eligibility criteria for listing in the National Register of Historic Places (NRHP), and one post-contact archaeological site was found within a proposed access road to contain structural remains and associated artifacts. In addition, eight river features were identified during the aquatic river reconnaissance, five of which were determined to be cultural, but none of them meet the NRHP eligibility criteria. The historic architectural survey consisted of background research and visual inspection via field survey. A total of 22 resources were identified, 10 of which had been previously identified and 12 of which were newly identified. Of these resources, three were identified as listed or potentially eligible for listing in the NRHP. However, based on consideration of the distance between them and the Reach 5A project area and an assessment of whether there would be any view from them to the project area, it was determined that there would be no adverse effects on any of those three resources as a result of the Reach 5A Remedial Action.

Additional archaeological Phase IB and architectural history surveys were conducted in 2025 within expanded portions of Reach 5A that will be affected by remediation and support activities and were determined to have a high potential to contain cultural resources. Results of these additional surveys were documented in GE's *Phase IB Cultural Resources Survey Report for Reach 5A: Addendum 1* (AECOM 2026b). A total of 6.76 acres of remediation and support areas were located within high-sensitivity areas. The archaeology survey included a visual inspection of both terrestrial and riverine areas of the project as well as the excavation of 419 shovel test pits. No archaeological sites were identified. One isolated pre-contact artifact, a Brewerton Side-Notched projectile point, was incidentally recovered from the main river channel during an unrelated biological benthic sampling event. Follow-up archaeological inspection identified no associated materials or features, and the artifact was documented as an isolated find. The historic architectural survey consisted of background research and visual inspection via field survey of the expanded remediation and support areas. No additional historic architectural resources were identified beyond those documented in the Revised Phase IB CRS Report, and no new effects were identified.

As discussed in Section 7.2.2, the access road layout has been revised to avoid the one post-contact archaeological site that had been identified during the 2024 cultural resource surveys as within a then-proposed access road area.

A *Cultural Resources Unanticipated Discoveries Plan* is provided in Appendix D. This plan, which applies to the overall ROR area and Remedial Action, outlines the steps and chain of communication that must take place if unanticipated human remains or archaeological resources or artifacts are encountered during remedial construction activities.

5.6 Treatability Studies

Treatability studies were performed for Reach 5A to achieve several objectives, including providing information needed to support remedial design evaluations, supplementing data gathered during the Reach 5A PDI, and providing data to be used by a remediation contractor during construction. These studies included: (1) sediment dewatering treatability testing that included a gravity drainage study, sediment stabilization amendment testing, and shake/vibration testing; (2) jar testing of potential sediment amendments to be used in one Reach 5A backwater (BW5A-1); and (3) amendment testing to support design of the chemical isolation layer in the Reach 5A sediment cap. Details associated with the setup and results of these treatability studies are provided in GE's 2026 Treatability Studies Summary Report. Those studies are summarized in the following sections.

5.6.1 Sediment Dewatering Testing

This section describes the sediment dewatering treatability study performed to evaluate the sediment dewatering and treatment options most suited to meet transportation and disposal facility requirements, including the requirements for placement in the UDF. The study was performed on sediments collected from six locations within Reach 5A: four from the main channel, one from West Pond, and one from a backwater area.

5.6.1.1 Gravity Drainage Study

A drainage study was performed to evaluate the ability of dredged sediment to passively dewater via gravity drainage. The purpose of this study was to estimate the water content before and after gravity drainage so as to evaluate whether the dredged material will need additional treatment to meet transportation and disposal facility requirements. The drainage study was performed on homogenized samples from each of the six bulk sediment sampling locations. Material was allowed to drain by gravity for 72 hours, with samples collected routinely and tested for moisture content and for liquid content by the Paint Filter Test (SW846 Test Method 9095B). Geotechnical testing was also performed on the gravity drained sediment samples to evaluate the physical properties, strength, and hydraulic conductivity to assess appropriateness for placement in the UDF.

Water that drained from the samples during the drainage study was collected and the volume was measured. Water samples from all locations were sent for analysis of total suspended solids (TSS), PCBs, total metals, and oil and grease to characterize the supernatant. Also, water samples from one bulk sample with a relatively high PCB concentration were analyzed for VOCs, polycyclic aromatic hydrocarbons (PAHs), other SVOCs, total petroleum hydrocarbons, dissolved metals, alkalinity, hardness, and TOC. These results were used to support the design of the temporary water treatment system (TWTS; see Section 12.1.4).

5.6.1.2 Sediment Stabilization Amendment Testing

Stabilization of sediments was investigated using a variety of commercially available amendments at various dosages with the bulk sediment collected from each location (without initial gravity drainage). The objective of this testing was to determine effective combinations of amendments/doses, mix ratio, and cure time needed to meet transportation and disposal facility requirements for Paint Tilter testing and structural strength. Findings from the stabilization testing determined that incorporating a Type 1L Portland cement was more effective for improving the workability and strength gain of the sediment than the other reagents in the testing program. It was found that Paint Filter Test criteria were continually met for this reagent at the study's lowest dosage rate of 2.5% at the initial measurement time of 10 hours.

5.6.1.3 Shake/Vibration Testing

Shake/vibration testing was also performed on the sediment samples to evaluate whether free liquids could be liberated from the excavated and processed materials as a result of post-processing handling and transportation. The testing used shaker equipment to simulate motion similar to that which might be imparted during transport of dewatered sediments to a disposal destination. The transport-simulated samples were then examined and tested for free water.

The test used sediment samples from each field sample location before any drainage or amendment testing, samples from each field sample location that was subject to gravity drainage testing, and stabilized sediment samples from each field sample location that cured for a period of time with the preferred amendment type and dose. Upon completion of the test, any stratification or liquid accumulation on the surface or the bottom was noted, and the samples underwent a Paint Filter Test.

For the as-received samples, four of the six samples had stratification and measurable liquid accumulation resulting from the shake/vibration test. For the samples that were first subject to gravity drainage testing, only one sample had stratification and measurable liquid accumulation resulting from the shake/vibration test. Finally, for the samples that were first subject to sediment stabilization amendment testing, two samples had stratification and measurable liquid accumulation resulting from the shake/vibration test. All samples were able to pass the Paint Filter Test after the accumulated liquid was removed.

5.6.2 Backwater Sediment Amendment Jar Testing

Jar testing of sediments collected from one backwater in Reach 5A (BW5A-1) was performed to evaluate the effectiveness of various carbon-based amendments—powdered activated carbon (PAC), granular activated carbon (GAC), and activated biochar (biochar)—including effective doses and placement methods. The results of this testing were used to design the amendment type and dose to be applied in the Core Area 1 habitat portion of this backwater (which has total PCB concentrations between 1 and 50 mg/kg), as described in Section 8.4.

Backwater sediment samples were collected from two locations within backwater BW5A-1 for this testing. Total PCB (congener) concentrations in these two sediment samples (5.4 and 11 mg/kg) were lower than anticipated; therefore, a third sample was prepared for the jar testing by spiking a portion of the sediment collected from this backwater with PCBs. The resulting total PCB (congener) concentration in the spiked sediment sample was 84 mg/kg. All three samples were used for the jar tests (two unspiked sediments and one with spiked sediment). A detailed description of the results is provided in Section 3.6 of the Treatability Studies Summary Report. In summary, all amendments and doses evaluated provided some degree of reduction in freely dissolved (i.e., bioavailable) porewater PCB concentrations in all three samples. Among these treatments, PAC achieved the greatest reduction in porewater total PCB concentration reduction at the lowest dose.

5.6.3 Chemical Isolation Layer Amendment Testing

Additional testing of PAC and GAC was performed as part of the treatability studies to evaluate the equilibrium and kinetic adsorption characteristics of PCBs with these amendments, which are candidate adsorptive amendment materials for the Reach 5A sediment caps. Isotherm testing was performed to characterize the adsorptive capacity of these amendments to sequester dissolved-phase PCBs transported by porewater within the chemical isolation layer of the cap when the phases are at equilibrium. Kinetic testing was performed to evaluate the rates at which PCBs adsorb from porewater onto the amendments. The results from this isotherm and kinetic testing were used to provide site-specific PCB adsorption parameters that were incorporated into the cap design model (see Appendix H), supporting optimization of amendment selection and dosage needed to achieve the project Performance Standards. Details regarding the methods and results of the chemical isolation layer testing are provided in Section 4 of the Treatability Studies Summary Report.[26]

5.7 HEC-RAS Modeling

As described in Section 5.2 and Appendix G of the Conceptual RD/RA Work Plan, a one-dimensional hydraulic model was developed to evaluate flow conditions in Reaches 5 and 6 using the USACE Hydrologic Engineering Center – River Analysis System (HEC-RAS) version 6.3.1 modeling software (USACE 2022). A one-dimensional model provided valuable information related to water surface elevations and stream velocities that were used to support the conceptual design. However, because of the complex geometry of the stream channel and floodplain throughout Reaches 5 and 6, the

[26] As stated in the Treatability Studies Summary Report, kinetic testing was designed as a 24-week study; however, that report includes results from only the first eight weeks of testing as directed by EPA. Additional data generated beyond that initial eight-week period were not available in time to be considered in the design presented herein; however, the data will be reported in a future revision of or addendum to this Final RD/RA Work Plan or the relevant SIP and any modification to the design amendment dosages will be documented accordingly.

one-dimensional model was expanded to a two-dimensional model to support the final design for Reach 5A.

The two-dimensional hydraulic model was developed using the USACE HEC-RAS version 6.6 modeling software (USACE 2024). Like the one-dimensional model, the two-dimensional model domain included all of Reaches 5 and 6,[27] and inputs to that model were based on a hydrologic analysis conducted using data from multiple sources, including USGS flow data collected at the Coltsville gage through 2023.

Model terrain was specified using detailed topographic LiDAR surveys of the riverbanks and floodplain, bathymetric surveys of the river channel, and survey data for bridge crossings obtained during the Reach 5A PDI (described in the Revised PDI Summary Report for Sediment/Riverbanks) and the SDC program (presented in SDC Summary Report). Specifically, the model terrain was developed using the following surveys:

- Upland topography collected by Spicer in 2022 as part of the Reach 5A PDI;
- Bridge survey data collected by Spicer in 2022 as part of the Reach 5A PDI;
- Single-beam bathymetry collected by Spicer in Reaches 5B, 5C, and 6 during 2022 as part of the Reach 5A PDI;
- Topobathymetric LiDAR survey collected by Whiteout for the Reach 5A river channel and riverbanks during 2025 as part of the Reach 5A SDC program (see Section 5.3.5.2); and
- Survey data of Woods Pond Dam and surrounding area as presented in the latest *Revised Operation, Monitoring, and Maintenance Plan, Woods Pond Dam – MA 00250* (GZA 2025).

For the portion of study area further away from the river beyond the coverage of those recent surveys listed above, the topographic information from the additional LiDAR data collected within the study area in 2015 (Quantum Spatial 2016) was used for the hydraulic model.

Calibration of the model was achieved through comparison of model predictions to field measurements of water surface elevations and current velocities at known flow rates. More detailed descriptions on the model calibration and the comparisons are provided in Appendix C (*Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6*). Once calibrated, the model was used to simulate flows associated with various recurrence intervals, including 1-, 5-, 10-, 25-, 50-, 100-, and 200-year return periods (as determined by the hydrologic analysis discussed in detail in

[27] While the current remedial design work is being performed for Reach 5A, the first hydraulic control point downstream of Reach 5A is Woods Pond Dam in Reach 6; therefore, the hydrologic analysis and hydraulic modeling included all of Reaches 5 and 6.

Appendix C). The model was also used to simulate a bankfull flow scenario and a trend-adjusted 100-year return period flow, which is described in Section 8.2.1.3.

Outputs from the two-dimensional HEC-RAS model simulations include water surface elevations, water depths, depth-averaged current velocities, shear stresses, and inundation extents, which were used to support several aspects of the final design, including sizing of armor material for the erosion protection layer of the engineered cap (described in Section 8.2.1.3 and Appendix H). Both existing conditions and post-remediation conditions (referred to as proposed conditions) were modeled to evaluate how changes in the river and riverbank terrain (resulting from the Natural Channel Design described in Section 8.5) could affect hydraulic characteristics in the river and ensure that there is no loss of flood storage capacity or an increase in water surface elevations throughout Reach 5A.

Figures 5-2a through 5-2i show estimated water depths in Reach 5A based on a comparison of the bathymetry data described in Section 5.3.5.2 and water surface elevations predicted by the two-dimensional HEC-RAS model for the low-discharge calibration scenario of 63 cfs at the USGS Coltsville gage.

Additional details regarding the hydrologic analysis and hydraulic model development and calibration are provided in Appendix C.

6 Project Management Structure and Communications

This section discusses the project management structure for GE, GE's representatives, regulatory agencies, and the remediation contractor(s) that will implement the remediation in Reach 5A. It identifies the remediation team, including key personnel, their roles and responsibilities, and lines of authority. Project communications, including communications with local entities, and methods used to communicate with the community are also discussed.

6.1 GE Project Management Team

GE has established a local project management team to prepare, plan and implement the ROR Remedial Action. The team consists of a Project Manager for the Reach 5A remediation; a Project Manager for the Reaches 5B, 5C, and 6 remediation; and a Project Manager for the UDF construction and operation as well as the transportation and disposal activities. Each Project Manager will be responsible for the safe and quality delivery of his or her allotted work scopes, including, but not limited to, the Construction Quality Assurance (CQA) responsibilities of the CQAP (Attachment E to the Revised POP) and the emergency/contingency planning and emergency response as outlined in Section 2 ("Contingency Plan Roles and Responsibilities") of the *Contingency and Emergency Procedures Plan* (Attachment F to the Revised POP). To ensure a consistent and coordinated effort across the ROR Remedial Action, GE has also appointed an Operations Manager who has overall responsibility for the safe and quality delivery of the remediation project and works with the Project Managers to ensure a consistent approach across the whole project.

To provide a main point of contact with EPA, Massachusetts Department of Environmental Protection (MassDEP), the Connecticut Department of Energy and Environmental Protection (CT DEEP), and local entities for the Reach 5A remedial construction, including local municipalities (the City of Pittsfield and the Towns of Lenox, Lee, Great Barrington, Sheffield, and Stockbridge [Towns]) and Mass Audubon, the GE Project Manager for Reach 5A has been designated as GE's Project Coordinator under the CD. GE's Project Coordinator will be responsible for leading all formal communications with, and submittals to, those parties. GE's Operations Manager and Project Managers will serve as Alternate Project Coordinators and will support the Project Coordinator in these communications. GE will provide notice to EPA, as required by Section II.J of the Revised Final Permit, of any changes to GE's designated Project Coordinator or GE's Alternate Project Coordinators.

6.2 GE's Representatives

GE has retained consultants and contractors to support and implement the various pre-design, design, construction, and monitoring phases of the Reach 5A remediation project. GE's three main consultants (Anchor QEA, Arcadis, and AECOM) have been designated Supervising Contractors for the ROR Remedial Action under the CD. Each Supervising Contractor has a project manager who will

assist the GE management team in the implementation and supervision of all work conducted in Reach 5A and be the main points of contact for their respective firms.

GE will retain a Construction Manager to serve as a representative of GE with responsibility for the overall management of construction activities in accordance with the approved site-specific plans and contract documents. The Construction Manager will manage the remediation contractor (and any other contractors or subcontractors) on behalf of GE and serve as the primary point of contact for communications to and from the remediation contractor (and any other contractors or subcontractors). The Construction Manager will provide CQA and monitor the day-to-day construction quality control (QC) activities performed by the remediation contractor (and its subcontractors) to verify compliance with the contract plans and specifications. The Construction Manager will also manage, coordinate, and administer quality assurance (QA)/QC activities and requirements, including those of any subcontractors to the Construction Manager, and may be assigned management of any third-party QA inspection and testing firms retained by GE.

6.3 Remediation Contractor

As previously discussed, GE will retain a qualified and experienced remediation contractor or contractors to perform the remedial construction in Reach 5A. The remediation contractor(s) will be responsible for performing the work activities in accordance with the EPA-approved design drawings, technical specifications, this Final RD/RA Work Plan, applicable SIPs, and any revisions or addenda thereto. The remediation contractor(s) will, at minimum, designate a project manager, project superintendent, Site Safety and Health Officer (SSHO), and QC Manager. The contractor's project manager will serve as the contractor's main point of contact for the project and coordinate directly with GE's Project Manager for Reach 5A and the Construction Manager throughout the remedial construction process. The contractor's project superintendent will be responsible for the overall management of construction activities in accordance with the approved site-specific plans and be the contractor's main point of contact for site-related communications. The SSHO will be responsible for implementing the contractor's Health and Safety Plan (HASP) and ensuring that the remedial construction is carried out in a safe manner in accordance with all applicable laws and regulations. The QC Manager will be the contractor's designee responsible for overseeing construction QC, submittal QC, and implementing the contractor's QC protocols in accordance with the CQAP and the contractor's QC plan.

Contractor selection, submittals, and SIP development are further discussed in Section 18.

6.4 Regulatory Agencies and Local Entities

GE will coordinate with and submit reports, notices, or other submissions required under the Revised Final Permit to the EPA Project Coordinator and Project Managers and will coordinate with and

provide copies of submissions to the Massachusetts and Connecticut Project Coordinators and representatives of other state agencies as appropriate.

GE will also coordinate as appropriate with local representatives from the City of Pittsfield, the Towns, and Mass Audubon pursuant to the requirements for coordination with these local entities described in the Revised Final Permit, the February 10, 2020 Settlement Agreement, and the Final Revised SOW. GE will also coordinate, as appropriate, with the Massachusetts Historical Commission and, as directed by EPA, with the Native American Tribes and Nations that have been designated as consulting parties for the ROR Remedial Action.

6.5 Communications

Periodic meetings and conference calls among GE, EPA, and the Construction Manager, and/or other entities described in this section will be scheduled as needed to discuss the status of ongoing efforts, upcoming events, and deliverables and to resolve any project-related issues that arise. GE will coordinate with EPA and other entities to schedule such meetings and conference calls, as necessary, to provide updates on the project schedule and discuss project deliverables. To aid in the coordination of communications, GE will develop a contact list applicable to the Reach 5A remediation and distribute the list to appropriate persons responsible for such communications.

In addition, GE will perform the public outreach activities required by the Revised Final Permit and described in the Final Revised SOW and QOL Compliance Plan, including, but not limited to, outreach regarding impacts to river and floodplain recreational activities, road usage, and coordination with land/property owners at or near areas affected by remediation and/or transportation and disposal activities.

7 Site Preparation and Support Area Development

This section provides information associated with site preparation activities and development of support areas to be performed by the remediation contractor prior to initiating remedial actions within Reach 5A. This includes preparing the site to protect existing structures and non-work areas from being impacted by construction activities, construction of temporary access roads and staging areas to facilitate the performance of the remediation work, and other ancillary support tasks necessary to facilitate remediation activities in Reach 5A. Details provided in this section on the temporary access roads and staging areas are preliminary. As described in Section 1.2, additional design details will be developed based on input to be provided by the remediation contractor (that has not yet been selected). The design information presented in this section of the Final RD/RA Work Plan, particularly related to the siting and design of temporary access roads staging areas, represents an advancement of the design relative to that provided in the Conceptual RD/RA Work Plan. Additional design details that reflect contractor input will be provided in a future revision of this work plan or as part of a SIP to be prepared with input from the selected contractor.

7.1 Site Preparation

Immediately prior to or following mobilization to the work areas within Reach 5A, the remediation contractor will perform several site preparation activities to establish the site controls, features, and procedures for subsequent implementation of the remedial construction activities. This includes the following: (1) obtaining utility clearances; (2) establishing site controls and access; (3) establishing survey controls; (4) installing erosion, sedimentation, and turbidity control measures; and (5) surface preparation. General information regarding various site preparation activities (e.g., coordinating with local utilities, permitting, verifying existing conditions, and establishing work areas) is provided in the CQAP (Attachment E to the Revised POP). The information provided in the following subsections supplements the CQAP by providing additional site-specific details associated with certain of these activities.

7.1.1 Utility Clearances

Aboveground and underground utilities that could potentially be affected by the construction activities will be identified prior to initiating any intrusive subsurface activities (e.g., soil excavation and sediment dredging). As indicated on the Design Drawings provided in Appendix A, certain aboveground and subsurface utilities are known to be present within and adjacent to the Reach 5A work areas. Subsurface utilities include sanitary and storm sewer lines, water service lines, and natural gas lines; aboveground utilities include overhead power and communication lines. There are five known utility crossings beneath the river in Reach 5A, including three sanitary sewer crossings (near Stations 0+00, 49+50, and 116+00), two natural gas pipelines (near Station 100+00), and one water main crossing (near Station 190+00).

The remediation contractor will be responsible for coordinating with Dig Safe to determine the locations of utilities at the start of the work and coordinating with the utility owners regarding protection, offsets, relocation, and/or termination of any utilities, as necessary to complete the work.

7.1.2 Work Area Safety and Security

The level of work area security will depend on the activities being performed and the location of those activities. Security measures will be selected in consultation with the remediation contractor and will include the following:

- **Contractor Safety Plans:** The remediation contractor will prepare, submit, and implement a site-specific HASP that will be included in the contracting documents and provided to EPA as part of the initial Site Preparation SIP. At a minimum, this plan will address personnel training, hazard communication, personal protective equipment (PPE), site control and security measures, emergency response procedures, and incident reporting. The remediation contractor will also develop and implement Job Safety Analyses (JSAs), or equivalent task hazard analyses, for all major work activities. These JSAs will identify the specific steps associated with each task, evaluate potential hazards (including physical, chemical, biological, and environmental hazards), and define appropriate control measures such as engineering controls, administrative controls, and required PPE. JSAs will be reviewed with field personnel prior to performing the associated work and will be incorporated into daily safety meetings.
- **Daily Safety Meetings:** Daily safety meetings (i.e., tailgate meetings) will be led by the remediation contractor before commencing work each day. These meetings will address the planned work activities, associated hazards, changes in site conditions, and required protective measures.
- **Temporary Fencing:** Temporary fencing and gates will be installed, as needed, to delineate and secure work areas during ongoing construction activities. Although other fencing configurations of equivalent performance may be considered, such temporary fencing in remote or wooded areas is expected to be at least four feet in height, constructed of high-density polyethylene (HDPE), and orange in color. When work is performed in public use areas (e.g., Canoe Meadows), temporary fencing will be constructed to restrict access to the work areas. Such fencing is expected to be at least six feet in height and constructed of galvanized steel chain-link or welded wire mesh panels. In addition, in accordance with 520 Code of Massachusetts Regulations (CMR) 14.04(3)(b), temporary fencing around narrow unattended open excavations that are greater than three feet in depth and have a width less than their depth will be at least six feet in height with openings of no more than four inches between vertical supports.

- **Warning Tape:** To restrict access during construction activities, warning tape may be installed at locations to delineate certain areas, such as the exclusion zone, contaminant reduction zone, and/or support zone.
- **Signage:** Warning signs will be installed at the entrances to restricted areas. In addition, descriptive panels (to be designed by GE in coordination with EPA) will be installed at entrances to restricted areas to describe the remediation activities and to inform the public how to find additional information on the project website and how to receive relevant notifications.
- **Sign-In/Sign-Out Sheet:** For the duration of construction activities, a sign-in/sign-out sheet will be maintained for work sites. All on-site personnel and visitors will be required to sign in upon entering work areas and sign out upon leaving.
- **Traffic Control Measures:** Traffic control measures will be implemented at access points to work areas along public roadways (e.g., Pomeroy Avenue and Holmes Road) where construction support vehicles will enter the work area. The contractor will install signs to warn oncoming traffic of the construction entrance. Where work is required within the public roadways (e.g., to construct work zone entrances), a police detail will be required in accordance with Massachusetts law. A flagger will be used, as needed, to control traffic when trucks or delivery vehicles have the potential to disrupt traffic along public roadways. Certain activities in high traffic areas may necessitate the use of other signaling devices (e.g., flashing beacons mounted on sawhorses). GE will work closely with the City to coordinate traffic control at work zone entrances. The remediation contractor will obtain any necessary traffic control approvals and make any required notifications prior to initiating traffic control measures.
- **Work Zone Inspections:** During construction activities, inspections of the active work area will be performed by the Construction Manager on each day of construction. The inspections will be performed to note and, if necessary, respond to any changes to the conditions of the work area.

7.1.3 Survey Control and Pre-Construction Surveys

In accordance with the CQAP, survey controls will be established by the remediation contractor at the start of the work and maintained throughout the construction activities. The benchmarks will be used by the remediation contractor's licensed surveyor to establish appropriate horizontal and vertical control consistent with the existing survey data. Remediation contractor survey requirements within each type of remediation area (e.g., river channel, riverbank, and floodplain) are provided in detail in the Technical

Specifications provided in Appendix B. The following pre-construction surveys have been specified (refer to Specification Section 02 21 00 – Surveys [Appendix B]):

- Utilities survey;
- Pre-construction conditions surveys of the work areas;
- In-river debris and shoreline tree surveys;
- Pre-construction surveys of the remediation and grading areas, including the river channel, riverbanks, backwaters, Other Waterbodies, floodplain areas, and vernal pools; and
- Pre-construction surveys of temporary access roads and staging areas.

The pre-construction survey data will be provided to the Construction Manager for review prior to the commencement of any Remedial Action work.

7.1.4 Erosion and Sedimentation Controls and Surface Water Best Management Practices

7.1.4.1 Erosion and Sedimentation Controls

Erosion and sedimentation control measures will be implemented to minimize the potential for erosion of exposed soils and subsequent accumulation of materials in site drainage pathways or the Housatonic River. In addition, these measures will be used to divert rainfall runoff from entering work areas and open excavations.

For floodplain soil excavation areas, erosion control measures to be implemented will include placement of staked silt fencing along the downhill side of the work areas, plus additional area-specific measures, as required. The approximate location and layout of the silt fencing is indicated on the Design Drawings (Appendix A). The silt fencing will be placed at the start of the site work activities and will be maintained until the work area has been restored and vegetation is established. In addition to the silt fence, other erosion and sedimentation control measures will be implemented as needed.

As indicated in the Technical Specifications (Appendix B), the remediation contractor will be required to install erosion controls over newly restored sloped areas and banks adjacent to the Housatonic River to minimize subsequent erosion of fill materials into the river. Such erosion controls will be biodegradable and will remain functional until adequate vegetation is established.

Erosion and sedimentation requirements are provided in Specification Section 31 25 00 – Erosion and Sediment Controls (Appendix B). Details on the erosion and sedimentation controls to be implemented during remediation activities (including installation, monitoring, and maintenance) will

be specified in the SIP for the given segment of the project, which will also include a Stormwater Pollution Prevention Plan (SWPPP), as discussed in Section 18.3.

7.1.5 Site Clearing

Various surface preparation activities will be performed prior to or in conjunction with the initial site preparation activities. Such activities will include the construction of temporary access roads and staging areas (where necessary) and clearing of above-grade portions of vegetation within or immediately adjacent to the limits of soil removal, with the exception of mature trees within or adjacent to relatively shallow (i.e., one-foot) removal areas. Certain additional information regarding the various surface preparation activities to be performed is specified on Design Drawings (Appendix A). Further information regarding such activities, including the installation of temporary access roads and staging areas, will be provided in the SIP for the given segment of the project.

The aboveground portions of cleared vegetation will be directly placed in piles or spread within approved floodplain areas to provide habitat, chipped and used for erosion control, taken off-site to a recycling facility, or disposed of off-site as a non-regulated material. Aboveground materials will be reused wherever practicable, with disposal of this material only as necessary. Grubbed materials removed from excavation areas will be disposed of with the soils in which they were in contact with. Surface features (e.g., fencing) that would interfere with the performance of the remediation or restoration actions will be removed and either be: (1) disposed of off-site as non-regulated materials, recycled, or set aside for reuse during site restoration if they did not contact site soils; or (2) disposed of in the UDF or off-site in accordance with the PCB characteristics of the adjacent soil subject to excavation.

7.2 Temporary Access Roads and Staging/Support Areas

Implementation of the in-river, riverbank, and floodplain components of the Remedial Action in Reach 5A area will require the use of temporary staging areas and access roads. Staging areas generally include dedicated areas where excavated materials will be processed and loaded for transport and where fill materials are delivered and temporarily stored prior to placement as part of the restoration process. Access roads are temporary transport routes used by trucks, equipment, and personnel to access work areas from public roads and for travel/relocation within work areas, including transport of excavated material to staging areas, delivery of backfill materials and supplies, and transport of processed materials. The following subsections provide additional details regarding the rationale, locations, types, layouts, sizes, and uses of the temporary staging areas and access roads.

While the information presented herein reflects GE's anticipated approach regarding the layout and function of staging areas and access roads, the final determination of these areas cannot be made without remediation contractor input to accommodate the contractor-specific equipment and

processes to be used. In addition, the locations of these areas identified herein are subject to ongoing discussions between GE and the respective property owners regarding access to those properties, such that specific layouts may be modified or additional staging areas added based on the results of those discussions. Accordingly, the final alignment and design of access roads and staging areas will be deferred to either a future revision of this Final RD/RA Work Plan or the relevant SIP.

7.2.1 Temporary Staging Areas

As indicated above, temporary staging areas will be established in selected areas to support implementation of the work. Staging areas will be established (and subsequently removed following work completion) as the work progresses along Reach 5A, generally progressing from upstream to downstream over multiple construction seasons. Functions of temporary staging areas include the following:

- Provide designated areas for consolidation, dewatering, and processing of dredged and excavated materials;
- Provide area(s) for truck access and loading so that processed material can be transported off site;
- Provide areas for delivery and short-term storage of imported cap and backfill materials;
- Provide areas for material and equipment laydown and staging;
- Provide areas for setup and operation water treatment systems;
- Provide areas for equipment decontamination/cleaning operations; and
- Provide support areas including areas for parking and field office trailers for project personnel, and equipment, material, and tool storage areas.

The Conceptual RD/RA Work Plan identified 10 preliminary staging areas throughout Reach 5A. Since that time, the locations and layout of the staging areas have been further evaluated. For this final design, seven staging area locations were identified in Reach 5A in consideration of the following factors:

- Proximity to Reach 5A sediment, riverbank, floodplain, and vernal pool remediation areas;
- Availability of at least two acres of available space, focusing on GE-owned, public, and non-residential areas distributed throughout Reach 5A;
- Availability of reasonable access to and from public roads where truck travel is permitted;

- Avoiding locations of Core Area 1 and Core Area 3 habitat areas and other sensitive habitats, to the extent possible;[28]
- Availability of relatively flat, level work areas to minimize the need for extensive site grading or filling;
- Avoiding or minimizing disturbances to or interference by existing utilities, including natural gas lines and overhead power lines;
- Prioritizing use of disturbed or degraded habitat areas, where practicable (e.g., utility corridors, open fields or other open areas, existing paths, areas with a strong dominance of invasive plant species, and areas impacted by historical or ongoing human-made disturbances);[29] and
- Condition 75 of EPA's conditional approval letter for the Conceptual RD/RA Work Plan, which requires GE to evaluate transport methods that minimize the use of local public roads and use temporary project-specific roads and river crossings to facilitate the use of rail transport to the UDF and to off-site disposal facilities. Given this directive, revised staging area locations were established, in conjunction with access roads, to maximize the use of the Utility Drive rail transload area and minimize the use of local public roads to the extent practicable.

The seven temporary staging area locations are shown collectively on Figure 7-1a and individually on Figures 7-1b through 7-1h. Key details regarding each area are summarized in Table 7-1. The table also identifies the project construction seasons when each staging area is anticipated to be used (based on the anticipated construction implementation schedule described in Section 18.1), which reflects the expectation that the Reach 5A remedial activities will be completed over five construction seasons.

Table 7-1
Proposed Staging Areas in Reach 5A

Staging Area[a]	Approximate Size (acres)	Property Owner	Anticipated River Reach Served[b]	Anticipated Construction Year
1	3.0	MassDFW	0+00 to 48+30 (Pomeroy Avenue Bridge)	Year 1
3	2.2	Mass Audubon	48+30 to 90+00	Year 2
4	2.1	GE; other private owner	80+00 to 100+50	Year 2

[28] No staging areas are proposed in Core Area 1 or 3 habitat areas; impacts to Core Area 2 habitat cannot be avoided given the widespread extent of Core Area 2 habitat in Reach 5A.

[29] Such disturbed or degraded areas were identified during the Reach 5A BRA and were described and shown in Section 10.1 and Figures 10-1a through 10-1e of the Revised BRA Report. Those areas were considered in selecting preliminary staging area locations, as well as access roads (discussed below).

Staging Area[a]	Approximate Size (acres)	Property Owner	Anticipated River Reach Served[b]	Anticipated Construction Year
5	4.5	GE; other private owner	100+50 to 158+00	Year 3
6	4.4[c]	MassDFW	116+00 to 150+00	Year 3
7	4.1	MassDFW	150+00 to 200+00	Year 4
10	4.6	GE	200+00 to 245+00	Year 5

Notes:

a. Staging Area IDs retain the numbering from corresponding areas established in the Conceptual RD/RA Work Plan. Because some of those areas were eliminated during final design, staging area numbers are not sequential.

b. There is overlap in reaches served based on proximity to floodplain soil areas on each side of the river and variability in the specific location material will be transported to based on remediation contractor's means, methods, and equipment selection.

c. The Staging Area 6 layout abuts the planned Utility Drive rail spur and loading area and encompasses the flattest and most level available work area within that parcel. Pending the final design location and layout for the rail loading area, Staging Area 6 is expected to provide a means of direct transport from the staging area to the rail loading area.

Staging area locations were selected, in part, to support the material handling, dewatering, and segregation for nearby remediation areas. For example, as indicated in the table above, Staging Area 1 (Figure 7-1b) is intended to support the remediation of floodplain soil, riverbank soil, vernal pools, and main channel sediments between the Confluence (Station 0+00) and the Pomeroy Avenue Bridge (Station 48+30). Because the Reach 5A remedial construction is anticipated to take five years to complete, construction of individual staging areas and associated access roads will not occur until they are needed to support the remediation in the applicable section of the river or floodplain. For example, because the remediation will occur from upstream to downstream, Staging Area 1 will be constructed to support remediation during the first construction season; staging areas identified to support remedial activities in farther downstream portions of Reach 5A will not be constructed until they are needed as the work advances. Table 7-1 identifies the anticipated construction year(s) in which each staging area will be required. The actual construction sequence and schedule may differ based on remediation contractor input, realized production, unplanned delays (e.g., due to weather, river flow, or field conditions), or other factors.

Staging areas will be established by clearing and grubbing each target area, as necessary, to remove vegetation such as trees and shrubs. Aboveground portions of cleared vegetation (unimpacted by PCB-containing site soils) may be stockpiled for future use in restoration measures. Grubbing will be minimized to the extent possible, and any rootballs that must be removed to facilitate proper grading and use of the area will be subject to disposal as PCB-containing material. While staging areas were selected to maximize use of relatively flat and level areas, some grading is anticipated in certain areas to provide suitable drainage and use of the site. Once suitably graded, geotextile fabric will be placed to provide separation between the native soils and the fill materials placed and graded to provide a suitable working surface. It is anticipated that the working surface will be composed of crushed stone because of its ability to even out variations in the existing grade relative to the target

surface grade within the staging area. Consistent with the intent that the remediation contractor will be responsible for the layout and functional uses of the staging areas, the remediation contractor may propose and utilize alternative or supplemental ground cover materials (e.g., wood mats or composite mats) that are suited to planned means and methods and meet the requirements of the Technical Specifications. Once the surface is established, the remediation contractor will lay out the staging areas (i.e., identify designated areas for travel routes, material staging, treatment systems, stockpiles, and support facilities) to accommodate its anticipated functions considering the remediation contractor's means and methods. Regardless of the remediation contractor's specific layout, any portions of the staging area that are used for stockpiling or processing of dredged or excavated materials will be designed to mitigate potential impacts to underlying materials. Such areas will include an underlying liner and protective working surface to prevent damage to the liner as a result of stockpiling or equipment operations. Liners will include a minimum 40-mil impermeable seamed liner (HDPE or equivalent) plus a protective overlying material such as geotextile and gravel or stone. Stockpile/processing areas will also be bermed and sloped to allow for containment and collection of liquids (e.g., leachate and precipitation) for appropriate treatment.

Because staging areas will be used for handling and processing of PCB-impacted materials, mechanical equipment, and fuel storage, they will be designed and managed in a manner that protects them from flooding up to and including the estimated water surface elevation for a river flow event with a 100-year return frequency at a given location. This will be achieved through perimeter berms, portable deployable equipment, contingency planning, and monitoring of weather and field conditions during implementation of the work. The specific methodologies will be developed by the remediation contractor and must meet or exceed the minimum requirements established in the Technical Specifications. Details on how each staging area will be protected from a 100-year river flow event will be provided in the applicable SIP.

It is possible that staging areas may be left in place during winter shutdown periods (either because they will be used again during the following season or because timing of the work does not allow for a staging area to be removed and restored prior to winter conditions). In that case, the remediation contractor will be required to remove and dispose of all impacted materials staged in the area prior to shutdown. In addition, all fuel, chemicals, and equipment will be required to be removed from the staging area and relocated to a designated upland storage area. The remediation contractor will be required to prepare and implement an overwintering plan that describes the measures and controls to be undertaken for overwintering of staging areas. At the remediation contractor's discretion, the plan may include additional measures to protect any remaining materials and infrastructure within a staging area (e.g., berms, liners, pads) from winter conditions, including potential flooding events.

When remediation and restoration activities are complete in a portion of Reach 5A being served by a given staging area (and that staging area is no longer needed), all equipment and materials will be

removed from the area and managed as discussed in Section 7.2.3. The area will then be disked, scarified, raked, or tilled to de-compact the soils and regraded to re-establish the original grade consistent with the site restoration plan. It will then be seeded and planted to re-establish the pre-existing functions and uses of the area, as further discussed in Section 10.5 and the Restoration Plan.

Final locations of the staging areas will be subject to potential modification based on input from the remediation contractor and GE's ability to obtain access agreements for the properties where the staging areas (and temporary access roads) will be constructed. Also, it should be noted that the privately owned property where Staging Areas 4 and 5 have been sited is subject to an Agricultural Preservation Restriction (APR) held by the Massachusetts Department of Agricultural Resources (MassDAR).[30] Temporary use of these areas for staging areas to support the Remedial Action will require an amendment to the APR, an agreement by MassDAR to forbear from enforcing the APR for this temporary period, or other arrangement to allow temporary use of this property for staging areas. The specific layout of each staging area, the portion of the available areas used, and the potential need for additional or alternate areas will also be subject to input from the remediation contractor and its specific means and methods for completing the work.

7.2.2 Temporary Access Roads

Temporary access roads will be constructed to facilitate implementation of the remediation work. The functions of temporary access roads include the following:

- Provide personnel, truck, and equipment access from public roadways to work areas and staging areas;
- Provide access to points along the river where equipment can enter and exit the river to perform dredging and restoration activities;
- Provide routes for transporting excavated and dredged materials from remediation areas to staging areas;
- Provide routes for transporting fill materials from staging areas into remediation areas as part of the backfill, capping, and restoration; and
- Provide routes for trucks to haul processed material from staging areas to consolidation and disposal areas (e.g., the Utility Drive rail loading area, UDF, and off-site disposal locations, as further discussed below).

[30] The GE-owned property where these staging areas are proposed is subject to the same APR, but that APR has been amended to allow on the GE-owned property any activities required by the CD, such as use of the property for staging areas to serve the ROR remedial action

The following two categories of access roads are planned:

- **Primary access roads** are the most significant roads where most of the transport will occur, including frequently traveled areas where access by the largest equipment (e.g., trucks delivering excavation equipment) and heaviest loads (e.g., loaded trucks) are anticipated. This includes access road segments from public roads to staging areas and from staging areas to the Utility Drive rail loading area, where applicable. As further discussed below, these roads typically follow existing travel corridors (e.g., sewer lines, farm roads, and existing access routes) and will be constructed using at least seven inches of crushed stone (further discussed in Section 7.2.2.1.1) underlain by geotextile fabric. Primary access road widths will target 24 feet where necessary to accommodate two-way traffic, and approximately 16 feet where frequent two-way traffic is not anticipated or cannot be accommodated due to field constraints.
- **Secondary access roads** are intended for equipment access from primary roads to specific remediation areas or river access points. These roads will generally be used less frequently, over a shorter duration, and by smaller loads. It is generally anticipated that these roads will be approximately 12 feet wide and constructed of crushed stone, gravel, timber mats, or composite mats, with timber mats or composite mats preferred in areas of soft, organic, wetland soil areas (see Section 7.2.2.1.1).[31] In each case, the secondary access road material will be underlain by geotextile or other fabric material to provide separation from the underlying soils. Because the secondary access roads are largely intended to facilitate access by contractor equipment to work areas, the size, type(s), and configurations of secondary access roads will be a function of the specific equipment planned by the remediation contractor for work activities in a given area. Accordingly, selection of specific construction materials for secondary access roads will be determined by the remediation contractor.

The overall layout of the primary and secondary access roads is shown on Figures 7-1a. Similar to the staging areas described above, the layout of the access roads has been revised in this Final RD/RA Work Plan from the conceptual layout provided in the Conceptual RD/RA Work Plan based on the following considerations:

- To account for the revised staging area locations and configurations described in Section 7.2.1;
- To allow for direct transport of materials from staging areas to the Utility Drive rail spur area on "internal" access roads (where practicable);
- To reflect the finalized remediation areas and footprints;

[31] Timber mats or composite mats have been considered for wetland areas in the final design pursuant to EPA Conditions 66 and 69.

- To capitalize on existing "disturbed areas" and existing pathways, including City sewer easements within the project area;
- To capitalize on existing access routes used to provide access as part of the SDC program in 2025 (see Section 5.3.2.1) or other purposes (e.g., access routes used to remove fallen trees in the river);
- To avoid disturbing an archaeological site that had been identified in the 2024 cultural resource surveys in a then-proposed access road (see Section 5.5);
- To provide an access route to the staging area on GE property that provides greater separation from the residential area along Anita Drive;
- In consideration of additional topographic data collected during the SDC program (e.g., to avoid steep terrain, follow existing pathways, and target more favorable locations for river access points); and
- To eliminate secondary access roads to vernal pools where the need for and method of remediation have yet to be determined based on results of the vernal pool pilot study.[32]

Some access roads to be constructed as part of the vernal pool pilot study in 2026 share the same alignment as the planned Reach 5A access roads. Where they coincide, roads constructed during the vernal pool pilot study will remain and be upgraded, as needed, to support the Reach 5A remediation.

Note that the access road layout includes various river access points, river crossing points, and temporary bridge locations. River access points are expected to be at-grade points where equipment would access/egress the river and are primarily intended for use by dredging-related equipment and the associated restoration equipment. The final river access points and methods will be determined by the remediation contractor. Preliminary locations of the river access points are shown on Figures 7-1a through 7-1h and on the Design Drawings (Appendix A). River access points and crossing points may require temporary placement of crushed stone or other materials to provide a safe and stable path or working location for equipment to work within or cross the river (i.e., a river crossing). Any materials placed within the river would be for temporary access and will be removed as part of the remediation and/or restoration activities once access is no longer needed.

Three temporary Housatonic River bridge crossing locations are anticipated and have been included in the temporary access road layout. Temporary bridges are located at points where primary access roads cross the river and where such roads may be extensively used by heavy equipment such as

[32] Secondary access roads may be added to access vernal pools where remediation is ultimately determined to be needed as identified in an anticipated future Final RD/RA Work Plan Addendum to address remediation of vernal pools not included in the pilot study.

loaded trucks transporting materials to staging areas or from staging areas to the Utility Drive rail loading area. Temporary bridges will be used to accommodate river crossing by loaded trucks, which are not suitable for at-grade crossings (e.g., trucks transporting intermodal containers from staging areas to the Utility Drive rail loading area via temporary access roads). The anticipated temporary bridge crossings are located near Stations 66+00, 139+00, and 213+00. The actual number, configuration, and locations of temporary bridge crossings may vary and will be determined by the remediation contractor based on the remediation methods and approach.

Details associated with temporary bridge crossing locations and designs will be developed based on input from the remediation contractor and will be presented in a future SIP. At a minimum, the bridge crossing design(s) will be required to accommodate normal base flow within the river, allow for required remediation of sediments and riverbank soils in the vicinity of the crossing, and be sufficient to accommodate single-lane traffic by loaded transport vehicles and other equipment to be used by the remediation contractor.

7.2.2.1 Access Road Design Considerations

As stated above, primary access roads are generally anticipated to be constructed of compacted crushed stone on top of a geotextile separation fabric. Alternative materials proposed by the remediation contractor may be considered (e.g., composite mats) if they provide similar performance and other project benefits (e.g., reduced ground disturbance, improved efficiency, reduced volume of access road materials that would require disposal, and enhanced effectiveness in soft soils). Secondary access road material types will be at the discretion of the remediation contractor based on anticipated equipment, loading, and use intensity. Anticipated secondary access road materials will typically include timber mats or composite mats, but may include crushed stone or gravel if needed for specific equipment or access needs. Typical access road design details are provided in the Design Drawings (Appendix A).

As also indicated above, primary access road widths are generally designed to be 24 feet wide in areas of frequent use by heavy equipment and loaded transport vehicles (including primary access routes from public roads to staging areas and from staging areas to the Utility Drive rail loading area). Primary access roads in less trafficked areas or where otherwise constrained by site conditions are generally designed to be 16 feet wide. Secondary access roads are anticipated to be 12 feet wide or as otherwise necessary to accommodate the remediation contractor's equipment. Note that deviations from these target widths may occur based on the following considerations:

- Access road widths may be wider at curves, turning points, and access points onto public roads to accommodate turn radii of trucks and equipment.
- Access roads may narrow at constriction points to avoid construction through or infringement on sensitive areas. For example, the primary access road from Pomeroy Avenue to

Staging Area 1 has a reduced width in certain areas to maintain a target minimum of five feet from vernal pools adjacent to the existing sewer easement.

- In some cases, planned access roads will follow existing developed roads (e.g., existing paved and gravel access routes in the vicinity of Utility Drive and the Pittsfield WWTP). In those cases, existing paved access roads will not be widened. Those roads have suitable sight distance to accommodate two-way traffic, and gravel turnouts can be constructed as needed to facilitate two-way traffic.

The remainder of this subsection identifies additional design considerations that affect the general configurations of access roads described above.

7.2.2.1.1 Soil-Bearing Capacity Evaluation

As described in Section 5.3.2.2, DCP tests were performed as part of SDC program to evaluate the soil properties and relative bearing capacity of soils in areas that were conceptually identified as locations for access roads and staging areas in the Conceptual RD/RA Work Plan. DCP tests were performed at 52 locations within Reach 5A, including 46 locations along potential access road routes and six locations within potential staging areas. The resulting data were then used to calculate CBRs as a means of assessing areas where, and to what degree, additional subgrade support will be required to accommodate anticipated construction access road uses. As further discussed in Appendix K, DCP tests and calculated CBR values were used to classify the existing ground surface at the proposed access road segments into one of four categories (unsuitable, poor, fair, and good), and to determine the minimum thickness of gravel cover required to support anticipated access road use within each category, as summarized in Table 7-2.

Table 7-2
Summary of Calculated CBRs from DCP Tests

Existing Subgrade Condition	Correlated CBR Value	Minimum Gravel Layer Thickness (inches)
Unsuitable	≤3% AND visually marshy/unstable	NA
Poor	≤3%	11.5
Fair	3%<CBR≤10%	9.0
Good	CBR>10%	7.0

Figures provided in Appendix K show the areas where each soil category was identified. The proposed access road locations were generally characterized by good or fair subgrade conditions, with isolated segments being characterized as poor or unsuitable. These isolated areas of poor and unsuitable soil classifications were generally identified along access roads upstream from Pomeroy Avenue in the vicinity of Staging Area 1.

As indicated in Table 7-2, a minimum gravel layer thickness of seven inches is sufficient for subsurface conditions identified as good, which includes the majority of the tested areas. Additional thicknesses may be required where other subsurface conditions have been identified (see Appendix K) or based on site-specific field conditions encountered by the remediation contractor during implementation of the work.

Very limited areas of planned access roads were identified as "unsuitable" in their present condition for driving directly on them based on the bearing evaluations. These limited areas generally occurred where secondary access roads pass through soft soils along bank areas upstream of Pomeroy Avenue. The preferred working surfaces in such areas include timber mats or composite mats (described above), and additional improvements (e.g., use of geogrid reinforcement or gravel) may be necessary to the subgrade in these areas. In addition, gravel may be needed in certain areas, particularly at the points at which access roads transition below the waterline at river access and crossing points, because timber mats and composite mats are not suitable for underwater areas. Adaptive management will also be employed in such areas, including periodic inspection, maintenance, and repair (as needed) to restore temporary access roadways.

It should also be noted that the DCP tests and soil-bearing capacity evaluations were performed at locations based on the access road layout provided in the Conceptual RD/RA Work Plan. Some changes to that conceptual layout occurred as part of the design such that certain DCP investigation locations no longer fall directly within planned access road locations. However, with the limited exceptions noted above, most locations indicate that area-wide soils are classified as "fair" or better and are thus suitable for use as access roads as described above, even where DCP test locations do not align with the limits of the final design access road layout. Where any planned access road areas are considered unsuitable or soft, the final design can accommodate alternative and supplemental road designs that can be employed as needed based on the conditions encountered by the remediation contractor in the field.

7.2.2.1.2 Access Roads Along Sanitary Sewer Easements

As indicated on the Design Drawings (Appendix A), significant portions of the planned access road layout are located along City sewer easements that traverse the area. Construction equipment and vehicles would traverse along the temporary access roads during the remediation, including trucks transporting excavated soils/sediment for disposal and trucks importing aggregate materials for backfill and cap construction. Use of the sewer easements in this manner capitalizes on the existing access paths and lack of vegetation in these areas, because those areas are already disturbed. GE has discussed the proposed construction of temporary access roads along sewer easements with the City. The City provided GIS files and Record Drawings for the constructed sanitary sewer pipeline. The City's Record Drawings indicate that most of the sanitary sewer lines beneath the proposed temporary access roads consist of a 72-inch Class IV reinforced concrete pipe. The City's GIS files and

Record Drawings show the approximate location of the sanitary sewer pipelines and manholes along with pipe invert elevations at the manholes.[33]

A geotechnical evaluation was conducted to assess the amount of cover soils (based on pipe burial depth) that would be needed to protect the sewer line during the anticipated traffic loads during remedial operations. The supporting geotechnical analysis and calculations are provided in Appendix K. The calculated factors of safety for three-foot and one-foot depths of cover were 3.1 and 2.2, respectively. The City's Record Drawings from the original sewer construction specified a minimum three feet of cover from top of pipe to top of pavement or aggregate roadway surface for access roads. Therefore, the access road design calls for a minimum of three feet of cover above the sewer pipes.

As discussed in Section 5.3.5.1, the sanitary sewer manhole locations and easements were surveyed by C.T. Male to refine the estimates of depth of ground cover above the sewer lines. Based on this survey data, it was determined that, in most areas, there are three or more feet of existing soil cover above the sewer pipeline along the segments where temporary access roads are planned. Cover thickness was determined to be less than two feet in one discrete area along the sewer easement west of Pomeroy Avenue near Staging Area 1 (Appendix K). In this location, the access road will be routed to avoid the sewer line or additional fill will be placed to provide at least three feet of total cover on above the sewer pipeline as noted on Design Drawing S1100 (Appendix A).

Notwithstanding the evaluation summarized above and presented in Appendix K, the remediation contractor will be required to inspect and evaluate field conditions (including pipe and manhole conditions and soil cover depth) and perform an independent analysis to confirm the viability of constructing temporary access roads along existing sewer mains. That evaluation will be required to consider sewer component conditions, pipe burial depths, specific access road designs, and surcharge loading associated with proposed equipment and operating conditions. This may result in additional protection or use limitations as part of the project implementation.

7.2.2.1.3 Entrances to Public Roadways

There are five locations where the proposed temporary access roads will intersect public roadways. These are as follows.

- The access road that leads to Staging Area 1 intersects Pomeroy Avenue just north of the Housatonic River bridge.

[33] The City confirmed that the sewer Record Drawings used a City-specific datum so values were corrected to the project datum (North American Vertical Datum of 1988 [NAVD88]) based on field survey measurements.

- The access road that leads to Staging Area 3 intersects Holmes Road at the current entrance to Canoe Meadows.[34]
- The access road located along the sewer easement intersects Holmes Road on the west side of the river.
- The access road to access Staging Areas 4 and 5 will be via an existing entrance to the Noble Farm property on East New Lenox Road.
- A new access road to Staging Area 10 will be from East New Lenox Road between the Butler Farm and the Electric Power Research Institute driveways.[35]

The locations of these intersections are shown on Figure 7-1a.

Primary access road widths are nominally 24 feet at each of these intersection locations with exception of the access road on the western side of the river south of Holmes Road. Curb cuts at these locations will have a target minimum 30-foot width to accommodate loaded trucks entering and exiting these locations.

At the Pomeroy Avenue intersection, the existing curb and sidewalk will be removed to provide a wider entrance that accommodates the potential for trucks entering and exiting this access road. A new temporary asphalt surface will be placed to provide a transition from the existing road surface onto the access road. The asphalt will include a designated crosswalk area to accommodate continued pedestrian use along Pomeroy Avenue during construction. Once the work in this segment of Reach 5A is complete, the asphalt material will be removed and new curbing and sidewalk will be placed to generally re-establish pre-existing conditions and road width. Curb and sidewalk restoration details will be consistent with the City's Public Works Department's engineering construction details. This intersection may be modified for increased accessibility as part of the vernal pool pilot study planned for 2026. Details associated with construction of the access road intersection with Pomeroy Avenue are provided in the Design Drawings (Appendix A).

The sewer easement along Holmes Road will not be a primary access/egress point from a staging area; it will primarily be used for the purpose of constructing the sections of access road along the eastern side of the river and along the sewer line north of Station 90+00. As a result, the existing access road width at the Holmes Road intersection (approximately 20 feet) will be maintained and the target width of access road beyond the entrance will be 16 feet. This intersection, including the

[34] GE understands that Mass Audubon intends to close the Holmes Road parking area during the remedial construction period and will provide alternate access to Canoe Meadows via Williams Street.

[35] The access road to Staging Area 10 was shifted south of the location shown in the Conceptual RD/RA Work Plan to avoid an archeological site identified in the Revised Phase IB CRS Report.

grade along the access road immediately east of the intersection, may be modified for increased accessibility as part of the vernal pool pilot study planned for construction in 2026.

Note that the other intersection locations do not include sidewalks, and transitions will be made consistent with the existing curb type at those locations (generally formed asphalt curbs). Stop signs (to stop project-related traffic at these intersections) will be placed at each intersection point. Gates and signage will also be placed at each location to deter unauthorized access during non-work periods.

7.2.2.1.4 Natural Gas Line Crossings

A natural gas easement and two underground natural gas utility lines cross the Housatonic River near Station 100+00 and pass south of the planned location of Staging Area 4. The owner of these gas lines (Kinder Morgan) requires that an "air bridge" (i.e., a slightly elevated structure that prevents vehicle load from being applied to the ground surface) be constructed at points where access roads will cross the natural gas lines to avoid additional applied loads on the natural gas lines associated with vehicle traffic.[36] Therefore, a temporary air bridge(s) will be constructed where access roads cross these gas lines.

7.2.2.2 Access Road Construction Considerations

Construction of access roads will generally proceed with the progress of the work. Sections of access road needed for a given year will be installed as part of site preparation activities prior to each construction season. In areas where primary or secondary access roads pass through areas subject to remediation, the sequence for completing the remediation will be determined in coordination with the remediation contractor.

Access roads will generally be constructed by clearing vegetation (shrubs and trees) from the access road locations. Limited grading will be performed where necessary, to provide a suitable subgrade. Erosion control measures will be installed along the disturbed areas and maintained for the duration of the project. Temporary culverts, or extensions to existing culverts, will be installed, where necessary, to accommodate drainage in areas where the access roads cross surface water drainage channels or swales.

7.2.2.3 Transport Routes from Staging Areas

As indicated above, one of the functions of the access roads will be to facilitate transport of impacted soils from staging areas either to the Utility Drive rail transload area or directly to the UDF. Table 7-3 summarizes the primary and secondary transport routes from the proposed staging areas to the Utility

[36] Kinder Morgan stated that it may consider an exception to using an air bridge on a case-by-case basis if the vehicle or equipment crossing over the natural gas lines results in low-ground pressure.

Drive rail transload area or directly the UDF.[37] The primary routes assume the use of the Utility Drive rail transload area. As discussed in Section 12.2, if at any time use of rail transport cannot match target production rates for sediment and soil removal (i.e., material is being removed and stockpiled faster than it can be transported for disposal, with the risk of running out of room), truck transport will be utilized to supplement rail transport and convey removed materials for disposal. In this situation, as also discussed in Section 12.2, EPA's conditional approval of GE's 2024 *Revised On-Site and Off-Site Transportation and Disposal Plan* (Revised T&D Plan; Arcadis 2024a) required GE to develop a backup plan for transportation of material via trucks directly to the UDF if needed.[38] Accordingly, as a backup plan, secondary routes have been identified for use in the event that the materials need to be transported directly to the UDF via truck; those secondary routes are noted in Table 7-3 and further discussed in Section 12.

Table 7-3
Summary of Primary and Secondary Transport Routes from Staging Areas for Material To Be Disposed of in the UDF

Staging Area	Primary Route from Staging Area(s) to UDF	Secondary Route(s) to UDF
1	Exit Staging Area 1 access road onto Pomeroy Avenue south and truck via public roads (Holmes Road) to Utility Drive rail transload area	Same as primary, except continue via public roads (US-20, Walker Street, Mill Street, and Willow Hill Road) directly to the UDF
3	Exit onto Holmes Road south and truck via public roads (Holmes Road) to Utility Drive rail transload area	Same as primary, except continue via public roads (US-20, Walker Street, Mill Street, and Willow Hill Road) directly to the UDF
4 and 5	Use internal access roads to cross river near Station 139+00 to Utility Drive rail transload area	Exit access road south onto East New Lenox Road and truck via public roads (New Lenox Road, US-20, Walker Street, Mill Street, and Willow Hill Road) directly to the UDF
6	Use internal access roads or directly from the staging area to the adjacent Utility Drive rail transload area	Exit via access roads onto Utility Drive then south onto Holmes Road and continue via public roads (US-20, Walker Street, Mill Street, and Willow Hill Road) directly to the UDF
7	Use internal access roads to transport to Utility Drive rail transload area	Exit via access roads onto Utility Drive then south onto Holmes Road and continue via public roads (US-20, Walker Street, Mill Street, and Willow Hill Road) directly to the UDF
10	Use internal access roads to cross river near Station 213+00 to Utility Drive rail transload area	Exit access road south onto East New Lenox Road and truck via public roads (New Lenox Road, US-20, Walker Street, Mill Street, and Willow Hill Road) directly to the UDF

[37] As discussed in Section 7.2.1, the staging areas identified in Table 7-3 are subject to modification based on input from the remediation contractor, GE's ability to obtain access agreements for the subject properties, and resolution of the APR issues affecting Staging Areas 4 and 5.

[38] EPA's conditional approval letter notes that this backup plan "is necessary because of potential capacity limitations, potential coordination issues with the sole operator of the railroad, staffing issues, equipment limitations, conflicts with freight shipments, accidents, and other issues that may prevent the use of rail needed to maintain the remediation schedule."

7.2.2.4 Access Road Restoration

In general, primary and secondary access roads will be removed when they are no longer needed and will be restored to pre-existing conditions. This will include removal of access road materials (stone, timber mats, composite mats, geotextile, geogrid, and temporary culverts), disking or other measures to de-compact the soil surface, regrading, replacement of topsoil, and revegetation consistent with pre-existing conditions as described in the Restoration Plan.

However, certain access road areas may be left in place for post-project use based on future discussions with the property or easement owners. For example, the City may prefer that the improved access roads remain in place for future use along certain sections of the sanitary sewer easements. Similarly, improved access roads constructed along existing farm roads may remain in place after the Reach 5A construction. Determination of whether any access roads remain in place will be subject to further discussion and coordination with the City or property owners.

7.2.3 Reuse or Disposal of Construction Materials

Temporary construction mats used for access roads and staging areas will be cleaned prior to removal from the site or reuse during a subsequent construction season. Following cleaning with a high-pressure water spray to remove all visible soil and sediment, wipe samples will be collected from the mats at a minimum frequency of one sample per 50 construction mats to verify that surface PCB concentrations are below 10 micrograms (µg) per 100 square centimeters (cm^2) prior to off-site removal. GE may propose a reduced wipe-sampling frequency if sampling results consistently demonstrate PCB concentrations are below this criterion. If initial wipe sampling confirms that cleaning procedures are effective (i.e., PCB concentrations are less than 10 µg per 100 cm^2), decontamination of construction mats that remain on site and are dedicated for future project use during subsequent construction seasons may be verified by visual inspection, provided that all visible soil and sediment have been removed from mat surfaces.

In addition, for sustainability purposes, GE proposes to reuse materials used to construct temporary access roads and staging for construction of other temporary access roads or staging areas in other parts of Reach 5A or other ROR reaches, subject to certain conditions (described below). This beneficial reuse approach will reduce the overall quantity of materials that require importation to the project site. As described above, crushed stone or gravel used for temporary access roads and staging areas will be placed above a geotextile material to provide a delineation between that material and the existing ground surface. Following use of the access roads and staging areas for hauling and management the remediation waste materials, GE will collect samples of the gravel materials at a frequency of one sample per 500 linear feet along the access roads and one sample per 2,500 square feet in the staging areas. The samples will be submitted for laboratory analysis of PCBs. If PCB concentrations are below 1 mg/kg, GE will reuse the corresponding crushed stone and gravel for constructing temporary access roads or staging areas in other areas of the project site.

These materials may be temporarily stockpiled or staged in a nearby support area prior to reuse. In the event that PCBs are detected at or above 1 mg/kg, the materials will not be reused and will either be transported for disposal in the UDF (if PCB concentrations are less than 50 mg/kg) or transported to a commercial off-site disposal facility (if PCB concentrations are greater than or equal to 50 mg/kg). In addition, materials used to construct the access roads and staging areas that are not designated for reuse will be transported for disposal in the UDF or commercial off-site disposal facility using the same criteria. This includes geotextile fabric, liners, tarps, geogrid, or similar materials.

Prior to conducting the sampling described above, GE will submit a sampling plan for EPA review and approval to identify the proposed sampling locations and methods and to identify any proposed temporary stockpile areas.

7.3 Equipment Cleaning Areas

Equipment and materials that may have contacted impacted sediment, soil, or water during remediation activities will be subject to various inspection/cleaning requirements while on site and prior to departing from the remediation site. Equipment cleaning areas will be constructed by the remediation contractor within the temporary staging areas to allow for cleaning and decontamination. Details and locations associated with the cleaning areas, including tier cleaning stations, will be developed by the contractor based on site conditions and its planned methods and details will be presented in the SIPs.

Equipment cleaning will be performed in accordance with Section 3.5 of the *Site Management Plan* (Attachment C to the Revised POP) and as described in Specification Section 02 51 00 – Decontamination (Appendix B). At a minimum, the following equipment cleaning procedures will be performed:

- During mobilization activities, all heavy equipment (e.g., excavators, loaders, and trucks) to be used on site will be subject to a visual inspection to verify that the equipment is generally clean and free of excess sediment or soil. Entry to the project work area will be refused until such time as the equipment has been adequately cleaned and subsequent visual inspection indicates satisfactory conditions.
- Tire cleaning stations will be constructed to prevent the tracking of soils onto public roads, and improvements to the temporary access roads from the tire cleaning stations to the egress on the public roads will be performed by placing a geotextile fabric and layer of crushed gravel in those areas. Each transport vehicle will be visually inspected prior to leaving the loading area. Sediment and soil accumulations on the vehicle tires or other exterior surfaces will be removed manually or, if necessary, by using a high-pressure water spray in an equipment cleaning area. The final locations and layout of the tire cleaning stations will be determined by the remediation contractor prior to construction and be presented in the applicable SIP.

- An equipment cleaning area will be constructed and used by the remediation contractor in each work area and will generally consist of an impermeable barrier that is sloped to a collection sump. Water and solids generated during decontamination activities will be collected and handled in accordance with Specification Sections 02 72 00 – Water Management and Treatment and 02 61 15 – Handling and Disposal of Impacted Materials, respectively (Appendix B).
- Material-handling equipment that has been used to remove or handle PCB-containing soils will be cleaned in an equipment cleaning area before any of the following: (1) it handles "clean" materials (e.g., backfill or capping materials); (2) it is moved to another project work area over public roads; or (3) it is demobilized from the project site. Equipment cleaning likely will be performed using high-pressure water spray. Water will be collected in a sump constructed by the remediation contractor and will be containerized and managed in accordance with Specification Section 02 72 00 – Water Management and Treatment (Appendix B). The equipment will be inspected by the Construction Manager prior to its departure from each area subject to remediation.
- Prior to being demobilized from areas subject to remediation, heavy equipment (e.g., excavators and loaders) and any temporary earth-retaining structures will be subject to wipe sampling following final equipment cleaning to confirm that PCB levels on the surface of the equipment are below 10 µg per 100 cm^2. Equipment and structures that do not meet this standard will be cleaned again and resampled until such time as PCBs are below that level.

7.4 Avoidance and Minimization of Rare Species Impacts

Measures to avoid and minimize impacts to the rare species of concern in Reach 5A, which are specified in Section 5.4, have been considered throughout the design phase (and even before that, considering Massachusetts Division of Fisheries and Wildlife [MassDFW] Core Area designations) and will be implemented through phased remediation and restoration, specific focused minimization and protection measures for the rare species, and targeted restoration design features intended to replace habitat functionality as quickly as possible and support long-term habitat value. These measures are described in the Restoration Plan, notably the Rare Species Conservation and Management Plan (Rare Species CMP) provided as Appendix B to the Restoration Plan, and also briefly summarized below.

Wood turtle impact minimization measures will include additional pre-construction surveys for wood turtles, telemetry-based monitoring and management prior to and during active construction, and focused pre-construction screening/sweeps in areas of proposed disturbance during the active season—all under direct herpetologist oversight. Such measures will also include installation of turtle exclusion barriers strategically in areas where they provide the greatest benefit (e.g., around access roads and staging areas in wooded or other areas determined to be sensitive) and where their

installation is feasible without creating additional unnecessary disturbance. Such barriers will consist of a continuous silt fence or a similar barrier; and their locations will be identified in the appropriate remediation SIPs, subject to adjustment based on new field observations of turtles. More details on the measures to be implemented to protect and minimize impacts to wood turtles are presented in Section 5.1 of the Rare Species CMP and the Wood Turtle Management Plan which is Attachment B to that plan.

Measures to avoid or minimize impacts to state-listed plants and lepidopterans will include avoidance where consistent with remediation requirements, protection of plant occurrences outside remedial footprints where practicable, and use of exclusion controls where needed to avoid impacts outside approved work areas. For impacts to state-listed plant species in remediation and support areas, minimization measures will include collection of seed from annual species and rhizomes or other plant material from suitable perennial species to use in subsequent propagation and replanting, as well as transplanting of state-listed plants to appropriate habitat outside active work limits where feasible. GE plans to work with the Native Plant Trust in the seed collection and propagation effort, as described in Section 5.2 of the Rare Species CMP and Attachment C to that plan. For state-listed lepidopterans, certain host plants, such as toothworts (*Cardamine* spp.), cuckoo flower (*Cardamine pratensis*), and ostrich fern (*Matteuccia struthiopteris*), will likewise be transplanted or have seeds or rhizomes collected for propagation and replanting, as discussed in Section 5.3 of the Rare Species CMP. Similar activities will be conducted for common milkweed (*Asclepias syriaca*) and swamp milkweed (*Asclepias incarnata*), which are host plants for the monarch butterfly, a species that is not state listed but has been proposed for federal listing. Where warranted, invasive plant management (e.g., controls of garlic mustard [*Alliaria petiolata*] and Japanese knotweed [*Fallopia japonica*]) will be implemented to improve habitats for state-listed plant species and the host plant for rare lepidopterans.

Measures to minimize impacts to state-listed dragonflies will be implemented primarily through the phased approach to in-river remediation and restoration, limiting impacts to a portion of the riverine habitat at a given time and supporting recolonization as restored segments become available.

Measures to avoid impacts to rare bats identified in Reach 5A will include seasonal restrictions on tree clearing to the extent practicable—i.e., conducting tree removal during the winter period (when the bats are hibernating) and avoiding the pup-rearing season. If tree removal is required during the active season within areas containing suitable roost habitat, pre-clearing surveys will be conducted to identify potential roost trees (e.g., trees with cavities/hollows or peeling bark) and species-protective measures will be implemented, as appropriate (e.g., adjusting limits of clearing where practicable and applying site-specific avoidance/exclusion measures in work areas, as needed).

Where avoidance measures are not sufficient to prevent the take of a state-listed species, mitigation will be implemented through the Rare Species CMP, which has been developed to provide a

long-term benefit to the subject species. These mitigation measures are summarized in Section 11 of the Restoration Plan with details in the Rare Species CMP provided as Appendix B to the Restoration Plan.

8 Sediment Remediation and Restoration Design

As described in Section 3.2, sediment remediation in Reach 5A will include sediment removal in the main channel, certain portions of six backwater areas (BW5A-1 through BW5A-6), and certain portions of two Other Waterbodies (i.e., West Pond and Lower Sykes Brook). Following sediment removal, an engineered cap (described in Section 8.2) will be placed to physically isolate the underlying contaminated sediments in the main channel, three backwater areas, and Lower Sykes Brook, and backfill (described in Section 8.3) will be placed in three backwater areas and West Pond. The Reach 5A sediment removal areas, including in-river areas, backwater areas, and Other Waterbodies are depicted on Figures 8-1a through 8-1d. As noted in Section 3.2.3, the Intermittent Side Channel will not include any sediment removal; instead, the channel will be hydraulically disconnected from the river and filled to elevations similar to the surrounding grade and restored with appropriate floodplain vegetation (as described in Sections 8.3.2).

8.1 Sediment Removal Design

This section presents design details for the sediment removal within the river channel, backwater areas, and Other Waterbodies.

8.1.1 Main River Channel

As described in the Revised Final Permit, the Performance Standards require that sediment be removed and an engineered cap be placed over the entire riverbed in Reach 5A. The following subsections explain the basis of design for the sediment removal limits and depths in the river channel.

8.1.1.1 Sediment Removal Depths

The Revised Final Permit requires that the sediment removal and subsequent capping shall result in a final grade that is generally consistent with the original grade or with modifications approved by EPA considering the principles of NCD. Based on these requirements, the sediment removal limits for the main channel are dependent on both the thickness of the engineered cap (see Section 8.2) and the proposed grading associated with the NCD (see Section 8.5.1). As described in Section 1.2, this Final RD/RA Work Plan presents the proposed final design for the NCD grading, engineered cap, and dredge prisms for the portion of Reach 5A planned for Year 1 construction (i.e., Stations 0+00 to 48+00).

Because the NCD grading plan will serve at the final restoration design surface after engineered cap placement, the NCD grading design establishes the governing geometry and elevations for the engineered cap design and sediment removal prism and is a critical basis-of-design element for these components. As described in Section 8.5.1, a proposed grading plan was developed for Reach 5A considering the principles of NCD to provide a stable channel planform. Using those

principles, the proposed NCD grading plan involves grading to reduce the slope at erodible riverbanks identified for remediation, shifting the location of river thalweg in some areas, widening and narrowing of the river channel at some locations, and adjusting the existing bed elevation to establish riffles and pools to achieve a more stable configuration for the riverbed and riverbanks. In addition, the proposed grading plan includes removal of depositional bars within the channel.[39]

Following development, the proposed NCD grading terrain was used as the design surface for evaluating the stable material sizing for the erosion protection layer of the engineered cap design, which is a driving parameter to determine the overall cap thickness. Based on the results of the evaluations presented in Section 8.2, the cap design resulted in the designation of two cap types for the main channel between Stations 0+00 and 48+00 (Type A and Type B), as described in Section 8.2.2 of this work plan. Additionally, in accordance with the Revised Final Permit and typical cap design practices, the engineered cap design will need to account for overplacement allowances, with additional sediment removal, for each layer. As described in Section 8.2 and summarized in Table 8-5, the sediment removal design assumes average cap overplacement allowances of three inches for each six-inch cap layer (i.e., the mixing/chemical isolation layer and gravel erosion protection layer, where required). In addition, the cap design includes an allowance for placement of a habitat layer with an average thickness of four inches above the erosion protection layer. Therefore, the total cap thickness assumed for the main channel between Stations 0+00 and 48+00 is 22 inches (for both cap Types A and B). Based on these cap design parameters, the minimum sediment removal thickness to accommodate placement of an engineered cap in the main channel between Stations 0+00 and 48+00 is 22 inches prior to consideration to an overdredge allowance, which is discussed in Section 8.1.1.4.

8.1.1.2 Sediment Removal Extent

To determine the extent of sediment removal and engineered capping, as discussed in Section 5.3.5.3, the existing shoreline was delineated through a field survey and field reviews with GE and EPA representatives to define the interface between the riverbank and the sediment (i.e., the sediment-riverbank interface). Following joint field reviews by GE and EPA, the surveyed shoreline stake elevation data from approximately 290 stakes were evaluated to define the shoreline. The survey data indicate that the field-delineated shoreline elevations range between 958.0 feet and 949.3 feet North American Vertical Datum of 1988 (NAVD88) from the Confluence (Station 0+00) to the downstream end of Reach 5A (Station 245+00). The survey data were evaluated along with other lines of evidence (i.e., surveyed surface water elevations, surveyed topobathymetric elevations, riverbank slopes, aerial imagery, and photographs of the shoreline) to define 37 elevation-based segments ranging from approximately 200 to 1,300 feet in length along both the left (east) and right (west) banks to represent the shoreline for Reach 5A. These defined elevation segments vary to

[39] In accordance with EPA Condition 11 in its December 3, 2024, conditional approval letter, the NCD grading surface and the resulting dredge prism will result in the removal of mid-channel bars along the river channel.

account for changes in the slope of the river between the Confluence and the downstream end of Reach 5A. The delineated elevations for each shoreline segment are listed by the river station groups in Table 8-1.

Using those delineated shoreline elevations, the 2025 topobathymetric DTM (see Section 5.3.5.2) was processed to extract the respective contours for each shoreline segment. A continuous shoreline boundary line was then created for Reach 5A by smoothing the extracted elevation contours, adjusting the contours as necessary to align the surveyed shoreline stakes, and using other lines of evidence (e.g., aerial imagery and notes from the joint field reviews) to account for location-specific conditions potential uncertainty (e.g., undulations in the topography, presence of point and side-channel bars, and overhanging trees). The existing shoreline boundary and surveyed shoreline stakes are shown in Figures 8-2a through 8-2i along with the topobathymetric DTM surface. The existing shoreline boundary is also depicted on the Design Drawings (Appendix A), and results in an existing main channel area of approximately 39 acres.

As noted in Section 8.1.1.1, the NCD grading surface includes bank grading and widens, narrows, or otherwise shifts the river channel at some locations. Therefore, the design extent for the engineered cap and sediment removal was established to account for these channel modifications. To establish the design extent for the engineered cap and sediment removal for Stations 0+00 through 48+00, elevation contours were extracted and smoothed from the NCD grading surface for each of the established shoreline elevations listed in Table 8-1, and the existing shoreline boundary line was used where the NCD grading surface does not extend to the existing shoreline. The resulting boundary line along each bank, referred to as a "modified" shoreline for the proposed NCD grading conditions, was used to establish the design extent for the engineered cap and sediment removal, which represents an area of approximately 7.1 acres for Stations 0+00 through 48+00. The "modified" shoreline is depicted on the Design Drawings D-, C-, and SR-Series plan views (Appendix A).[40]

8.1.1.3 Structure, Utility, and Bank Protection Offsets

Several structures and utilities are located along the Reach 5A river channel. The Revised PDI Summary Report for Sediment/Riverbanks provides details regarding the locations, types, and dimensions of these features. In summary, the utilities and structures identified along the Reach 5A river channel include the following:

- Bridges, including the Pomeroy Avenue Bridge and the Holmes Road Bridge;

[40] The "modified" shoreline downstream of Station 48+00 will be prepared using the same method as Stations 0+00 through 48+00, once the NCD grading design is finished for this section of river.

- Subsurface utility crossings below the river, including the Kinder Morgan natural gas pipeline at Station 100+00, water main crossing at Station 190+00, and three sewer crossings at Stations 00+00, 49+50, and 116+00;
- Overhead utility crossings, including overhead power lines and overhead sewer and natural gas piping within the substructures of the bridge crossings;
- Storm water outfalls, including associated headwalls and in-river riprap scour protection;
- Discharge channel for the City publicly owned treatment works; and
- Concrete and stone remnants associated with a former bridge crossing.

No residential structures (e.g., housing, garages, retaining walls, or sheds) were observed immediately on or adjacent to the riverbank in Reach 5A.

To protect the integrity of these structures and utilities, the dredge prisms will include a minimum of 10-foot setbacks from the bridge piers (i.e., the Pomeroy Avenue Bridge and the Holmes Road Bridge) and from each of the subsurface utility crossings below the river, the water main crossing, and the three sewer crossings. In addition, prior to the start of dredging operations, the remediation contractor will perform surveys of the dredge areas for in-river and shoreline structures and to identify the presence and extent of riprap and other bank protection measures along the shoreline as described in Specification Section 35 24 00 – Sediment and Riverbank Soil Removal (Appendix B). The dredge prisms will be further modified using this pre-construction survey data to incorporate 10-foot setbacks the in-river and shoreline structures and minimum five-foot setbacks from riprap and other bank protection measures.

8.1.1.4 Dredge Prism Development

Using the parameters outlined in Sections 8.1.1.1 and 8.1.1.2, a "neat" dredge surface was developed for Stations 0+00 to 48+00 by applying a removal depth of 22 inches (1.83 feet) below the proposed NCD grading surface where the engineered cap will be constructed. After generating the "neat" dredge surface, an engineered dredge prism was developed to tie into bank grading associated with the proposed NCD grading surface.

In some areas where the NCD grading plan is 22 inches or more above the existing bathymetry between Stations 0+00 and 48+00 (i.e., to create a riffle feature or adjust the channel alignment), the resulting dredge prism is higher than the existing bathymetry. In these circumstances, no sediment removal is necessary to accommodate placement of the engineered cap and additional fill (referred to as grading fill) will be placed to achieve the final restoration surface elevations.

After the above-referenced adjustments, the resulting conceptual dredge prism is a three-dimensional surface that specifies the horizontal (X and Y) and vertical (Z) extent of sediment estimated for

removal between Stations 0+00 to 48+00. The target dredge prism elevation contours are shown on the Design Drawings D-Series plan views (Appendix A). Figure 8-3 shows the removal thicknesses based on the dredge prism surface developed for Stations 0+00 to 48+00.

In addition to the cap overplacement tolerances described above in Section 8.1.1.1, the sediment removal design includes an assumption for overdredging below the target dredge prism, because dredging requires some removal tolerance below the target dredge prism to account for factors such as varying bathymetry, operational control of the dredging equipment, and removal verification. Environmental dredging projects often assume an overdredging allowance of up to six inches below the target dredge cut; however, dredging contractors are typically able to achieve an average overdredging accuracy of approximately four inches or less. The actual dredging accuracy that will be achieved will be dependent on the dredging equipment and methods used by the remediation contractor.

As described in Section 8.1.1.3, structural and utility offsets will be incorporated into the dredge prisms to protect the integrity of the structures and utilities. Specifically, 10-foot dredge prism offsets will be incorporated from the bridge piers and from each of the subsurface utility crossings below the river. For Station 0+00 to 48+00, the dredge prisms incorporate a 10-foot offset from the sanitary sewer crossing near Station 0+00, as shown on Drawing D1100 (Appendix A). As dredge prisms are developed for areas downstream of Station 48+00, the dredge prisms will incorporate the noted offsets. In addition, prior to the start of dredging operations, the dredge prisms will be further modified to incorporate offsets from in-river and shoreline structures and the limits of riprap and other bank protection measures based on the pre-construction survey data collected by the remediation contractor, as described in Section 8.1.1.3. The offsets will be incorporated into the dredge prisms by trimming out the offset limits; and engineered slopes will be incorporated into the dredge prism extending from the setback limits on a stable slope, which will generally be established at 3 units horizontal for every 1 unit vertical (3H:1V), except for riprap areas or areas with steeper existing bathymetric slopes, where a stable slope will be established at 2H:1V.

During construction, the dredge prism files will serve as the basis for determining whether dredging has achieved the required elevations in accordance with specified dredging tolerance requirements by comparing post-construction bathymetric survey data to the design dredge prism.

8.1.1.5 Dredge Slope Stability

As described in Appendix E, a dredge slope stability analysis was conducted to assess segments of Reach 5A where existing slopes may be marginally stable or potentially unstable. The purpose of this analysis was to identify locations where slope stability is a major concern during construction and to evaluate mitigation strategies to reduce the risk of instability or surface slides. The analysis assumed a uniform sediment removal thickness of two feet across Reach 5A, based on the removal depth of

22 inches (1.83 feet) specified in Section 8.1.1.4 for Stations 0+00 to 48+00. Although the assessment encompassed the entire length of Reach 5A, results downstream of Station 48+00 are considered preliminary and will require updating as deeper dredge cuts are defined during the advancement of the dredge and cap designs for Stations 48+00 to 245+00.

Appendix E identifies three "high" risk areas between Stations 0+00 and 48+00 that may necessitate engineered shoreline stabilization measures, specifically along the right (western) bank at Stations 13+00 to 15+50, 25+50 to 26+50, and 44+75 to 48+75. In these sections, temporary sheet piling may be installed prior to dredging operations to support shoreline stability and would remain in place until capping activities are completed. Further evaluation of these zones will be undertaken in collaboration with the remediation contractor, including review of final shoreline dredge cuts that consider instances where the NCD grading plan elevations are higher than current bathymetry, thereby resulting in shoreline dredge cuts less than two feet. Any proposed temporary sheet pile details will be included in the SIP.

In other segments, slopes designated as "low" or "moderate" risk in the dredge slope assessment are not anticipated to require engineered shoreline stabilization solutions; these sites can be managed using appropriate construction techniques by the remediation contractor.

8.1.1.6 Dredge Prism Volume

For Stations 0+00 to 48+00, the target dredge prism surface discussed above was compared with the existing bathymetry elevations to estimate the volume of sediment to be removed. Downstream of Station 48+00, the sediment removal volume estimate was prepared based on the preliminary NCD grading and the preliminary cap design that may be subject to future revision in a subsequent design submittal.

The estimated sediment removal volumes are summarized in Table 8-2 for the main river channel, including a breakdown by cap certification unit (described in Section 8.1.1.7).[41] The estimated design removal volume within the Reach 5A channel is approximately 99,450 cubic yards (cy), including approximately 18,630 cy for the first subreach (i.e., Stations 0+00 to 48+00). In addition, Table 8-2 includes estimated removal volumes associated with an assumed average overdredging thickness of four inches across each of the Reach 5A removal areas. Taking into account this average overdredge assumption, the total estimated removal volume within the Reach 5A river channel is approximately 120,600 cy, including approximately 22,400 cy for the first subreach.

[41] The estimated sediment removal volumes summarized in Table 8-2 include the volume of sediment below the "modified" shoreline boundary between Stations 0+00 and 48+00 and sediment volumes below the "existing" shoreline boundary downstream of Station 48+00, as defined in Section 8.1.1.2. The volume of sediment and soil above these boundaries are considered bank removal volumes as described in Section 9.4.

Note that during construction, based on the type of dredging and the equipment used, offsets or setbacks from shoreline and in-river structures and utilities may be implemented to maintain the stability of those structures. The actual volume that will be dredged, processed and disposed of will be subject to conditions during dredging, the means and methods (including whether the remediation contractor performs the dredging in the dry or in the wet), geotechnical considerations, and the contractor's ability to achieve the specified overdredge tolerances.

8.1.1.7 Cap Certification Units

Cap Certification Units (CCUs) were developed to segregate the in-river work areas into smaller, discrete units that will be used to verify completion of the required sediment removal and capping operations.[42] The CCUs will allow for the subdivision of work areas into management areas to facilitate timely completion and verification. The same CCUs will be used for the dredging and capping operations. Dredging may be conducted in multiple CCUs at any given time; and once dredging operations in a particular CCU are completed, operations in that CCU will transition to fill or engineered cap placement while dredging operations continue in downstream CCUs.

A total of 82 CCUs have been delineated for Reach 5A, including 16 CCUs for Year 1 work between Stations 0+00 and 48+00. Each CCU extends across three river stations (approximately 300 feet). For Stations 0+00 and 48+00, the lateral boundaries of the CCUs are based on the modified shoreline developed using the NCD grading design as described in Section 8.1.1.2. For this work plan, the lateral extents of the CCUs downstream of Station 48+00 were developed using the existing shoreline and will be updated in a revision of or addendum to this work plan once the NCD grading design is finalized for those sections of the river.

The CCUs are shown on Figures 8-4a through 8-4e, and the CCUs for Stations 0+00 through 48+00 are shown on the Design Drawings (Appendix A). As noted above, Table 8-2 presents a summary of area and estimated removal volumes for each CCU. For Station 0+00 through 48+00, the CCUs range in size from approximately 0.38 acre to 0.5 acre, with an average of 0.44 acre.

8.1.1.8 Disposal Evaluation – Main Channel Sediment

As described in Section 3.6, off-site disposal is required for sediment that is represented by a three-dimensional polygon associated with a single vertical core that has an average PCB concentration greater than or equal to 100 mg/kg. To meet this requirement, the depth-weighted average PCB concentrations for the PDI and SDC sediment cores collected from the main river channel were calculated based on the target removal depth.

[42] Separate Riverbank Certification Units (RCUs) were developed to verify completion of the required riverbank soil removal and grading operations as described in Section 9.3.

For this evaluation, the target removal depths for Stations 0+00 through 48+00 were based on the dredge prisms developed as described in Section 8.1.1.4, and the target removal depths for areas downstream of Station 48+00 were based on the preliminary cap design thickness below the preliminary NCD grading elevations, which may be subject to future revision in a future revision of or addendum to this work plan.

Thiessen polygons were generated for each sediment sample location using the existing shoreline extent; and the river channel was divided into eastern, central, and western zones to isolate the Thiessen polygons to each sub-channel area (as required by Condition 22 in EPA's December 2024 conditional approval letter). Each Theissen polygon was assigned a PCB concentration equal to the length-weighted average concentration calculated using PCB data above the target removal depth in the dredge prism at that location. Where the dredge prism depth exceeded the length of a sediment core at a given location, the length-weighted average concentration was calculated based on all available data at that location. Figures 8-5a through 8-5i show length-weighted average PCB concentrations calculated for each Thiessen polygon.[43]

Based on the PDI and SDC data and the designated removal depths, there are five core locations that have depth-weighted average PCB concentrations that exceed 100 mg/kg (SE-030-61-W, SE-078-22-C, SE-078-22-C-R, SE-080-85-E, and SE-139-45-E, shown on Figures 8-5b, 8-5d, and 8-5f). Thus, the sediments removed from these five locations will be subject to off-site disposal. Those sediments are estimated to have a collective design volume of 850 cy.[44]

The estimated volume-weighted average PCB concentration of the remaining sediments (which have a preliminary estimated design volume of approximately 98,600 cy[44]) is approximately 5.8 mg/kg, which satisfies the 25 mg/kg criterion for disposal in the UDF as described in Section 3.6.

8.1.2 Backwaters and Other Waterbodies

The Performance Standards require remediation within certain Reach 5A backwaters and Other Waterbodies. Remediation will include amendment placement within portions of BW5A-1, which is located within a Core Area 1 habitat, and sediment removal followed by backfill or cap placement in other designated areas.

8.1.2.1 Backwater and Other Waterbody Extents

The backwater and Other Waterbody boundaries presented in the Conceptual RD/RA Work Plan were delineated as part of the BRA, and the SDC program included additional surveying used to

[43] These figures include areas where no average PCB concentration is reported. In these areas, no sediment removal is required to achieve the target subgrade elevations for either the engineered cap or the Natural Channel Design grading plan.

[44] These estimated disposal quantities are neat volumes that do not include potential overdredge volumes.

refine these boundaries. Following the completion of the SDC surveying, the boundaries of the Reach 5A backwaters and Other Waterbodies targeted for remediation were evaluated using multiple lines of evidence, primarily the topographic and bathymetric survey data discussed in Sections 5.3.5.1 and 5.3.5.2, including the high-resolution aerial photography and upland terrain LiDAR, topographic land survey data, and topobathymetric LiDAR survey data. Although the SDC survey data generally confirmed the boundaries presented in the Conceptual RD/RA Work Plan, minor refinements were made to the limits for each of the backwater areas, the Intermittent Side Channel, West Pond, and Lower Sykes Brook. Notably, the boundary of the Intermittent Side Channel was adjusted from its previous delineation—which had been based on the channel bottom—to now include the top of the channel banks. These boundaries were generally defined using the 963-foot NAVD88 contour obtained from topographic survey data collected during the SDC program.

The updated boundaries for the backwater areas and Other Waterbodies are shown on Figures 8-6a through 8-6f and were used to develop the sediment removal extents as described in Section 8.1.2.2.

8.1.2.2 Sediment Removal Evaluations

The sediment removal design for the backwaters of Reach 5A is based on PCB evaluations of the data collected during PDI sampling to achieve the concentration criteria required by the Performance Standards (Section 3.2.2). One of the six backwaters (BW5A-1) is located in Core Area 1 habitat, which has different Performance Standard from the other five backwaters (BW5A-2 through BW5A-6), which are located in areas outside Core Area 1 habitat. As presented in the Conceptual RD/RA Work Plan, remediation is required in all six backwaters. This section presents the results of the updated PCB evaluations that were performed and the resulting sediment remediation extents and volumes. Maps of PCB concentrations (Thiessen polygons) and targeted remediation areas are shown on Figures 8-6a through 8-6f.

8.1.2.2.1 Backwater Located in Core Area 1 Habitat (BW5A-1)

As described in Section 3.2.2, the Performance Standard for backwaters located within Core Area 1 habitat is to remove (and cap) discrete total PCB concentrations greater than or equal to 50 mg/kg in surficial (0- to 1-foot) sediment and place an amendment in areas where total PCB concentrations are between 1 and 50 mg/kg in surficial (0-to 1-foot) sediment to reduce bioavailability. Figure 8-6a shows Thiessen polygons of 0- to 1-foot PCB concentrations in backwater BW5A-1, and Table 1-1 in Appendix F summarizes the PCB concentrations for each Thiessen polygon in that backwater. There are four discrete polygons (0.15 acre) in this backwater with total PCB concentrations greater than or equal to 50 mg/kg.[45] Within these areas, the upper one foot of sediment will be removed, followed

[45] During the final design evaluation, the extent of sediment removal in backwater BW5A-1 was expanded from the footprint described in the Conceptual RD/RA Work Plan to address one additional polygon at sample location SE-BW5A-1-C-D-9-9, which had a measured PCB concentrations of 35.4 mg/kg and 116 mg/kg in the parent and field duplicate samples, respectively.

by placement of an engineered cap. The estimated neat volume of sediments to be removed from BW5A-1 is approximately 240 cy. The design of the replacement cap in the backwater areas subject to excavation is summarized in Section 8.2 and described more fully in Appendix H.

PCB concentrations in the remaining polygons in this backwater (totaling 1.7 acres) are all between 1 and 50 mg/kg. As described in Section 8.4, an amendment (PAC) will be placed over the remainder of this backwater to reduce PCB bioavailability as required by the Revised Final Permit.

8.1.2.2.2 Backwaters Outside Core Area 1 Habitat (BW5A-2 Through BW5A-6)

The Performance Standard for surface sediments in backwaters located outside Core Area 1 habitat defines the criteria for sediment removal following by the placement of a contiguous engineered cap; however, the Revised Final Permit allows for the placement of backfill in areas where sediment is removed, provided that the backfill cannot be factored into the spatial weighting calculations. GE has elected to follow sediment removal with the placement of an engineered cap in three backwaters (BW5A-2, BW5A-4, and BW5A-5) and place backfill in two areas (BW5A-3 and BW5A-6) as described below. Backfill is planned for BW5A-3 due to its overlap with a residential property and for BW5A-6 because it is near the City's WWTP outfall.

Consistent with the PCB evaluation presented in the Conceptual RD/RA Work Plan, the PCB SWACs in the surface and subsurface intervals in each of these five backwaters were evaluated to delineate the remedial extents for each area. The remediation footprint required to achieve a PCB SWAC of 1 mg/kg in the surficial 0- to 1-foot of sediment was delineated through a "hill topping" exercise—i.e., "removal" of Thiessen polygons sequentially from high to low concentration until an average PCB concentration of 1 mg/kg in surface sediments was achieved. In areas where an engineered cap will be placed, the original concentration value was replaced with a concentration equal to 1% of the existing average surface sediment PCB concentration for the given backwater.

For the subsurface depth interval, the average PCB concentration was calculated using the original concentration values in areas targeted for backfill or by applying a concentration equal to 1% of the existing average surface sediment PCB concentration to subsurface polygons located beneath the surface cap. If the subsurface PCB concentration still exceeded 1 mg/kg, then the removal depth was increased in backfill areas or the cap area was increased until a subsurface average PCB concentration of 1 mg/kg was achieved. The top one foot of sediment will be removed to accommodate the placement of an engineered cap in BW5A-2, BW5A-4, and BW5A-5. Surface and subsurface removal to a depth of three feet in BW5A-3 and five feet in BW5A-6 will be performed, followed by backfill placement to achieve a spatial average PCB concentration of 1 mg/kg. Detailed summaries of the existing and post-remedy PCB SWAC calculations are provided in Tables 1-2 to 1-6 in Appendix F. In these tables, green- or orange-highlighted cells indicate locations and depth intervals where sediment removal followed by backfill or cap placement is required to achieve the 1 mg/kg spatial average criterion, and the remediation

approach is listed. Cells with blue-gray shading indicate locations and depth intervals where no remediation is required.

In addition to the areas required for removal based on the PCB evaluation described above, the remediation footprint was expanded to include three additional polygons in backwater BW5A-5 and one additional polygon in BW5A-6 (previously designated as "unremediated polygons") based on an evaluation performed in accordance with Condition 23 in EPA's December 2024 conditional approval letter.[46] These additional polygons were added to the removal scope for constructability considerations and to mitigate potential for cross-contamination.

Figures 8-6b through 8-6f show Thiessen polygons of PCB concentrations for each depth interval, the remedial approach, and the remedial boundaries in backwaters BW5A-2 through BW5A-6, respectively. Table 8-3 summarizes the PCB SWACs, removal areas, and volumes for each backwater area. The estimated volume of sediments to be removed from these five backwaters is approximately 4,300 cy. The engineered cap and backfill designs in the backwater areas are summarized in Sections 8.2 and 8.3, respectively, and described more fully in Appendix H.

Table 8-3
Total PCB Concentrations, Remedial Extents, and Volume Estimates (BW5A-1 Through BW5A-6)

Area ID	Existing Average Total PCB (Aroclor) Concentration (mg/kg)		Remedial Approach	Remedial Extent (acres)	Post-Remediation Surface Spatially Weighted Average Total PCB (mg/kg)	Estimated Removal Volume (cy)[b]
	Surface (0–1 foot)	Subsurface (1–X feet)[a]				
BW5A-1	19	NA	Dredge and cap	0.15	0.70	240
			Amendment	1.70	NA	--
BW5A-2	11.8	20.0	Dredge and cap	0.29	0.12	480
BW5A-3	118	45.0	Dredge and backfill	0.18	0.021[d]	600
BW5A-4	17.0	14.5	Dredge and cap	0.06	0.17	90
BW5A-5	9.73	3.17	Dredge and cap	1.02	0.95	1,650
BW5A-6[c]	10.7	17.9	Dredge and backfill	0.35	0.021[d]	1,500
			Total	**3.75**	**—**	**4,560**

Notes:

a. Subsurface PCB values represent the spatially weighted average for all subsurface intervals based on the evaluation depth, which varies by backwater depending on the depth of recovery during PDI sediment sampling.
b. The estimated removal volumes presented in this table are rounded and are based on a one-foot removal in the areas to be capped. The removal depths for areas to be backfilled are three feet in BW5A-3 and five feet in BW5A-6 (see Appendix F).

[46] EPA Condition 23 stated that GE shall re-evaluate the proposed dredging areas in the backwaters and, where appropriate due to constructability considerations, propose to dredge and cap contiguous areas where practicable due to concerns that dredging in the adjacent polygons could contaminate the unremediated polygons.

c. In BW5A-6, the remedial boundary for the 2- to 2.5-foot interval was used to define the limits of removal from 2.5 to 5 feet due to limited data available below 2.5 feet (see Figure 8-6f).
d. In dredge and backfill areas, the post-remediation surface spatially weighted average is the assumed PCB concentration of 0.021 mg/kg for unaffected backfill.

8.1.2.2.3 Other Waterbodies

As described in Section 3.2.3, although the Revised Final Permit does not address the Other Waterbodies in Reach 5A, GE has elected to evaluate four of the five areas (i.e., the outlet from Morewood Lake, Lower Sackett Brook, Lower Sykes Brook, and West Pond) under the Performance Standards for backwaters given that they are separate from, but hydraulically connected to, the main river channel.[47] As presented in the Conceptual RD/RA Work Plan, PCB evaluations for these areas were performed in the same way as for the backwaters and determined that two of the four areas (outlet from Morewood Lake and Lower Sackett Brook) have existing spatial average PCB concentrations less than 1 mg/kg and therefore require no remediation. The remaining two areas, West Pond and Lower Sykes Brook, have spatial average PCB concentrations that exceed 1 mg/kg and thus require remediation. Figures 8-7a through 8-7d show Thiessen polygons of PCB concentrations for each depth interval in these four areas and detailed summaries of the PCB SWAC calculations are provided in Tables 2-1 to 2-4 in Appendix F.

Consistent with the approach applied to the backwater areas, the top 1.5 feet of sediment will be removed to accommodate the placement of an engineered cap in a portion of Lower Sykes Brook.[48] The limits of the removal and cap area necessary to achieve a spatial average PCB concentration of 1 mg/kg in surface sediment are shown on Figure 8-7d. In West Pond, surface and subsurface removal to a depth of two feet will be performed, followed by backfill placement to achieve a spatial average PCB concentration of 1 mg/kg. In addition to the areas required for removal based on the PCB evaluation, the remediation footprint in West Pond was expanded to include one additional polygon (previously designated as an "unremediated polygon") based on an evaluation performed in accordance with EPA Condition 23 (see Section 8.1.2.2.2). The limits of the removal and backfill extent for West Pond are shown on Figure 8-7b. Detailed summaries of the post-cap and post-backfill PCB SWAC calculations are provided in Tables 2-2 and 2-4 in Appendix F. Green- or orange-highlighted cells indicate locations and depth intervals where remediation is necessary to achieve the 1 mg/kg spatial average criterion, and the remediation approach is provided. Table 8-4 summarizes the PCB SWACs, removal areas, and volumes for these two Other Waterbodies. The total estimated volume of sediments to be removed is approximately 4,640 cy.

[47] As also noted in Section 3.2.3, the fifth area, the Intermittent Side Channel, is being converted to floodplain wetland habitat, as described in Sections 8.1.2.2.4 and 8.3.2.

[48] In response to EPA Condition 24, the removal depth in Lower Sykes Brook was adjusted to include removal of the 1- to 1.5-foot depth interval, which has a PCB concentration above 100 mg/kg.

Table 8-4
Total PCB Concentrations, Remedial Extents, and Volume Estimates in Other Waterbodies

Area ID	Existing Average Total PCB (Aroclor) Concentration (mg/kg)		Remedial Approach	Remedial Extent (acres)	Post-Remediation Surface Spatially Weighted Average Total PCB (mg/kg)	Estimated Removal Volume (cy)[2]
	Surface (0–1 foot)	Subsurface (1–X feet)[1]				
West Pond	4.6	1.9	Dredge and backfill	2.07	0.94	4,480
Lower Sykes Brook	8.0	39.9	Dredge and cap	0.06	0.38	160
			Total	**2.13**	**—**	**4,640**

Notes:

1. Subsurface PCB values represent the spatially weighted average for all subsurface intervals based on the evaluation depth, which varies by backwater dependent on the depth of recovery during PDI sediment sampling.
2. The estimated removal volumes presented in this table are rounded and are based on a 1.5-foot removal in Lower Sykes Brook and up to two feet of removal in West Pond (see Appendix F).

8.1.2.2.4 Intermittent Side Channel

The Intermittent Side Channel is hydraulically connected to the main river channel at three locations: (1) near Station 1+00 at the upstream end; (2) near Station 10+00 in the middle of that channel; and (3) near Station 15+00 at its downstream end. Because this side channel was formed as a result of scour due to overbank flooding, GE has identified this as a key risk to the remediation. In the future, this side channel has the potential to further bypass high flows from the main channel, resulting in additional erosion in the floodplain and eventually even replacing the main channel, with the new river channel then expanding out into the adjacent floodplain. This side channel also poses a risk to the adjacent sanitary sewer line, specifically during periods of higher flow, when water in this side channel flows in a southeasterly direction until it intersects the sanitary sewer line. Rather than excavation and capping in this channel, GE is proposing to cut off its connection to the main river channel by rebuilding and stabilizing the riverbanks at the three points where it connects to the river. GE is also proposing to convert the channel to floodplain transitional forest/shrub wetland habitat by filling in this channel with approximately 1,800 cy of clean backfill to mitigate potential erosion during future river flooding events. Given this approach, an evaluation of the impact on the flood storage capacity of the floodplain has been performed, as summarized in Section 8.2.5. Additional details on the fill placement in the Intermittent Side Channel are provided in Section 8.3.2.

8.1.2.3 Disposal Evaluation – Backwaters and Other Waterbodies

As described in Section 3.6, off-site disposal is required for sediment that is represented by a three-dimensional polygon associated with a single vertical core that has an average PCB concentration greater than or equal to 100 mg/kg. To meet this requirement, the depth-weighted average PCB concentrations for the PDI backwater and Other Waterbody sediment cores were calculated based on the target removal depth.

Four backwater core locations in BW5A-3 have depth-weighted average PCB concentrations that exceed 100 mg/kg. The Theissen polygons associated with these core locations are shown on Figure 8-6c and represent an area of 0.1 acre. The sediments removed from these four locations—which are estimated to constitute 360 cy—will be subject to off-site disposal.

The Revised Final Permit also requires that sediments to be disposed of in the UDF have a volume-weighted average PCB concentration of less than or equal to 25 mg/kg. The volume-weighted average of the remaining 4,200 cy of sediments to be removed from backwaters is approximately 21 mg/kg, which meets the UDF disposal criterion in the Revised Final Permit. Table 1-7 in Appendix F provides a detailed summary of the estimated disposal volumes and volume-weighted average PCB calculations for the sediments to be removed from the backwater areas.

None of the core locations in the Other Waterbodies subject to remediation has a depth-weighted average PCB concentration that exceeds 100 mg/kg. In addition, the volume-weighted average of the sediments to be excavated from the Other Waterbodies is approximately 6.8 mg/kg, which is less than the 25 mg/kg criterion for sediment disposal in the UDF. Thus, all sediments to be removed from the Other Waterbodies meet the criteria for disposal in the UDF. Table 2-5 in Appendix F summarizes the estimated disposal volumes and volume-weighted average PCB calculations for the Other Waterbodies.

8.1.3 Dredging and Dredged Material Transport

Section II.B.2.a.(2)(a) of the Revised Final Permit requires that sediment removal and capping in Reach 5A be performed using engineering methods employed from within the river channel or other methods approved by EPA. While the design establishes the remedial objectives, Performance Standards, and general constructability constraints, the specific means and methods for implementing the sediment remediation cannot be fully defined at the design stage and require detailed input from the remediation contractor.

Reach 5A presents a combination of physical, environmental, and operational constraints that significantly influence how the work can be executed. Access to the river corridor is limited by steep and high banks in multiple locations, two vehicular bridge crossings, adjacent residential parcels, and extensive floodplain wetland habitats—including wet meadows, marshes, shrub swamps, and forested wetlands—that comprise a large majority of the adjacent floodplain. These constraints limit the feasibility of upland access, staging, and support areas and necessitate contractor-specific approaches to access planning, equipment selection, and work sequencing.

In addition, in-river conditions within Reach 5A present inherent challenges to remedial implementation. As summarized in Section 2.2, water depths during the typical summer construction season vary widely across the reach, and river flows and stage heights may also change rapidly in response to precipitation events, necessitating adaptive construction approaches to maintain

equipment stability, manage sediment controls, ensure worker safety, and protect partially completed remedial features.

Because of these constraints, several critical elements of the remedy must be developed based on the remediation contractor's proposed methods, including, but not limited to, river access locations and approaches; equipment types and deployment methods; sediment removal techniques; sediment handling, dewatering, and transport strategies; cap material delivery and placement methods; temporary stabilization measures; and detailed sequencing of in-water and near-bank activities. While this Final RD/RA Work Plan provides a conceptual framework consistent with Revised Final Permit requirements, incorporation of remediation contractor input is necessary to translate that framework into practical, site-specific implementation details that are achievable, protective, and compliant. Accordingly, those details will be developed following remediation contractor procurement and will be incorporated into future SIPs submitted for EPA review and approval, in an effort to ensure that the selected means and methods are responsive to site conditions while meeting the Performance Standards and intent of the Revised Final Permit.

Final selection of the means and methods for performing the in-water sediment remedial construction, based on input from the remediation contractor, will consider the following key factors:

- Ability to meet Performance Standards specified in the Revised Final Permit;
- Use of removal and capping methods employed from within the river channel, to the extent practicable;
- Access to the river;
- Access to nearby properties to site support areas for sediment dewatering, material segregation, and material staging;
- Ability to achieve sediment removal and cap placement to the required elevations and within acceptable tolerances;
- The need to segregate excavated material for disposal at the UDF or for off-site disposal;
- Ability to remove and handle LWD from the river channel;
- The need to reconstruct the river channel and banks after sediment removal (considering Natural Channel Design);
- Adaptability to variable water depths and river flow conditions;
- Achievement of production rates consistent with the timeframe contemplated in the Revised Final Permit;
- The need to minimize disturbance to private residential properties;

- The need to minimize impacts to Core Area 1 and 3 habitat for construction of staging areas and access roads; and
- The ability to minimize downstream transport of suspended sediment or turbidity from work related to cap material placement to the extent practicable. For example, even if sediment removal and cap placement is conducted "in the dry," the construction of coffer cells, dams, or other structures to divert river flow has the potential to resuspend sediment.

Given the factors and constraints listed above, multiple methods will likely be used for sediment removal and restoration within the main river channel in Reach 5A. Sediment removal means and methods may include performing the work in the wet (e.g., using amphibious excavators or similar equipment) or in the dry (e.g., in dewatered cells). Final selection of the means and methods for performing the in-water sediment remedial construction will be based on input from the remediation contractor and will be presented in the applicable SIPs.[49] Possible methods that may be used by the remediation contractor for sediment removal in the main river channel are described in Appendix G.

An adaptive approach will likely be needed to effectively complete the remediation, in which lessons learned and experience working in one section of Reach 5A are used to adjust the remedial design or construction methods for other sections of the reach, to the extent practicable. Modifications to the remedial design or construction methods will follow an adaptive management process that is described in the Revised AMP (see Section 19).

Additional work components related to the implementation of the sediment remediation work are discussed in the following subsections.

8.1.3.1 Sediment Removal Operations and Sequence

The main channel sediment removal will generally be performed from upstream to downstream, followed by placement of the engineered cap after verification that the dredging is complete. In general, it is anticipated that the Reach 5A remediation activities will require five construction seasons to complete; however, the anticipated five-year duration of the Reach 5A remediation may vary based on the conditions encountered in the field and realized production. Approximately 16 CCUs will need to be dredged and capped during each construction season to achieve a five-year remediation schedule. The proposed dredging sequence and schedule for each construction season will be developed based on input from the remediation contractor and described in the respective SIPs.

The sediment and soil removal along the river channel will be performed within the CCUs to subgrade elevations shown in dredge prism files (described in Section 8.1.1.4) to facilitate placement of an engineered cap. In general, the sediment removal operations will be performed from upstream

[49] In the event that the SIPs provide for dredging to be performed in dewatered cells, they will also address whether there will be an effort to remove aquatic species (e.g., fish, turtles) from cells during dewatering.

to downstream during each construction season concurrently with the adjacent riverbank soil removal activities. Where conducted from within the river, the riverbank soil removal will be generally performed by excavating from the top of slope toward the toe of slope before dredging the adjacent river sediment. As noted in Section 8.1.1.7, dredging may be ongoing in multiple CCUs at any given time to achieve the productivity necessary to maintain the overall project schedule.

Once dredging operations in a particular CCU have been completed, the remediation contractor will notify the Construction Manager, who will coordinate with a third-party surveyor to perform a post-dredging survey to confirm the removal of sediment to the required elevations, as described in Specification Section 35 24 00 – Sediment and Riverbank Soil Removal (Appendix B). If the post-dredging survey indicates that the required elevations have not been achieved within the allowable tolerances, the remediation contractor will be directed to perform additional dredging. Once the post-dredging survey verifies that dredging has been completed within a CCU, the work within that CCU will transition to fill or engineered cap placement, while dredging operations advance in downstream CCUs.

Sediment removal, backfilling, and capping in backwater areas and Lower Sykes Book are expected to be performed concurrently with the nearby sediment removal operations in the river channel and/or floodplain soil removal operations. For example, the sediment removal and capping operations in backwater BW5A-6 and Lower Sykes Book are expected to be performed concurrently with the dredging and capping work in the adjacent CCUs. Similarly, sediment removal within backwater areas BW5A-2, BW5A-3, and BW5A-4 will likely be performed concurrently with the adjacent floodplain removal work in EA20. The actual sequence for the backwater and Other Waterbody will be developed based on input from the remediation contractor and described in the respective SIPs.

8.1.3.2 Shoreline Vegetation Pruning

Trees and shoreline vegetation that overhang the sediment removal and capping areas and are not located in riverbank removal areas will be pruned or removed to the extent necessary to allow the safe and effective implementation of in-river remediation. Where tree trimming or removal is necessary, the trees will be cut above the trunk, and the root mass will be left in place where possible. Vegetation removed from the shoreline will be transported based on specific site conditions, transported to a staging area for processing and final disposal.

As described in Specification Section 31 13 18 – Removal of In-River Debris and Shoreline Vegetation (Appendix B), the remediation contractor will conduct a survey to identify trees with a diameter at breast height of six inches or greater that are proposed for removal along the shoreline to facilitate dredging and capping work for the upcoming construction season as required by EPA Condition 80. The results of the tree survey will be presented in the respective SIPs.

8.1.3.3 Debris and Obstructions

Certain segments of the river channel contain considerable amounts of woody debris, such as downed trees and driftwood, rocks, and, to a lesser extent, consumer debris (i.e., trash). It is expected that buried debris (i.e., buried logs and large rocks) are also present within the river.

Large debris will be removed in advance of or concurrently with sediment removal operations. Smaller debris will be removed during sediment removal operations. Mechanically removed debris will be loaded into haul vehicles and transported to a nearby staging area for handling and appropriate sizing. Large debris (i.e., fallen trees) will be cut into manageable sizes before being transported to the staging area.

If appropriate, some debris may be decontaminated and beneficially reused; for instance, boulders and riprap could be power washed and reused for bank stabilization or channel reconstruction. Boulders, riprap, and other large rock encountered during the dredging operations will be reviewed on a case-by-case basis by the Construction Manager and the remediation contractor to identify items for potential reuse. Materials for reuse will be decontaminated by the remediation contractor using a high-pressure water spray and any other methods necessary (e.g., brushing) to remove all adhered sediments and other solids. Decontaminated materials will be segregated and staged separately from other materials and will be subject to visual inspection by the Construction Manager prior to reuse.

8.1.3.4 Dredged Material Transport to Temporary Staging Areas

The remediation contractor will be responsible for selecting the specific means and methods for transporting dredged material from the sediment removal areas to the temporary staging areas. Within the river corridor, it is anticipated that off-road haul trucks, amphibious equipment, or small scows may be used to transport dredged material from the removal areas to shoreline access points. These vehicles may either continue directly to the temporary staging areas or deliver material to localized transload stations located near the riverbank. At such transload locations, dredged material may be transferred from in-river or near-shore equipment to higher-capacity or more efficient upland haul trucks suitable for longer-distance transport along designated access roads.

At a minimum, dredged material transport in upland areas is anticipated to utilize haul trucks operating on the primary and secondary access roads constructed and located as described in Section 7.2.2. These access roads will provide controlled routes for moving dredged material between shoreline access points, transload locations, and the temporary staging areas while minimizing impacts to surrounding properties and sensitive areas.

Dredged material will be wet following removal and prior to dewatering. The remediation contractor will not be allowed to drain water from dredging buckets within the removal areas prior to loading

material into haul trucks or other transport equipment, unless the dredging is performed within a contained area (i.e., a containment structure constructed using steel sheet piles or other methods).

All trucks used to transport dredged material will be watertight and will be properly maintained, inspected, and monitored to prevent leakage or spillage of free liquids during transport.

8.1.3.5 Dredging Best Management Practices

The sediment removal and capping operations will be required to comply with specific water quality requirements relating to turbidity and PCB levels, which are defined in Section 3.8 of the *Construction Monitoring Plan* (Attachment G to the Revised POP). To meet these requirements, the remediation contractor(s) will implement appropriate operational controls and BMPs during dredging and capping activities.

Detailed methods for controlling sediment resuspension and maintaining compliance with the water quality requirements will be developed with input from the remediation contractor, based on the contractor's planned means and methods for performing sediment removal operations. The contractor's proposed methods and operational controls will be documented and incorporated into future SIPs submitted to EPA for review and approval.

In general, it is anticipated that the remediation work will incorporate many of the following BMPs, as appropriate to site conditions and the remediation contractor's selected methods:

- Sequencing dredging operations in such a manner as to avoid sediment removal activities upstream of cap placement activities;
- Performing dredging on sloped areas from the top of slope toward the toe of slope;
- Using GPS-enabled positioning systems on dredging equipment to allow precise control of dredge bucket location and elevation;
- Conducting equipment, vehicle, and vessel operations in a manner that minimizes sediment disturbance and potential resuspension;
- Utilizing suitably experienced and qualified dredge operators;
- Controlling the rate of dredging operations to reduce the generation of suspended sediment;
- Removing debris from the riverbed in a controlled and steady manner;
- Optimizing the number of dredge bucket "bites" required to achieve the target dredge depth to maximize sediment capture efficiency;
- Controlling the rate at which the dredge bucket is raised and lowered through the water column, particularly when operating near the riverbed;

- Avoiding actions that can result in resuspension of sediments, such as dragging the bucket along the riverbed or reopening the bucket after initial closure; and
- Ensuring that the dredge bucket is fully closed, to the extent practicable, prior to lifting it through the water column.

8.2 Engineered Cap Design

As described in Section 3.2.4, the Performance Standards for river and backwater sediments include requirements for placing an engineered cap over the entire riverbed in Reach 5A and in portions of backwater areas requiring removal. In addition, as described in Section 8.1.2.2.3, an engineered cap will be placed in one Other Waterbody, Lower Sykes Brook.

As stated in the Revised Final Permit, the engineered caps are required to be designed "to physically isolate contaminated sediments from potential ecological and human receptors, and minimize the transport of PCBs from the sediment beneath the caps to the bioavailable surface layer and the water column." The final designs for the engineered caps in the main river channel, backwaters, and Lower Sykes Brook were designed in accordance with guidance set forth in EPA's *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*, Subaqueous Capping Guidance, and the Interstate Technology and Regulatory Council's *Contaminated Sediments Remediation: Remedy Selection for Contaminated Sediments* (ITRC 2014) and *Sediment Cap Chemical Isolation Guidance* (ITRC 2023). In addition, the final design addresses the conditions in EPA's December 3, 2024, conditional approval letter.

As described in Section 3.2.4, the Performance Standards for engineered caps require that all engineered caps constructed for the ROR include the following layers or functions: mixing, chemical isolation, erosion protection, geotechnical filter, bioturbation, and habitat (left side of Figure 8-8). The Revised Final Permit indicates that a single layer may serve multiple functions, which is consistent with EPA's Subaqueous Capping Guidance.

The remaining sections summarize the final design for the engineered cap in Reach 5A. Details of the design evaluation and the associated modeling are provided in Appendix H.

8.2.1 Cap Layers

8.2.1.1 Chemical Isolation Layer

As described in the Revised Final Permit, the chemical isolation layer will be "sufficient to minimize (reduce by 99%) the flux of PCB concentrations through the isolation layer." In backwater areas where a cap will be placed (i.e., portions of BW5A-1, BW5A-2, BW5A-4, and BW5A-5), removal and capping will be performed to achieve a SWAC of 1 mg/kg total PCB in each averaging area, for which the calculation assumes that a "PCB concentration equal to 1% of the existing average surficial

concentration shall be used as the PCB concentration in capped areas." As stated in Section 8.1.2.2.3, an engineered cap will also be placed in one of the Other Waterbodies, Lower Sykes Brook.

To meet the requirements for engineered caps in the Revised Final Permit, the chemical isolation layer in the main river channel and backwaters (as well as Lower Sykes Brook) was designed to meet the following criteria:

- For the main channel and Lower Sykes Brook:
  - Achieve 99% reduction in PCB mass flux across the chemical isolation layer within a 100-year time frame based on model calculations.
- For the backwaters:
  - Achieve 99% reduction in PCB mass flux across the chemical isolation layer within a 100-year time frame based on model calculations; and
  - Confirm that concentrations within the surficial six inches of the cap remain less than 1% of the existing average surficial concentration (i.e., that used as the replacement value in the evaluation to identify areas requiring capping).

Model simulations were performed using CapSim (version 4.2.3; Reible 2023; Shen et al. 2018) to identify the chemical isolation layer thickness and composition (i.e., sorptive amendment) needed to meet the Performance Standards. CapSim is a one-dimensional model of chemical transport within sediment caps. The model simulates the transport of contaminants resulting from various transport processes, including groundwater advection, diffusion/dispersion, bioturbation/bioirrigation, and exchange with the overlying surface water, consistent with the requirements of the Revised Final Permit (see Section 3.2.4). The cap model predicts PCB mass flux and concentrations (for both porewater and sorbed phase) throughout the cap over time.

To optimize the chemical isolation layer design, Reach 5A was subdivided into five unique cap areas based on the following factors: (1) observed spatial differences in groundwater seepage rates; (2) differences in waterbody type (i.e., main channel versus backwaters); (3) observed differences in porewater concentrations beneath the cap; and (4) constructability considerations.

Figure 8-9 shows the five unique cap areas (called subareas) that were simulated with the model (differentiated by color). They are as follows:

- **Subarea 1:** Upper portion of Reach 5A main channel (which includes the lower portion of Sykes Brook);
- **Subarea 2:** Lower portion of Reach 5A main channel;
- **Subarea 3:** BW5A-1;

- **Subarea 4:** BW5A-2 and BW5A-4; and
- **Subarea 5:** BW5A-5.

Looking at the observed spatial differences in groundwater seepage rates, observed seepage rates in the main channel ranged from -88 cm/year to 250 cm/year, with an average of 46 cm/year.[50] Accordingly, an average seepage rate of 50 cm/yr (rounded to one significant digit) was used in the modeling to represent the upper two-thirds of Reach 5A (including the main channel and Lower Sykes Brook [Subarea 1] and backwaters in this area [Subareas 3 and 4]), shown as shades of blue on Figure 8-9. In the lower portion of Reach 5A and associated backwaters (Subareas 2 and 5), where seepage rates are more variable, a higher seepage rate of 300 cm/year was used in the modeling; this value represents the maximum observed seepage rate in this area, rounded to one significant digit. Shades of green on Figure 8-9 represent the areas in the lower portion of Reach 5A where this higher seepage rate was applied (Subareas 2 and 5).

Within each of these subareas, the main channel (including Lower Sykes Brook) was modeled separately from the backwaters due to differences in expected bioturbation depths (i.e., bioturbation is expected to be deeper in the backwaters based on the presence of finer substrate and concomitant differences in infauna) and TOC content of the existing surface sediments (which is generally higher in the backwaters). Differences in porewater PCB concentrations were also considered in the subareas. For example, in the upper portion of Reach 5A (blue shading on Figure 8-9), porewater concentrations in backwaters BW5A-2 and BW5A-4 were within the same order of magnitude; therefore, BW5A-2 was conservatively selected to represent the conditions of those two backwaters in the modeling.

Constructability was also taken into consideration in the subareas. The cap configuration in the upper portion of the main channel (blue area in Figure 8-9) is expected to be effective in the lower portion of Sykes Brook because this area is relatively small and in close proximity to the main channel; therefore, the cap for Sykes Brook was specified to be the same as that for the main channel in this upper portion of Reach 5A.

In each of the five subareas that were modeled, the transport of PCBs was simulated for each of the 10 PCB homolog groups (mono- through decachlorobiphenyl) to account for the differences in mobility among the various homologs. Model-predicted mass flux and concentration for each homolog were summed to calculate the total PCB mass flux throughout the chemical isolation layer

[50] Where measured seepage rates at main channel locations were negative, seepage rate values were set to zero for calculation of the average. Furthermore, the seepage measured at BW5A-1 was excluded from the average, given that it reflects a different hydrologic environment from the main channel.

It should be noted that the measured site-specific average seepage rate of 46 cm/year (which is equivalent to approximately 18 inches per year) is within the middle of the range cited in a study conducted by USGS of the Housatonic River basin (which cited a range of 13 to 25 inches/year; Bent 1999).

and the total PCB concentration within the surface of the cap. PCB mass fluxes predicted by the model at the sediment-cap interface and the interface between the chemical isolation layer and erosion protection layer were used to calculate percent reduction in mass flux across the chemical isolation layer throughout the course of 100-year simulations.

Initially, a cap consisting of a six-inch sand chemical isolation layer overlain by a six-inch gravel/cobble erosion protection layer was evaluated with the model. The model was then run iteratively by adjusting the amendment content and/or thickness of the chemical isolation layer as needed to result in predicted reductions in the PCB mass flux across the chemical isolation layer of 99% throughout the 100-year simulation. In the backwaters, if a 99% reduction in PCB mass flux across the chemical isolation layer was achieved, but the solid-phase total PCB concentration predicted in the surface of the cap was greater than 1% of the existing average surficial concentration of that backwater at the end of the 100 year simulation, additional model simulations were conducted with higher amendment content and/or increased thickness of the chemical isolation layer until both criteria were satisfied.

As described in Section 5.6.3, testing of two adsorptive amendment materials (PAC and GAC) was performed during the treatability studies to support selection of the material and dosage to be specified in the Reach 5A sediment caps. That testing was designed as a 24-week study; however, the Treatability Studies Summary Report included results from only the first eight weeks of testing as directed by EPA. Additional data generated beyond that initial eight-week period were not available in time to be considered in the design presented herein. Initial review of the treatability study isotherm test data suggested that some PCB congeners did not reach full equilibrium for the testing with GAC. Likewise, the abbreviated kinetic testing period (i.e., eight versus 24 weeks) did not allow for a complete evaluation of PCB sorption equilibrium with GAC. Therefore, the results from the full 24 weeks of testing and any resulting modifications to the design may be considered further in future revisions of or addenda to this work plan. As of now, results of the treatability testing showed that PAC was a more effective amendment than GAC. Thus, for the purposes of the current final design, PAC was specified as the sorptive amendment.

The chemical isolation layer modeling results show that a six-inch chemical isolation layer consisting of sand with 1% by weight PAC (0.47 pound per square foot [lb/sf]) will meet the applicable Performance Standards (i.e., to reduce the flux of PCB concentrations through that layer by 99% and, in backwaters, to achieve total PCB concentrations within the surficial six inches of the cap that are less than 1% of the existing average surficial concentration) in each of the cap areas.[51] Additional

[51] See Section 8.2.1.2 for discussion of how incorporation of a mixing layer was accounted for in the modeling evaluations.

details related to the chemical isolation layer modeling approach, inputs, development, and results are provided in Appendix H.

8.2.1.2 Mixing Layer

The Performance Standards for engineered caps state that the cap shall include a "mixing layer to prevent contamination of the chemical isolation layer due to mixing with underlying contaminated sediment during cap placement, taking into account geotechnical considerations, placement techniques, and other factors as appropriate" (Section II.B.2.i.(1)(a)(i)). The concept of a dedicated mixing layer was included in EPA's 1998 Subaqueous Capping Guidance based on experience in constructing caps at that time. However, experience from capping projects conducted since that time indicates that contemporary placement techniques have been able to place materials with minimal mixing (e.g., less than one inch; Anchor Environmental 2007; Shaw et al. 2008). Based on simple soil mechanics, mixing of cap materials and sediments is mainly a concern for fine unconsolidated sediments, as indicated in the Subaqueous Capping Guidance. In Reach 5A, the coarse nature of the native sediment bed (i.e., more than 90% sand and gravel as noted in Section 3.4 of the Conceptual RD/RA Work Plan) does not present a mixing challenge for placement of granular cap materials. The mixing potential is reduced further because the existing sediment surface will be excavated to facilitate placement of the cap.

Nonetheless, as a more conservative assumption, final design of the chemical isolation layer described in Section 8.2.1.1 assumed that some mixing would occur between the bottom two inches of the six-inch chemical isolation layer and the native sediment during placement. Results of the chemical isolation layer modeling (provided in Appendix H) demonstrated that, even if this mixing were to occur during placement, the applicable Performance Standards for the chemical isolation layer would still be achieved with the specified thickness and amendment content of the chemical isolation layer.

8.2.1.3 Erosion Protection Layer

As described in the Revised Final Permit, the engineered caps will include an erosion protection layer to prevent erosion in accordance with federal and state requirements and consistent with pertinent EPA or USACE guidance. As indicated in EPA's Subaqueous Capping Guidance, an erosion protection layer has a dual function: it is intended to stabilize the contaminated sediments being capped and prevent them from being resuspended and transported off site. It also makes the cap itself resistant to erosion.

The erosion protection layer (often referred to as an armor layer) will be placed above the chemical isolation layer and will be designed to protect it from erosional processes in the river. River currents and flood flows represent the dominant factors contributing to potential cap erosion, as river currents, particularly during high-flow events, can result in elevated current velocities and bed shear

stresses and have the potential to erode or resuspend cap material. Because Reach 5A is not used for navigation, effects from vessel wakes and propellor wash, which are often important considerations for cap design, are not relevant in Reach 5A. In addition, because of the cold winter temperatures in western Massachusetts, ice has the potential to damage a cap. However, ice cover in Reach 5A is generally limited to thin accumulations near the banks, and the river freezes over only during exceptionally cold winters. As a result, ice is not expected to contact the sediment cap or pose a risk to its integrity.

As described in the Revised Final Permit, the design flow event for the erosion protection layer is a flow event up to and including the applicable return interval event, which shall be calculated using up-to-date flow data, with additional considerations for the potential impacts of climate change on cap performance and appropriate measures to mitigate them. EPA's *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* states the following (on page 5-9): "The design of the erosion protection features of an in situ cap (i.e., armor layers) should be based on the magnitude and probability of occurrence of relatively extreme erosive forces estimated at the capping site. Generally, in situ caps should be designed to withstand forces with a probability of 0.01 per year, for example, the 100-year storm."

In the Conceptual RD/RA Work Plan, the erosion protection layer was initially developed using a design flow rate with a 100-year return period based on flow information through 2022 from the USGS Coltsville gage. However, a wide range of flows was evaluated to understand velocities in the river channel under various conditions, including lower flows during which a greater proportion of the flow remains in-channel and higher flows that were evaluated to assess the potential impacts of climate change on cap performance. The Conceptual RD/RA Work Plan evaluated flows up to approximately equal to the 200-year return period flow based on the entire period of record for the USGS Coltsville gage. Conditions 5 and 134 of EPA's conditional approval letter required that GE present an analysis of the USGS Coltsville gage data to assess whether using flow data from recent years shows significantly different results from the entire period of record.

As described in Appendix C, a trend analysis of the USGS Coltsville gage flow data was performed using a 20-year rolling analysis window to determine flows at specific recurrence intervals to determine whether the full-record 100-year flow was meaningfully different from a trend-adjusted 100-year flow. The result of that 20-year rolling analysis window indicates that a trend-adjusted 1% annual exceedance probability (i.e., 100-year) flow at the USGS Coltsville gage was 10,350 cfs compared to a flow of 7,277 cfs for the full-record analysis (i.e., a 42% increase). Based on this analysis, a "trend-adjusted" 100-year flow was used as a conservative the upper-bound design flow in the hydraulic modeling to evaluate the erosion protection layer sizing. However, as described below, this evaluation considered a wide range of flow conditions since critical velocities are not necessarily associated with the highest flows.

The stable particle size, expressed as median diameter (D_{50}), required to resist the current velocity and related bed shear stress was calculated in accordance with Appendix A to EPA's Subaqueous Capping Guidance. The method is based on the USACE's *Hydraulic Design of Flood Control Channels* (USACE 1994). This method uses velocity and flow depth to determine the stable median armor stone size (D_{50}).

Site-specific data and the two-dimensional HEC-RAS model (described in Section 5.7) were used to calculate the design velocities associated with a wide range of high-flow events for the proposed NCD grading surface, which will serve as the final restoration design surface after engineered cap placement. Specifically, the model was used to simulate flows with recurrence intervals of 1-, 5-, 10-, 25-, 50-, and 100-year return periods along with the trend-adjusted 100-year flow described above. In addition, the model was also used to simulate a bankfull flow scenario.

Stable particles sizes for each flow event were computed using the hydraulic model output (see the equation in Appendix H). This calculation was performed using raster grid output data from the HEC-RAS model for current velocity and water depth. The recommended minimum safety factor for the calculation of stable particles sizes is 1.1; however, to be conservative, a safety factor of 1.5 was used in the calculation of stable particle sizes for Stations 0+00 through 48+00. That same conservative safety factor was also used for the preliminary design downstream of Stations 48+00; however, that value may be re-evaluated for certain portions of that downstream area. The calculated stable particles sizes for each flow were evaluated to identify the maximum calculated D_{50} value for each raster grid cell. Figure 8-10 shows the largest calculated D_{50} in Reach 5A for the range of flows analyzed (i.e., up to and including the trend-adjusted a 100-year flow); each bar on this figure represents the maximum value computed within each 300-feet segment of the river (which approximately coincides with the CCU defined for dredging and capping, as described in Section 8.1.1.7).

The results of this evaluation indicate that a coarse gravel erosion protection layer (with a D_{50} of three inches or less) would be sufficient to protect the chemical isolation layer material from erosive forces throughout most of Reach 5A (i.e., more than 80%), which is generally consistent with the overall results from the one-dimensional HEC-RAS model presented in the Conceptual RD/RA Work Plan. For Stations 0+00 through 48+00, the results indicate that a D_{50} of 1.5 inches is sufficient to resist anticipated erosive forces in most areas. However, a D_{50} of three inches was specified in portions of the subreach where relatively higher erosive forces were predicted (e.g., immediately downstream of the Confluence and the lower portion of the subreach), as well as in specified riffle areas. For Stations 0+00 through 48+00, a D_{50} of three inches was also specified for areas where bed scour may occur near the in-river structures (i.e., bendway weirs, J-hooks, sills, and cross vanes) shown on the geomorphic design plans (Drawings SR1100 through SR1105; Appendix A). For the remaining subreaches downstream of Station 48+00, similar to the first subreach, a D_{50} of 1.5 inches

is sufficient for most areas to resistant in anticipated erosive forces. Again, however, higher D_{50} values of 3, 6, 9, 12, and 24 inches are required for certain areas that experience relatively higher velocities. Further adjustments to account for features such as riffle areas and in-river structures will be incorporated and presented in a future revision of or addendum to this work plan for these more downstream subreaches.

Once the erosion protection material sizing (D_{50}) was estimated, the thickness of the erosion protection layer was specified, in accordance with a recommendation by Maynord (1998), as 1.5 times the median particle diameter (i.e., 1.5 times D_{50}) or the maximum particle diameter (i.e., D_{100}), whichever is greater. These calculations, together with evaluations for the other cap layers discussed in this section, were used to develop the final cap design types described in Section 8.2.2.

Details related to the evaluations performed to develop the final design for the erosion protection layer are presented in Appendix H.

8.2.1.4 Geotechnical Filter Layer

As described in the Revised Final Permit, "the use of a geotechnical filter layer between the chemical isolation layer material and erosion protection layer material shall be evaluated and may be necessary for those areas requiring cobble or larger-sized material in the erosion protection layer."

Where needed, a filter layer provides an interface between the erosion protection layer and the protected material and is an essential element for protecting contaminated sediments (Maynord 1998). The filter prevents migration of one granular material through another (often referred to as "piping"), distributes the weight of overlying armor units to provide more uniform settlement, and permits relief of hydrostatic pressures within the soils. A filter layer is often required when using larger-diameter material for the erosion protection layer of an engineered cap. The same armor-to-filter relationships are used to assess the potential for piping between the filter layer and chemical isolation layer and may be used to evaluate the gradations for the chemical isolation material as well (i.e., to prevent piping of underlying sediment into the chemical isolation layer).

Standard geotechnical filter criteria include recommended particle size ratios between base and overlying materials (i.e., between the sand chemical isolation material and the overlying erosion protection material). The primary filter criterion for a particle size ratio for subaqueous capping materials is that the ratio of D_{15} (i.e., the 15th percentile particle size) of the armor stone to D_{85} (i.e., the 85th percentile particle size) of the underlying base layer should be less than 5. This relationship relates to the ability of the base layer material (e.g., sand) to pass through the void spaces in the overlying larger material (e.g., erosion protection armor stone). Meeting the recommended filter criterion minimizes the potential for wash-out of the base material by the creation of internal filters in the armor stone voids. The potential for piping can be minimized by using well-graded gradations for the two materials.

For Stations 0+00 through 48+00, a geotechnical filter layer is not required because the erosion protection layer will consist of a coarse gravel material. As described in Section 8.2.1.3, preliminary evaluations indicate that cobble- and boulder-sized erosion protection layers may be required in certain portions of Reach 5A downstream of Station 48+00. In such areas where cobble- and boulder-sized erosion protection layers are needed, a gravel geotechnical filter layer will be placed between the erosion protection layer and chemical isolation layer.

8.2.1.5 Habitat Layer

The Performance Standards for engineered caps state that the cap shall include a "habitat layer to provide functions and values equivalent to the pre-existing surficial sediment substrate" (Section II.B.2.i.(1)(a)(vi)). Based on the evaluations described in Section 8.2.1.3, a gravel-sized material is the predominant erosion protection layer material that will be used throughout Reach 5A, with some areas that experience higher velocities requiring larger materials (cobbles or boulder-sized materials).

As described in Section 2.3, the surface sediment in Reach 5A currently consists predominantly of sands and gravels. It is anticipated that, at least in some areas, sufficient sediments will be infilled and deposited on top of the cap in Reach 5A via natural sedimentation processes after the remediation is complete, as that is an ongoing process occurring currently in the river. However, despite the natural infill that is expected to occur, an average of approximately four inches of additional habitat material is planned to be placed on top of the erosion protection layer in Reach 5A. That habitat layer will have a composition similar to the existing sediment bed. In much of the river, a habitat layer consisting of locally available bank-run gravelly sand material will be placed above the erosion protection layer. In river channel areas designated as riffles as part of the Natural Channel Design, the habitat layer material will be the same coarse gravel material specified for the erosion protection layer (i.e., D_{50} of three inches). In backwater areas and Lower Sykes Brook, a habitat layer consisting of locally available topsoil will be placed above the erosion protection layer. Figure 8-11 shows the designated habitat layer types within Reach 5A.

Further details on the proposed gradation for the habitat layer materials are presented in Appendix H.

8.2.2 Engineered Cap Types

Based on the results of the evaluations presented in Sections 8.2.1.1 through 8.2.1.5, the cap design for Station 0+00 through 48+00 includes two cap types (Types A and B) as summarized in Table 8-5. The primary difference between these two cap types is in the erosion protection layer (cap Type A has a D_{50} of 1.5 inches and cap Type B has a D_{50} of three inches). Table 8-6 summarizes the preliminary cap types for other caps downstream of Station 48+00, which may be subject revision or refinement. Figure 8-12 shows the extents of where these different cap types will be applied in Reach 5A. Figures 8-13 and 8-14 shows schematic cross-sections of each cap type. Overall,

approximately 85% of the capped area in Reach 5A will have a Type A or Type B cap, approximately 11% of the area will have a Type C cap, and approximately 4% of the capped area will have a Type D, Type E, or Type F cap. Cap material requirements are included in Specification Section 31 05 13 – Soils and Aggregates (Appendix B) and cap placement and verification requirements are included in Specification Section 35 28 00 – Engineered Cap (Appendix B). Typical cap details and placement locations are depicted on the Design Drawings (Appendix A).

Table 8-5
Reach 5A Engineered Cap Types for Stations 0+00 Through 48+00

Cap Type	Cap Layer Summary
Type A (29% of the CCUs in 0+00 to 48+00)	• Chemical Isolation Layer: Minimum six-inch-thick layer of sand with carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Erosion Protection Layer: Minimum six-inch-thick layer of gravel (D_{50} of 1.5 inches) • Habitat Layer: Approximately four inches (average) of locally available bank-run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design
Type B (71% of the CCUs in 0+00 to 48+00)	• Chemical Isolation Layer: Minimum six-inch-thick layer of sand with carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Erosion Protection Layer: Minimum six-inch-thick layer of coarse gravel (D_{50} of three inches) • Habitat Layer: Approximately four inches (average) of locally available bank-run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design

Table 8-6
Preliminary Engineered Cap Types for Stations 48+00 Through 245+00

Cap Type	Cap Layers
Type A (49% of the CCUs in 48+00 to 245+00)	• Chemical Isolation Layer: Minimum six-inch-thick layer of sand with carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Erosion Protection Layer: Minimum six-inch-thick layer of gravel (D_{50} of 1.5 inches) • Habitat Layer: Approximately four inches (average) of locally available bank-run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design
Type B (32% of the CCUs in 48+00 to 245+00)	• Chemical Isolation Layer: Minimum six-inch-thick layer of sand with carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Erosion Protection Layer: Minimum six-inch-thick layer of coarse gravel (D_{50} of three inches) • Habitat Layer: Approximately four inches (average) of locally available bank-run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design

Cap Type	Cap Layers
Type C (14% of the CCUs in 48+00 to 245+00)	• Chemical Isolation Layer: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Geotechnical Filter Layer: Six-inch-thick layer of gravel • Erosion Protection Layer: Minimum 13-inch-thick layer of cobble (D_{50} of six inches) • Habitat Layer: Approximately four inches (average) of locally available bank-run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design
Type D (1% of the CCUs in 48+00 to 245+00)	• Chemical Isolation Layer: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Geotechnical Filter Layer: Six-inch-thick layer of gravel • Erosion Protection Layer: Minimum 18-inch-thick layer of cobble (D_{50} of nine inches) • Habitat Layer: Approximately four inches (average) of locally available bank-run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design
Type E (1% of the CCUs in 48+00 to 245+00)	• Chemical Isolation Layer: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Geotechnical Filter Layer: Nine-inch-thick layer of gravel • Erosion Protection Layer: Minimum 18-inch-thick layer of medium riprap (D_{50} of 12 inches) • Habitat Layer: Approximately four inches (average) of locally available bank-run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design
Type F (3% of the CCUs in 48+00 to 245+00)	• Chemical Isolation Layer: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Geotechnical Filter Layer: 12-inch-thick layer of gravel • Erosion Protection Layer: Approximately 36-inch-thick layer of large riprap (D_{50} of 24 inches) • Habitat Layer: Approximately four inches (average) of locally available bank-run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design
Type G (Backwaters and Other Waterbodies)	• Chemical Isolation Layer: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Erosion Protection Layer: Minimum six-inch-thick layer of gravel (D_{50} of 1.5 inches) • Habitat Layer: Approximately four inches (average) of locally available topsoil

Note:
The preliminary cap types identified for areas downstream of Station 48+00 are subject to revision as the design progresses once the Natural Channel Design for this portion of the river is finalized. Details of the final cap types will be provided in a future revision of or addendum to this work plan.

8.2.3 Cap Material Selection

Details on the proposed cap material types and gradations are presented in the Specification Section 31 05 13 – Soils and Aggregates and Specification Section 35 28 00 – Engineered Cap (Appendix B). Based on the cap design, multiple material sources are expected to be required to source the required cap materials. Selection of the sources for the cap materials will involve outreach to local material suppliers and require input from the remediation contractor. Based on availability of local materials, some adjustment to the cap material design gradations may be warranted if the

overall design intent is maintained. Proposed changes (if any) to cap material design gradations, based on local material availability, will be presented in a revision or addendum to this work plan.

Potential sources of cap materials, the capability of these sources to meet the required material types and quantities, and the routes of delivery will be described in the SIP for each construction season.

8.2.4 Cap Placement

Similar to sediment removal operations (as noted in Section 8.1.3), cap placement means and methods may include performing the work under wet or dry conditions; however, final selection of the means and methods for performing the in-water sediment remedial construction will be based on input from the remediation contractor and will be presented in the relevant SIPs.

Various placement technologies may also be employed based on the material to be placed. For example, fine-grained material (e.g., sand and aggregate particles less than three inches in diameter) could be placed using mechanical bucket placement methods, using a telebelt system, or using broadcast spreading methods fed by a conveyer or as a slurry through a pipeline. For larger materials (i.e. a median particle size larger than two inches), mechanical bucket placement will likely be required, with the cap materials delivered to the capping location by truck, scow, or conveyor. Again, these methods will be finally determined based on input from the remediation contractor and will be presented in the relevant SIPs.

Placement of PAC, a component of the chemical isolation layer, through a water column presents inherent challenges due to its very fine particle size and low bulk density, which can cause the material to remain suspended, disperse laterally, or be transported downstream rather than settle uniformly on the target surface. These characteristics make it difficult to achieve controlled placement and consistent amendment distribution, particularly under even modest flow conditions. To address these limitations, various approaches have been developed to modify the physical behavior of PAC during placement, including use of pelletized amendments, composite or core-based materials, and delivery systems that incorporate temporary binding or weighting agents. These approaches increase the effective particle size and density of the PAC during placement, allowing it to settle more readily through the water column and achieve more uniform placement at the sediment surface while minimizing loss to the surrounding water column. If placement of the chemical isolation layer is performed under dewatered (i.e., dry) conditions, the PAC may be blended with sand and placed mechanically or as a slurry, thereby eliminating the challenges associated with placement through the water column. Details on the selected PAC product and placement methods will be described in the SIP for each construction season.

Methods for controlling sediment resuspension and maintaining compliance with the water quality requirements during cap placement will also be developed with input from the remediation contractor, based on the contractor's planned means and methods for performing cap placement

operations. The contractor's proposed methods and operational controls will be documented and incorporated into the relevant SIPs. In general, it is anticipated that the capping work will incorporate similar BMPs to those noted for sediment removal in Section 8.1.3.5.

In order to efficiently place cap material to achieve the required minimum thicknesses, the remediation contractor will be provided with an overplacement allowance for each cap layer. For both cap Types A and B, the overplacement allowance for the minimum six-inch-thick chemical isolation layer and minimum six-inch-thick erosion protection layer is an average of three inches across the CCU. It is anticipated that the remediation contractor will implement means and methods to minimize the overplacement of cap materials. The habitat layer material will be placed above the erosion protection layer at variable thicknesses to achieve the final elevations of the NCD grading design. Where the overplacement of underlying cap layers is less than the allowable thicknesses, the thickness of the habitat layer will be greater than four inches to achieve the final elevations of the NCD grading design. In localized areas where the underlying cap layers exceed the allowable thicknesses, the thickness of the habitat layer will be less than four inches. Overall, the average thickness of the habitat layer across Reach 5A is expected to be at least four inches.

8.2.5 No-Rise and Flood Storage Capacity Evaluations

The two-dimensional HEC-RAS model (summarized in Section 5.7 and detailed further in Appendix C) was used to confirm that the proposed NCD grading plan (which serves as the final restoration design surface after placement of the engineered cap) does not result in any significant increase in water surface elevation within Reach 5A. For this assessment, the model examined the NCD grading plan across Stations 0+00 through 48+00, which is presented herein as a final design.[52] Simulations were performed under 100-year flow conditions for two scenarios: (1) existing conditions (i.e., current bathymetry); and (2) post-remediation terrain for Stations 0+00 through 48+00 (including fill placement within the Intermittent Side Channel as described in Section 8.3.2) along with the existing bathymetry downstream of Station 48+00.

Comparative analysis of the resulting water surface elevations along the river channel for these scenarios confirmed that the post-remediation configuration for Stations 0+00 through 48+00 does not lead to an increase in flood stage elevation or an associated loss of flood storage capacity. As documented in Appendix C, the model results demonstrate that post-remediation water surface elevations are lower than the existing water surface elevations, thereby satisfying FEMA's no-rise requirement of 0.00 feet.

[52] Flood storage capacity evaluations for areas downstream of Station 48+00 will be performed once the NCD grading design and cap design evaluations are complete and will be presented in a revision of or addendum to this work plan that addresses the downstream reaches.

Additionally, the HEC-RAS model was employed to delineate inundation boundaries for the 100-year flood event under both existing and post-remediation conditions. Appendix C shows that the differences between these scenarios are negligible.

Finally, a flood storage assessment was performed to assess any overall changes in flood storage capacity resulting from topobathymetric modifications made between Stations 0+00 and 48+00 as part of the Natural Channel Design grading plan. For this assessment, gains or losses in flood storage capacity were calculated on a foot-by-foot basis by comparing the existing and proposed terrain elevations within the 100-year floodplain in this subreach. This evaluation included the proposed infill of the Intermittent Side Channel area. This evaluation shows net gains of flood storage capacity at higher elevations (i.e., between elevations 957 feet and 968 feet); however, those gains are offset by net losses at lower elevations (between elevations 951 feet and 957 feet). Overall, there is a relatively small net loss in flood storage capacity within this subreach (Stations 0+00 and 48+00) of approximately 65 cy, which equates to less than one inch across the Intermittent Side Channel. Excluding the infill of the Intermittent Side Channel, there is an overall net gain in flood storage capacity of approximately 1,890 cy. The overall net loss in this subreach will be offset in the design for the remainder of Reach 5A to be compliant with the requirements of the Final Revised Permit.

8.3 Backfill Design – Backwaters and Other Waterbodies

As noted in Section 8.1.2, backfill will be placed in backwaters BW5A-3 and BW5A-6, West Pond, and the Intermittent Side Channel as part of the site restoration process.

8.3.1 Backwater Areas and West Pond

As described in Sections 8.1.2.2.2 and 8.1.2.2.3, GE has elected to follow sediment removal with backfill placement in two backwater areas (BW5A-3 and BW5A-6) and in West Pond. Sediment removal will be performed to a maximum depth of three feet in BW5A-3, five feet in BW5A-6, and two feet in West Pond. The backfill design for these three areas includes placement of sandy material to meet the required elevations minus 12 inches. The final 12 inches of backfill will consist of uncompacted topsoil. The topsoil layer will be tested prior to placement to verify that it meets the requirements of Specification Section 31 05 13 – Soils and Aggregates (Appendix B).

8.3.2 Intermittent Side Channel

As described in Section 8.1.2.2.4, the Intermittent Side Channel is hydraulically connected to the main river channel at three locations. Due to the risks summarized in that section, the Intermittent Side Channel connection to the main river channel will be cut off by rebuilding and stabilizing the banks at the three points where it connects to the river (i.e., near Station 1+00, near Station 10+00, and near Station 15+00). In addition, the Intermittent Side Channel will be filled with approximately 1,800 cy of clean backfill (up to five feet in portions of the channel) to create floodplain transitional

forest/shrub wetland habitat and to mitigate potential erosion during future river flooding events. Given this approach, an evaluation of the flood storage capacity and the effect of filling the channel was conducted, which is summarized in Section 8.2.5.

The backfill design for the Intermittent Side Channel considers the potential for inundation of surface water and groundwater during future river flooding events. Therefore, to reduce the permeability of the fill and thus prevent erosion at the connections to the main channel, and to reduce the infiltration or loss of water into the subsoils below the backfill, the backfill design includes the placement and compaction of general backfill, followed by a silty loam base layer, and finally, placement of a nine-inch layer of uncompacted topsoil. The general backfill of sandy material would be placed within the channel to meet the required elevations to cut off the channel, minus 12 inches. The silty loam or fine-grained material layer would then be placed and compacted to a thickness of three inches. The final nine inches of the backfill will consist of topsoil and will be left uncompacted to support vegetative growth. The topsoil layer will be tested prior to placement to verify that it meets the requirements of Specification Section 31 05 13 – Soils and Aggregates (Appendix B).

8.4 Backwater BW5A-1 Amendment Design

Backwater BW5A-1 is the only backwater in Reach 5A located in Core Area 1 habitat. As summarized in Section 3.2.2, the Revised Final Permit states that portions of backwater areas located within Core Area 1 habitat that have discrete total PCB concentrations between 1 and 50 mg/kg in surficial sediment will receive placement of an amendment (AC and/or other comparable amendment) to reduce PCB bioavailability. As discussed in Section 8.1.2.2.1, approximately 1.7 acres of BW5A-1 will be subject to amendment placement.[53] Figure 8-6a shows the portion of BW5A-1 that will receive amendment application. As described in Section 5.6.2, bench-scale jar testing of sediments collected from this backwater was performed to evaluate the effectiveness of various amendment types and doses in reducing bioavailable porewater PCB concentrations in these sediments. Methods and results from that bench-scale testing are provided in Section 3 of the Treatability Studies Summary Report.

8.4.1 Amendment Type and Application Rate

AC applications typically result in bioavailability reductions of 70% to 99% in PCB-impacted sediment (Patmont et al. 2014). Therefore, the AC type and dose was selected to achieve that typical range of performance. As described in Section 3.6 of the Treatability Studies Summary Report, of the three amendments tested (PAC, GAC, and biochar), PAC achieved the greatest reductions in porewater PCB concentrations at the lowest dose. Based on that, sediments within BW5A-1 will be treated with PAC, with a recommended application rate that will result in 2% by weight PAC within the top six inches of

[53] As described in Section 8.1.2.2.1, the remediation of BW5A-1 will also include sediment removal and engineered cap placement in an approximately 0.15-acre portion of that backwater at four discrete polygons with total PCB concentrations greater than or equal to 50 mg/kg in surface sediment.

sediment. To account for construction variability and uncertainty, a 25% uncertainty factor has been incorporated into the design, resulting in a target application rate of 2.5% by weight PAC for the top six inches of sediments. Using a PAC density of 25 pounds per cubic foot and an assumed sediment density of 61 pounds per cubic foot (the same soil density measured during the vernal pool pilot study bench testing; see Appendix B of the Final Vernal Pool Work Plan), the target PAC application rate will be 0.79 pound per square foot, or approximately 34,400 pounds per acre.

Because this backwater is located in an area of sensitive habitat, the AC will be placed in such a way that minimizes habitat impacts by broadcasting the AC as a thin layer on top of the sediments and allowing natural processes (i.e., bioturbation) to mix the amendment into the sediments.

As described in the Final Vernal Pool Work Plan, two different amendment application approaches will be tested during the vernal pool pilot study: (1) placement of a PAC/sand blend; and (2) placement of a commercially available pelletized PAC delivery product. Given the similarity in site characteristics, these application methods are also potentially applicable to BW5A-1. The selection of the amendment application method for BW5A-1 will be made following completion of the vernal pool pilot test construction in late 2026.

Based on laboratory testing conducted as part of the bench-scale testing related to the vernal pools (Appendix B of the Final Pilot Work Plan), a blend of 50% PAC and 50% sand by weight has a bulk density of 32 pounds per cubic foot. Therefore, to achieve the target PAC application rate of 0.79 pound per square foot, the average thickness of the PAC/sand blend that would be placed is estimated to be approximately 0.6 inch. If a commercial pelletized PAC delivery product is used, the thickness of that product that would need to be placed will be dependent on the product specification.

8.4.2 Amendment Application Approach

As discussed in Section 8.4.1, two different amendment application approaches will be tested during the vernal pool pilot study: (1) placement of a PAC/sand blend; and (2) placement of a pelletized PAC delivery product. The selection of the amendment application method for BW5A-1 will be made following completion of the vernal pool pilot test construction in late 2026.

Based on experience on similar projects, it is anticipated that the pelletized PAC delivery product, if selected, would be applied pneumatically and that the PAC/sand blend, if selected, would be applied hydraulically. Pneumatic application (i.e., for pelletized PAC delivery product) is a method that delivers the amendment pellets to the treatment area in a dry manner and thus has the potential to generate dust. The PAC/sand blend would be mixed with water and pumped to the application area where it would be sprayed into place, which minimizes the potential to generate dust. During the

amendment application, dust control measures will be implemented to maintain compliance with particulate matter and visible dust QOL criteria described in Section 13.2.

Prior to placement, the amendment area will be divided into Amendment Certification Units (ACUs). The ACUs will be used to verify that the PAC application rate is achieved by tracking and documenting the amount (i.e., tons) of amendment placed in each ACU. In addition, cores, catch pans, and/or visual observations may be used to verify uniform placement of the amendment across the target placement area.

Vegetation removal will be completed prior to amendment placement, if needed, based on judgment by the field engineer, the remediation contractor, and a project wetland scientist. Vegetation removal will be minimized to minimize disturbance to the BW5A-1 habitat. However, cutting of resilient species, such as dogwood shrubs and small woody vegetation, will be conducted as necessary to promote amendment application. Any vegetation removal will leave the root system in place. There will be no tree removal in the amendment application area.

8.5 Restoration Design for Aquatic Areas

This section summarizes the restoration design for in-river and other aquatic features in Reach 5A, including the river channel, backwaters, and Other Waterbodies. Restoration objectives and methods are provided in the separate Restoration Plan, and NCD-related Design Drawings are included in Appendix A to this Final RD/RA Work Plan and again in Attachment D to Appendix A to the Restoration Plan.

Restoration planning for these aquatic environments is driven by the Performance Standards in Section II.B.1.c.(1) of the Revised Final Permit, as summarized in Section 3.1.3. Baseline physical and ecological conditions documented in the Revised BRA Report provide the reference point for design (e.g., channel form and bed conditions, riverbank and backwater habitat characteristics, and habitat features). Restoration will be implemented in coordination with the remediation sequence to support phased disturbance and progressive recovery and to reduce the magnitude and duration of habitat disruption to the extent feasible and consistent with remediation requirements.

8.5.1 River Channel Restoration

The design and restoration of the river channel and the riverbanks are closely tied together. This section describes the river channel restoration, focusing on the geomorphology of both the channel and banks. Section 9.5 provides additional details on the stabilization techniques used to restore the banks following remediation activities.

8.5.1.1 River Channel Design Goals

The primary goal of the river channel restoration design is to provide a stable channel profile (riffle/pool sequence) and to reduce excess bank erosion without eliminating the channel's natural sediment supply or degrading riverine habitat. As described in Section 9, the Revised Final Permit established criteria for the identification of the banks in Reach 5A that require remediation due to both their assessed erosion potential and their PCB concentration. Although overall river stability is a desirable outcome, the priority of the restoration design is to reduce erosion on the remediated banks while leaving the remaining banks largely undisturbed except where necessary to maintain stability on the remediated banks. Bank grading and stabilization techniques were also applied in areas where river stability is a threat to infrastructure or property; however, not every bank that is erosional was modified as part of the design. Additional design goals for the river channel restoration include the following:

- Grade remediation banks to a stable dimension.
- Restore a stable channel bed morphology through the design reach that reduces NBS.
- Minimize channel modifications to ones that are necessary for erosion reduction in the bed and banks.
- Apply channel and bank structures to areas that require more robust stabilization in addition to grading.
- Stabilize areas where existing infrastructure encroaches on the river channel.
- Ensure that any channel modifications do not create instability elsewhere in the river.

8.5.1.2 River Channel Design Methodology

The application of an NCD approach is required by the Revised Final Permit to achieve channel stability. This type of approach will ultimately make the river more geomorphologically functional and resilient, and will also improve aquatic habitat diversity by restoring key physical features such as riffles, pools, glides, and runs. NCD also aims to ensure that sediment transport is maintained through a river system and recognizes that some amount of erosion in river systems is essential for overall watershed stability. While excess sedimentation in rivers can cause the river to aggrade and erode at an unmanageable rate, traditional engineering solutions often over-harden rivers, preventing any sediment from being entrained in the water column and increasing stream power through hardened reaches, which often causes degradation and erosion downstream. NCD aims to achieve sediment equilibrium so that neither aggradation nor degradation occurs in the river.

Using NCD principles, practitioners apply stable river measurements and ratios to the dimension, pattern, and profile of a degraded river system based on several known river and valley types identified by Rosgen (1996). These measurements are typically scaled according to bankfull

dimensions and include parameters such as riffle length, riffle width-depth ratio, pool-to-pool spacing, pool depth and width, meander length and width, channel sinuosity, and radius of curvature.

There are also a variety of approaches that may be used to restore degraded river systems. Rosgen (1996) separates restoration approaches for incised streams into four "Priorities." These approaches are summarized as follows.

- **Priority 1:** An incised stream is relocated at a higher elevation on the adjacent floodplain; this is the most stable approach to restoration for long-term stability but requires the greatest level of intervention.
- **Priority 2:** Channel incision is decreased by a combination of raising the bed and excavating a lower floodplain, creating reduced shear stresses and increased floodplain connectivity.
- **Priority 3:** A lower floodplain is established, but the channel bed elevation stays the same; this provides limited relief during higher flood flows and is typically reserved for projects that are laterally constrained or in very steep V-shaped valleys.
- **Priority 4:** The stream banks are stabilized in place, but none of the channel dimension, pattern, or profile is altered; this approach requires minimal earthwork and tree clearing but can incur additional maintenance.

For the Housatonic Reach 5A restoration design, a mix between the Priority 2 and Priority 4 approaches was taken. The channel alignment is mostly unaltered due to the size of the river and the difficulty associated with rerouting channel flow; however, the profile has been modified to increase stable riffle habitat in sections of the alignment that are already relatively straight. The overall slope of the existing channel does not change but fill material was added in some locations to allow riffle features to achieve a stable width and depth. Modifications that were made to the channel in accordance with this design methodology are listed below.

Alignment

- Moderate shifts in the location of the channel thalweg were made away from tall banks and valley edges where a stable channel width has not been achieved.
- Existing radii of curvature were smoothed in areas where feasible.
- Stable pool-to-pool spacing was applied based on reference data in areas where required bank modifications allow.

Cross-Section

- A partial bankfull cross-section was applied based on reference dimensions to banks that require remediation; in most areas, only one bank and the channel bottom were modified.
- A relatively consistent channel width was maintained and "pinch points" in the channel where flows below bankfull become constricted were reduced.
- Grading of remediation banks was smoothed into existing banks to reduce any sharp transitions.
- Side bar features were graded in areas where remediation is required on the inside of a bend.
- Inflow elevations of all tributaries were maintained.[54]

Profile

- A consistent bankfull slope was applied for each of the five defined subreaches in Reach 5A (described in Appendix A to the Restoration Plan).
- Reference facet slopes were applied to riffles, runs, pools, and glides with some exceptions where mimicking existing features is more beneficial for the design.
- The number of existing riffles was increased, mimicking a more stable C-type channel where riffle-pool habitat ratios are closer to 50-50.
- The proposed profile was simplified for ease of constructability and increased stability, removing micro-pools from the design.
- Modifications were made to ensure that pools are located in the bends and riffles in straight sections of the channel.

This design approach improves existing geomorphic conditions while minimizing the impact of earthwork on the existing river channel and banks. Figure 8-15 shows the elevations of the NCD grading design developed for Stations 0+00 to 48+00.

8.5.1.3 River Channel Design Constraints

Several constraints impacted the proposed design, including existing infrastructure, valley conditions, and overall constructability. In several locations along Reach 5A, the existing stream has eroded to the maximum extent that the valley width will allow. In locations where a remediation bank abuts the edge of the valley, it is not possible to grade the valley at a stable slope due to the large earthwork volume and area of disturbance that such an approach would require. In these locations, the design

[54] One exception to this was for the Intermittent Side Channel (discussed in Section 8.1.2.2.4), where the hydraulic connection to the main river channel will be eliminated by re-building the bank at the three locations where this side channel connects to the river.

shifted the channel slightly away from the edge of the valley until a stable bankfull width was achieved. This sometimes required placement of a moderate amount of fill against the edge of the valley to establish a stable floodplain bench on the side of the channel.

There are also some locations within Reach 5A where bank grading is not recommended due to the presence of existing infrastructure such as stormwater outfalls, utility crossings, bridge abutments, and adjacent private property (see Section 8.1.1.3 for discussion of structure, utility, and bank protection offsets). Existing floodplain habitat features such as vernal pools also limit the extent of bank grading done in some locations. In locations where extensive bank grading is not possible to achieve channel stability, supplementary bank structures and in-channel structures have been applied in the design to reduce erosion. In addition, improvements to the channel profile in some of these areas (described above) will benefit long-term stability.

8.5.1.4 Riverbed Habitat Restoration

Restoration of riverine habitats in Reach 5A will be achieved through an integrated combination of sediment remediation, engineered capping, backfilling and grading to the final restoration surface, channel reconstruction using NCD principles, and installation of structural habitat features. This NCD approach encompasses both the river channel and adjacent riverbanks which function as an integrated system. The goal of riverine restoration is to reconstruct a stable channel that is consistent with NCD principles and capable of supporting the successional re-establishment of riverine habitat functions, including benthic macroinvertebrate, fish, and other aquatic and shoreline-associated biological communities.

Aquatic plants are sparse in Reach 5A. Therefore the riverine restoration program in Reach 5A does not include active planting of native riverine aquatic plant species (with the exception of state-listed plants, discussed below). Rather, it is assumed that natural recolonization of plants from upstream would occur as suitable substrate conditions develop over time. However, there are two state-listed plant species which occur along the river margins and will be impacted by the river dredging and associated bank remediation and stabilization. These two species, matted spike-sedge and Frank's lovegrass, will be included in a plant propagation program, which will involve seed collection and ultimately replanting in the appropriate restored conditions along the river margins.

Additional details regarding riverbed habitat restoration are provided in the Restoration Plan.

8.5.2 Backwater/Other Waterbody Restoration

All six backwater areas in Reach 5A will require remediation, as described in Section 8.1.2. Remediation will involve sediment removal and capping or backfill placement in a majority of those backwaters. For those backwaters that will be capped, the engineered cap will consist of a sand-gravel cap (that includes a sorptive carbon-based amendment) plus a surficial habitat layer

consisting of approximately four inches of locally available topsoil, with final grades intended to be consistent with original grades. These backwater habitats consist primarily of deep marsh, with some smaller areas of shallow marsh. Potential impacts related to habitat alterations from sediment removal and capping may include changes in surface sediment content, removal of the existing seed bank and organisms, impacts to state-listed species habitat, risk of invasive species colonization, and surface disturbance that may affect existing native vegetation and habitat structures such as LWD. Active nesting sites for marsh birds and waterfowl may be impacted if vegetation is removed or disturbed during the breeding season. Amphibians and reptiles, which often rely on shallow water and marsh edges for breeding and shelter, could be impacted if present when construction occurs. The removal of LWD and alteration of microhabitats can reduce shelter and basking sites for several species.

The primary restoration goal for the backwaters is to restore surface water hydrology of the backwater deep marsh habitat by re-establishing the pre-remediation hydraulic connection to the river, thus maintaining backwater flooding and the overall hydrologic regime. In addition to restoring hydrologic connectivity, restoration will address substrate and vegetation recovery within the remediated backwaters. The cap material (and backfill material in backwaters that will be backfilled) is expected to provide suitable planting/growth media for deep marsh plant species and to support revegetation through both natural recolonization and, where warranted, active revegetation measures. A seeding and revegetation program has been developed and implemented for individual backwater areas based on site-specific impact evaluations and restoration needs. Because backwater flooding in these areas generally occurs at least annually, sediment deposition is expected to enhance substrate suitability for revegetation over time. The Restoration Plan provides design details that will allow for these restoration goals to be achieved.

With regard to Other Waterbodies, the remediation of Lower Sykes Brook will include sediment removal and capping similar to the main river channel; therefore, habitat impacts and the restoration approach will be similar to those for the main channel. West Pond remediation is similar to that described above for backwaters (i.e., removal and backfill), with similar potential habitat impacts and restoration considerations. The restoration of the outlet from this pond will also include provisions to account for beaver dam activity, particularly on the western side. The restoration of these affected Other Waterbodies is also described in the Restoration Plan.

9 Riverbank Remediation and Stabilization Design

9.1 Delineation of Riverbank Remediation Areas

As described in Section 3.3, the Revised Final Permit requires the removal of contaminated soil from erodible riverbanks in Reach 5A. A bank is considered contaminated if it contains discrete total PCB concentrations greater than or equal to 5 mg/kg in the surficial one foot of soil. A bank is considered erodible if the BEHI and NBS rating is classified as "Moderate-High" or greater using the BANCS model.[55] Riverbank remediation areas were originally delineated in the Conceptual RD/RA Work Plan to meet those Performance Standards based on the results of the bank erodibility assessment (BEHI and NBS ratings) designated during the PDI field investigations (summarized in Section 5.1.2.2), and the riverbank soil PCB data collected during the PDI (described in Section 5.1.1.2). Using the above definition of erodible, a summary of lengths of erodible banks binned by PCB concentration is provided in Table 9-1.

Table 9-1
Lengths of Erodible Banks Binned by PCB Concentration

Total PCB (mg/kg)	Category	
	Length of Erodible Bank (linear feet)	% of Erodible Bank
<1	1,819	19.2%
1–5	2,244	23.7%
Total (<5)	**4,063**	**43%**
5–10	2,697	28.5%
10–25	2,117	22.4%
25–50	447	4.7%
50–100	98	1.0%
>100	50	0.5%
Total (≥5)	**5,409**	**57%**

Based on the evaluation described above, there are approximately 5,400 linear feet of riverbank that are considered erodible with PCB concentrations exceeding 5 mg/kg and, therefore, require remediation (i.e., approximately 11% of the total 50,000 linear feet of riverbanks in Reach 5A).

In addition to the bank areas where remediation is required (described above), the Revised Final Permit required that GE evaluate the PCB data, erosion potential, adjacent floodplain removal, and

[55] As described in Section 4.3.1 of the Conceptual RD/RA Work Plan, although the Revised Final Permit provides that a bank is considered to be erodible if the BEHI and NBS rating is classified as "Moderate-High" or greater, there is no such rating for BEHI or NBS. As a result, GE established in the conceptual design that a BEHI score of 27 would be the conservative lower bound for the Moderate-High range, and that all banks with an NBS score of Moderate or greater would be considered to meet the definition of erodible.

constructability issues at other banks and, based on these factors, consider supplemental riverbank removal. GE conducted that review, as described in the Conceptual RD/RA Work Plan, and selected additional bank segments for supplemental remediation based on constructability considerations (e.g., small sections of bank that do not require remediation but are situated between banks where remediation is required) and banks where the erosion potential is relatively high based on either the BEHI or NBS rating and the adjacent floodplain PCB concentrations are elevated. Based on that evaluation, GE selected an additional approximately 6,900 linear feet of banks for supplemental remediation (i.e., approximately 14% of the total 50,000 linear feet of riverbanks in Reach 5A). Therefore, in total, the Conceptual RD/RA Work Plan proposed for remediation a total length of bank of approximately 12,300 feet (approximately 25% of the riverbanks in Reach 5A).

During EPA's review of the Conceptual RD/RA Work Plan, GE and EPA collaboratively reviewed the remaining riverbanks (i.e., those riverbank areas that had not been identified for remediation in the Conceptual RD/RA Work Plan) and identified additional riverbank areas to be remediated. Those additional riverbank areas were documented in a series of figures provided in Attachment 1 to EPA's conditional approval letter (pursuant to EPA Condition 27). As a result of that evaluation, the total length of riverbanks identified for remediation has increased to approximately 16,700 feet (approximately 33% of the riverbanks in Reach 5A). Those riverbank remediation areas are shown on Figures 9-1a through 9-1i.

9.2 Riverbank Definition

As described in Section 5.3.5, supplemental field surveys were conducted to better define the Reach 5A riverbanks, including the bottom and top of bank. Section 8.1.1.2 summarizes the process used to delineate the existing shoreline through field surveys and joint field reviews with GE and EPA representatives. The resulting shoreline delineation defines the interface between riverbank soils and in-river sediments (i.e., the sediment-riverbank interface) based on existing conditions.

For purposes of defining the top of bank, the Massachusetts Wetlands Protection Act regulations (310 CMR 10.54(2)(c)) state that "the upper boundary of a Bank is the first observable break in the slope or the mean annual flood level, whichever is lower." Consistent with this regulatory definition, the top of bank used for the Reach 5A PDI riverbank sampling was initially identified as the first observable break in slope, as interpreted from comprehensive aerial and mobile LiDAR topographic survey data collected in 2021 and 2022 (as described in the Revised PDI Summary Report for Sediment/Riverbanks). The top-of-bank elevation was further constrained to be no higher than the elevation of the adjacent 1 mg/kg PCB isopleth, which approximately corresponds to the 10-year floodplain elevation.

To support final design development, additional survey and design analyses were performed to refine the delineation of the top of bank, which serves as the interface between the riverbank and the

floodplain. Initial top-of-bank delineation surveys were conducted in October 2024 between Stations 00+00 and 49+00 (i.e., upstream of the Pomeroy Avenue Bridge) to identify the first observable break in slope in the field. Wooden stakes installed by the surveyor at interpreted top-of-bank locations were subsequently reviewed by GE and EPA during a field review conducted in November 2024. During this review, GE and EPA representatives observed that the majority of the top-of-bank delineation stakes were appropriately positioned and generally represented the boundary between riverbank soils and floodplain soils.

Using the 2025 topobathymetric DTM (see Section 5.3.5.2), an updated top-of-bank boundary was delineated throughout Reach 5A in areas with riverbank remediation and in locations where floodplain remediation areas are in close proximity to the riverbank. Multiple lines of evidence were used to delineate the top-of-bank boundary and to address location-specific conditions and potential uncertainty (e.g., localized topographic undulations and overhanging vegetation). These lines of evidence included: (1) surveyed top-of-bank wooden stakes between Stations 00+00 and 49+00; (2) processed elevation contours derived from the topobathymetric DTM; (3) slope angles calculated from the topobathymetric DTM; and (4) high-resolution aerial photography.

The resulting delineated top-of-bank boundary representing existing conditions, along with the surveyed shoreline stakes, is shown on Figures 8-2a through 8-2i in conjunction with the topobathymetric DTM surface.

9.3 Riverbank Certification Units

Like the CCUs described in Section 8.1.1.7, Riverbank Certification Units (RCUs) were developed to segregate the riverbank work areas into smaller, discrete units that will be used to verify completion of the required riverbank remediation and grading work. The RCUs abut the CCUs and extend laterally to where the NCD specifies riverbank soil removal, grading, or backfill and where riverbank remediation is required but not captured by the NCD grading. Longitudinally, each RCU extends across three river stations (approximately 300 feet), where applicable, and aligns with the corresponding CCU boundaries (e.g., RCU-03L and RCU-3R align with CCU-03). The RCUs were established along both banks of the river where work activities are planned and each RCU ID includes a suffix to indicate the bank location (i.e., “L” for the left bank, and “R” for the right bank as facing downstream).

For Stations 0+00 to 48+00, the lateral boundaries of the RCUs along the river align with the modified shoreline developed using the NCD grading design (Section 8.1.1.2). Downstream of Station 48+00, the lateral extents of the RCUs along the river align with the existing shoreline and will be updated in a revision of or addendum to this work plan once the NCD grading design is finalized for those subreaches of the river.

The RCUs are shown on Figures 8-4a through 8-4e, and the RCUs for Stations 0+00 through 48+00 are shown on the Design Drawings (Appendix A). Table 9-2 presents a summary of the area and estimated removal volume for each RCU.

9.4 Riverbank Soil Excavations

As described in Section 9.5, application of NCD principles includes bank grading (and other stabilization measures) and other channel modifications to reduce bank erosion and maintain a stable channel in Reach 5A. Specifically, the proposed Reach 5A grading plan involves grading to reduce the slope at most of the erodible riverbanks identified for remediation in Section 9.1, grading at non-remediation riverbanks to provide necessary transitions upstream and downstream of those banks, and grading at other non-remediation banks where necessary to support a stable channel design. In general, the proposed grading plan includes grading of riverbanks on a 3H:1V slope, with some exceptions in localized areas where such grading is not practicable as described in Section 9.5.1.

Where NCD includes grading at riverbanks identified for remediation, the resulting soil removal at most of those banks will remove more than the one foot of soil required by the Revised Final Permit. However, there are some limited areas where the bank grading does not address bank segments identified for remediation; in those areas, a minimum of one foot of soil will be removed from the bank with no additional grading (these areas shown on Design Drawings D1100 through D1105 between Stations 0+00 and 48+00 [Appendix A]).

Between Stations 0+00 and 48+00, a total of approximately 5,790 linear feet of banks will be subject to removal and stabilization. This includes approximately 2,930 linear feet where remediation is required, plus an additional approximately 2,860 linear feet where remediation is not required, but additional grading is proposed as part of NCD.[56] The target excavation elevation contours are shown on the Design Drawings D-Series plan views.

The target post-excavation surface was compared with the existing topography elevations to estimate the volume of riverbank soil to be removed. For Stations 0+00 to 48+00, the target dredge prism described in Section 8.1.1.6 includes the bank grading developed based on NCD principles. Downstream of Station 48+00, the riverbank soil removal volume estimate was prepared based on the preliminary NCD grading surface. The volume estimate was further modified to include a minimum of one foot of soil where the NCD bank grading does not address the limited number of bank segments identified for remediation. The estimated riverbank soil removal volumes are summarized in Table 9-2. The overall estimated riverbank soil removal volume along the Reach 5A channel is approximately 40,800 cy, including approximately 6,560 cy between Stations 0+00 and 48+00.

[56] This includes two additional bank remediation areas identified by EPA in an email dated March 9, 2026.

The Revised Final Permit requires that riverbank soils with high PCB concentrations be segregated and disposed of off site and that the remaining soil to be disposed of in the UDF has a volume-weighted average PCB of less than 50 mg/kg. The volume-weighted average PCB concentration of the soils to be excavated from the riverbanks is approximately 15 mg/kg. This satisfies the 50 mg/kg average criterion for disposal in the UDF. Details associated with calculation of the volume-weighted average PCB concentrations are provided in Appendix F.

9.5 Riverbank Stabilization/Restoration Design

As described in Section 8.5.1, application of NCD principles means that the design and restoration of the riverbanks is closely linked to the design and restoration of the main river channel. Accordingly, this section provides a summary of riverbank grading and other riverbank stabilization measures that have been applied to riverbanks in Reach 5A.

9.5.1 Riverbank Grading

The main goal of the riverbank grading is to reduce bank erosion and provide a stable bank following remedial activities. In general, riverbanks grading was specified at nearly a 3H:1V slope, with some exceptions in localized areas where that type of grading is not practicable. For example, as stated in Section 8.5.1.3, in locations where a remediation bank abuts the edge of the valley, it is not practical to grade the valley at a stable slope due to the large earthwork volume and area of disturbance that approach would require. These areas were evaluated on a case-by-case basis and bank grading was developed based upon the final proposed stabilization treatment. The bank grading applied to riverbanks between Stations 0+00 and 48+00 is shown on the Design Drawings SR-Series plan views (Appendix A).

9.5.2 Riverbank Stabilization Toolbox Development

A critical component of the Reach 5A riverbank restoration design is to determine riverbank stabilization measures for banks that require remediation. A riverbank stabilization toolbox was developed to help guide and streamline the process of selecting a stabilization option for a particular bank. The toolbox encompassed a decision tree which was fed information about each bank location and output the ideal stabilization technique based on the results from the decision points. The outcome of the riverbank stabilization toolbox was used as a starting point, but ultimately the final stabilization treatment that was selected for each bank relied in part on engineering judgement. The following section describes the process for developing the toolbox and how the results were utilized to select the proposed bank stabilization treatment. Figure 3 of Appendix A to the Restoration Plan provides an illustration of the final toolbox decision tree.

To build the toolbox, a list of applicable riverbank stabilization measures was developed based on industry standard NCD techniques. Riverbank stabilization measures were ranked from “softest,”

which would require the least intervention to the bank or channel, to "hardest," which would require the most intervention. The following list of potential riverbank stabilization techniques was developed as the basis for the toolbox, listed in order from those requiring least to most intervention:

- Coir matting;
- Coir matting with rock toe;
- Brush mattress;
- Root wads;
- Lunkers;
- J-hook;
- Cross vanes;
- Bendway weir;
- Bioengineered bags;
- Toe wood; and
- Riprap.

Once this list of techniques was determined, the parameters to be used at each step of the decision tree were identified. The following general parameters were quantified or characterized for each remediation bank:

- **Alignment Parameters:** The existing channel alignment of Reach 5A will be minimally altered for proposed conditions. The alignment parameters that were quantified included radius of curvature, delta angle, and chord length. For straight sections of the channel, these values were zero. The location of the bank in relation to the meander, which was either inside or outside the meander bend, was identified.
- **Erodibility Assessment:** Although work to regrade and stabilize banks is being performed, the BEHI scores provided information on areas that are susceptible to erosion based on the current alignment of the channel. It is likely that many banks will continue to experience similar shear stresses even after the grading work is completed, although some forces will be alleviated by adjusting the thalweg (as described in Section 8.5.1.2). Therefore, the erodibility assessment scores were important to understanding the erodibility of each bank and the protection that would be required. Banks with higher BEHI scores tend to require harder armoring riverbank stabilization techniques.

- **Profile Parameters:** The profile parameters were defined by the proximity of a bank to a riffle or pool or transitional features such as a run or glide. This was based on the proposed profile, since the locations of some riffles and pools were adjusted in the design to help stabilize conditions within Reach 5A where possible. Certain techniques require a minimum or maximum water depth to be installed properly, so characterizing the profile adjacent to the remediation bank was crucial for selecting the optimal stabilization measure.
- **Adjacent Floodplain Work:** Adjacent floodplain remediation was also considered within the decision tree to minimize excessive material removal where possible. Certain stabilization techniques require more excavation than others, so characterizing excavation that was already planned to occur adjacent to a remediation location helped inform the decision tree as to whether a technique could work in conjunction with this excavation.

Each parameter also has a quantitative cutoff or binary statement to inform the decision point whether to branch off along decision A or B. An example of a quantitative cutoff for the meander parameters would be whether a radius of curvature for a bend section is greater than 250 feet. If that is true, then the decision tree would branch toward a lower intervention technique. However, if the radius of curvature is greater than or equal to 250 feet, then the process would branch toward a higher intervention technique. An example of a binary statement is whether adjacent floodplain work is required at given bank location. If this is true, the decision tree would branch toward a higher intervention technique since excavation for a stabilization technique would be more desirable if floodplain excavation is already occurring. If this statement is false, the decision tree would branch toward a lower intervention technique. The final decision tree was developed to utilize a remediation bank input and accompanying data, feed it through the decision points, and produce the best riverbank stabilization technique.

The following parameters were used at various points in the decision tree:

- Straight versus Bend:
  - Straight: Radius >500 feet or Delta Angle <25;
  - Bend: Radius <500 feet and Delta Angle >25.
- Low versus High Erodibility:
  - Low: BEHI Moderate or Lower;
  - High: BEHI High or Greater.
- Gentle versus Tight Curve:
  - Gentle: Radius >250 feet or Delta Angle <90;
  - Tight: Radius ≤ 250 feet or Delta Angle ≥90.

- Short versus Long Bend:
  - Short: Chord Length <100 feet;
  - Long: Chord Length ≥100 feet.

The initial results of the toolbox were assessed and adjustments to the parameters were made to reach the current configuration of the decision tree. Additionally, adjustments were made to couple techniques that would require similar amounts of intervention but lend themselves to different priorities. For example, root wads and lunkers were coupled since they similarly protect the toe of the bank. Lunkers require specialized installation, while root wads are sometimes difficult to source. Therefore, alternatives were proposed and further refinements beyond the toolbox results were made where warranted, as discussed in the next paragraph.

Once the toolbox results were in a place where no further decision tree adjustments could be reasonably made, refinements of selected bank treatments shifted to applying engineering judgment. One large component of this was grouping stabilization techniques along a continuous remediation reach for constructability (given that the toolbox does not account for constructability so identified bank treatments can vary over short distances). Additional considerations were also applied to refinement of the toolbox results, including the following:

- Consideration of adjacent infrastructure and proximity to residential areas to assess whether a harder armoring technique would be required;
- Review of proposed grading to determine whether a selected bank treatment technique was constructable; and
- Consideration of the availability of certain materials such as logs and root wads.

The finalized riverbank stabilization results are presented in the Design Drawings (Appendix A). Section 9.5.3 provides additional details related to the various riverbank stabilization treatments that were considered.

9.5.3 Riverbank Stabilization Treatments

Bioengineering techniques include use of natural materials and riparian vegetation as a strategy to control bank erosion and promote longer-term stability of the river channel and banks while attempting to minimize the adverse effects of stabilization when possible. Such techniques can be grouped into two basic categories: (1) those that reduce the force of water against a riverbank; and (2) those that increase a bank's resistance to the force of water. Both categories of bioengineering techniques employ riparian vegetation as a means of erosion control. Vegetative growth reduces local velocities against the bank, thereby reducing near-bank shear stress. Over time, as the

vegetation grows and matures, the hard mass provided by plant roots can provide protection from erosion and collapse and increase internal bank strength (Rosgen 2006; Wynn et al. 2004).

Many of the techniques that are designed to reduce the force of water against a riverbank do so by directing flow away from banks. The structures used to direct flow away from a bank, such as vanes and bank spurs, are made of materials such as logs or native rock. Other examples of techniques to reduce the force of water against a bank include reshaping a bank to reduce its angle or constructing a bench which can reduce the shear stress affecting the lower portion of the bank.

Techniques designed to increase a bank's resistance to the force of water function in much the same way as traditional hardening techniques, such as use of gabions, riprap, and concrete, by "armoring" a riverbank with materials that are more resistant to the force of water than native soil. Natural materials, such as coir fiber, provide flow resistance while also serving as a substrate for plant growth, or incorporate interstitial space to provide ground contact for rooting plants.

In areas that are subject to greater instability where shear stress and channel velocities are higher, bioengineering techniques are unlikely to succeed (at least by themselves), and thus traditional hardening methods (e.g., use of riprap) are necessary to prevent bank soil erosion. However, bioengineering techniques and traditional hardening methods are not exclusive of each other. In areas where shear stress and channel velocities are relatively high, bioengineering can be used in conjunction with traditional hardening methods to provide the most effective strategy for bank stability.

In some cases, bank stabilization methods are applied to only discrete portions of the banks along a given stretch of a river, which reduces the adverse ecological impacts compared to stabilizing the banks throughout the entire reach. This partial or intermittent bank stabilization approach focuses on the areas with the greatest need for stabilization. Since many bioengineering techniques are specifically designed to reduce flow velocities, dissipate energy, and reduce erosional forces along the banks on which they are applied rather than simply deflecting the river's energy upstream or downstream, they are consistent with intermittent bank stabilization because they mean that the stabilization design for particular sections of riverbank can minimize energy displacement that could affect nearby riverbank segments.

The various bank stabilization techniques listed in Section 9.5.2 that have been considered for use on the banks in Reach 5A are described in more detail below. These descriptions include a general description of the types of conditions typically present in Reach 5A for which each technique is applicable.

9.5.3.1 Coir Matting

Coir fabric or coir matting is erosion control matting constructed of coconut fibers. The matting protects the banks while vegetation is established and biodegrades in about four to six years. Coir fabric is also used to construct a variety of other bioengineering systems, including pre-vegetated mats, pre-planted coir pillows, and vegetated geogrid. Coir matting is also used in conjunction with other techniques such as vanes and weirs to protect the bank between instream structures.

Coir matting is applicable in a variety of conditions in Reach 5A to protect banks while vegetation becomes established. This treatment can be used alone in depositional areas or on banks with low near-bank shear stress. This includes the inside of mender bends, straight reaches where the thalweg is in the center of the channel, or downstream of stable point bars. In such conditions, the bank will be graded to a low slope of 3H:1V or less, covered in coir matting, and replanted with herbaceous and shrub vegetation. Coir matting can also be used on the upper bank slopes (above bankfull elevation) on banks undergoing stabilization with riprap or compartmentalized placed fill.

9.5.3.2 Coir Matting with Rock Toe

Coir matting with rock toe is a stabilization technique that includes a bank of rock (stones) along the toe of the bank and coir matting along the upper portion of the bank (VDEC 2022). This method provides more robust stabilization than utilizing coir matting alone by providing hard armoring at the normal water depth. The rock toe stabilizes the base of the bank and prevents erosion, while the coir matting protects the upper portion of the bank and allows vegetation to establish.

Coir matting with rock toe is typically installed along moderate to highly erodible banks that are adjacent to riffles or transitional features, such as runs or glides. They are also useful for areas where slightly more armoring is desired compared to simply applying coir matting along the entirety of the bank. Similar to the coir matting technique, where the core matting technique is used, slopes will be graded at 3H:1V or less, covered in coir matting, and replanted with vegetation. The rock toe will be installed with the coir matting keyed in at the rock layer.

9.5.3.3 Brush Mattresses

Brush mattresses, also referred to as live brush mats or brush matting, is composed of live fascines and branch cuttings that cover a streambank and are secured with dead stout stakes and live stakes (NDEP 2023). Brush mattresses protect the bank as vegetation takes time to establish, providing an enhanced stabilization technique compared to planting vegetation along a riverbank alone. In such cases, the bank will be graded back to a slope no steeper than 2H:1V, with 3H:1V or less preferred. The live brush mats will layered perpendicular to flow along the bank and stakes will be driven into the bank at a specified spacing. Vegetative plantings can also be used in conjunction with the brush mattress, but other stabilization measures can be implemented as well, such as instream structures or toe protection.

Brush mattresses are typically installed along moderate to highly erodible banks adjacent to riffle features or inside meander bends, where sloping the bank at 3H:1V is feasible or where banks are already at a slope of 2H:1V or less.

9.5.3.4 Root Wads

Root wad revetments are composed of root wads, which are downed trees that are placed along a riverbank with the root mass (root ball) exposed toward the flow and the stem or bole of the tree buried in the bank. Generally, the root system of the trees used as root wads is at least three feet in diameter. Root wads are often placed in clusters along the outer meander bends of a river to form a protective layer against high shear stress impacting the riverbanks.

Root wads are often used in conjunction with logs or boulders to create an integrated revetment, in which the root wad tree is laid on top of a footer log, to provide stability and achieve the desired angle that is necessary to maximize resistance to flow. Boulders are often placed between the root wads to minimize erosion or scour around the root wad, and to anchor the root wads to increase their tolerance to shear stress. Since root wad revetments have the potential for scour around the structure, particularly on the upper bank above the root wad, the placement of the root wad clusters is usually accompanied by vegetative plantings, brush layers, or matting to help stabilize the upper bank (Harman 2004). Root wads are also a method of adding woody debris to the system for habitat.

When properly installed and given measures to minimize scour around the structure, root wads can provide a high level of stability in or near high stress bends. Root wads are typically installed along the outside of a meander bend, adjacent to a pool feature. For Reach 5A, they will be placed downstream of a J-hook on banks where the instream structure alone cannot fully protect the bank from erosional forces and additional stabilization is needed. These banks are characterized as moderately to highly erodible and are along long, gradual meander bends.

9.5.3.5 Lunkers

"Lunkers" stands for "Little Underwater Neighborhood Keepers Encompassing Rheotactic Salmonids" (Altschuld et al. 2017). A lunker is a box or crib structure constructed of logs that is anchored to the toe of the bank below water surface to provide habitat for aquatic life, particularly fish, and stabilize the toe of the bank. Lunkers can be used in conjunction with other stabilization techniques, such as installing coir matting or brush mattress along the upper portion of a streambank.

Because of the water depth requirements, lunkers are typically installed at deeper portions of the stream, such as pool features. Lunkers also require excavation along the toe of the bank to properly anchor the structure, so they are typically installed in areas where significant excavation may occur. These are highly specialized structures, so planned installation in Reach 5A is limited to areas where aquatic habitat is a priority.

9.5.3.6 J-Hooks and Cross Vanes

Both J-hooks and cross vanes are instream structures that deflect near-bank erosional forces away from unstable riverbanks. Differing from a single arm vane, a J-hook extends beyond the end of the vane at an angle toward the downstream direction to create a "J-hook" shape (Hickman and Thompson 2016a). A log J-hook involves placement of a log with a root wad anchored into the bank, facing upstream, and angled on a downward slope from bankfull elevation at the bank to the channel bed elevation at the end of the log. A footer consisting of a second log or boulders is placed beneath the log. Filter fabric is often placed along the footer, and the area between the log and the bank is backfilled to prevent undercutting of the vane. A rock J-hook is of similar geometry but constructed of large boulder-sized rock.

A cross vane is similar to a J-hook but, in addition to an arm that ties into the outer bend of the channel, it also has one that ties into the inside of the bend, providing protection on both banks and forming a more robust grade control feature in intermittent locations along the channel's profile. Like J-hooks, cross vanes can consist of either logs or rocks.

J-hooks and cross vanes are typically installed at the upstream end of an outer meander bend or other unstable area of moderate to high NBS to deflect flow away from the bank and dissipate energy. They are installed upstream of a pool feature at a run. Where grading is proposed along the bank that the J-hook or cross vane is protecting, coir matting will be applied to protect and revegetate the bank. For longer meander bends, or along banks that require additional protection, these structures will be used in conjunction with root wads or a series of bendway weirs. For the most part, log-based and rock-based J-hooks and cross vanes can be used interchangeably. There are some circumstances in which it is difficult to install a log-based structure such as when the water is too deep or the bank is too low to adequately bury and anchor the log. There may be other situations where banks are too high or steep to be suitable for use of log-based structures. In these instances, rock-based J-hooks or cross vanes may be used rather than log-based structures.

9.5.3.7 Bendway Weir

Similar to a J-hook and cross vane, a bendway weir is an instream structure that deflects flow away from the riverbank and can be constructed out of logs or rocks. This structure is a single arm vane that linearly extends from the toe of the bank toward the thalweg of the stream (Hickman and Thompson 2016b). A bendway weir is angled upstream into flow at approximately a 70° angle. Water flowing over the structure is redirected away from the bank and slowed down, promoting aquatic diversity and complexity within a downstream pool (Derrick 2014).

Bendway weirs are typically installed along an outer meander bend and can be installed in series for longer bend lengths. While J-hooks are typically constructed upstream of a pool feature along a run, bendway weirs can be constructed in series along the outside of a bend to continuously redirect flow

throughout the meander feature. Bendway weirs can be used in conjunction with other riverbank stabilization techniques to provide additional erosion protection. Where riverbank grading is proposed, coir matting will be applied to protect the bank adjacent to the bendway weir structures. Considerations for the use of log versus rock are similar to those for J-hooks and cross vanes.

9.5.3.8 Bioengineered Bags

Use of bioengineered bags or compartmentalized fill consists of placing filled bags or tubes of organic material and stone on the riverbank to armor slopes. Envirolok is a trade name for a particular brand of bag. The bags are typically built into a wall unit using either straps or a locking spike to create a stable surface. The bags are composed of a synthetic material that is filled with a planting medium. Native plants are planted between the layers or lifts of bags to promote vegetation growth. The bags break down under UV exposure and can last from 10 years to over 50 years depending upon the amount of exposure (Envirolok 2026).

Compartmentalized fill can be used on moderately steep banks or in areas of high to extreme shear stress. The banks undergoing such treatment are graded to a 2H:1V slope or less, with bank soil removal as necessary. The compartmentalized fill is placed from the toe of the bank to bankfull elevation. Above bankfull, the bank is stabilized with a vegetative technique, including planting of herbaceous and shrub species. For Reach 5A, due to the specialization of this stabilization technique, proposed installation of bioengineered bags is limited to areas where riverbank grading of 3H:1V or less is not feasible due to the amount of cut or fill that would be required or proximity of the bank to adjacent infrastructure.

9.5.3.9 Toe Wood

A toe wood structure incorporates native woody material into a submerged, undercut bank to replicate natural stable riverbank and to add flow resistance for bank protection. The toe material is composed of root wads that are cantilevered over foundation logs to provide an undercut bank for instream and overhead cover for aquatic habitat. The logs are placed on the lower one-half of the bank to ensure that the wood is submerged throughout the year to prevent wood deterioration. Woody materials are placed over and between the toe logs. Approximately 10% to 20% of the log and debris lengths are exposed to flow forces; the remaining lengths are buried deep and counter-buttressed with fill and vegetation to avoid buoyancy factor ensuring that the wood will remain intact throughout all flows including floods. Backfill is placed over the top of the toe material and planted with riparian vegetation up to bankfull stage.

Toe wood is typically installed along the outside of meander bends in reaches with deep pools so the toe wood can remain submerged. Toe wood has limited use in Reach 5A as it typically requires extensive excavation to the bank for installation and placement of the footer logs.

9.5.3.10 Riprap

Stone has long been used to provide immediate and permanent riverbank protection. One use of stone is riprap which consists of large angular rocks placed on the bank to reduce bank shear stress and erosion. Riprap is one of the most effective measures at the toe of a slope or unstable bank for preventing erosion. A primary advantage of riprap over vegetation is its immediate effectiveness with little to no establishment period. Riprap is typically placed on banks at a 2H:1V slope but may be used on steeper bank slopes of up to 1.5H:1V. Stone size, shape, gradation, and density are all important design considerations.

In some situations, joint planting is combined with riprap to provide some vegetation. Joint planting refers to the insertion of plugs and/or live stakes between the rocks to encourage the growth of riparian vegetation. The planting of cuttings in riprap helps to provide longer-term stability once the vegetation becomes established.

The Revised Final Permit requires that riverbank reconstruction follow a hierarchy of approaches, with placement of riprap being the least preferred in that hierarchy. Therefore, in Reach 5A, riprap will be used only on banks that are under high to extreme near-bank shear stress. Also, because it is the hardest armoring technique, riprap will be used in limited areas where additional protection is required for adjacent infrastructure or utility crossings. In such areas, the bank will graded to the selected slope (with bank soil removal as necessary) and riprap placed from the toe of the bank to a maximum of bankfull elevation. Above bankfull elevation, other applicable bank treatments will be used, such as coir matting and joint plantings (where appropriate), to revegetate the banks with herbaceous and shrub vegetation.

9.5.4 Riverbank Stabilization Plan

Design Drawings detailing the locations and extents of the proposed riverbank stabilization structures in the first subreach (i.e., river Stations 0+00 to 48+00) are shown in Appendix A. A summary of those stabilization techniques is provided in Table 9-3. Note that some of the possible stabilization techniques described above have not been used in this first subreach, but may be utilized in further downstream subreaches.

Table 9-3
Subreach 1 Bank Stabilization Techniques Summary

Stabilization Technique	Proposed River Stations Applied	Number of Separate Bank Applications	Total Length of Technique Applied (Linear Feet)	Length of Bank Protected by Technique
Coir matting	LB 0+00 to 4+94; LB 6+49 to 7+44; RB 3+02 to 4+20; RB 4+29 to 9+31; LB 8+44 to 12+41; LB 14+00 to 22+27; RB 13+50 to	13	5,957	5,957

Stabilization Technique	Proposed River Stations Applied	Number of Separate Bank Applications	Total Length of Technique Applied (Linear Feet)	Length of Bank Protected by Technique
	18+14; RB 23+05 to 23+86; LB 23+46 to 25+77; RB 23+87 to 25+57; RB 26+36 to 33+51; LB 27+67 to 45+39; RB 38+60 to 39+51			
Brush mattresses	LB 1+25 to 2+49; LB 9+47 to 10+98; LB 15+16 to 16+89; RB 22+82 to 23+87; LB 38+11 to 39+80	5	722	722
J-hooks	RB 23+85; LB 28+20	2	NA	291[a]
Bendway weirs	RB 3+06; LB 8+87; RB 12+13; LB 14+66; LB 31+66	5	NA	207[a]
Cross vanes	CH 6+97	1	NA	330[a]
Toe wood	RB 3+73 to 4+16; RB 4+35 to 4+84; LB 7+44 to 8+19	3	167	167
Riprap (above toe wood)	LB 7+39 to 8+44	1	105	105

Notes:

a. The length of bank protected is calculated based on the arm length of the structure and protects 1× the arm length upstream and 2× the arm length downstream of the structure.

LB: left bank
RB: right bank
CH: in-channel

In addition to the bank stabilization techniques listed above, the riverbanks will benefit from stabilization of riffle features in appropriate locations for the alignment. A list of existing and proposed riffles within the first subreach is provided in Table 9-4. The existing and proposed stations listed are based on the existing and proposed alignments respectively. Existing riffles are listed in the same row as their proposed counterparts except in cases where a new riffle was added or an old riffle was removed.

Table 9-4
Subreach 1 Riffle Stabilization Summary

Existing Riffle Start Station	Existing Riffle End Station	Existing Riffle Length (linear feet)	Existing Riffle Notes	Proposed Riffle Start Station	Proposed Riffle End Station	Proposed Riffle Length (linear feet)	Proposed Riffle Notes
EX 0+12	EX 0+89	77	Good	PR 0+00	PR 1+25	125	Lengthened
				PR 5+81	PR 6+97	116	New
				PR 11+00	PR 11+91	91	New

Existing Riffle Start Station	Existing Riffle End Station	Existing Riffle Length (linear feet)	Existing Riffle Notes	Proposed Riffle Start Station	Proposed Riffle End Station	Proposed Riffle Length (linear feet)	Proposed Riffle Notes
EX 14+81	EX 15+51	70	In a bend	—	—	—	Replaced with compound bend feature
EX 18+27	EX 22+12	385	Uncentered thalweg	PR 17+59	PR 21+69	410	Shifted slightly upstream
EX 28+44	EX 29+18	74	Transverse	PR 26+65	PR 28+20	155	Shifted upstream and lengthened
EX 34+65	EX 36+35	170	Uncentered thalweg	PR 34+14	PR 35+74	160	Similar extents
EX 39+27	EX 39+62	35	Transverse, in a bend	—	—	—	Replaced with compound bend feature
EX 41+10	EX 43+54	244	Extends into bend with shear banks	PR 40+51	PR 42+08	157	Moved riffle upstream and smoothed the Bend
EX 48+57	EX 52+57	400	Uncentered thalweg	PR 47+00	PR 51+70	470	Extended start of riffle upstream of bridge
Total Existing Riffle Length (linear feet)		1,455		Total Proposed Riffle Length (linear feet)		1,684	

Notes:
EX: existing riffle start/end station
PR: proposed riffle start/end station

10 Floodplain Remediation and Restoration Design

10.1 Delineation of Floodplain Remediation Areas

Floodplain remediation in Reach 5A includes the removal of floodplain soils on residential properties, non-residential EAs, and vernal pools to the extent required by the applicable Performance Standards in the Revised Final Permit. Floodplain remediation areas were originally delineated in the Conceptual RD/RA Work Plan to meet the applicable Performance Standards. The conceptual floodplain remediation areas were revised and expanded during final design to account for several conditions in EPA's conditional approval letter for the Conceptual RD/RA Work Plan and to take account of supplemental floodplain soil PCB data collected during the SDC program (see Section 5.3.1.2). This section summarizes the updated delineation of floodplain remediation areas on residential properties and non-residential EAs. Additional details related to those updated remediation delineations are provided in Appendices I (for residential properties) and J (for non-residential EAs).

10.1.1 Residential Properties

There are a total of 27 residential floodplain properties that were evaluated as part of the PDI for Reach 5A floodplain residential properties. These include 22 current residential properties identified in the Revised Final Permit and five additional residential parcels that were not included in the list of parcels in the Revised Final Permit and were not addressed previously as part of the A/P Lawn Properties but for which EPA directed GE (or GE agreed) to conduct additional limited sampling to confirm that PCB concentrations in soil are less than the Residential Performance Standards.

As described in Section 3.4.2, the applicable Residential Performance Standards are an average PCB concentration of 2 mg/kg in the top foot of soil and in the 1- to X-foot depth increment (where X equals the depth to which PCBs are detected at concentrations of 2 mg/kg or greater, up to a maximum depth of 15 feet), with no discrete PCB concentration in the top foot of soil exceeding 10 mg/kg (the NTE level) for parcels exceeding 0.25 acre in size.

The floodplain residential properties that were identified as not meeting those standards were Parcels I6-3-13, J6-2-3, J3-1-11, J3-1-12, J3-1-13, J3-2-2, J3-2-3, J3-2-4, J3-2-5, J3-2-6, K3-1-2, and K2-1-10. In addition, the Conceptual RD/RA Work Plan provided for remediation of one additional residential property (Parcel J6-3-1) that had been evaluated previously in a separate Removal Action associated with the A/P Lawn Properties and for which remediation was proposed but deferred by the property owner. Detailed evaluations of current conditions and the extent of remediation required to achieve the Residential Performance Standards on these 13 properties were provided in Appendix E to the Conceptual RD/RA Work Plan and are summarized in that work plan.

EPA's conditional approval letter for the Conceptual RD/RA Work Plan contained six conditions relating to the residential floodplain property evaluations (Conditions 115 through 120) that resulted in an expansion of the removal areas on 10 of those 13 residential properties. In addition to these conditions, EPA and GE conducted discussions during fall 2024 related to expansion of the evaluation areas associated with residential Parcels J6-3-1 and J6-2-3. Specifically, the evaluation areas for both properties were expanded to include adjacent properties whose ownership is uncertain, but which property owners maintain as part of their own.[57] As a result, additional floodplain soil sampling was performed on these properties.

The various EPA conditions, modifications, and SDC discussed above required a re-evaluation of 12 of the 13 residential parcels listed above (no revision was required for Parcel J3-2-6). Details associated with these reevaluations are provided in Appendix I, including maps showing updated soil removal polygons which extend to the top of bank, where applicable, for each property. Figure 10-1 is a map showing an overall summary of the remedial extents for floodplain residential properties in Reach 5A. Table 10-1 summarizes the estimated soil removal areas and volumes for each property. In total, remediation of these 13 Reach 5A floodplain residential properties will involve excavation of approximately 5,400 cy of soil. Table 10-2 summarizes the post-remediation PCB concentrations for each such property, including the maximum surface (0- to 1-foot) PCB concentration, the surface (0- to 1-foot) average PCB concentration, and the average PCB concentration calculated for subsurface soils (where applicable) using the "X" depth value. As shown in that table, the remediation will achieve the Residential Performance Standards in the Revised Final Permit at each property.

[57] Tax Parcel J6-3-2 was evaluated in the Conceptual RD/RA Work as non-residential EA 8 based on GE's understanding that this parcel was owned by Mass Audubon. However, GE was subsequently notified that Parcel J6-3-2 is not owned by Mass Audubon. Further, a large portion of this parcel is located in the former right-of-way for the Holmes Road Bridge that existed prior to relocation to its current location. Accordingly, the legal ownership of this property is not clear. However, during discussions with the owner of adjacent residential Parcel J6-3-1, that property owner indicated that he maintains a large portion of Parcel J6-3-2 as a lawn area as part of his property. Given this information, GE proposed (with EPA approval) to conservatively re-evaluate Parcels J6-3-1 and J6-3-2 as a single residential parcel. A similar issue exists for a small portion of land on the eastern side of the river that was also part of the former Holmes Road Bridge right-of-way immediately adjacent to residential Parcel J6-2-3. Legal ownership of this piece of land is similarly uncertain, but the owner of Parcel J6-2-3 maintains this area as a lawn as part of his property. Therefore, GE proposed (with EPA approval) to conservatively include this area in the evaluation of residential Parcel J6-2-3.

Table 10-1
Residential Property Remediation Areas and Volumes

Parcel ID	Removal Depth Interval (feet)	Removal Surface Area (acre)	Removal Volume (cy)
I6-3-13	0–1	0.52	836
	1–6		2,237
J6-2-3	0–1	0.064	104
	1–3		81
J6-3-1	0–1	0.32	519
	1–4		661
J3-1-11	0–1	0.018	29
J3-1-12	0–1	0.050	44
J3-1-13	0–1	0.014	21
J3-2-2	0–1	0.13	203
	1–2		49
J3-2-3	0–1	0.16	262
J3-2-4	0–1	0.047	76
J3-2-5	0–1	0.024	38
J3-2-6	0–1	0.000074	0.12
K2-1-10	0–1	0.094	152
K3-1-2	0–1	0.053	85
Total		**1.5**	**5,397**

Table 10-2
Post-Remediation PCB Concentrations in Residential Properties

Parcel ID	"X" Depth (feet)	Maximum PCB (0–1 foot; mg/kg)	0–1 Feet Average PCB Concentration (mg/kg)	1–X Feet Average PCB Concentration (mg/kg)
I6-3-13	6	9.8	1.13	1.96
J6-2-3	3	6.3	0.24	0.42
J6-3-1	10	9.9	0.74	1.91
J3-1-11	None[a]	4.6	0.72	—
J3-1-12	None[a]	0.50	0.23	—
J3-1-13	None[a]	8.3	0.17	—
J3-2-2	2	8.5	0.32	0.51
J3-2-3	3	9.3	0.39	0.66[b]
J3-2-4	3	0.19	0.12	1.40[b]
J3-2-5	None[a]	2.8	0.13	—
J3-2-6	None[a]	7.1	0.19	—
K2-1-10	4	5.7	0.21	1.15[b]

Parcel ID	"X" Depth (feet)	Maximum PCB (0–1 foot; mg/kg)	0–1 Feet Average PCB Concentration (mg/kg)	1–X Feet Average PCB Concentration (mg/kg)
K3-1-2	2	8.3	0.58	0.94[b]

Notes:

a. All samples below a depth of one foot had non-detected PCBs or PCB concentrations less than 2 mg/kg, and thus the evaluation was limited to the top foot.

b. No remediation is required at this residential parcel in the 1- to X-foot depth interval because the Performance Standard is already achieved.

10.1.2 Non-Residential Exposure Areas

As described in Section 2.1, EPA's HHRA divided the ROR floodplain into 90 non-residential EAs for the assessment of human direct contact with floodplain soils. Of those 90 EAs, 38 are located within Reach 5A. Several properties that comprise seven of those EAs (EAs 3, 8,[58] 9, 23, 25, 28, and 30) within the Reach 5A floodplain are residential properties that are subject to the Residential Performance Standards; therefore, those properties were addressed as part of the residential property assessment described in Section 10.1.1. The remaining 31 non-residential EAs are subject to non-residential Performance Standards described in Section II.B.3.a of the Revised Final Permit (summarized in Section 3.4.1 of this Final RD/RA Work Plan). Several of those non-residential EAs contain overlying direct contact subareas, which are typically characterized by a different and/or more frequent exposure scenario.

Detailed evaluations of current conditions and the extent of remediation required to achieve the applicable non-residential Performance Standards were provided in Appendix F to the Conceptual RD/RA Work Plan and summarized in that work plan. That evaluation resulted in the need for soil remediation at 19 EAs/subareas and one Frequently Used Subarea. EPA's conditional approval letter for the Conceptual RD/RA Work Plan contained six conditions pertaining to soil remediation in the non-residential floodplain EAs (i.e., Conditions 121 through 126). In addition, supplemental floodplain soil PCB data were collected for three EAs (EAs 19, 22, and 33) in 2024 and 2025 as part of the SDC program. Those EPA conditions and SDC required a re-evaluation of numerous EAs (plus the addition of three EAs that were not previously identified for remediation in the Conceptual RD/RA Work Plan). Details associated with the revised evaluations of non-residential floodplain EAs are provided in Appendix J.

A summary of proposed removal areas and volumes for the 22 non-residential floodplain EAs/subareas requiring remediation is provided in Table 10-3. This table also includes the pre- and post-remediation PCB exposure point concentrations (EPCs) for each of these EAs. Maps showing

[58] As noted in Section 10.1.1 (footnote 57), non-residential EA 8 comprised Pittsfield Tax Parcel J6-3-2, which was originally evaluated under non-residential standards but has now been combined with the adjacent residential Parcel J6-3-1, with both parcels conservatively re-evaluated as a single residential parcel.

0- to 1-foot soil PCB concentrations and proposed remediation areas for each EA/subarea are shown on Figures 10-2a to 10-2r. Remediation of these non-residential floodplain EAs results in a total estimated removal volume of approximately 18,550 cy of floodplain soil.

Table 10-3
Removal Area and Volume Estimates and Post-Remediation EPCs for Non-Residential Floodplain EAs and Subareas

EA ID	Depth Interval (feet)	Includes Core Area 1 Habitat	Performance Standards		Pre-Remediation EPC (mg/kg)	Post-Remediation EPC (mg/kg)[1]	Removal Area (acres)	Removal Volume (cy)
			Primary (RME 10^{-5}/ HI = 1)	Secondary (RME 10^{-4}/ HI = 1)				
1	0–1		21	N/R	16	13.9	0.40	641
2	0–1		14	N/R	18	13.6	1.15	1,852
4	0–1		14	N/R	20	13.8	0.19	311
4/61	0–1		14	N/R	30	7.6	0.048	78
	0–3		14	N/R	20	13.2	0.056	272
5	0–1		14	N/R	59	13.2	0.10	161
7	0–1		14	N/R	20	13.2	0.16	259
10	0–1	Yes	4.6	6.9	13	3.9	0.62	1,007
10a	0–1	Yes	4.6	4.6	27	3.2	0.17	276
10b	0–1		4.6	N/R	6.8	3.8	1.56	2,519
11	0–1		14	N/R	15	13.9	0.036	58
16	0–1		14	N/R	34	7.4	0.43	691
17	0–1	Yes	14	38	13	12.3	0.073	118
18	0–1	Yes	21	58	32	16.5	0.82	1,315
19	0–1	Yes	14	38	23	22.1	0.44	714
20	0–1	Yes	14	38	28	11.7	2.37	3,825
22	0–1		14	N/R	19	13.97	0.84	1,359
22a	0–1		14	N/R	36	13.9	0.70	1,136
24	0–1		14	N/R	18	13.9	0.48	775
26	0–1	Yes	14	27	3	2.8	0.012	19
31a	0–1		14	N/R	53	12.2	0.093	150
33	0–1		14	N/R	15	12.6	0.40	643
34	0–1		21	N/R	22	20.2	0.23	368
						Total	**11.4**	**18,547**

Notes:

1. The post-remediation EPCs are truncated and generally shown to one decimal place to demonstrate achievement of the applicable Performance Standards.

N/R: not relevant; the Secondary Performance Standards are not relevant in EAs that do not include Core Area 1 habitat.

10.1.3 Vernal Pools

As described in the Conceptual RD/RA Work Plan, 48 of the 59 vernal pools in Reach 5A have a PCB SWAC that exceeds the vernal pool Performance Standard of 3.3 mg/kg and therefore require

remediation. Section 4.2.4 of the Final Revised SOW requires GE to conduct a pilot study to evaluate the use of both traditional excavation/restoration techniques and amendments, such as AC, for the remediation of vernal pools. Details pertaining to this pilot test are provided in GE's Final Vernal Pool Work Plan submitted to EPA on June 30, 2025, and conditionally approved by EPA on December 22, 2025. As detailed in the Final Vernal Pool Work Plan, 10 pools requiring remediation have been included in the pilot study—five pools for amendment-based treatment (5A-VP-9, 5A-VP-12, 5A-VP-15, 5A-VP-22, and 5A-VP-27), five pools for removal-based treatment (5A-VP-4, 5A-VP-7, 5A-VP-16, 5A-VP-52, and 5A-VP-57), and several vernal pools that do not require remediation to serve as field controls.

Remediation of the vernal pools not included in the pilot test will include either traditional excavation and restoration techniques or placement of AC amendments, depending on the results of the pilot study (with the exception of pool 5A-VP-13, as detailed below). GE anticipates that implementation of the vernal pool pilot study will be conducted in 2026, prior to initiation of other construction activities in Reach 5A. GE will conduct post-remediation monitoring of the pilot study vernal pools for a period of five years, which is anticipated to be ongoing while remediation is occurring in other areas of Reach 5A. Following the third year of monitoring, GE will submit an addendum to the Final RD/RA Work Plan that will provide remedial design details for the remaining vernal pools to be remediated in Reach 5A considering the first three years of vernal pool monitoring results.

Remediation of one non-pilot-study vernal pool (5A-VP-13) has been included in this Final RD/RA Work Plan because it intersects with the remediation required for residential Parcel I6-3-13 (described in Appendix I).[59] The current 0- to 1-foot PCB SWAC of this vernal pool is 20 mg/kg, which accounts for the fact that a small portion of this vernal pool was already remediated previously (in 2017) as part of the A/P Lawn Properties removal.[60] The proposed remediation required to meet the Residential Performance Standards on Parcel I6-3-13 (described in Appendix I) will include removal of 0.12 acre of soil within the vernal pool, which would reduce the PCB SWAC in the pool to 10 mg/kg. Because the resulting SWAC is still higher than the vernal pool Performance Standard of 3.3 mg/kg, additional removal for this vernal pool is required. The additional remediation areas were derived using a hill-topping approach, as described in Appendix A to GE's *Second Revised Pre-Design Investigation Work Plan for Reach 5A Non-Residential Floodplain Exposure Areas* (Anchor QEA 2021b). This is also consistent with the approach used for the five vernal pools selected for removal-based

[59] As noted above, although remediation of the non-pilot-study pools in Reach 5A has generally been deferred until after completion of the pilot study, it was determined that performing the remediation in this one non-pilot vernal pool concurrently with the residential property would increase efficiency and minimize the need for future disruption to the residential property owner.

[60] It was assumed in the SWAC calculation that replaced soils in this previously remediated portion of the pool had a PCB concentration of 0.021 mg/kg (the assumed PCB concentration for unaffected backfill in areas of the CD site).

remediation in the pilot study. The evaluation involved processing the pre-remedy spatial distribution of 0- to 1-foot PCB concentrations (based on Thiessen polygons) into three-foot by three-foot raster grids and then sequentially "removing" raster grid cells with the highest PCB concentration and replacing them with a PCB concentration of 0.021 mg/kg (representing backfill). The pool-wide SWAC was calculated after each remediation step and compared against the performance criterion until a value less than 3.3 mg/kg was achieved. The estimated additional removal areas and volumes for vernal pool 5A-VP-13 are shown in Table 10-4, and the removal footprint for this vernal pool is presented in Figure 10-3.

Table 10-4
Additional Removal Area and Volume for Vernal Pool 5A-VP-13

Vernal[1] Pool ID	Total Area (acres)	Pre-Remediation SWAC (mg/kg)	Post-Residential Removal SWAC (mg/kg)	Additional Vernal Pool Removal	
				Area (acres)	Volume (cy)
5A-VP-13	0.40	20	10	0.10	163

Note:

1. The total removal area in vernal pool 5A-VP-13 is 0.22 acre, which includes 0.12 acre of residential removal and additional 0.10 acre of removal evaluated herein.

10.1.4 Disposal Evaluation

As described in Section 3.6, if the volume-weighted average PCB concentration in the floodplain soil to be removed from a non-residential EA equals or exceeds 50 mg/kg, the soil with the highest PCB concentrations within the EA will be separated out for off-site disposal until the average concentration of the remaining soil to be removed in the EA decreases to less than 50 mg/kg for subsequent disposal at the UDF. Because the removal from residential properties (Section 10.1.1) and the vernal pool (Section 10.1.3) generally overlaps with non-residential EAs, the entire volume within the boundary of an individual EA (non-residential, residential, and vernal pool) was combined for this assessment.[61] Additional details related to methods for disposal and delineation of soils subject to disposal in the UDF and off-site disposal are provided in Appendix J. The estimated volumes for disposal in the UDF and off-site disposal are summarized in Table 10-5. The Design Drawings provided in Appendix A show the delineation of soil areas subject to off-site site disposal; all other floodplain soils will be disposed of in the UDF.

[61] Residential Parcel J6-3-1 (an A/P Lawn Property where remediation was deferred) covers a larger floodplain area beyond an EA (i.e., former EA 8); therefore, it was evaluated individually.

Table 10-5
Floodplain Soil – Estimated Disposal Volumes Summary

EA	Residential Parcel(s) ID	Vernal Pool ID	Volume-Weighted Average PCBs (mg/kg)	UDF Disposal		Off-Site Disposal		Total Volume (cy)
				Volume-Weighted Average PCBs (mg/kg)	Volume (cy)	Volume-Weighted Average PCBs (mg/kg)	Volume (cy)	
1	—	—	63	45	409	94	232	641
2	—	—	82	49.7	804	107	1,048	1,852
4	—	—	43	43	661	—	—	661
5	—	5A-VP-13	79	20	130	127	161	291
7	I6-3-13	5A-VP-13	73	47	1,997	112	1,368	3,365
9	J6-2-3	—	41	41	185	—	—	185
10	—	—	43	43	3,802	—	—	3,802
11	—	—	38	38	58	—	—	58
16	—	—	31	31	691	—	—	691
17	—	—	55	—	—	55	118	118
18	—	—	99	29	172	110	1,143	1,315
19	—	—	53	40	555	100	159	714
20	—	—	49	49	3,825	—	—	3,825
22	—	—	56	49	1,876	76	619	2,495
23	J3-1-11, J3-1-12, J3-1-13	—	9.3	9.3	94	—	—	94
24	—	—	54	49	409	60	366	775
25	J3-2-2, J3-2-3, J3-2-4, J3-2-5, J3-2-6	—	21	21	628	—	—	628
26	—	—	62	—	—	62	19	19
28	K3-1-2	—	20	20	85	—	—	85
30	K2-1-10	—	32	32	152	—	—	152
31a	—	—	45	45	150	—	—	150
33	—	—	117	—	—	117	643	643
34	—	—	65	—	—	65	368	368
—	J6-3-1	—	50	48	1,131	78	49	1,180
Volume Totals					**17,814**	—	**6,293**	**24,107**

10.2 Soil Removal Activities

As described in Section 10.1, a total of approximately 24,110 cy of soil will be removed from floodplains in Reach 5A, including approximately 5,400 cy from residential properties, 18,550 cy from non-residential EAs, and 160 cy from vernal pool 5A-VP-13. The removal limits for floodplain remediation areas located between river Stations 0+00 and 48+00 are shown on the Design Drawings (Appendix A). Prior to initiating removal activities in the areas subject to soil removal, the horizontal limits of removal will be surveyed and staked in the field. During removal activities, field measurements will be made to verify that the target removal depths and elevations have been achieved for each excavation area. As further described in Section 10.1.4, excavated soils will be subject to disposal in the UDF or at an appropriate off-site facility, as shown on the Design Drawings (Appendix A). Following removal, common backfill/topsoil material will be obtained from an off-site source and will be placed and compacted to re-establish original grade. The removal and backfill activities will be conducted as shown on the Design Drawings (Appendix A) and in accordance with the provisions in Specification Section 31 23 00 – Soil Excavation and Fill (Appendix B), and in the *Soil Cover/Backfill Characterization Plan* and the CQAP (Attachments B and E to the Revised POP, respectively).

There are numerous mature trees within and adjacent to floodplain excavation areas that serve to provide erosion control as well as habitat. For those reasons, an effort will be made to leave in place those mature trees that are adjacent to floodplain soil excavations limited to the top foot of soil, to the extent consistent with the remediation. Excavations in the vicinity of these trees will be performed by hand by the remediation contractor, using methods in accordance with Specification Section 31 23 00 – Soil Excavation and Fill, under GE and EPA oversight. However, trees located within or adjacent to excavations greater than one foot will be removed due to potential tree health and stability concerns associated with deeper excavations, unless otherwise proposed by GE and approved by EPA in the field.

10.3 Handling of Removed Materials

As described above, the Design Drawings (Appendix A) depicting removal limits for floodplain soils also show the limits of soils to be disposed of in the UDF or at an appropriate off-site facility. Materials to be disposed of at the UDF will be segregated at the staging areas and handled separately from materials to be disposed of at an off-site disposal facility(ies). The remediation contractor will maintain appropriate signage within and/or adjacent to the stockpiles to document the type of stockpiled materials and the date on which the materials were placed in the stockpiles. The remediation contractor will install, regularly inspect, and maintain filter fabric, hay bales, or approved equivalent controls around those features. Inspections of the stockpiled material areas will be performed weekly. Additional materials handling activities to be performed once those materials are at the staging areas are described in Section 12.1.

10.4 Backfilling Excavations

This section addresses the backfilling of applicable excavations within floodplain areas. Information regarding the placement locations, measurement, composition, and installation of acceptable backfill/topsoil materials is provided on the Design Drawings (Appendix A) and in Specification Sections 31 05 13 – Soils and Aggregates and 31 23 00 – Soil Excavation and Fill (Appendix B).

The specific backfill and topsoil sources to be used for this project will be identified by the remediation contractor. Source materials will be sampled for PCBs and for the VOCs, SVOCs, and metals listed in Appendix IX of 40 CFR 264 plus benzidine, 2-chloroethyl vinyl ether, and 1,2-diphenylhydrazine (Appendix IX+3 VOCs, SVOCs, and metals), as well as pH and TOC for topsoil sources. Once received, the analytical results will be provided to EPA as part of the next SIP to be submitted. Other submittals relating to backfill and topsoil materials, as required in Specification Section 31 05 13 – Soils and Aggregates (Appendix B), will be provided to EPA at least three days prior to the delivery of the subject materials to the work site.

10.5 Restoration Design

This section summarizes the restoration design for the Reach 5A floodplain affected by remediation, including floodplain wetlands and uplands in non-residential EAs, the vernal pool included in the current program, and residential lawn/property areas. The detailed restoration design, habitat-specific methods, planting plans, and implementation sequencing are presented in the Restoration Plan.

Restoration approaches for these terrestrial and wetland settings are based on the baseline conditions and habitat functions documented in the Revised BRA Report and are intended to meet the applicable Performance Standards described in Section II.B.3.a of the Revised Final Permit. Design elements emphasize minimizing vegetation clearing where practicable, preserving mature trees where feasible, maintaining or re-establishing site hydrology (particularly in wetlands and vernal pool settings), and stabilizing disturbed areas promptly through appropriate backfilling, grading, and native revegetation. For residential properties, restoration will also address repair or replacement of site features and re-establishment of pre-remediation grades and drainage patterns, consistent with the applicable restoration requirements and subject to discussions with the property owner and any modifications agreed upon by GE and the property owner.

10.5.1 Floodplain Habitat in Non-Residential Areas

The restoration of Reach 5A floodplain habitats in non-residential EAs will focus on returning disturbed areas to their pre-remediation conditions, addressing impacts from remediation to approximately 11 acres of non-residential floodplain wetlands and uplands subject to remediation, as well as additional areas affected by access roads and staging areas. Restoration measures will

prioritize habitat-specific approaches to soil management, native vegetation re-establishment, hydrological protection, invasive species control, structural habitat enhancement, and re-establishing conditions for affected fauna.

In general, floodplain wetlands and uplands in these areas will be restored by backfilling excavated areas to original grades using clean, texture-matched soils, re-establishing microtopography where practicable, replanting native plant species, and implementing targeted invasive species control. In affected wetlands, hydrology will be protected and re-established by restoring natural surface flow paths, maintaining shallow groundwater connectivity, and reconstructing essential seasonal inundation patterns necessary to support wetland community structure and function.

The specific restoration details, including detailed planting plans, for the various types of affected floodplain habitats – i.e., transitional floodplain forest, high-terrace floodplain forest, shrub wetlands, wet meadows, and forested uplands – as well as other upland habitats, are provided in Sections 8.4 and 8.5 of the Restoration Plan.

10.5.2 Vernal Pools

Restoration activities will eventually be required in the 48 certified vernal pools within Reach 5A that will require remediation (see Section 10.1.3). Restoration activities in the 10 pools that were selected for the vernal pool pilot study are described in Section 5.5.8 of the Final Vernal Pool Work Plan. As described in Section 10.1.3, only one additional pool in Reach 5A is being remediated at this time (5A-VP-13); therefore, the Restoration Plan provides details associated with the restoration of that pool, as summarized below. The restoration performed in the pilot study vernal pools will be described in the Vernal Pool Pilot Study Summary Report and the proposed restoration for the remaining pools (other than 5A-VP-13) will be described in the subsequent Addendum to the Final RD/RA Work Plan for Reach 5A that will address those remaining vernal pools.

For vernal pool 5A-VP-13, prior to soil excavation, the vegetation and organic material in and surrounding the vernal pool will be documented to replicate habitat conditions following the excavation. Soil will be removed during the pool's dry season, and excavated areas will then be backfilled as follows:

- Excavation areas where the depth of removal is limited to one foot will be backfilled with uncompacted topsoil only.
- Areas where excavations are deeper than one foot will include the placement and compaction of general backfill, followed by a silty loam base layer, and finally, placement of a 12-inch layer of uncompacted topsoil. The general backfill of sandy material would be placed to meet the required elevations, minus 15 inches. The silty loam or fine-grained material layer would

then be placed and compacted to a thickness of three inches. The final 12 inches of backfill will consist of topsoil and will be left uncompacted to support vegetative growth.

The topsoil layer will be tested prior to placement to verify that it meets the requirements of Specification Section 31 05 13 – Soils and Aggregates (Appendix B). The area will be replanted with native vegetation, which will include trees or taller vegetation that previously provided shade and unique ecological functions to the vernal pool ecosystem. The specific restoration details for this vernal pool, including a planting plan, are provided in Section 9.4 of the Restoration Plan.

10.5.3 Residential Properties

As described in Section 10.1.1, there are 13 residential properties in Reach 5A that require soil removal. Restoration will return disturbed areas to pre-remediation conditions (or as otherwise agreed upon by GE and the property owner) using property-specific approaches to backfilling, surface stabilization, landscaping, hardscape repair, stormwater drainage protection, and safeguarding existing structures and utilities. Excavated areas will be backfilled with clean, suitable material to original or near-original grades; topsoil will be replaced as needed; and lawns, gardens, walkways, fencing, and other site features will be restored—all as discussed with the property owner and with any modifications agreed to by GE and the property owner. Section 8.6 of the Restoration Plan describes the restoration approach for these residential properties in more detail.

11 Summary of Measures to Address Habitat Impacts

As discussed in the Restoration Plan, the Reach 5A remediation and support activities will impact the habitats of the river, riverbanks, backwaters, Other Waterbodies, and floodplain in that reach. As further discussed in that plan, numerous measures will be applied before, during, and after construction to avoid, minimize, and/or mitigate such impacts. Such measures incorporated into the remedial plan for Reach 5A are multi-faceted. They include various pre-restoration measures to minimize such habitat impacts, as described in the habitat-specific sections of the Restoration Plan and summarized in Section 7.4 of this plan. They also include the restoration of each habitat type as an integrated part of the remedial activity. As described in the Restoration Plan, ecological community types impacted by remediation and support activities (i.e., access roads and staging areas) will be fully restored in place, with the primary goal of replacing the pre-remediation habitat functions and, where practicable, enhancing the quality of that habitat. Section 8.5 summarizes the restoration activities to be performed in the main river channel, backwaters, and Other Waterbodies; Section 9.5 summarizes the riverbank stabilization/restoration design; and Section 10.5 summarizes the restoration of affected floodplain areas, including vernal pool 5A-VP-13. Comprehensive descriptions of restoration methodologies for each impacted ecological community type are provided in the Restoration Plan.

Encompassed within the restoration process are numerous measures which contribute to the mitigation of habitat impacts. Examples include the following:

- Use of NCD principles, including replacement/addition of coarse substrates (gravel and cobble), avoiding high levels of embeddedness, riffle/run/pool reconstruction, and including heterogeneity into riffles (low bars, boulder clusters, and subtle scour-fill features) to generate a mosaic of velocities and depths suitable for riverine aquatic biota such as fish, benthic macroinvertebrates (including state-listed dragonflies), and herpetofauna such as the wood turtle;
- Plantings of native floodplain plant species specific to each floodplain habitat impacted by remedial activities;
- Placement of habitat features such as woody debris in floodplain habitats consistent with pre-remediation content;
- Regrading of floodplain habitats to replace pre-remediation surface flooding conveyance;
- Effective application of sediment and erosion control measures, including rapid stabilization of disturbed areas with suitable seed mixes;
- Control of invasive plant species within and adjacent to impacted areas;

- In-river habitat replacement and enhancements, including creation/restoration of sandy point bars and quiescent sides of lee zones in the river to support certain plant species (including state-listed species);
- Creation, restoration, or enhancement of turtle nesting habitats and in-river habitat enhancements, such as placement of root wads and LWD, and creation of sandy/gravelly point bars and deep pools in the river; and
- Restoration and enhancement of moth and butterfly habitats through control of invasive species and installation of host plants within and adjacent to impacted areas.[62]

Again, these are just examples. A full discussion of such measures is provided in the Restoration Plan.

With specific reference to rare species, the individual rare plant and animal species that have been identified as subject to unavoidable temporary takes due to the Reach 5A remediation and supporting activities were identified in Section 5.4. The specific mitigation measures proposed to address the unavoidable takes of those rare species are described in detail in the Rare Species CMP attached as Appendix B to the Restoration Plan, which (taking into account all relevant factors) provides for a long-term net benefit to the state-listed species determined to be subject to a take from remedial activities.

[62] This includes the planting of host plants for the state-listed mustard white butterfly and ostrich fern borer moth. In addition, to address potential impacts to monarch butterflies, which are not state-listed but have been proposed for federal listing, milkweeds (*Asclepias* spp.), which are host plants for monarch butterflies, have been included in restoration planting plans, as discussed in the Restoration Plan.

12 Material Handling, Transport, and Disposal

This section provides an overview of the initial material-handling and processing activities to be applied in Reach 5A.[63] It also describes the transportation and disposal requirements for excavated sediments, soils, and debris. Additional details regarding waste transport and disposal, including potential transportation routes and procedures and disposal procedures, both for disposal at the UDF and for off-site transport, were provided in GE's 2024 Revised T&D Plan.

This section also describes the road improvement evaluation performed for the gravel portion of Roaring Brook Road/Woodland Road[64] and Valley Street and for the private culvert bridge along Valley Street, and it presents the resulting road improvement design for the gravel portion of Valley Street.

12.1 Initial Handling and Processing

This section describes initial handling and processing activities that will occur at the temporary staging areas to segregate and prepare removed materials for transportation for disposal.

12.1.1 Material Staging and Dewatering

The removed sediments, soils, and debris will either be transported from the removal areas to nearby temporary staging areas (described in Section 7.2.1) before transport to the UDF or to an off-site disposal facility, or they may be directly transported to the UDF or off-site disposal facility. At the staging areas, removed sediments, soils, and debris will be segregated into appropriate stockpiles based on in situ characterization, with separate stockpiles for materials that will be subject to disposal at the UDF and those to be sent to an off-site disposal facility(ies). Debris encountered during sediment and soil removal will be segregated for disposal based on the in situ characterization of the surrounding sediment or soil (see Section 12.1.2).

Site-related material-handling activities will be performed in accordance with the protocols described in GE's Revised POP. If a departure from those protocols becomes necessary, alternate protocols will be discussed with EPA prior to implementation. The approach for handling removed sediments, soils, and debris has been developed in consideration of: (1) the nature and characteristics of the materials to be removed; (2) on-site processes needed to prepare the materials for temporary staging and subsequent disposition (e.g., dewatering of materials containing excessive water); and (3) the overall sequence and schedule of the removal activities. Based on these considerations, several handling-related

[63] While this section provides an initial description of material handling and processing, an adaptive management approach will be utilized. For example, as discussed in Section 8.1, it is anticipated that more than one method will be used for removal of sediments within the main river channel in Reach 5A. Different sediment removal methods can result in excavated sediments having a range of water content. For that reason, the remedial design or construction methods for material handling and processing may need to be modified.

[64] The gravel road running north/south on the eastern side of the Housatonic River is called Roaring Brook Road in the Town of Lenox and Woodland Road in the Town of Lee.

activities will be performed after the sediments, soils, and debris are removed and before they are transported for final disposition at the UDF or an off-site disposal facility.

To the extent practicable, removed sediment, soil, and debris will be directly loaded into sealed vehicles for transport to the staging areas for temporary stockpiling and management (e.g., dewatering) prior to further transport. Where saturated soils and sediments are encountered, those materials will be allowed to drain within the excavation limits by being placed in small piles within the area to be remediated for gravity dewatering or by draining directly from the excavator bucket suspended over the excavation area prior to being loaded into sealed vehicles for transport.

Excavated materials transported to staging areas will be staged and managed at the staging areas until they have been sufficiently dewatered by gravity to pass the Paint Filter Test (SW846 Test Method 9095B). For excavated materials that will be disposed of at the UDF, if gravity dewatering does not yield material that will pass the Paint Filter Test, drier excavated materials (if available in sufficient quantities) or drying agents (e.g., Type 1L Portland cement or other suitable and locally available material) will be blended with the excavated material (as necessary) to condition the material such that it is suitable for transport (i.e., contains no free liquids and passes the Paint Filter Test). If additional dewatering is needed for materials that will be transported to an off-site disposal facility, GE will take other actions (e.g., blending excavated materials that have a higher moisture content with excavated soils that have a lower moisture content, if practicable) prior to adding drying agents. Once the excavated materials are sufficiently dewatered, the materials prepared for final disposition will be loaded into lined and covered containers (i.e., intermodal containers) for loading onto over-the-road vehicles for transport to the Utility Drive rail transload area for eventual transport to the UDF or for off-site transport (see Section 12.2).

Results of the treatability study (summarized in Section 5.6.1) suggest that the relatively coarse-grained sediments present in the majority of samples collected from the main river channel behaved like free-draining soils. This suggests that passive dewatering, particularly if excavated sediments can be mixed with drier excavated upland soils, will be sufficiently able to provide for primary dewatering and preparation for material stabilization. With exception of one sample collected outside of the main channel (from West Pond), all Reach 5A sediment samples passed the Paint Filter Test in untreated states (i.e., before gravity drainage or stabilization). After gravity drainage for a period of six hours, all samples passed the Paint Filter Test.

The treatability study also demonstrated that Type 1L Portland cement additives resulted in materials that were able to pass the Paint Filter Test and meet proposed materials strength goals for placement in the UDF or an off-site facility. Consideration will also be given to mixing in drier soils (in place of or in addition to amendments) as a stabilization measure, both to reduce the moisture content at a faster rate and improve workability of the sediment for placement in the UDF.

12.1.2 Debris Management

As described in Section 8.1.3.3, certain segments of the river channel contain considerable amounts of LWD, rocks, and, to a lesser extent, consumer debris (i.e., trash). Similar debris may also be encountered during remediation of the riverbanks and floodplains. Large debris removed from sediment or soil areas will be brought to the temporary staging areas, segregated based on in situ characterization of the surrounding sediment or soil, and staged for appropriate handling.[65] At the staging areas, large debris will be cut into manageable sizes before being transported for disposal.

12.1.3 Waste Characterization and Material Segregation

As described in Section 5.1.2.5, sediment samples collected from 10 transects in the main channel during the Reach 5A PDI were analyzed by the TCLP for disposal characterization; and none of the TCLP parameters was detected above the RCRA hazardous waste toxicity characteristic regulatory levels in 40 CFR 261.24. Once off-site disposal facilities have been selected (as described in the applicable SIP), GE may perform additional waste characterization sampling to establish the necessary waste profiles and to ensure that the material to be sent to such facilities has been adequately characterized, as required by the selected disposal facilities. If additional waste characterization sampling is deemed necessary, GE will coordinate with EPA and submit a plan to describe the proposed sampling (to be included, if necessary, in the applicable SIP).

Based on the in situ delineation and the evaluation under the PCB and hazardous waste criteria described above and in Section 5.1.2.5, the sediments and soils from Reach 5A will be designated for on-site or off-site disposal. Any debris encountered will generally be classified in a manner consistent with the characterization of the surrounding sediment and soil. However, if removed large debris is potentially subject to Toxic Substances Control Act or RCRA regulations for disposal or does not conform to the disposal characterization of the surrounding sediment or soil, that debris will be segregated and additional characterization of the debris will be performed.

12.1.4 Water Treatment

Water generated as a result of the various remedial activities (i.e., water generated from sediment, soil, and debris staging and processing; stormwater that accumulates in the staging area exclusion zone; backwash water generated during operation of water treatment systems; and water used for decontamination) will be collected at the staging area and treated at a nearby TWTS, which will discharge treated water to the Housatonic River. One treatment system will be constructed at the most appropriate staging area in closest proximity to the active work area(s) for that construction season. If multiple staging areas are planned for a given construction season, water from the areas

[65] This section is limited to describing the management of debris once it is at the staging areas. The approach for managing debris encountered during sediment remediation activities is described in Section 8.1.3.3.

without a TWTS will be collected and conveyed for treatment at the nearby TWTS or, as a contingency measure, at the Building 64G Groundwater Treatment Facility (GWTF) at the GE Pittsfield Facility. Additionally, if water generated exceeds what the TWTS can accommodate or if necessary for planned or unplanned maintenance purposes associated with the TWTS, the excess water will be collected and conveyed for treatment at the GWTF at the GE Facility or at the water treatment facility to be constructed at the UDF, once operational.[66]

Prior to initiating excavation operations, a TWTS will be constructed within the temporary staging areas or other potential areas available for remediation contractor support/laydown, as shown on the Design Drawings (Appendix A). Minimum requirements for TWTS components and treatment standards are provided in Specification Section 02 72 00 – Water Management and Treatment (Appendix B). Water generated from the gravity dewatering of the excavated material and decontamination activities will be collected and conveyed to the TWTS for treatment.

As stated in the ARARs table (Table 4-1), such discharge will meet the substantive requirements of EPA's National Pollutant Discharge Elimination System (NPDES) regulations, including any discharge criteria established by the EPA On-Scene Coordinator in accordance with 40 CFR 122.3(d). Proposed discharge criteria for the Reach 5A TWTS are presented in Table 12-1 and Specification Section 02 72 00 – Water Management and Treatment (Appendix B) for EPA review and approval. The proposed criteria are based on the water treatment system discharge criteria established by EPA for the 1.5-Mile Reach Removal Action and on criteria presented in GE's December 2024 *Conceptual Sediment Dewatering and Water Treatment Evaluation, Addendum to the Upland Disposal Facility Revised Final Design Plan* (Arcadis 2024b), with modifications to account for conditions provided by EPA in its June 11, 2025, conditional approval letter for that conceptual evaluation.

The TWTS will be capable of storing pre-treated influent water and post-treatment effluent water in closed storage tanks. Water processed by the TWTS will be run through filters to remove suspended solids and then through GAC filtration tanks for the removal of organic compounds including PCBs. Minimum requirements for construction and performance of the TWTS are included in Design Drawings D7000 and D7001 (Appendix A) and Specification Section 02 72 00 – Water Management and Treatment (Appendix B). The TWTS performance requirements have been established to provide for the removal suspended solids, PCBs, and other constituents (e.g., oil and grease and insoluble metals) from the water based on expected influent characteristics, as measured during the Reach 5A treatability study (see Section 5.6.1.1), and to meet the discharge criteria in Table 12-1 as approved by EPA (with any required modifications). The remediation contractor will be responsible for the setup and operation of the TWTS and achieving the approved discharge criteria. The remediation contractor will be required to conduct system startup testing in accordance with Specification

[66] For such planned maintenance events, GE will notify EPA in advance of the event. In the case of an unplanned event where the maintenance need is immediate, GE will notify EPA as soon as possible either during or following the event.

Section 02 72 00 – Water Management and Treatment and to conduct required water quality sampling. Residuals from the TWTS (i.e., settled solids, expended filter bags, and GAC media) will be handled and disposed of with the excavated material in the UDF.

If the applicable discharge criterion is met for an analyte for three rounds of operational water quality testing, the testing of that analyte for the remainder of the construction season (i.e., until winter shutdown) may be reduced or eliminated with approval from EPA. The analytes to be tested during operation of the TWTS and the applicable discharge criteria will be reviewed during implementation using the adaptive management approach discussed in Section 19.

12.2 Transportation and Disposal

The design evaluations presented in Sections 8, 9, and 10 include an evaluation of the existing PCB data from sediments, riverbank soils, and floodplain soils subject to removal to determine what portions of those materials can be disposed of in the UDF and what portions must be sent to an approved off-site disposal facility under the applicable Performance Standards for disposal. This section provides an overview of GE's plan for transportation and disposal of excavated sediments and soils. Additional details regarding waste transport and disposal, including EPA-approved transportation routes and procedures and disposal procedures both for disposal at the UDF and for off-site transport, were provided in the Revised T&D Plan.

As described in the Revised T&D Plan, it is expected that materials removed from Reach 5A will be transported primarily by rail for disposal. Where rail transport is used, trucks will be necessary to take removed material directly from removal areas or from temporary staging areas to a rail loading area and, in most cases (and all cases involving the UDF), from the railroad to the final disposal site. To support the use of rail transport for the materials removed from Reach 5A during the Remedial Action, the Revised T&D Plan proposed construction of two rail loading and/or unloading areas (referred to herein as rail transload areas) at the following locations, and EPA approved and directed GE to use those locations:

- **Utility Drive**, adjacent to Reach 5A in the City, near the Pittsfield WWTP; and
- **Woods Pond Spur**, adjacent to Reach 6 in the Town of Lenox at a railway museum property.

The locations of these two rail transload areas are shown on Figures 12-2 and 12-3. The conceptual design for these two rail transload areas was submitted in the *Conceptual Design Plan for Rail Transload Areas in Reaches 5 and 6* (Rail Conceptual Design Plan) for EPA review and approval on February 20, 2026 (Arcadis and AECOM 2026); that plan remains under EPA review as of the date of the present submittal. The remainder of this section describes the anticipated operations to move material either from the temporary staging areas to the rail loading location and then to disposal locations or directly to the disposal locations.

At this time, it is anticipated that truck movement from the temporary staging areas to the Utility Drive rail transload area, which is immediately adjacent to the proposed location of Staging Area 6 (Figure 7-1f), will follow the routes included in the Revised T&D Plan, as illustrated on Figure 12-1. Specifically, material removed from Reach 5A will start from the temporary staging areas (or directly from removal areas if loaded there) and will travel via truck to the Utility Drive rail transload area. For staging areas on the western side of the river, trucks will either travel from those staging areas to the Utility Drive rail transload area via internal access roads (for Staging Areas 6 and 7) or will travel to that area via Holmes Road (for Staging Areas 1 and 3). For staging areas on the eastern side of the river, trucks will travel from the temporary staging areas to the Utility Drive rail transload area either (1) via temporary access roads and river crossings to the Utility Drive transload area; or (2) via temporary access roads to East New Lenox Road and from there to New Lenox Road, then to US-20, and then to Holmes Road to get to the Utility Drive transload area.

As discussed in the Revised T&D Plan, if at any time during the Remedial Action the use of rail transport cannot match target production rates for sediment and soil removal (i.e., material is being removed and stockpiled faster than it can be transported for disposal, with the risk of running out of room), truck transport will be utilized to supplement rail transport and convey removed materials for disposal. For that reason, as noted in Section 7.2.2.3, EPA's conditional approval of the Revised T&D Plan required GE to develop a backup plan for transportation of excavated material via trucks directly to the UDF or to off-site disposal facilities in case rail cannot be used. In that situation, as a backup plan, the secondary routes proposed in Table 7-3 and illustrated on Figure 12-1 will be used for transport of material to the UDF, and the routes to be used for transport of material to off-site disposal facilities, if applicable, will be discussed with EPA.

As provided in the Final Revised SOW, the final methods of transport and transportation routes to the UDF and to the selected off-site disposal facilities will be described in the applicable SIPs for Reach 5A.

12.2.1 Utility Drive Rail Transload Area Operations

Trucks arriving at the Utility Drive rail transload area will enter the area by turning left from the entrance driveway at the Pittsfield WWTP and continuing down a temporary access road constructed for the rail transload area. Once at the loading/unloading area, the loading/unloading equipment (e.g., reach stackers, top-pick cranes) will remove the intermodal container from the truck and either place it directly on a waiting railcar or place it in temporary storage until a railcar is available.

As described in the Rail Conceptual Design Plan, the Utility Drive rail transload area is designed as two parallel spurs with a tail connecting the end of each (see Figure 12-2). This track orientation will allow railroad engine operations to pull empty cars into one spur, disconnect, traverse around the tail, and connect to and push out full cars (backward) from the other spur. It is anticipated that, at

this area, container loading/unloading equipment will be able to reach both rail spur tracks from the transload support area; however, it is also anticipated that, for each operational day, one track will be designated for only empty railcars and the other track will be designated for only full railcars. Each railcar will receive intermodal containers for either on-site or off-site disposal; no railcars will receive material designated for both on-site and off-site disposal. The details of the rail transload area operations will be provided in the forthcoming final design plan for the rail transload areas.

Once a railcar is fully loaded, which is anticipated to contain a minimum of four, and more typically six, intermodal containers, the railcar will be taken either to the Woods Pond Spur for transfer of the intermodal containers to trucks for transport to the UDF (see Section 12.2.2) or to the CSX interchange in the City of Pittsfield for transfer of the railcar to a cross-country rail carrier for transportation to an off-site disposal facility (see Section 12.2.3).

12.2.2 Material Transport to the UDF and UDF Disposal

Over-the-road transport of excavated materials to the UDF is considered "on-site" transport and is subject to the on-site permit exemption specified in Section 121(e) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Paragraph 9.a of the CD. Based on the final designs presented in Sections 8, 9, and 10, it is anticipated that approximately 32,800 cy of excavated sediment and soil from the first mile of Reach 5A will be transported on site to the UDF.[67] It is also anticipated that railcars with intermodal containers with material for on-site disposal will travel from the Utility Drive rail transload area to the Woods Pond Spur rail transload area at least once per day during construction operations. As described in the prior section, the Woods Pond Spur rail transload area is designed as two parallel spurs (see Figure 12-3). This track orientation will allow railroad engine operations to push empty cars into one spur, disconnect, traverse to the parallel spur, and connect to and pull out full cars forward from the other spur. It is anticipated that, at this transload area (as at the Utility Drive area), container loading and unloading equipment will be able to reach both rail spur tracks from the transload support area; but it is also anticipated that, for each operational day, one track will be designated for only empty railcars and the other track will be designated for only full railcars.

Once at the Woods Pond Spur rail transload area, loading/unloading equipment will remove the intermodal containers from the railcar and either place them directly on a waiting truck chassis or place them in a temporary storage area until trucks are available to take those containers to the UDF.

[67] This estimate includes an assumed sediment overdredge depth of 4 inches and relates only to the initial subreach of Reach 5A, for which final NCD-based design details have been developed. The comparable design details and the resulting estimate of the volume to be transported to the UDF for the remainder of Reach 5A will be provided in a future revision of or addendum to this work plan.

As stated in GE's Revised T&D Plan, truck transport between the Woods Pond Spur transload area (located on the western side of the river) and the UDF (located on the eastern side of the river) is likely to occur using one of two routes:

- **Northern Route:** This route will involve truck travel over local public roads, including traveling along Willow Creek Road, Crystal Street, Valley Street, and Woodland Road and entering the UDF property from the existing east entrance on Woodland Road. This alternative assumes travel along some private roads to get between Valley Street and Crystal Street and the use of Schweitzer Bridge to cross the Housatonic River.
- **Southern Route:** This route will involve truck travel over local public roads, including traveling along Willow Creek Road, Crystal Street, over the Mill Street Bridge, and Willow Hill Road and entering the UDF property from a new western access road being constructed through the private property immediately to the west of the UDF.

The Northern Route requires coordination and access agreements with property owners along Valley Street as the road itself is owned by private entities. In addition, Valley Street will need to be reconditioned and improved (see Section 12.3). Current operations of local businesses along Valley Street require a significant amount of daily truck traffic, which precludes use of this route for ROR-related truck traffic during the hours in which these businesses normally work (which, based on discussions with them, are Monday through Friday from 5:00 a.m. through 5:00 p.m.). At EPA's request, the Northern Route was previously considered as the primary route for truck transport between Woods Pond Spur and the UDF. However, based on field evaluations and property owner discussions in support of this design, several physical limitations exist with this transport route. Specifically, the existing truck traffic for local businesses receiving and shipping goods creates bottlenecks and access limitations at several points along the route. Additionally, parking areas for local businesses are near capacity and cannot accommodate additional truck traffic during normal business hours when employee vehicles are present. Therefore, it is proposed that the Northern Route be the primary route for truck transport between Woods Pond Spur and the UDF *only* during holidays, weekends, and evenings, when the local businesses along Valley Street are closed. The Southern Route is proposed for truck transport between Woods Pond Spur and the UDF during these businesses' normal working hours (5:00 a.m. through 5:00 p.m. on Monday through Friday). This approach can be reviewed during implementation using the adaptive management approach discussed in Section 19.

Additional details regarding transport of materials to the UDF are provided in the Revised T&D Plan and Rail Conceptual Design Plan. As noted above, in accordance with the Final Revised SOW, the final methods of transport and transportation routes will be described in the Year 1 SIP for Reach 5A.

Once at the UDF, the contents of the intermodal containers will be unloaded directly into the UDF, or, if necessary based on project sequence and schedule, the containers themselves will be placed into a temporary storage area for future unloading and placement of their contents into the UDF. Additional details related to operations at the UDF are presented in the *Upland Disposal Facility Revised Final Design Plan* (Arcadis 2024c) and the *Upland Disposal Facility Revised Operation, Monitoring, and Maintenance Plan* (UDF Revised OMM Plan; Arcadis 2024d).

12.2.3 Off-Site Material Transport and Disposal

As stated in the Revised T&D Plan, numerous Subtitle D and Subtitle C landfills outside of Massachusetts were identified and reviewed. Each facility was reviewed for its CERCLA approval status, waste acceptance criteria (sampling and analytical requirements), capacity limitations, rail access, and transportation distance, modes, and options. Additional details regarding candidate off-site disposal facilities were provided in the Revised T&D Plan.

In accordance with Attachment E of the Revised Final Permit and as summarized in Sections 3.6 and 4, portions of excavated soil and sediment will be transported to an approved off-site disposal facility or facilities outside of Massachusetts. As required by Section II.B.6.a.(2) of the Revised Final Permit, a minimum of 100,000 cy of PCB-impacted sediment, riverbank soils, and/or floodplain soils for the entire ROR Remedial Action will be sent off site to such an out-of-state facility. Based on the final designs presented in Sections 8, 9, and 10, it is anticipated that approximately 3,000 cy of excavated sediment and soil from the first mile of Reach 5A will be transported off-site for disposal.[68] The actual quantity of excavated soil and sediment that is transported to an approved off-site disposal facility will be documented to track progress toward achieving this minimum 100,000 cy requirement.

It is anticipated that railcars with intermodal containers with material for off-site disposal will travel from the Utility Drive rail transload area to the CSX interchange in the City approximately once every other day during construction operations. Once at the CSX interchange, the railcars will be transferred to a cross-country rail carrier for subsequent transport by rail to an off-site disposal facility.

GE's evaluation of off-site disposal facilities is ongoing. As noted above, in accordance with the Final Revised SOW, the selected off-site disposal facility, final methods of transport, and transportation routes will be described in the Year 1 SIP for Reach 5A.

[68] This estimate includes an assumed sediment overdredge depth of 4 inches of volume and relates only to the initial subreach of Reach 5A, for which final NCD-based design details have been developed. The comparable design details and the resulting estimate of the volume to be transported off site for the remainder of Reach 5A will be provided in a future revision of or addendum to this work plan.

12.3 Road Improvement Evaluation and Design

Pursuant to Section 6.2 of GE's QOL Compliance Plan, GE performed an engineering evaluation of the existing conditions of the gravel portions of Roaring Brook Road/Woodland Road[69] and Valley Street to determine the need for and type of reconditioning and upgrading (i.e., improvements) of the road and associated infrastructure (e.g., culverts) to make them suitable for construction truck traffic. The engineering evaluation considered the following:

- The type of truck(s) anticipated to travel over the roads, including anticipated maximum load;
- Existing topography, including mitigation to impacts to the steep grade of October Mountain to the east of Roaring Brook Road/Woodland Road;
- Improving surface drainage around the reconditioned and upgraded road to reduce future erosion;
- Mitigating the potential impact to the surrounding area, including habitat/ecological impacts; and
- Enhancing road functionality and maintaining safety.

Based on the results of that engineering evaluation and in accordance with EPA's conditional approval of the Revised T&D Plan, GE is submitting as Appendix L a plan to improve the gravel portion of Valley Steet. The proposed design details are included on Design Drawings and in Technical Specifications presented in Appendix L. This design plan includes the proposed upgrades, including details, where appropriate, for the installation of culverts and drainage features.

12.3.1 Evaluation of Roaring Brook Road/Woodland Road and Valley Street

A topographic field survey was conducted of the gravel portion of Roaring Brook Road/Woodland Road and Valley Street between September and December 2025 by C.T. Male (on behalf of GE) to accurately document existing conditions (e.g., elevations, drainage features, utilities, and existing rail locations) and to support detailed evaluation of the roads and, if appropriate, design of road improvements. The survey consisted of both field-collected survey and publicly available LiDAR survey data to yield a continuous model of the top of the existing ground surface for use for the evaluation of the roads and, where appropriate, development of the design of road improvements. The detailed topographic survey results were supplemented with a site walk performed in November 2025 to identify the most problematic existing grade and safety, erosion, and drainage areas.

[69] As noted above, the gravel road running north/south on the eastern side of the Housatonic River is called Roaring Brook Road in the Town of Lenox and Woodland Road in the Town of Lee.

The existing roads were evaluated for use by loaded standard tractor trailers (WB-67) and shorter tractor trailers (WB-62) along Roaring Brook Road/Woodland Road.[70] As discussed above, it is anticipated that truck traffic along Valley Street will be limited to smaller tractor trailers suitable for carrying intermodal chassis and the full (or empty) intermodal containers to be transferred at the Woods Pond Spur rail transload area.

The evaluation of Valley Street indicated that that road with improvements will be suitable for over-the road construction-related truck traffic. The resulting design of the required road improvements is described in Section 12.3.2.

The evaluation of Roaring Brook Road/Woodland Road indicated that that road, even with improvements, is not suitable for over-the-road truck traffic hauling soil/sediment. Although improvements could be made to the stability of the road (i.e., the aggregate surface) to support the anticipated weight of loaded tractor trailers, and although the width of the road could be improved to allow for safe one-way travel with pull-offs for occasional two-way traffic, the significant slope/grade of this mountainous road makes it unsuitable for travel by the over-the-road tractor trailers required for transport of material from Reach 5A directly to the UDF. Specifically, numerous locations along the road exceed 6% to 7% grade, which is considered to be a general industry standard maximum grade recommended for safe passage by large and heavy vehicles, and one location along the northern portion of the road (Roaring Brook Road), approximately 1,000 feet in length, has a 10% to 12% grade. The evaluation of that portion of Roaring Brook Road included assessment of the earthwork requirements to reduce the long and steep grade to a usable angle (e.g., reduce it to 6% to 7% grade). That evaluation indicated that a significant amount of cutting of October Mountain and/or filling of the floodplain between the road and the river would be required. Specifically, the regrading design would require removal of more than 10 feet of October Mountain, at the location of the road, with the removal tapering/extending more than 80 feet into the surrounding mountain area and fill of more than 15 feet of material, at the location of the road, with clearing and fill extending more than 50 feet into the sensitive floodplain habitat. Such earthwork would cause significant and unnecessary destruction of the surrounding state forest and floodplain habitat. A relatively similar amount of disturbance into the mountain and floodplain would be required to flatten all areas along Roaring Brook Road/Woodland Road that are currently more than 6% to 7% grade.

Based on the safety concerns with using a road with a long length of 10% to 12% grade (as well as other areas between approximately 6% and 10% grade) and the effort to minimize impact to the October Mountain State Forest, the evaluation of Roaring Brook Road/Woodland Road determined

[70] Tractor trailer geometries, including for WB-67 and WB-62, are defined in the 2018 Green Book (AASHTO 2018).

that that road is unsuitable to use to support Reach 5A over-the-road truck traffic hauling soil/sediment.

12.3.2 Design for Gravel Road Improvements for Valley Street

As noted above, the evaluation of Valley Street indicated that that road with improvements will be suitable for construction-related truck traffic. This section describes the road improvements for Valley Street.

The design approach for these road improvements generally involves removing a minimum of the top six inches of unsuitable material from existing grade and replacing that material with a compacted gravel subbase material (see Appendix L for specifications). The extent of removal is dependent on the observed conditions of the existing road base materials, as well as areas within the 100-year floodplain, as defined by FEMA (see Design Drawings in Appendix L). Removal in areas situated within the defined 100-year floodplain is designed to maintain existing flood storage capacity and result in no net fill within the 100-year floodplain, as discussed further below. Additional soil geotechnical investigations will be performed to confirm the assumptions made regarding the suitability of the existing material to support the haul truck traffic anticipated during the remedial activities. Those investigations are described in Section 12.3.4.

After the top minimum of six inches of unsuitable existing grade is removed, if additional unsuitable material (e.g., soft/loose, saturated material) is observed at the surface, additional removal of unsuitable materials will be conducted and replaced with compacted gravel subbase as discussed above. If the exposed surface is suitable for use in the road improvement based on visual observations, the underlying soils will be proof-rolled prior to new material placement. Woven geotextile will be utilized on top of the prepared/compacted subgrade and covered with approximately one foot of compacted gravel subbase along the entire length and width of selected road improvement areas.

Given the relatively flat grade of Valley Street and surrounding topography, no high-erosion or potential ponding areas were observed, and improvements specified in the Design Drawings (Appendix L) include general grading to address surface water flow without significant disturbance to the existing surrounding topography. No existing culverts flow under Valley Street and no supplemental culverts are required for or included in the road improvement design. Additionally, given the existing and proposed topography, no roadside ditches or swales are required for or included in the design as there are no anticipated impacts to existing drainage patterns as a result of the proposed grading.

With the exception of removing a soil berm currently located at the east entrance to the gravel portion of Valley Street, the design of the road improvements avoids, to the maximum extent

practicable, cuts into the existing grade beyond those necessary to enhance the road base condition and decrease erosion potential. Earthwork and disturbance of existing conditions have been minimized to preserve existing vegetation and minimize the need for clearing.

Due to space constraints, the road improvements are designed for one-way truck traffic. Additionally, due to such constraints, particularly considering proximity to the Woods Pond shoreline, the design does not include any truck pull-offs in the redesigned road to allow for occasional two-way traffic. In these circumstances, traffic controls will be used to coordinate the one-way traffic and mitigate the potential for interaction between local traffic and construction traffic. Potential traffic control approaches are anticipated to include temporary road closures to local traffic during work hours, gated access or flaggers at both ends of single-lane road, and/or radio-controlled or monitored construction traffic flow. Further, a directional approach for full or empty trucks may be used for the route along Valley Street between the UDF and Woods Pond Spur rail transload area to improve traffic safety. Under such an approach, the remediation contractor would be limited to using Valley Street only for driving full trucks to the UDF (i.e., driving east) and would be required to use a different route for driving west to return empty trucks to the Woods Pond Spur rail transload area.

As noted above, given that some of the proposed road improvement work is located within the footprint of the 100-year floodplain defined by FEMA (see Design Drawings in Appendix L), the road improvements within that floodplain are expected to be constructed to be similar to the existing conditions and elevations such that drainage and flood storage capacity in this area are not impacted. Nevertheless, an evaluation of the impacts of the road improvements on flood storage capacity in the floodplain will be conducted to confirm that there will be no loss of flood storage capacity due to the reconditioning or upgrade of the gravel road, which is intended to remain in place after completion of use for the Remedial Action. To meet the substantive requirements specified in the NPDES Construction General Permit that are applicable to the improvement of the existing gravel road, the remediation contractor will be required to develop a SWPPP. That SWPPP will be included in the SIP covering the road improvement work.

12.3.3 Evaluation of Existing Culvert Bridge Along Valley Street

As part of the engineering evaluation of the existing conditions of Valley Street, a load rating evaluation was performed for the existing culvert bridge over the spillway immediately east of the river, considering the expected weight rating of truck traffic to be used for the Remedial Action. The load rating evaluation for this structure was performed in accordance with the Massachusetts Department of Transportation (MassDOT) Bridge Design Manual for the anticipated tractor trailer with intermodal chassis and other standard MassDOT inventory and operating loads. The results of the engineering evaluation are provided in Appendix L. This evaluation concluded that the anticipated load may cross the culvert bridge safely and without restriction. Accordingly, no reconstruction of the culvert bridge is required to support construction-related truck traffic.

12.3.4 Supplemental Data Collection for Valley Street Improvements

As noted in Section 12.3.2, to confirm the assumptions included in the design for the gravel road improvements to Valley Street, additional geotechnical information will be collected in spring 2026. Specifically, soil geotechnical investigations and laboratory testing will be performed to confirm the assumptions made regarding the suitability of the existing material to support the design of the improvements for the gravel portion of Valley Street. These investigations will be performed to characterize the variability, depth, and engineering properties of the site soils along the alignment of the proposed upgraded roadway and to collect soil data through field and laboratory testing to support and identify geotechnical design considerations, such as nearing capacity, settlement, and global and local stability.

The proposed locations of the geotechnical borings are shown the Design Drawings presented in Appendix L. A total of four borings are planned, spaced approximately every 600 to 700 linear feet within the anticipated limits of the proposed Valley Street road improvements. Final locations may be adjusted in the field based on site conditions at the time of the geotechnical investigation and any observations made along the alignment indicating special conditions, a higher-risk area, or priority areas for proposed drainage. The borings will each be advanced to a target depth of approximately 10 feet bgs, and the final locations will be surveyed. Borings will be terminated at a shallower depth if refusal is encountered. Refusal will be considered to be encountered when split-spoon samplers have 50 blow counts with less than six inches of penetration (split-spoon refusal) or the augers can no longer proceed (auger refusal). If refusal is encountered within the top five feet at a boring location, one additional boring attempt will be made to reach target depth at a short distance from the original boring location.

The geotechnical borings will be advanced with a drill rig mounted on an all-terrain vehicle using continuous flight augers, rotary wash boring techniques, or a combination of each, depending on the subsurface conditions encountered. Continuous soil sampling will be performed using split-spoon sampling procedures, with continuous sampling at standard intervals to the full depth of each boring. All sampling will be conducted using a split-spoon sampler and SPTs following ASTM standard ASTM D1586. A qualified geotechnical engineer or geologist will log the borehole, record groundwater elevations, and document details related to the advancement and sampling of each boring (e.g., penetration lengths and blow counts). Field logs will also include visual classifications of materials encountered during drilling (e.g., color, texture, and moisture content) and interpretation of subsurface conditions between samples.

Sufficient soil from the split-spoon samplers (or from a combination of such samplers) will be provided to an appropriate geotechnical laboratory for analysis of geotechnical index properties in accordance with the ASTM standards noted below. The samples for laboratory testing will be chosen from depths and locations within each soil layer to confirm the observed stratigraphy noted in the

boring logs and from zones of loose or soft soils. The exact types and number of tests will be determined based on field observations and at the discretion of the geotechnical engineer overseeing the work. It is anticipated that material composited from representative intervals will be submitted for analysis of CBR (using ASTM D1883), Modified Proctor compaction testing (using ASTM D1557), grain size (using ASTM D6913), Atterberg (liquid and plastic) limits (using ASTM D4318), and moisture content (using ASTM D2216). A final determination of the analysis will be made based on field observations and at the discretion of the geotechnical engineer overseeing the work.

The SPT data, field descriptions, and laboratory data will be evaluated to confirm the design of the gravel road improvements presented herein. Soil descriptions in the boring logs will be updated where needed to conform to the laboratory-determined soil classifications.

Boreholes will be backfilled with the soil cuttings and/or sand after completion. Excess soil cuttings will be dispersed on site in the general vicinity of the borehole. However, if visual or olfactory evidence of unknown contamination is discovered during any point of the soil geotechnical investigations, the drilling spoils, fluids, and any other potentially contaminated material shall be containerized for disposal characterization and properly characterized for disposal in accordance with GE's *Waste Characterization Plan* (Appendix A of the Revised POP). Other investigation-derived waste (e.g., PPE) will also be managed and disposed of in an appropriate manner in accordance with GE's *Waste Characterization Plan*.

13 Quality of Life Standards Compliance and Monitoring

The remedial construction work in Reach 5A will be performed in compliance with the QOL standards for air quality, noise, odor, and lighting that were established in GE's QOL Compliance Plan, which was approved by EPA on May 28, 2025. This section briefly summarizes the QOL standards, discusses compliance with those standards generally, and describes the related monitoring activities to be conducted during construction.

13.1 General

The remediation contractor will implement methods, controls, and other mitigation measures, as needed, to maintain compliance with the QOL standards in accordance with Specification Section 01571 – Operations Environmental Restrictions and Controls (Appendix B). Details on the proposed methods and controls measures to be implemented by the remediation contractor will be provided in the applicable SIPs.

Numerous properties are in relatively close proximity to the remedial construction activities to be performed in Reach 5A and have the potential to be affected by those activities. Those properties include, but may not be limited to, the following:

- Residential properties located west of Pomeroy Avenue and on the eastern/northern side of the river, and Miss Hall's School located on the southern side of the river, between Stations 0+00 and 48+00;
- Residential properties near the work area entrance along Pomeroy Avenue;
- The Canoe Meadows property owned by Mass Audubon;
- Residential properties located between Pomeroy Avenue (Station 48+00) and Holmes Road (Station 57+00);
- Residential properties near the work area entrances along Holmes Road;
- Residential properties located on the western side of the river between the river and Holmes Road between Stations 57+00 and 185+00 (e.g., Palomino Drive neighborhood);
- Residential properties located on the eastern side of the river between the river and East New Lenox Road between Stations 57+00 and 245+00 (e.g., Joseph Drive neighborhood), including those properties near the work area entrance along East New Lenox Road; and
- Pittsfield WWTP located on Utility Drive on the western side of the river between Stations 185+00 and 245+00.

GE's Construction Manager or a third-party contractor retained by GE will perform air quality monitoring and noise monitoring to demonstrate compliance with the applicable QOL standards

and, as warranted, to respond to any project-related complaints regarding air quality, noise, odor, and lighting. Monitoring for compliance with the QOL standards will be conducted in accordance with the QOL Compliance Plan as well as the *Ambient Air Monitoring Plan* and *Construction Monitoring Plan* (Attachments D and G to the Revised POP, respectively). The approximate locations for air quality monitoring for PCBs and particulates are shown on the Design Drawings (Appendix A). Additional details pertaining to air monitoring are provided in Section 13.2. Noise monitoring locations and timing will be determined in the field in consultation with EPA and the remediation contractor based on the implementation plan and schedule.

If any QOL standards are exceeded or a project-related complaint is received that requires corrective action, GE will work with the remediation contractor to implement controls and any necessary mitigation measures to address the exceedance or complaint in accordance with the applicable requirements of the QOL Compliance Plan.

During remedial construction activities, the work areas and temporary access roads will be closed to public access. GE will coordinate with the applicable landowners to minimize the effect of the project on recreation. As described in Section 7.1.2, restricted work areas will be marked with appropriate signs and/or fencing. In addition, descriptive panels (designed by GE in coordination with EPA) will be installed at entrances to restricted areas to describe the construction activities and to inform the public on how to find additional information on the project website and how to receive relevant notifications. GE will provide notice of remedial activities and affected recreational areas and uses through a community notification program described in Section 7.1 of the QOL Compliance Plan and will address any complaints as described in Section 7.2 of that plan. Examples of places where these signs, fences, panels, and/or notices are anticipated to be installed include, but are not limited to, locations where temporary access roads exit onto public roads; selected locations along temporary access roads that are in close proximity to residential properties; and selected locations on the Canoe Meadows property where public walking trails will remain open adjacent to and crossing temporary access roads.

The QOL Compliance Plan provides additional information on measures to mitigate potential impacts from increased traffic. It specifies that the existing local roads that are part of the EPA-approved routes will be evaluated to determine the need for and type of reconditioning and upgrading of the roads and associated infrastructure to make them suitable for truck traffic. It also specifies that pre-construction, during-construction, and post-construction assessments will be performed to assess the condition of the local municipal roads and associated infrastructure (e.g., bridges and culverts) along the approved travel routes. GE performed pre-construction road assessment activities between September 14 and October 1, 2025, and the results were presented in GE's *2025 Road Assessment Report* submitted in February 2026 (Arcadis 2026; see Section 12.3). In addition, GE evaluated transport methods that minimize the use of local public roads and use temporary

project-specific access roads and river crossings to facilitate the use of rail transport to the UDF and to off-site disposal facilities.

13.2 Air Monitoring

Construction activities to be performed during remediation could result in the generation of airborne particulates (i.e., dust) or PCB emissions. Activities that could result in PCB and airborne particulate emissions include sediment/soil excavation, staging and handling, handling and application of cap or backfill materials, and vehicle traffic along temporary access roads.

Air monitoring will be performed during the remedial construction by a firm other than the remediation contractor. Air monitoring and compliance will be consistent with the QOL Compliance Plan and the *Ambient Air Monitoring Plan* (Appendix D to the Revised POP). Specific procedures for ambient air sampling are provided in Appendix G (Standard Operating Procedure for Ambient Air Monitoring for Particulate Matter and Polychlorinated Biphenyls) to GE's 2023 *Field Sampling Plan/Quality Assurance Project Plan* (FSP/QAPP; Arcadis 2023a).

The compliance point for attainment of the ambient air standards will be at the closest downwind receptor. Wind direction will be determined based upon the meteorological monitoring outlined in Section 14.1.1. Air monitoring will be conducted at representative locations near the closest receptor to the remediation activities or between the active work areas and the closest receptor. During active construction, air monitoring will be performed at a minimum of three locations around each of the following areas:

- The active sediment, riverbank, and floodplain remediation work area(s);
- The active temporary staging area(s); and
- Each of the active rail loading and unloading area(s).

Proposed air monitoring locations representative of each of these three location types for the first construction season are shown on the Design Drawings (Appendix A). Adjustments to these locations may be made based on changes to the remedial design based on remediation contractor input; therefore, final air monitoring locations will be provided in the SIP covering each subreach. Actual monitoring locations may be further adjusted in the field in consultation with EPA, the remediation contractor, and the air monitoring consultant in response to site conditions, property access, property owner request, or the locations of active operations. Based upon the proximity of remediation activities to the active staging area(s) and/or active rail loading and unloading area(s), monitoring locations may serve to monitor multiple location types. It is anticipated that, as construction progresses down the river, the monitoring locations for the active remediation areas will shift to encompass the work area. Monitoring locations around the temporary staging areas and the rail transload areas will remain fixed during the periods of their use.

During implementation of the Reach 5A construction, the primary constituent subject to ambient air monitoring will be particulate matter smaller than 10 micrometers in diameter (PM_{10}). Air monitoring for PM_{10} will be conducted during all construction activities that may generate particulate matter. Ambient air monitoring of PM_{10} will be conducted daily during construction activities for a minimum of 10 hours when construction is ongoing and throughout the duration of daily construction activities. If construction activities are ongoing for longer than 10 hours, particulate monitoring will continue until daily activities are complete. As described in the QOL Compliance Plan and Ambient Air Monitoring Plan, particulate monitoring will be performed using real-time meters with dataloggers to obtain continuous readings for determining the 10-hour average, which will be compared with the PM_{10} Notification and Action Levels.

Ambient air monitoring for PCBs will be conducted during construction activities that may result in generation of PCB emissions. PCB monitoring will be conducted in accordance with EPA Method TO-10A, which is a low-volume method used in locations when there is no site power available. A minimum of two baseline monitoring events (i.e., monitoring conducted to assess conditions prior to implementation of remediation activities) will be conducted for PCBs within a few weeks of each other prior to the start of the remedial construction activities in Reach 5A during each construction season. The following locations will be used for baseline PCB air monitoring for the Reach 5A Year 1 construction season:

- For active remediation work areas: WA-01-R, WA-05-R, WA-06-R, WA-09-R (Design Drawing G0100);
- For temporary staging areas: SA-01-N, SA-02-R, SA-03-R, SA-04-R (Design Drawing G0100);
- For the Utility Drive rail transload areas: RA-UD-01-R, RA-UD-02-R, RA-UD-03-N, RA-UD-04-R (Design Drawing S2001); and
- For the Woods Pond Spur rail transload area: RA-WP-01-N, RA-WP-02-N, RA-WP-03-R, and RA-WP-04-N (Design Drawing S2002).

As described in Section 12.2, operations at the rail transload areas will involve transfer of intermodal containers between trucks and railcars. These containers will be sealed prior to arrival at the transload areas; therefore, no activities that may result in generation of PCB emissions will be performed at these areas. To demonstrate this, PCB air monitoring will be performed at the rail transload areas during the first year of their operation. However. such monitoring will be discontinued at these areas in subsequent years if Year 1 monitoring indicates that PCB air levels are consistently below the PCB Notification Level in the QOL Compliance Plan.

At the start of Reach 5A remediation activity that may generate PCB emissions, and each new type of such activity, sampling for PCBs will be conducted for two sequential 24-hour periods (i.e., back-to-back). If monitoring indicates that air levels are acceptable (i.e., are below the PCB Notification Level

specified in the QOL Compliance Plan), the monitoring frequency will be reduced to one 24-hour monitoring event weekly for each area of active construction or work activity for the duration of that activity. If monitoring indicates that air levels are not acceptable (i.e., are above the Notification or Action Level specified in the QOL Compliance Plan), the actions specified in Section 4.3.3.1 (for a Notification Level exceedance) and/or Section 4.3.3.2 (for an Action Level exceedance) of the QOL Compliance Plan will be implemented.

If the total duration of active construction or work activity is less than one week, then one sampling event will be completed. Monitoring for two sequential 24-hour periods will be reinstituted when a new type of remediation construction activity occurs.

13.3 Noise Monitoring

The primary objective of the noise QOL standards is to limit potential impacts of noise generated by the project on the surrounding communities. As described in Section 4.4.1 of the QOL Compliance Plan, separate noise QOL standards were established for residential areas and non-residential areas (e.g., commercial, industrial, agricultural, and undeveloped areas). Further, for residential areas, separate numerical QOL standards have been established for daytime and nighttime periods. The residential daytime QOL standard includes both a Notification Level and an Action Level. The residential nighttime noise standard and non-residential noise standard (applicable any time of day) are both Action Levels.

Noise monitoring will be conducted in accordance with Section 4.4.3 of the QOL Compliance Plan. This includes initial monitoring that will be conducted at the start of a new type of construction activity in each construction season to assess representative noise levels and confirm that the noise levels do not exceed the designated standards. If the initial monitoring indicates that noise levels are acceptable, subsequent monitoring will occur as follows: (1) bi-weekly for each type of construction activity to verify noise levels; (2) when a new remediation activity, equipment, or reduced distance to receptors has the potential to increase noise levels; (3) if work hours are extended to the nighttime period (i.e., between 9:00 p.m. and 7:00 a.m.); and (4) in response to noise complaints.

Noise monitoring will be performed at the following types of locations in Reach 5A:

- Active sediment, riverbank, and floodplain remediation area(s) in close proximity to receptors;
- Temporary staging area(s); and
- Rail transload area(s).

Noise monitoring locations will be selected from the overall set of air monitoring locations and will be co-located with them, where appropriate, based upon work activities and site conditions. Potential monitoring locations are shown on the Design Drawings (Appendix A). Actual monitoring

locations may be adjusted in the field in consultation with EPA and the remediation contractor in response to site conditions, property access, property owner request, or the locations of active operations. Additional details regarding the noise monitoring equipment and procedures for the initial monitoring are presented in GE's *Construction Monitoring Plan* (Appendix G to the Revised POP).

13.4 Odor Monitoring

As described in Section 4.5.1 of the QOL Compliance Plan, the odor standard to be applied during remediation is to mitigate the presence of uncomfortable project-related odors identified by project workers, GE, or EPA or via an odor complaint from the public. Although each odor complaint will be investigated, the standard will be considered to be not met if uncomfortable project-related odors are identified frequently and recurrently or if such objectionable odors are not mitigated in a timely manner. If project workers, GE, or EPA identify an objectionable odor or if an odor complaint is received from the public, GE will investigate the presence and source of the odor to determine whether the odor is related to the remediation project. If multiple odor reports or complaints are received regarding the same potential odor source, they will be investigated together.

Specifically, in each such case, GE will document the odor report or complaint, evaluate the source of the odor to determine whether it is project related, and notify EPA within 24 hours of receiving the report or complaint. For complaints, GE will implement the complaint management program described in Section 7.2 of the QOL Compliance Plan. If the odor is project related, GE will further discuss the nature and intensity of the odor with EPA and the person making the report or complaint and, if necessary and possible, obtain an objective assessment of odor intensity. If a project-related odor is determined to be uncomfortable or a nuisance, GE will propose and implement mitigation measures as appropriate to reduce or eliminate the source of the odor.

In the specific event that an odor complaint or report is received that relates to the distinct rotten-egg smell of hydrogen sulfide, GE will conduct air monitoring for that constituent at the work area perimeter for approximately one hour. The hydrogen sulfide monitoring equipment and procedures are described in the *Construction Monitoring Plan* (Appendix G to the Revised POP).

13.5 Lighting Monitoring

As described in Section 4.6.1 of the QOL Compliance Plan, the lighting standard to be applied during remediation is to mitigate nuisance project-related lighting impacts based on any complaints from nearby receptors. Although each lighting complaint will be investigated, the standard will be considered to be not met if frequent, recurrent lighting complaints related to project activities occur or if project-related nuisance lighting impacts are not mitigated in a timely manner. Evaluation of compliance with the lighting QOL standard will be triggered by complaints from nearby receptors. If a lighting complaint is received from the public, GE will investigate the complaint to determine

whether the lighting issue is related to the remediation project. If multiple complaints are received regarding the same potential lighting source, they will be investigated together.

13.6 Reporting

As described in Section 4.7 of the QOL Compliance Plan, monthly QOL summary reports will be prepared to document QOL monitoring results, any complaints received during the period, any exceedances of QOL standards, and any actions taken in response to monitoring or complaints. GE has initiated the preparation and submittal of these monthly reports (relating to date to monitoring at the UDF); those reports will continue to be submitted on a monthly basis as remediation activities are ongoing.

14 Construction Monitoring

This section describes monitoring to be performed during the implementation of remedial construction activities to verify that the work is being conducted in accordance with this Final RD/RA Work Plan and the forthcoming SIPs. These construction monitoring activities will include environmental monitoring (other than QOL monitoring) and construction-related monitoring, and will be consistent with the requirements of the *Construction Monitoring Plan* (Attachment G to the Revised POP) and the CQAP (Attachment E to the Revised POP).

14.1 Environmental Monitoring

14.1.1 Weather Monitoring

Monitoring of weather conditions will be performed throughout remedial construction activities. On-site meteorological stations have been established at the GE Pittsfield Facility and at the UDF property. A third optional (temporary) location may be established near one of the active staging areas, depending on the location of construction activities. These on-site meteorological stations will record daily wind speed and direction, relative humidity, air temperature, and precipitation during the remedial construction activities.

These data and other readily available public weather data will be reviewed, as necessary, to support appropriate evaluations. For example, because weather conditions can impact the functioning of air monitoring equipment, weather data will be reviewed in conjunction with air monitoring data if an applicable air quality standard is exceeded.

Weather forecasts will also be monitored throughout construction operations for safety purposes and to support construction operations and planning. Forecasts of significant weather events (e.g., heavy rain, strong winds, lightning, snow, freezing temperatures, and flooding) will be reviewed daily to protect worker safety and construction equipment, to support project planning, and to protect active work areas and minimize the potential for the spread of contamination. Precipitation forecasts will be reviewed in combination with river stage forecasts (described in Section 14.1.2) to forecast conditions that may necessitate modifications to planned construction activities.

14.1.2 River Flow Monitoring

River flow conditions will be monitored daily during active remediation activities to: (1) protect active work areas and completed work (in both the river and floodplain); (2) monitor for safe work conditions for workers and construction equipment operating on or adjacent to the river; and (3) minimize the potential for the migration of PCB-impacted materials.

The following sources of data will be used to monitor river flow conditions:

- USGS flow data measured at the Coltsville, Massachusetts,[71] and Lenoxdale, Massachusetts,[72] flow-monitoring stations will be reviewed daily, with measurements noted on daily logs.
- River stage forecasts published by the National Oceanic and Atmospheric Administration's National Water Prediction Service[73] for the Housatonic River at Great Barrington will be reviewed in conjunction with weather forecasts to evaluate forecasted weather and river conditions that may necessitate reducing production rates or temporary operational shutdowns.
- River staff gages or water surface elevation boards may also be installed along certain portions of the river, such as near active staging areas, to provide for localized river flow and water depth monitoring.

14.1.3 Wood Turtle Monitoring

In addition to the environmental monitoring described in the prior sections, monitoring will be conducted for wood turtles, a state-listed species known to occur in Reach 5A. This monitoring will be part of the overall wood turtle management program described in the Wood Turtle Management Plan, which is Attachment B to the Rare Species CMP that is Appendix B to the Restoration Plan. That management plan, which will be implemented under the full-time oversight of a designated herpetologist, describes pre-construction measures to minimize the likelihood of impacts to wood turtles (as discussed in Section 7.4 above) and monitoring and other protocols to protect wood turtles during site preparation and remedial construction activities, including both work during the turtles' active season (April 1 through October 31) and potential work outside that season. That plan also covers the training of field and construction personnel to recognize wood turtles and understand the conservation practices necessary to avoid or minimize direct impacts to any turtles encountered. That plan will be followed during the performance of remedial activities in Reach 5A, subject to modification as remediation and restoration work proceed through the five subreaches.

14.2 Construction-Related Monitoring

14.2.1 Site Control Inspections

As discussed in Section 7.1.4, erosion and sedimentation control measures will be implemented to minimize the potential for erosion of exposed soils and subsequent accumulation of soils and other materials, to divert rainfall runoff as appropriate, and to minimize downstream migration of

[71] Source: https://waterdata.usgs.gov/monitoring-location/USGS-01197000/

[72] Source: https://waterdata.usgs.gov/monitoring-location/USGS-01197145/

[73] Source: https://water.noaa.gov/

sediments. Such controls will include silt fencing, filter socks, check dams, turbidity curtains, and water application on construction road surfaces. The location and layout of the erosion control measures will be specified in the SIP for each subreach of Reach 5A.

To verify the proper functioning of these control measures, including erosion and sedimentation controls, stormwater management controls, water quality control, dust controls, and/or other BMPs as appropriate, the remediation contractor will perform an inspection of the installed control measures at least daily throughout construction activities and until restoration activities are complete to the satisfaction of the Construction Manager. In addition, turtle exclusion barriers will be inspected daily in areas where work is being performed or where vehicle or equipment operations occur. The results of the erosion and sedimentation controls inspections and the turtle exclusion barrier inspections, including any required maintenance, repair, or replacement, will be recorded in the remediation contractor's daily activities report.

14.2.2 Imported Materials Testing

Imported materials to be used for sediment capping and backfill will be subject to chemical and geotechnical testing to verify that the imported materials meet the requirements described in Specification Section 31 05 13 – Soils and Aggregates (Appendix B) for the use of these materials. Imported material testing requirements are presented in the revised *Soil Cover/Backfill Characterization Plan* (Attachment B to the Revised POP) and in Specification Section 31 05 13 – Soils and Aggregates (Appendix B). These requirements for characterization of potential cap/backfill materials include an initial borrow source assessment, chemical characterization sampling, and geotechnical characterization sampling.

The initial borrow source assessment will include some or all of the following: (1) a field visit to evaluate the materials; (2) research on the historical use of the borrow source area and origin of the proposed materials; and (3) review of any chemical/physical characterization data that may already exist for the material at the source. If the initial assessment indicates that the materials at the borrow source are potentially usable and thus warrant further evaluation, sampling for chemical and geotechnical characterization will be conducted.

Chemical characterization sampling will be conducted for imported soils and granular materials (e.g., topsoil, sand, and gravel). Representative samples will be analyzed for PCBs and the Appendix IX+3 VOCs, SVOCs, cyanide, and metals. Stone materials (e.g., riprap, cobbles, and boulders) will not be subject to chemical testing, provided that those materials are from a source found to be acceptable from the initial borrow source assessment.

The frequency of sampling and chemical testing required will depend on the source/location of the potential material. For candidate material from an undisturbed (virgin) in-place source (e.g., an active

gravel/borrow pit), samples will be collected for chemical analysis at a frequency of one per 20,000 cy. For candidate materials that have not been certified as a virgin source, samples will be collected at an initial frequency of one per 2,000 cy to characterize up to 20,000 cy of material from the borrow source and at a frequency of one sample per 7,500 cy thereafter. Based on the results from this sampling, GE may request approval from EPA to reduce this sampling frequency to a rate of up to one sample per 20,000 cy.

Geotechnical characterization sampling requirements will vary depending on the imported material and its planned use; these requirements are described in Specification Section 31 05 13 – Soils and Aggregates (Appendix B). Samples for potential cap, cover, or backfill materials will generally be collected and analyzed for the specified parameters at a similar frequency as the chemical characterization testing.

In addition to receiving material certifications from the AC vendor, testing of AC to be used for the chemical isolation layer of the sediment caps will be conducted prior to placement to verify that the iodine number (a measure of the adsorption capacity of AC) meets the minimum specification requirements.

Other imported materials that are not used for sediment capping and backfill (e.g., erosion control materials, geosynthetics, and vegetation) will also require some level of testing, QC, or review of manufacturer data. Testing requirements for these specific material types are included in the Technical Specifications (Appendix B).

14.2.3 Surface Water Quality Monitoring

Surface water quality monitoring will be performed in the river channel during intrusive remediation activities, including sediment removal and riverbank soil removal and stabilization, and during intrusive remediation activities in backwaters and Other Waterbodies with a hydraulic connection to the Housatonic River. Monitoring will also be performed in the main river channel during restoration activities such as in-water backfilling or engineered capping activities, including restoration activities in backwaters and Other Waterbodies with a hydraulic connection to the Housatonic River.

The surface water quality monitoring program is described in the approved *Construction Monitoring Plan* (Attachment G to the Revised POP). Monitoring components near active work areas will include upstream and downstream turbidity monitoring; routine water column sampling (including field measurements of temperature, pH, and conductivity); and visual observations. Each of these components are described further below.

14.2.3.1 Turbidity Monitoring

Turbidity monitoring will consist of the deployment of two continuous turbidity monitors for each active work area. One will be located immediately upstream of the active work area and the other will

be located approximately 500 feet downstream of both the active work area and any erosion and sedimentation control measures. The specific monitoring locations will be chosen in the field based on channel morphology and accessibility to produce durable and reliable monitoring across a variety of potential flow conditions.

As described in the approved *Construction Monitoring Plan*, the turbidity action level will be a measurement at the downstream location that is at least 50 nephelometric turbidity units (NTU) higher than the measurement at the upstream location. If the turbidity action level is exceeded, site assessment activities will be initiated, including but not limited to the following:

- Review of the ongoing removal and/or other construction activities and the potential need for modification of the condition or performance of the existing erosion and sedimentation control measures; and/or
- Continued monitoring at the downstream location to determine whether the exceedance was an anomaly or whether the elevated reading was a short-duration event.

If it is determined that the turbidity action level exceedance was not an anomaly or short-duration event (e.g., if an exceedance is observed for two or more consecutive 15-minute readings), evaluative water column samples will be collected at both the upstream and downstream locations, using the collection and analysis protocols described in Section 3.9.2 of the *Construction Monitoring Plan*, for analysis of total PCBs and TSS.

If elevated downstream turbidity reading reflects a water quality impact that could persist or recur and that it is related to the removal or other construction activities, the construction activities will be modified to the extent feasible or additional controls will be implemented.

14.2.3.2 Water Column Sample Collection

As described in Section 3.9.2 of the *Construction Monitoring Plan*, routine water column samples will be collected in accordance with the procedures included in Appendix B1 of the revised FSP/QAPP (Standard Operating Procedure for Surface Water Grab Sampling and Velocity Measurement). In accordance with this procedure, water samples will be obtained by slowly submerging the sample collection device with minimal surface disturbance to a depth that is 0.5 times the total water depth.

As with turbidity monitoring, water column samples will be collected upstream and downstream of the active work area. The upstream sample will be collected at the same location as the upstream turbidity monitoring location. The downstream sample will be collected approximately 500 feet downstream of the downstream subreach boundary for each construction season.

Sample collection will begin at a weekly frequency. If the results from the first three weeks of routine water column sampling indicate that PCB levels are acceptable (i.e., do not exceed the PCB action

level described below), routine sampling will then be conducted every other week for each area of active construction for the duration of that construction activity. If the data collected every other week indicate that construction activities are not significantly impacting water quality, GE may propose to EPA to further reduce the routine water column sampling frequency.

The water column samples will be analyzed for PCB congeners by EPA Method 1668C and TSS by EPA Method SM 2540D. During sample collection, temperature, pH, and conductivity will be measured in the field at each sample collection location.

As described in the *Construction Monitoring Plan*, the PCB action level will be a sample result for PCBs at the downstream sample location that is at least 5 µg per liter higher than the measurement at the upstream location. If the PCB action level is exceeded, site assessment activities will be initiated, including but not limited to the following:

- Review of the ongoing removal activities and the potential need for modification of the condition or performance of the existing erosion and sedimentation control measures; and/or
- Collection of additional water column samples from various locations within or adjacent to the removal area in an effort to identify the potential source(s) of the elevated PCB result.

If these assessment activities indicate that the elevated downstream PCB result reflects a water quality impact that could persist or recur and that it is related to removal activities, the construction activities will be modified to the extent feasible or additional response measures will be implemented. Appropriate response measures for this situation may include changes to dredge buckets, dredging techniques, and construction sequencing; avoiding or slowing dredging operations during high-velocity conditions; deployment of additional sorbent booms, sorbent pads, or turbidity control measures; or other appropriate response. Daily evaluative water column sample collection, as well as the construction modifications or other response measures (as appropriate), will continue until compliance with the PCB action level is achieved and GE demonstrates to EPA that such modifications and/or additional measures are no longer necessary.

14.2.3.3 Visual Observations

The remediation contractor and the Construction Manager will visually observe the water surface for the presence of turbidity and/or sheens downstream from the erosion and sedimentation control measures during in-water construction activities, as described in Section 3.9.3 of the *Construction Monitoring Plan*.

Visual observations will be performed at least daily during in-water construction activities and whenever water column sample collection is occurring. If water quality impacts are observed (visually) by the remediation contractor or persons conducting water column sampling, the observer will notify the Construction Manager and GE, the turbidity monitoring data will be reviewed, and GE

will make any required notifications. If the turbidity data are within the required limits, then no further action will be taken. In addition, if a visible sheen is observed to be generated during remediation activities, GE will notify EPA in accordance with the procedures specified in the POP.

Corrective actions to address observed impacts may include, but are not limited to, deploying sorbent booms or pads or slowing construction in the affected area. If sheens are observed that trigger the deployment of sorbent materials, the remediation contractor will visually inspect and verify the condition and effectiveness of the position of the deployed booms and oil sorbent materials at least once every hour until visual confirmation that sheens are no longer present and GE demonstrates to EPA that corrective actions are no longer necessary.

14.2.3.4 Downstream Water Quality Monitoring Program

In addition to the water quality monitoring near active work areas, monitoring for turbidity, TSS, and PCBs will be conducted at a location farther downstream from the active work area(s), coinciding with the current Woods Pond Dam monitoring location (defined under GE's Baseline Monitoring Program). The downstream monitoring will consist of monthly sample collection during active river remediation activities, with real-time measurements for turbidity and analyses for PCBs and TSS.

14.2.4 Water Treatment/Discharge Sampling

As described in Section 12.1.4, the remediation contractor will provide and operate a TWTS to manage and treat the following: (1) water generated during the remediation activities, including dredging; (2) free water separated during the processing of dredged sediments, debris removal, soils, material staging and processing; (3) stormwater that accumulates in material staging area exclusion zones; (4) backwash water generated during operation of the TWTS; (5) water used for truck washes; and (6) decontamination water. Specific requirements for the construction and operation of the TWTS are included in Specification Section 02 72 00 – Water Management and Treatment (Appendix B). Water treated by the TWTS will be discharged to the Housatonic River in accordance with all applicable substantive requirements for the discharge of the treated water, including the discharge criteria specified in Section 12.1.4 and Table 12-1. Sampling requirements for the TWTS are described in Specification Section 02 72 00 – Water Management and Treatment (Appendix B), including analytical parameters and discharge limits for these analytical parameters.

Sampling frequency is also described in Specification Section 02 72 00 – Water Management and Treatment (Appendix B). During the initial startup test, the TWTS will be operated in recirculation mode at the peak flowrate until the entire initial batch is treated. After the entire initial batch is treated, the initial startup test will be conducted; the TWTS will remain in recirculation mode until sample results have been received, to verify that the system is operating properly. This process will be repeated until two consecutive batches have undergone successful treatment. After initial startup sampling and verification, the TWTS will release treated effluent to the Housatonic River and for the

first month weekly sampling of the effluent will be performed. If all samples in that first month indicate the TWTS is operating properly (i.e., results are less than the applicable discharge criteria), testing will be conducted monthly during and after the second month of operation, extending until system winterization or shutdown.

If any effluent monitoring result exceeds the applicable discharge criterion listed in Table 12-1 and the Technical Specifications (Appendix B), the remediation contractor will immediately notify GE's Construction Manager and GE, and GE will notify EPA. The remediation contractor will then perform an evaluation and propose corrective action(s) in writing to the Construction Manager and GE within 24 hours of notification of the exceedance. GE will then propose corrective action(s) to EPA for review and approval. If the evaluation indicates that there is little likelihood of a recurrence of the exceedance, the proposed corrective action may consist of continued monitoring.

The treatment of water and leachate at the UDF area will be managed separately, as described in GE's December 2024 addenda to the *UDF Revised Final Design Plan* (Arcadis 2024c) and UDF Revised OMM Plan relating to the sediment dewatering and treatment systems.

14.2.5 Surveying

Surveys will be performed to confirm that the cut and fill grades required by the design are met during construction, to document pre- and post-construction conditions, and to document testing and sampling locations.

Survey requirements and methodology are discussed in the revised CQAP (Attachment E to the Revised POP) and in Specification Section 02 21 00 – Surveys (Appendix B). Based on site conditions (i.e., generally shallow water in the river), hydrographic survey methods are expected to include single-beam acoustic systems or topographic surveying. Single-beam survey data collection techniques will generally conform to guidelines set forth in the USACE guidance document EM 1110-2-003, *Engineering and Design – Hydrographic Surveying* (USACE 2013). Survey methods for topographic surveys will generally conform to guidelines set forth in the USACE guidance document EM 1110-1-1005, *Engineering and Design – Control and Topographic Surveying* (USACE 2007).

Project-specific requirements for land-based and water-based survey activities, such as required survey extents, spacing requirements, tolerances, and accuracy are included in Specification Section 02 21 00 – Surveys (Appendix B), and the criteria to be used for verification and acceptance of post-dredge and post-placement cap surveys are included in Specification Section 35 24 00 – Sediment and Riverbank Soil Removal and Specification Section 35 28 00 – Engineered Cap (Appendix B).

14.2.6 Cap Verification

During remediation activities, engineered cap materials will be installed in Reach 5A of the Housatonic River. To verify that engineered cap materials are placed in accordance with the remedial design, the following QA/QC activities will be performed:

- Verify imported material quality prior to placement of engineered cap materials through testing described in Section 14.2.2.
- Verify placement of each layer of the engineered cap materials to the specified thickness and to the required lateral extents.
- For chemical isolation layers, verify that the amendment content in the chemical isolation layer materials meets the specified requirements.

14.2.6.1 Verification of Cap Thickness and Lateral Extent

For each engineered cap layer, placement of cap materials to the specified thicknesses and lateral extents will be verified using a combination of independent measurement techniques, including manual topographic surveys, bathymetric surveys, LiDAR surveys, direct physical measurements using core samples, and tracking of placement quantities and locations.

The most appropriate measurement technique will be selected prior to or during the initial stages of construction and may vary as construction proceeds depending on local site conditions. However, it is expected that the main verification methods for the sand cap layers will consist of physical measurements and surveys. Physical measurements of sand layers will be distributed at randomly selected locations the CCUs and collected at a frequency of about 20 in situ measurements per CCU to provide thickness verification. The measurement locations will be spaced to provide relatively uniform spatial distribution throughout the CCU. When core sampling is used to measure thickness of the chemical isolation layer, the core sampling will be conducted in accordance with the procedures described in Appendix C2 of the revised FSP/QAPP (Standard Operating Procedure for Sediment Probing, Coring, and Sample Collection). The applied cap layer thickness in the collected core samples will be measured as the thickness of the clean (unmixed) sand visually observed in the core plus 50% of the thickness of the mixing zone where the sand comprises at least half of the matrix of sand and underlying native sediments, as determined through visual observations or physical characterization in the field. If catch pans are used to measure the applied cap thickness for any material, the thickness will be determined as the average of a minimum of two measurements across the catch pan.

Placement of an individual cap layer will be considered complete within a CCU if the minimum required design thickness has been achieved in at least 95% of the thickness measurements in that CCU and any remaining measurements are 90% or greater of the minimum design thickness.

In addition to physical measurements, topographic and bathymetric surveys will be performed prior to and following the placement of each sand layer to verify cap layer thickness. Cap layer thickness will be calculated based on the difference between pre- and post-placement survey data. If topographic and bathymetric survey data identify any potentially non-conforming thickness of these layers, additional physical measurements will be conducted as necessary to assess the layer thickness at the potentially non-conforming location.

For erosion protection layers consisting of coarse gravel, cobble, or larger-sized materials, topographic and bathymetric surveys will be used to verify the minimum thickness because physical thickness measurements of material sizes larger than gravel are not practicable. Pre- and post-placement survey data will be collected for each layer, and the thickness of the layer will be calculated as the difference between the two surveys. Cap layer thickness will be calculated based on the difference between pre- and post-placement survey data.

The survey data collection methodology used to determine layer thickness will vary depending on the type of survey. For bathymetric survey data collected using single-beam acoustic systems, bathymetric survey data will be collected using track lines spaced 10 feet apart, and the pre- and post-placement survey data collected in this manner will be used to generate a cap thickness (isopach) map. The thickness for the cap layer indicated by the isopach map will be compared to the target layer thickness. As noted above, placement of the cap layer will be considered complete within a CCU if the minimum required design thickness has been achieved in at least 95% of the grid area, and remaining grid area measurements are 90% or greater of the minimum design thickness.

For survey data collected using topographic survey methods, which are required in nearshore and shallow-water areas that are inaccessible to bathymetric survey equipment, pre- and post-placement topographic survey measurements will be collected from the same coordinates on a 10-foot by 10-foot grid. Measurements at a closer spacing may be made as needed to characterize sloped areas or grade breaks. The pre- and post-placement survey measurement will be directly compared to each other to determine the cap layer thickness at each survey location. Again, placement of the cap layer will be considered complete within a CCU if the minimum required design thickness has been achieved in at least 95% of the topographic survey measurements, and any remaining measurements are 90% or greater of the minimum design thickness.

For survey areas that transition between single-beam bathymetric and topographic survey methods, a 10-foot overlap will be used where both survey methods are employed, to allow for comparison of survey data from both methodologies at the transition between these survey types. For all cap layers, volumetric placement quantities and equipment positioning will be recorded and used as an additional line of evidence to verify proper placement of cap materials to the thicknesses and extents required by the design.

Finally, habitat layer placement verification will be based on topographic and bathymetric surveys to confirm that the top of the habitat layer has achieved the required elevations for the NCD grading design surface within the allowable tolerances outlined in Section 35 28 00 – Engineered Cap (Appendix B).

14.2.6.2 Chemical Isolation Layer Composition Testing

Testing of the amendment content of the chemical isolation layer will be conducted throughout construction to demonstrate the efficacy of material blending and cap placement operations. Amendment content testing will be performed for samples collected both before placement (ex situ) and after placement (in situ).

At the start of cap placement each construction season, the remediation contractor will conduct a chemical isolation layer placement test as described Specification Section 35 28 00 – Engineered Cap (Appendix B), targeting one-third of the first CCU to be capped. The contractor will collect a pre-placement sample of the amended sand. Following placement in the cap placement test area, cores will be collected from the test area as described in Appendix C2 of the revised FSP/QAPP (Standard Operating Procedure for Sediment Probing, Coring, and Sample Collection) at the frequency described in Specification Section 35 28 00 – Engineered Cap (Appendix B). The cores will be used for visual inspection, chemical isolation layer thickness measurements, and collection of post-placement samples.

Additional cap placement tests will be required if the remediation contractor makes refinements to the material blending and/or placement process based on the results of the cap placement test or if placement means and methods (specifically, the pre-placement blending ratio, the pre-placement amendment content, or the placement means, methods, or rates) are changed during the course of the work or at any time if requested by the Construction Manager.

Following successful completion of the cap placement test at the beginning of each construction season, ongoing testing of the amendment content of the chemical isolation layer will be performed on two pre-placement samples per CCU, as described in Specification Section 35 28 00 – Engineered Cap (Appendix B). The sampling frequency may be adjusted as the work progresses and sufficient data are generated to verify adequate placement, with approval from EPA.

14.2.7 Structural/Geotechnical Monitoring

Visual, structural, and geotechnical monitoring will be performed near structures, inclines, and infrastructure with the potential to be affected by the remedial construction. Monitoring will occur at the locations identified in Table 14-1. Monitoring activities will focus on the potential settlement or displacement of structures (e.g., utilities, outfalls, bridge structures) or changes to the topography of

steep slope areas adjacent to the river resulting from dredging, capping, or riverbank soil excavation and stabilization activities. Monitoring methodology is described in the following sections.

Table 14-1
Site Features Subject to Structural or Geotechnical Monitoring

Monitoring Location	Site Feature	Visual Inspection	Structural Monitoring		Geotechnical Monitoring	
			Crack Gages	Optical Surveys	Piezometers	Extensometers
Station 0+00	Sanitary Sewer Crossing	•				
Station 37+00	Steep Riverbank Slope near Pond	•			•	•
Station 48+50	Pomeroy Avenue Bridge	•	•	•		
Station 49+00	72-Inch Diameter Sanitary Sewer	•				
Station 49+70	Outfall	•				
Station 52+50	Outfall	•				
Station 57+00	Holmes Road Bridge	•	•	•		
Stations 63+00 to 74+00	Upslope Sanitary Sewer	•				
Station 116+00	Sanitary Sewer Crossing	•				
Stations 154+50 to 159+50	Steep Riverbank Slopes at Private Parcels that Extend into River	•				
Station 157+00	Outfall	•				
Station 160+00	Outfall and Stone Wall	•	•	•		
Stations 171+00 to 183+00	Steep Riverbank Slopes at Private Parcels that Extend into River	•				
Station 190+00	Water Main Crossing	•				

14.2.7.1 Visual Inspections

For site features requiring visual inspection, these inspections will be performed for each relevant site feature prior to, during, and after completion of sediment remediation activities (i.e., dredging and capping activities) and riverbank soil excavation and stabilization activities. Monitoring will begin when any of these activities are initiated within a 100-foot radius of utility pipelines, outfalls, or stone walls, as measured from the nearest point from the centerline of the pipeline or outfall or the nearest point of the stone wall. For steep slope areas and bridges, monitoring will begin when activities are

initiated within 150 feet of these areas, as measured from the nearest point at the toe of slope or bridge abutment.

An initial visual inspection will consist of representative photographs documenting the current condition of the site feature, and a written description of the condition of the site feature including areas of significant deterioration or physical damage and sketch drawings if appropriate. Visual inspections of structural elements that are below the water line are not required. Visual inspections for buried site features, such as sanitary sewers, will focus on ground surface conditions above and in the vicinity of these site feature.

Visual inspections of site features will be performed daily whenever dredging, capping, or soil excavation/stabilization operations are active within the 100- or 150-foot radius, as appropriate for the site feature. The daily inspection will seek to identify changes to the site feature such as visual evidence of distress, changes to topography at or adjacent to the site feature, loss of materials from the site feature (e.g., a missing stone from a stone wall), deformation, or other visual changes. During dredging, the remediation contractor will also use RTK-GPS equipment to maintain required buffers for pipeline crossings and meet dredge tolerances. If visual changes to the site feature are observed, the inspector will photograph the site feature and provide a written description of the observed changes to the site feature. The inspector will notify the Construction Manager of these observed changes within 24 hours of the observation. The Construction Manager will meet with the remediation contractor and evaluate the need for corrective action, which may include modifying or postponing the remedial construction activities within the inspection radius of the site feature.

A final visual inspection of each site feature will be performed one week after the remedial construction activities have been completed within the monitoring radius of the applicable site feature. The final visual inspection will repeat the initial visual inspection, including collection of representative photographs and a written description of the condition of the site feature.

14.2.7.2 Structure Monitoring

Structure monitoring will be performed for the site features indicated in Table 14-1. Structure monitoring will use crack gages and optical survey instrumentation as described below.

14.2.7.2.1 Crack Gages

Crack gages are used to measure relative offset changes across cracks in a structure. Monitoring will begin approximately two weeks prior to the scheduled initiation of dredging, capping, or soil excavation/stabilization activities within a 100-foot radius of the nearest point of the bridge abutment or stone wall. The site feature will be visually inspected to identify existing cracks. Any identified cracks will be photographed and measured at least three times prior to initiating those activities within a 100-foot radius: two weeks prior, one week prior, and one day prior.

During the period when remedial activities are occurring within 100 feet of the site feature, daily inspections will be performed. Cracks identified prior to those activities will be measured for changes to previous measurements. If new cracks are observed, these will be photographed, measured, and added to the list of cracks requiring inspection.

If a crack gage measurement is obtained that is more than 0.2 inch greater than the initial measurements for a bridge abutment, or more than 0.3 inch greater than the initial measurements for a stone wall, the cause of the measurement will be evaluated and the Construction Manager will be notified within 24 hours of the measurement. The Construction Manager will meet with the remediation contractor to evaluate the need for corrective action, which may include modifying or postponing the remedial construction activities within the inspection radius of the site feature and/or a requirement for the remediation contractor to submit a written proposal for completing the dredging or capping while minimizing the potential for future cracking. If revisions to the dredging, capping, or excavation/stabilization plan are required, GE will propose corrective action(s) to EPA for review and approval.

Following completion of remedial activities within 100 feet of the site feature, additional crack gage measurements will be collected twice weekly for the first week following completion of dredging and capping, and once weekly thereafter, until three consecutive stable measurements have been obtained.

14.2.7.2.2 Optical Surveys

For the site features subject to optical surveying in Table 14-1 (i.e., bridge abutments and stone walls), multiple survey prisms will be attached to those site features. The survey prisms will be affixed by a licensed surveyor approximately two weeks prior to when remedial activities are expected to be initiated within a 100-foot radius of the nearest point of the bridge abutment or stone wall. The three-dimensional location of the survey prism will be recorded at least three times prior to initiating remedial activities within a 100-foot radius: two weeks prior, one week prior, and one day prior.

During the period when remedial activities are occurring within 100 feet of the site feature, daily measurements of the survey prisms will be collected using a survey total station. If a survey prism measurement is obtained that indicates displacement by more than 0.4 inch for bridge abutments or more than 0.8 inch for a stone wall, the cause of this displacement will be evaluated and the Construction Manager will be notified within 24 hours of the measurement. The Construction Manager will meet with the remediation contractor and evaluate the need for corrective action, which may include modifying or postponing the remedial construction activities within the inspection radius of the site feature and/or a requirement for the remediation contractor to submit a written proposal for completing the remedial activities while minimizing the potential for future movement.

If revisions to the dredging, or capping, or soil excavation/stabilization plan are required, GE will propose corrective action(s) to EPA for review and approval.

Following completion of remedial activities within 100 feet of the site feature, additional optical survey measurements will be collected twice weekly for the first week following completion of those activities, and once weekly thereafter, until three consecutive stable measurements have been obtained.

14.2.7.3 Geotechnical (Slope) Monitoring

Geotechnical monitoring will consist of installation of piezometers and monitoring using extensometers to monitor for potential movement of steep slope areas. As indicated in Table 14-1, geotechnical monitoring is planned for a steep slope portion of the river near Station 37+00 that is adjacent to a pond located about 100 feet from the south bank of the river.

14.2.7.3.1 Groundwater Monitoring

Open standpipe piezometers or monitoring wells will be used to measure groundwater levels in soil and rock strata. An open standpipe piezometer was installed previously near Station 37+00 as part of geotechnical investigation conducted as part of the Reach 5A SDC program. This piezometer will continue to be used for construction-related monitoring as conditions allow. This piezometer will be inspected at least eight weeks prior to beginning remedial construction activities within 100 feet of Station 37+00 and one groundwater level measurement will be taken. If the open standpipe piezometer has been damaged or is otherwise unusable, a new open standpipe piezometer will be installed in a proximate location above the south bank of the river between the river and the pond.

To establish baseline pore water pressures, additional groundwater level measurements will be collected once weekly for a minimum of four weeks before remedial construction activities are scheduled within 100 feet of Station 37+00. While remediation activities are being performed within 100 feet of Station 37+00, groundwater level measurements will be collected daily and the slope will be visually inspected for any apparent changes in moisture conditions at the slope face that may indicate changes in seepage patterns or groundwater levels. If the measured groundwater levels indicate a change of one foot or more when no significant rain events have occurred or are occurring, the Construction Manager will be notified within 24 hours of the measurement and the cause will be evaluated. The Construction Manager will meet with the remediation contractor and evaluate the need for any corrective action, which may include modifying or postponing the remedial construction activities adjacent to the steep slope area and/or a requirement for the remediation contractor to submit a written proposal for completing the remedial activities while minimizing the potential for future movement of the steep slope. If revisions to the remediation plan are required, GE will propose corrective action(s) to EPA for review and approval.

Once remediation construction activities have been completed to 100 feet beyond the steep slope area, groundwater level measurements will be taken twice weekly for the first week following completion of those activities, and once weekly thereafter, until three consecutive stable measurements have been obtained.

14.2.7.3.2 Displacement Monitoring

A tape extensometer is physical measuring device used to measure relative displacement between two points. At least four tape extensometers will be installed near Station 37+00, near the south bank of the river between the river and the pond. The tape extensometers will be affixed to two anchorages, one from a set point outside of the field of displacement and the other at a set point inside of the field of displacement. The tape extensometers will be set such that lateral displacements expressed along the slope will be captured by the monitoring array (e.g., two at different positions down the face below the crest and two across the crest at different points).

To establish baseline measurements at each location, measurements from each tape extensometer will be collected once weekly for a minimum of two weeks before remedial construction activities are active within 100 feet of Station 37+00. During dredging and capping activities within 100 feet of Station 37+00, tape extensometer measurements will be collected daily. If the measured relative displacement changes by more than one inch from the baseline measurements as summed up from two adjacent in-line tape extensometers or by more than 0.8 inch from a single tape extensometer, the Construction Manager will be notified within 24 hours of the measurement and the cause of this measurement will be evaluated. The Construction Manager will meet with the remediation contractor and evaluate the need for any corrective action, which may include modifying or postponing the remedial construction activities adjacent to the steep slope area and/or a requirement for the remediation contractor to submit a written proposal for completing the remedial activities while minimizing the potential for future movement of the steep slope. If revisions to the remediation plan are required, GE will propose corrective action(s) to EPA for review and approval.

Once remediation construction activities have been completed to a point at least 100 feet beyond the steep slope area, tape extensometer monitoring will continue twice weekly for the first week following completion of those activities, and once weekly thereafter, until three consecutive stable measurements have been obtained.

15 Sustainability Considerations

15.1 Overview

Section II.H.14 of the Revised Final Permit required GE to prepare a sustainability and climate adaptation plan that includes measures to ensure that the remediation activities in the ROR are designed and constructed to be resilient to potential impacts from climate change and to incorporate, where practicable and appropriate, methods to minimize greenhouse gas (GHG) emissions. GE's *Sustainability and Climate Adaptation Plan* (SCAP; Anchor QEA 2022b) was submitted to EPA on September 16, 2022, and conditionally approved by EPA on January 27, 2023. EPA's conditional approval letter on the SCAP directed GE to provide design details and measures to be implemented to provide climate resiliency and sustainability in a specific section in the Conceptual and Final RD/RA Work Plans for each RU. Consistent with that directive, a preliminary vulnerability assessment performed consistent with EPA's 2019 Climate Resilience Technical Fact Sheet: Contaminated Sediment Sites (EPA 2019) was provided in the Conceptual RD/RA Work Plan. An updated version of that assessment that accounts for changes in design considerations and EPA's conditions related to the conceptual vulnerability assessment is provided in this section. It should be noted that this assessment will likely be updated further as additional details related to remedy implementation are better understood. That is because, as described in Section 1.2, the specific means and methods of remedy implementation will require input from the remediation contractor. Those means and methods will be provided in a future revision of this work plan or as part of a SIP.

15.2 Vulnerability Assessment

A vulnerability assessment was conducted to define and summarize potential climate change vulnerabilities of the Reach 5A remediation and to identify potential resiliency measures to avoid or mitigate such impacts. The results of this assessment are described in the following subsections and summarized in Tables 15-1 and 15-2.

As described in the above-referenced EPA 2019 Fact Sheet, the following steps were performed as part of the vulnerability assessment: (1) an exposure assessment to identify particular hazards of concern and characterize exposure to those hazards caused by climate change; (2) a sensitivity assessment to evaluate the likelihood for those hazards to reduce the remedy's effectiveness; (3) identification of potential resiliency measures to mitigate high-priority vulnerabilities; and (4) a review of adaptive capacity to adjust to climate variability and extremes caused by climate change. Each of these elements is described further in the following subsections.

Table 15-1
Potential Vulnerabilities Associated with Potential Climate Change Impacts

Reach 5A Remedy Components		Potential Vulnerabilities Due to Extreme Weather			
		Physical Damage	Water Damage	Power Interruption	Reduced Access
Submerged Components	Engineered cap during construction[1]		●		
	Engineered cap post-construction[1]	●	●		
Upland Components	Riverbank reconstruction and stabilization measures		●		
Site Operations and Infrastructure	Exposed construction equipment and vehicles	●	●		●
	Sediment dewatering and treatment equipment	●	●		
	Fuel storage units	●			●
	Monitoring equipment	●		●	
	Fencing and signs for controlling access or use	●			●
	Field office trailers and other support structures	●	●	●	●
	Temporary access roads	●	●		●

Note:

1. For a submerged engineered cap, physical damage refers to damage from debris such as large trees or limbs entering the river as a result of an extreme weather event. Water damage in this context refers to damage caused by high flow velocities resulting from extreme weather events that could damage the cap.

Table 15-2
Potential Resiliency Measures to Address High-Priority Vulnerabilities

Potential Points of System Vulnerability		Potential System Disruption Due to Extreme Weather				Potential Resiliency Measures for High-Priority Vulnerabilities
		Physical Damage	Water Damage	Power Interruption	Reduced Access	
Submerged Components	Engineered cap during construction		●			• Evaluate the feasibility of using water diversion/containment barriers to reduce water velocities or to conduct sediment removal and capping under dewatered (dry) conditions
	Engineered cap post-construction	●	●			• Design the engineered cap's erosional protection layer to withstand a 100-year return period flow consistent with EPA guidance (see Section 8.2) • Conduct a sensitivity analysis to evaluate whether the erosion protection layer should be further enhanced to protect against higher flows (see Section 8.2) • Implement a post-construction long-term monitoring and maintenance program (see Section 20)
Upland Components	Riverbank reconstruction and stabilization measures		●			• Conduct a geomorphological field survey and assessment of the Reach 5A river channel (see Section 5.3.2) • Design river channel and riverbank reconstruction details in accordance with the principles of Natural Channel Design (See Section 9.4) • Restore vegetation with drought-resistant plantings
Site Operations and Infrastructure	Exposed construction equipment and vehicles	●	●		◐	• Develop contingency plans, monitor weather forecasts, and relocate equipment to higher ground when there is a potential for flooding
	Sediment dewatering and treatment equipment	●	●			• Where possible, locate sediment processing areas outside the 100-year floodplain or implement flood protection measures during staging area construction • Use wind-resistant covers on sediment stockpiles
	Fuel storage units	●			◐	• Locate outside flood-prone areas, construct wind-resistant housing or anchors, and protect with secondary containment
	Monitoring equipment	●		○		• Monitor weather forecasts and relocate vulnerable equipment to shelter when extreme storms are forecasted
	Fencing and signs for controlling access or use	○			○	

Potential Points of System Vulnerability		Potential System Disruption Due to Extreme Weather				Potential Resiliency Measures for High-Priority Vulnerabilities
		Physical Damage	Water Damage	Power Interruption	Reduced Access	
Site Operations and Infrastructure (cont.)	Field office trailers and other support structures	●	◐	○	○	• Use wind-resistant anchors, monitor weather forecasts, and evacuate vulnerable shelters when extreme wind events are forecasted
	Temporary access roads	◐	◐		●	• Inspect temporary access roads after extreme weather events and repair as necessary

Notes:
● = High priority
◐ = Medium priority
○ = Low priority

15.2.1 Exposure Assessment

An exposure assessment was performed to identify potential hazards of concern to the remedy components due to extreme weather events. The identified hazards were then used as part of the sensitivity analysis to assess the likelihood of such hazards (Section 15.2.2) and to identify potential resiliency measures to address the hazards (Section 15.2.3).

The *Massachusetts Climate Change Assessment Report* (Massachusetts 2022) states that the most important climate hazards for the Berkshires and Hilltowns region in Massachusetts include temperature extremes, changes in precipitation patterns, and consequent changes in the patterns of river flows. The regional climate outlook for this area projects that the summer average temperatures could increase by 3.6°F above the historical average and that there could potentially be 63 fewer days below freezing during the winter. Predictions within the report state that river flooding may be three times more likely in the future with annual daily rainfall events increasing in intensity from 2.8 inches of rainfall to four inches of rainfall in these daily events. The report further states that climate change threatens to degrade ecosystem service flows from forests through habitat transition (driven by changing temperature and precipitation regimes) and increased mortality from pests, pathogens, and invasive species as well as more extreme weather (e.g., ice and wind storms). These potential climate change impacts have been taken into consideration in this exposure assessment through the extreme storm event and drought conditions impact review.

With increased rain events, there is concern that an extreme event such as a 500-year flood will recur at more frequent intervals. The USGS webpage[74] provides an overview of the potential for a 500-year flood. The "500-year flood" corresponds to an annual exceedance probability (AEP) of 0.2%, which means that a flood of that size or greater has a 0.2% chance (or 1 in 500 chance) of occurring in a given year. Because the AEP of such an event is extremely rare, adjustments to the AEP by limiting

[74] Source: https://www.usgs.gov/water-science-school/science/floods-and-recurrence-intervals

data within the recorded rain event dataset based on potential climate change would have minimal effect on the return interval. However, the 500-year flood AEP may be re-evaluated based on future climate data using the adaptive management process discussed in Section 15.2.4.

As described in Sections 8 through 10, the Reach 5A remedy components that were developed to meet the Performance Standards include removal and capping of sediments in the riverbed and backwaters, excavation and stabilization of riverbank soils, excavation and backfill of floodplain soils (including those at residential properties, non-residential floodplain EAs, and vernal pools), and habitat restoration. The exposure assessment related to impacts from extreme weather events included a review of potential hazards to the submerged and upland components of the remedy and to site infrastructure critical to remedy construction, monitoring, and operation. Potential hazards that may arise to the remedy or during remedy construction due to extreme weather events include the following:

- Physical damage to in-progress remedial construction from flooding or high river flows;
- Physical damage to support facilities from flooding;
- Remedial construction delays or unsafe conditions due to unseasonably high river flows that can cause stage heights to increase rapidly;
- Reduced access to upload support areas due to flooding of access roads;
- Potential resuspension and transport of sediments during remedial construction due to high river flows;
- Scour of the completed engineered cap or underlying sediment due to extreme river flows;
- Physical damage to completed engineered caps due to fallen trees;
- Erosion of riverbanks during high river flow events;
- The die-off of restored vegetation in the floodplain due to drought or extreme heat conditions, which would make these areas more prone to erosion; and/or
- An increase in stressed or dead vegetation that will allow more sun to penetrate water, potentially increasing water temperature and thereby causing stress to aquatic species such as fish and amphibians.

15.2.2 Sensitivity Assessment

The sensitivity assessment included an evaluation of the likelihood for the climate change hazards of concern to reduce the remedy's effectiveness. While some of the general effects of climate change are universal, regions may experience different levels of effects based on geography and land development pattern. The Commonwealth of Massachusetts has developed the *Massachusetts Climate Change Projections – Statewide and for Major Drainage Basins: Temperature, Precipitation,*

and Sea Level Rise Projections (NE CASC 2018). This document indicates that, in Massachusetts, winters may become dominated by rain instead of snow, which would decrease spring-generated snow melts. Rain patterns may change with the result of increases in rain intensity and potential longer periods of drought. If increased rain intensity or more frequent intense storms occur, the likelihood of the potential hazards identified in Section 15.2.1 would increase.

Sensitivity to extreme weather events will differ during construction and after construction. The construction-related hazards identified in Section 15.2.1 (i.e., the first five bullets) have a potential to disrupt or delay remedy implementation for a period of time during any construction season if an extreme weather event occurs. Because the Reach 5A remedial construction will take multiple years to complete, the potential chance of such disruption increases. During construction, extreme weather events could cause physical damage to the following:

- Portions of the engineered cap that are actively under construction;
- Completed portions of the engineered cap;
- Water diversion/containment barriers used to construct in-river work cells;
- Exposed soils during riverbank excavation or partially constructed stabilization measures;
- Exposed soils or backfill in floodplain remediation areas before adequate soil stabilization is established;
- Excavated sediment and soil stockpiles at staging areas;
- Construction equipment working in the river or in the floodplain;
- Fuel storage units, if staged within the floodway;
- Monitoring equipment;
- Temporary access roads; and/or
- Power to site.

Post-construction hazards to the remedy may also exist due to extreme weather events (i.e., the last five bullets in Section 15.2.1). Extreme weather events are typically evaluated during remedial design regardless of whether climate change impacts are expected to occur. With the potential for increased severity or frequency of extreme weather events, the remedial design for Reach 5A includes sensitivity analysis for certain aspects of the remedy to determine if more resilient measures should be incorporated into the final remedial design.

If remedy components are not designed to be resistant to the potential effects of climate change, indirect impacts that could result include, but are not limited to, the following:

- Recontamination of downstream areas due to erosion or loss of engineered cap material, or erosion of previously non-erosional riverbank areas;
- Downstream transport of sediment or soil to river or floodplain areas that were previously uncontaminated or remediated;
- Unexpected and additional costs for repairing engineered caps or performing additional dredging or excavation; and/or
- Unexpected and additional costs for repairing or replacing tree die-off from drought or extreme heat after site restoration.

Table 15-1 was developed consistent with the EPA's 2019 Fact Sheet to summarize potential vulnerabilities of the remedy and remedial construction to extreme weather and to identify potential direct effects, including physical damage, water damage, power interruption, and reduced access.

15.2.3 Resiliency Measures

In accordance with EPA's 2019 Fact Sheet, potential resiliency measures were developed to address the high-priority vulnerabilities identified in Table 15-1. Table 15-2 lists the vulnerabilities identified in Table 15-1 and provides a priority designation (i.e., low, medium, or high priority) for each identified vulnerability and potential direct impact. Table 15-2 also lists the potential resiliency measures that have been identified for each identified vulnerability. Resiliency measures evaluated during the final design phase to address certain vulnerabilities are summarized in the following paragraphs.

As described in Section 8.2.1.3, the design of the engineered cap erosion protection layer was initially developed using a design flow rate with a 100-year return period based on the flow information through 2022 from the USGS Coltsville gage. However, a wide range of flows was evaluated to understand velocities in the river channel under various conditions, including events up to and including a "trend-adjusted" 100-year event that was determined by analyzing flow data on 20-year rolling intervals. This approach was a way to account for changes in flow conditions over time (resulting from climate change) and assess the potential impacts of climate change on cap performance.

As discussed in Section 2.2, river flow conditions can be variable, and stage heights can increase rapidly from runoff from large storms. This was identified as a key factor in the review of potential in-river implementation options for Reach 5A. As described in Section 8 and Appendix G (*Evaluation of Potential Sediment Remediation Methods for Reach 5A River Channel*), multiple

methods for sediment removal and capping within the main river channel may be used depending on the conditions encountered (to be determined based on remediation contractor input). One of the potential implementation methods is the construction of in-river diversion/containment cells to allow for the sediment removal and capping work to be conducted within dewatered (i.e., "dry") conditions, which would address the potential vulnerability associated with working directly within the river.

Additional potential resiliency measures that were incorporated into the final design are as follows (and summarized in Table 15-2):

- The design for reconstruction and stabilization of riverbanks will follow the principles of Natural Channel Design, and that design has been informed by a geomorphological field survey and assessment of the Reach 5A river channel as part of the SDC program described in Section 5.3.3 and in Section 3 of Appendix A of the Restoration Plan (Geomorphic Assessment and Natural Channel Design).
- Contingency plans will be developed to identify response actions associated with potential extreme weather events (e.g., monitoring weather forecasts and relocating equipment and personnel when extreme weather events are forecasted). These contingency plans will be presented in the relevant SIPs.
- Where possible, sediment processing areas have been located outside the 100-year floodplain, and flood protection measures will be implemented for staging areas within the floodplain based on the local topography and accessible land.
- Fuel storage units will be located outside flood-prone areas, staged in wind-resistant housing or with anchors, and protected with secondary containment.
- Temporary access roads will be inspected after extreme weather events and repaired as necessary to minimize project delays, as provided in Section 7.

15.2.4 Adaptive Capacity

Section II.F of the Revised Final Permit requires that an adaptive management approach be incorporated into the design and implementation of the Remedial Action to adapt requirements or activities based on new information and make changes as needed to achieve the expected benefits of the project. This approach is described in GE's Revised AMP. Specifically, that plan describes the adaptive management process that will be implemented to adapt and optimize project activities (i.e., design and construction) to account for lessons learned from work conducted at early stages of the project, new information, and changing conditions. That process will be followed for the Reach 5A remediation and is described in Section 19.

15.3 Greenhouse Gas Emissions Evaluation

EPA's January 27, 2023, conditional approval letter for GE's SCAP directed GE to include in its Final RD/RA Work Plan for each RU an estimate of direct and indirect GHG emissions during the remediation in that area and specific measures that GE will take to minimize those emissions to the extent practicable. As described in Section 1.2, GE plans to defer the identification of the specific means and methods to implement the Reach 5A remediation (including the selection of equipment) until after a remediation contractor has been selected. Accordingly, GE submitted a letter to EPA on February 5, 2026, proposing to defer the estimation of GHG emissions and the identification of specific measures to minimize such emissions during the Reach 5A remediation to the appropriate SIPs for Reach 5A after a remediation contractor and equipment have been selected. EPA has not made any objection to this approach.

16 Evaluation of River Water Withdrawals and Uses

16.1 Overview

As described in Section 3.7, the Revised Final Permit includes a Performance Standard requiring GE to minimize/mitigate impacts to withdrawals and/or uses of water from the ROR by any entity during implementation of the Remedial Action. Section II.H.22 of the Revised Final Permit required GE to prepare a plan that provides details regarding achievement of that Performance Standard and associated requirements of the Revised Final Permit. GE's *Revised Water Withdrawal and Uses Plan* (WWUP; Anchor QEA 2023) was submitted to EPA on April 3, 2023, and it was approved by EPA on May 10, 2023.

The approved WWUP presented a description of pre-design activities to identify industrial, commercial, and private river water withdrawals and uses from the portions of ROR that will be subject to remediation activities (i.e., Reaches 5 through 8) and gather information for each identified river water user within each RU.[75] That plan also provided a description of the evaluations to be performed to assess potential impacts to identified river water withdrawals and uses during remedial activities and how the information will be used during the design process to minimize/mitigate those potential impacts. It also described the notifications to be made to potentially affected water users during remedial design and Remedial Action activities. After EPA's approval of the WWUP, GE conducted efforts to identify river water withdrawals and uses in Reach 5A and in Reaches 5B through 8. The following sections summarize those efforts, primarily focusing on Reach 5A, and evaluate how impacts will be minimized/mitigated during implementation of the Remedial Action.

16.2 Summary of Outreach Activities and Information Obtained

This section presents a summary of the water withdrawal and uses outreach activities performed for Reach 5A in accordance with the WWUP and associated findings in that reach. As provided in the WWUP, outreach activities included the following:

- Review of available online records;
- Outreach to MassDEP;
- Outreach to local municipalities;
- Outreach to industrial facilities and agricultural operations along the river;
- Outreach to private property owners/lessees;

[75] As described in the WWUP, river water uses are considered activities in which water is physically withdrawn from or discharged to the river for residential, agricultural, industrial, or other uses. That plan states that the evaluation is not intended to evaluate uses of the river for recreational purposes (e.g., boating, swimming, and fishing).

- Identification of permitted discharges to the river (excluding stormwater); and
- Visual observations during the field PDI activities.

As part of the initial step to identify potential river water users, GE reviewed available online records related to public water supplies, including those maintained by the Commonwealth of Massachusetts Bureau of Geographic Information (MassGIS). Based on a review of those records, no public or private entity was found that withdraws water for potable use along Reach 5A. This finding is consistent with 314 CMR 4.06(6)(b), which designates the Housatonic River as a Class B water.[76]

GE also contacted MassDEP and requested any available registration and permit documents and information for known uses of water withdrawn from the Housatonic River within Reach 5A. As noted in the WWUP, in accordance with 310 CMR 36.00, any person withdrawing an average daily volume of more than 100,000 gallons of water from a surface or groundwater source within Massachusetts must file with the registration program (for uses that began before 1988) or obtain a permit (for new users after 1988), except for some uses that are exempt under 310 CMR 36.05. Based on MassDEP's review, there are no identified water withdrawals within Reach 5A.

As part of the outreach process GE also contacted the City of Pittsfield and the Berkshire Regional Planning Commission to do the following: (1) gather information regarding any known industrial, commercial, or private withdrawals and users of river water; (2) confirm that no known public water suppliers draw water directly from the Housatonic River; and (3) request any available information on known groundwater extractions and uses within 500 feet of the river. The City notified GE that there are no known withdrawals or users of river water along Reach 5A and confirmed that no known public water suppliers draw water directly from the Housatonic River within that reach. The City suggested contacting MassDEP regarding potential groundwater extractions. As described above, MassDEP was contacted as part of GE's outreach efforts, and no groundwater withdrawals were identified within Reach 5A. The Berkshire Regional Planning Commission notified GE that the information requested would be maintained by MassDEP and the respective municipalities.

GE also contacted agricultural operations and private property owners/lessees along Reach 5A. This initially involved reviewing the MassGIS database records, mapping the parcels located near the Housatonic River in Reach 5A, and then identifying parcels that are located within 500 feet of the river. These parcels were then filtered by land use type (e.g., residential, industrial/commercial, and agricultural). The information gathered during this step, as well as information gathered through

[76] In accordance with 314 CMR 4.05(3)(b), Class B waters are designated as a habitat for fish, other aquatic life, and wildlife and for primary and secondary contact recreation. Class B waters are suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. They are not designated as suitable as a source of potable water unless they are designated for public water supply as a "Treated Water Supply" under 314 CMR 4.06(1)(d)6. and (6)(b). The Housatonic River does not have the latter designation.

review of property and aerial mapping and as part of EPA's HHRA, was used to identify industrial/agricultural facilities and private property owners/lessees that needed to be contacted as part of the outreach process.

Two parcels (having a single owner) located within 500 feet of the Housatonic River in Reach 5A are designated as having agricultural use. These parcels are J3-2-202 and K4-6-201 (shown on Figure 16-1).[77] Survey forms requesting information regarding existing or planned water withdrawal, existing or planned groundwater withdrawal, and permitted discharge details were mailed to the owner of these parcels. The owner indicated there are no existing or planned river water or groundwater withdrawals and no permitted discharges to the Housatonic River associated with these parcels.

Survey forms requesting information regarding existing or planned river water or groundwater withdrawals were also sent to six other private property owners/lessees along Reach 5A for parcels that appeared to have developed land (e.g., properties with structures, dwellings, gardens, or ponds) with some reasonable chance of river water use. These parcels were J4-4-6, J5-2-4, J5-2-7, J6-3-1, K2-1-6, and K2-1-7 (shown on Figure 16-1). All six survey forms were completed and returned, all indicating that there are no existing or planned river water or groundwater withdrawals on those properties.

In addition to the above activities, GE reviewed available online records for active NPDES permit holders within Reach 5A. The Pittsfield WWTP is the only active permit holder in Reach 5A based on the available records. The location of the discharge is at the downstream end of Reach 5A in the backwater area identified as BW5A-6 (shown on Figure 16-1).

Lastly, to supplement the efforts described above, GE reviewed information and observations gathered during PDI field activities performed within Reach 5A to determine whether there were indications that any property owners/lessees adjacent to the river are withdrawing river water (e.g., pipes extending into the river, intake structures, or pumps located along the shoreline). Specifically, visual observations along the shoreline and other information (i.e., photographs) gathered as part of the Reach 5A PDI activities (as described in Section 5.1.2.8) were reviewed to identify any potential water withdrawals. Based on results of that review, water withdrawal and use survey forms were sent to the property owners of four additional parcels (Parcels J6-2-2, J6-2-3, J6-2-10, and J6-2-11, all shown on Figure 16-1) in the vicinity of piping that extends into the river to confirm it is a discharge and not a withdrawal. Three of the four survey forms were completed and returned, all indicating that there are no existing or planned river water or groundwater withdrawals

[77] A third parcel designated as having agricultural use was identified near the downstream end of Reach 5A (Parcel K1-1-109). This parcel is owned by GE, and there are no water withdrawal or use activities associated with the parcel.

on those properties. GE was unsuccessful in its attempts to contact the fourth property owner regarding the survey that was sent.

16.3 Evaluation of Potential Impacts on River Water Uses

Based on results of the outreach activities conducted to date (described in Section 16.2), no river water or groundwater withdrawals within 500 feet of the river were identified in Reach 5A. The Pittsfield WWTP is the only permitted discharge identified in Reach 5A, with the discharge point located at the downstream end of the reach. As noted in the previous section, the WWTP discharge is located within backwater BW5A-6. This backwater (and the adjacent river channel) will require remediation to achieve the Performance Standards; accordingly, the presence of this discharge has been accounted for in the design (see Section 8.1.2.2). The WWTP is permitted to discharge 17 million gallons per day (MGD). Based on GE's discussions with the City, the typical discharge ranges from approximately 10 to 14 MGD, with a maximum daily flow as high as 30 MGD.

The WWUP also requires that, for each RU in the ROR, GE must conduct an evaluation to determine whether water withdrawals or uses downstream of that RU could be affected by the remediation in that RU. In the downstream reaches located between Reach 5A and the first downstream dam at Woods Pond (i.e., Reaches 5B through 6), GE's outreach efforts to identify river water withdrawals and uses within 500 feet of the River identified one groundwater withdrawal from a residential property in Reach 5C. The property is located along Roaring Brook Road in the Town of Lenox. In its completed survey form, the property owner noted that a drilled well on the property supplies drinking water and that the well is approximately 300 feet from the river and 220 feet deep. Due to the nature of this withdrawal; the fact that erosion, sedimentation, and turbidity controls will be implemented to minimize the potential for downstream river transport of materials from the Reach 5A remediation area (as discussed in Section 7.1.4); and water quality monitoring will be conducted during Reach 5A remediation to determine (in part) whether any downstream transport is occurring and whether response actions are required, remediation in Reach 5A is not expected to affect this groundwater withdrawal. While GE's outreach efforts also identified several groundwater and surface water withdrawals further downstream in Reach 7, remediation in Reach 5A is not expected to affect those withdrawals due to the distance downstream, the presence of Woods Pond Dam as well as other dams in Reach 7 to impede the downstream transport of solids/PCBs, and the above-described controls and monitoring to be implemented during the Reach 5A remediation.

17 Property Access and Coordination

GE will require access to various private and public properties, both along Reach 5A and outside of Reach 5A, to facilitate site preparation and remedial construction and restoration activities within that reach. Those activities include performing remedial excavation and backfilling activities on private and public properties, developing the Utility Drive and Woods Pond Spur Rail transload areas, constructing temporary access roads, and constructing temporary staging areas at several locations.

GE has developed a database of properties that will be affected by Reach 5A remediation and support activities. Property owner contact information, obtained from review of tax mapping and property owner records, is included in the database. GE will contact most property owners prior to the start of any site work to notify them of the anticipated work and request that they execute an access agreement or consent form allowing GE and the regulatory agencies (including EPA) access permission to perform and oversee the work. GE has already initiated access discussions with several large landowners within Reach 5A, including MassDFW and Mass Audubon. GE also has initiated discussions with the Berkshire Scenic Railway Museum in Lenox, Massachusetts, which owns the property that is the anticipated location of the Woods Pond Spur Rail transload area. GE has secured access permission from the owner of the properties located at 60 Willow Hill Road and 0 Mill Street in Lee, Massachusetts, that will provide access to and storage for UDF construction and operation activities. GE will track the status of property access negotiations in the database. If GE is unable to obtain access from a property owner after making several attempts to do so, GE will notify EPA and provide support for any future attempts by EPA to obtain access permission.

18 Remedial Construction Coordination and Reporting

18.1 Anticipated Implementation Schedule

As described in Section 1.2, several aspects of the final design described herein require input from the remediation contractor based on its planned remediation methods. Procurement activities to select a remediation contractor will commence following submission of this Final RD/RA Work Plan. GE will work with EPA to address its comments and revise this Final RD/RA Work Plan, as needed, later in 2026. Additional design details related to remedy implementation (based on input from the selected remediation contractor) will be incorporated into that future work plan revision or the subsequent SIPs.

The anticipated schedule for implementation of the remedial activities in Reach 5A is over a period of five years, beginning in 2028, after the anticipated completion of the UDF. Accordingly, as discussed in Section 1.2, Reach 5A has been subdivided into five subreaches (each approximately one mile long) corresponding to each anticipated year of construction. As also discussed in Section 1.2, GE anticipates working with the selected remediation contractor to prepare two SIPs for construction in the first subreach (i.e., Year 1) in Reach 5A—the first SIP to cover site preparation work to be performed in advance of the remediation and the second SIP to cover remediation activities in that subreach. This approach will allow the site preparation work for Year 1 to be commenced in late 2027, with remediation commencing in 2028 after completion of the UDF. Additional SIPs will be prepared with input from the remediation contractor(s) for each subsequent subreach and year of construction.

The anticipated five-year duration of the Reach 5A remediation may be adjusted based on the adaptive management approach outlined in Section 19.

18.2 Contractor Selection and Submittals

As noted above, following submittal of this Final RD/RA Work Plan, GE will begin the process of selecting a qualified remediation contractor to perform the remedial construction in Reach 5A. Prior to the selection of a remediation contractor, GE will perform a contractor qualification process to ensure that the contractor is suitably qualified and experienced to perform the proposed construction activities. This process may include soliciting Statements of Qualifications (SoQs) from prospective contractors and reviewing those SoQs to develop a shortlist of prospective contractors to receive Request for Proposal (RFP) documents, followed by development of RFP documents and a formal solicitation for proposals from the short-listed prospective contractors. Remediation contractor experience (and that of any subcontractors, as appropriate) on projects of similar scope and magnitude will be reviewed, as well as the experience of the contractors' management team, to assess their ability to perform the activities required for this project.

GE will provide prospective remediation contractors with appropriate documentation that describes the project, provide the Design Drawings and Technical Specifications for completing the work, and solicit proposals from the prospective remediation contractors. After appropriate review, GE will select a remediation contractor for the Reach 5A remediation implementation.

Once selected, the remediation contractor will be required to provide certain pre-mobilization submittals to demonstrate that the contractor: (1) has an adequate understanding of the scope of the project; (2) has developed a project-specific sequence that can efficiently perform all project activities within the allowable schedule; (3) will utilize acceptable materials, products, and procedures; and (4) will perform all activities in a manner that is protective of on-site workers and the surrounding community. GE and the Construction Manager will use these pre-mobilization submittals to develop a Site Preparation SIP and a Remedial Construction SIP for submittal to EPA for review and approval.

The remediation contractor will be required to provide GE with various other submittals throughout the course of this project as specified in the Technical Specifications. The overall purpose of these submittals is to verify the materials and procedures used in the work activities are consistent with the project design. In accordance with the Revised POP, all contractor submittals will be tracked to confirm receipt and approval.

18.3 Supplemental Information Packages

SIPs will be prepared by GE and the Construction Manager in consultation with the selected remediation contractor and will be based on details regarding means and methods, control measures, and BMPs received in remediation contractor submittals. As noted above, GE will prepare two SIPs for construction activities to be performed in Year 1—the first related to site preparation work to be performed in advance of the remediation (Site Preparation SIP) and the second covering remediation activities (Remedial Construction SIP).

The Year 1 Site Preparation SIP is anticipated to be finalized in approximately the third quarter of 2027 and will provide site preparation details, including, but not limited to, final alignment of access roads and staging areas, site preparation work schedule and sequencing, tree removal and vegetation clearing plans, and means and methods for tree removal and vegetation clearing in upland areas and for construction of access roads and staging areas. The Year 1 Remedial Construction SIP is anticipated to be finalized in approximately the fourth quarter of 2027 and will provide details for remediation in Year 1, including, but not limited to, a Year 1 work schedule and sequencing, sediment remediation and dewatering methods, water management and treatment details, means and methods for the various remedial construction elements, selected off-site disposal facilities, material source identification, and GHG estimates.

SIP details, including but not limited to those listed above, will be incorporated into a series of plans submitted as part of the SIPs. Such plans will include (at a minimum) the following:

- Site-specific SWPPP;
- A detailed description of the means and methods, control measures, and BMPs to be implemented based on input from the remediation contractor;
- Remediation contractor's HASP, which will describe the project-specific safety and health requirements and procedures to be followed during the remediation activities;
- Contingency plans, based on input from the remediation contractor, which will define responses to potential emergencies, standard exceedances, extreme weather events, or other contingencies that may arise during the construction work to aid site personnel in responding quickly and effectively and to protect workers and the local community in the instance of such an event; and
- Any revisions to GE's general *Site Health and Safety Plan GE-Pittsfield/Housatonic River Site* (Arcadis 2023b), based on input from the remediation contractor, that relate to implementation of Reach 5A remediation.

In subsequent years, SIPs will be prepared annually to cover planned remediation work for each upcoming subreach and year. It is anticipated that the plans that make up the SIP will be updated annually, as appropriate, and any new plans or relevant details will be added to subsequent SIPs. Subsequent SIPs will reflect lessons learned in the previous year(s) and incorporate the adaptive management approach described in Section 19.

18.4 Grants of Environmental Restrictions and Easements and Implementation of Conditional Solutions

In addition to completing remediation and restoration activities in Reach 5A, GE will prepare, execute, and record Grants of Environmental Restrictions and Easements (EREs) for any GE-owned properties in the Reach 5A non-residential EAs that do not meet the Residential Performance Standards in the Revised Final Permit. GE will also prepare and (after execution) record Notice EREs for any Reach 5A properties owned by the Commonwealth of Massachusetts, including MassDFW, in non-residential EAs that do not meet the Residential Performance Standards and EREs for any Reach 5A properties owned by the City of Pittsfield that do not meet those Performance Standards. GE will also make best efforts to obtain subordination agreements for these EREs from the holders of encumbrances and other interests in these properties. These activities will be conducted in accordance with GE's *Plan for Obtaining Environmental Restrictions and Easements and Inspecting Subject Properties* (ERE Plan; GE 2018), submitted on December 14, 2018, and approved by EPA on December 20, 2018.

Additionally, GE will make best efforts to obtain EREs from the owners of other properties in non-residential EAs that do not meet the Residential Performance Standards, as described in GE's ERE Plan, and if the property owners agree, GE will prepare and record such EREs. GE will also make best efforts to obtain subordination agreement for these EREs from the holders of encumbrances and other interests in these properties. In the event that the owners of such non-residential properties decline to execute EREs, GE will implement Conditional Solutions on their properties in accordance with the applicable requirements of the Revised Final Permit (Section II.B.7.b) and the pertinent procedures in GE's *Plan for Implementing Future Projects or Work* (GE 2022), approved by EPA on September 7, 2023.

18.5 Project Closeout

Following completion of all remediation activities in Reach 5A, GE will conduct an interim pre-certification inspection. GE will also prepare an Interim Remedial Action Completion Report for Reach 5A, as described in Section 18.6. A Post-Construction IMM Plan will be developed for Reach 5A so monitoring can begin in Reach 5A while work continues in subsequent downstream reaches. Long-term monitoring and maintenance are discussed in Section 20. Ultimately, GE will prepare a Final Remedial Action Completion Report for the overall ROR Remedial Action that will be a site-wide deliverable that will incorporate information from the Reach 5A Interim Remedial Action Completion Report and IMM Plan.

18.6 Interim Completion Reporting for Reach 5A

In accordance with the Final Revised SOW, GE will prepare and submit an Interim Remedial Action Completion Report following the completion of all remedial construction activities in Reach 5A. In addition, given that Reach 5A has been subdivided into five subreaches corresponding to construction seasons, GE will prepare annual interim completion reports after each construction season.[78] Each of these annual interim completion reports is anticipated to provide a largely contemporaneous documentation of various remediation activities, issues (if any) during the remediation activities and the resolutions and agreements reached among GE, the remediation contractor, and/or EPA. After all the planned remedial activities are completed for Reach 5A, these individual annual completion reports will be combined and integrated into an overall Interim Remedial Action Completion Report for Reach 5A (described below).

In addition, as described in Section 13 of the Restoration Plan, GE will prepare annual restoration reports on the pre-restoration avoidance, minimization, and protection measures implemented and

[78] The primary purpose of the annual interim completion reports is to provide more immediate documentation of remedial activities completed during each year of the project. These annual reports will be provided to EPA for review and input but not approval. The annual interim completion reports will then be used to prepare the overall Interim Remedial Action Completion Report (at the completion of remedial activities in Reach 5A) that will be submitted to EPA for review and approval.

the restoration activities conducted during the prior year in the subject subreach. These annual restoration reports will be included in or submitted concurrently with the annual interim construction completion reports described above. They will likewise be combined and integrated into the overall Interim Remedial Action Completion Report for Reach 5A.

Consistent with Section 5.5 of the Final Revised SOW, the Interim Remedial Action Completion Report for Reach 5A will include the following:

- Background information and a description of the pre-remediation activities for Reach 5A, including any pre-construction measures implemented to avoid and minimize adverse habitat or rare species impacts;
- Description of the remediation and restoration activities performed in Reach 5A;
- Description of any deviations from the design submittals approved by EPA and any other difficulties and problems encountered;
- Summary of response action quantities (e.g., soil and sediment removal volumes, extent of capped areas, extent of riverbanks reconstructed, and volume of water treated);
- Results of QA/QC testing performed during remediation;
- As-built record construction drawings signed and stamped by a professional engineer, including post-excavation topographic surveys, final post-restoration elevation surveys, drawings showing changes in channel geometry, and drawings showing backfill materials and associated thicknesses;
- Listing of the waste streams and their characterization, quantity of materials disposed of, and where such materials were disposed of, including estimates of the quantity and type of waste material disposed of at the UDF and the quantity and type of waste material transported off-site for disposal, as well as copies of all manifests or other shipping documents for the off-site waste shipments;
- Results of monitoring performed during remediation activities;
- Representative project photographs;
- Compliance with ARARs (except for those ARARs waived by EPA);
- Demonstration of achievement of the applicable remediation Performance Standards and any impact on flood storage capacity;
- Documentation of any observed rare species and measures implemented for their protection;
- Description of any mitigation measures implemented or planned to address unavoidable habitat impacts, including to rare species;

- Description of EREs executed and Conditional Solutions implemented;
- Results of the interim pre-certification inspection(s) for Reach 5A; and
- Summary of wood turtle protection measures, and documentation of monitoring activities and any corrective actions.

In addition. during the performance of post-restoration monitoring in a given subreach, GE will prepare and submit an annual report summarizing the post-construction restoration monitoring conducted during the prior year, as described in GE's 2024 *Revised Restoration Performance Objectives and Evaluation Criteria Report* (Revised RPOEC; Arcadis and AECOM 2024), which was conditionally approved by EPA on July 15, 2024. That annual monitoring report will provide suitable information to evaluate the existing condition of the restored areas and achievement of or progress toward achieving the restoration evaluation criteria and the functioning of the restored habitats.

19 Adaptive Management

Section II.F of the Revised Final Permit required that an adaptive management approach be incorporated into the design and implementation of the ROR Remedial Action to adapt requirements or activities based on new information and make changes as needed to achieve the expected benefits of the project. This approach is described in GE's Revised AMP.

19.1 Overview

The overall objective of the adaptive management approach, as stated in Section 1.3 of Revised AMP, is to maintain or improve the efficiency of the project, mitigate short-term impacts as needed, and help ensure that the remediation activities are successfully completed, that the work remains consistent with the Revised Final Permit, and that the targets and objectives set forth in the Revised Final Permit are met. The Revised AMP describes the iterative process in which successful design elements, construction methods, equipment, and techniques that are identified in the implementation of this Final RD/RA Work Plan (or any revision of it) will be continued and/or improved over the course of its implementation and the remediation activities in subsequent RUs. Similarly, any design elements, construction methods, equipment, or techniques that are less successful can be identified and then refined, modified, or eliminated, as appropriate, to achieve the remedial objectives more efficiently and effectively.

19.2 Identification and Evaluation of Potential Adaptive Management Items

As described in prior sections, GE has elected to subdivide Reach 5A into five subreaches corresponding to each anticipated year of construction. This segmented construction approach is consistent with the adaptive management process in which successful design elements, construction methods, equipment, and techniques that are identified early in the construction process will be built upon, and those that are less successful can be identified and then refined, modified, or eliminated as appropriate.

Section 2.2 of the Revised AMP lists several questions that may be considered as a guide to identify whether a design or construction element has the potential for adaptive management consideration. During the Reach 5A remedy implementation, various elements of construction will be evaluated on an ongoing basis based upon a variety of data and information gathered during the construction and monitoring phases of the project. In addition, the adaptive management process considers the potential effect of changing conditions caused by climate change. Section 15 provided a summary of sustainability considerations, including a preliminary vulnerability assessment to define and summarize potential climate change vulnerabilities of the Reach 5A remediation and to identify

potential resiliency measures to avoid or mitigate such impacts. Those measures may change over the course of this relatively long-term remediation project.

Once a potential adaptive management item is identified, it may be incorporated into one of the three types of adaptive responses: field response actions, near-term response actions, or longer-lead response actions. These response actions are described in full in the Revised AMP, but generally correspond to the time frame for, and ease of, the implementation of the potential adaptive management item. Field response actions would consist of relatively minor field refinements to construction or monitoring procedures that would not require GE or EPA approval unless the refinement conflicts with an approved work plan or the design. Near-term response actions may correct obvious deficiencies or changed conditions and be implemented when observed or within a period of several days to weeks to months and may require an approved design modification or a change to construction methods or equipment. Longer-lead response actions are those which would be performed at some point after the condition is observed, typically in the following construction or monitoring season or for a subsequent RU and may require an approved design modification, work plan revisions, or a change to construction methods or equipment.

19.3 Coordination and Documentation

GE and EPA will review the progress of remedial activities and determine conditions that may warrant response actions through the adaptive management process. Meetings and other coordination efforts will be conducted between GE and EPA to determine whether near-term or longer-lead response actions are needed. GE and EPA will work collaboratively through the adaptive management process to maintain project effectiveness and progress. Field response actions, which do not require GE or EPA approval unless the action conflicts with an approved work plan or design, will be documented (where appropriate) in project construction management meeting notes or daily reports, as appropriate. Near-term and longer-lead response actions that are accepted by both GE and EPA will be formally documented and incorporated into the project records and added to appropriate plans as required. If a near-term or longer-lead response action requires a change or modification to the project design, GE's engineering team will prepare an engineering change notice (ECN) to document the change, and the ECN package will be subject to EPA review and approval. All documentation will be maintained for post-construction reporting and for consideration during subsequent design phases. As noted above, the segmented construction approach being implemented in Reach 5A will allow for this type of consideration, which could include modification/refinement of the design and/or construction process.

20 Long-Term Remediation Monitoring and Maintenance

Sections II.C and II.H.18 of the Revised Final Permit require GE to develop a long-term Post-Construction IMM Plan. Section 5.1 of the Final Revised SOW states that GE will submit an IMM Plan for each RU as part of or concurrently with the Final RD/RA Work Plan for that RU. On February 5, 2026, GE submitted a letter to EPA explaining that submittal of a full IMM Plan for Reach 5A at the same time as this Final RD/RA Work Plan would be premature since the final elements of the remediation would not yet have been approved. Instead, GE proposed to submit an outline or matrix of the anticipated key elements of the IMM program for EPA review and comment ahead of preparing the full IMM Plan, with the full IMM Plan to be submitted along with an anticipated future Revised Final RD/RA Work Plan. EPA has advised GE that this approach is acceptable.

Consistent with this approach, a tabular summary of Remediation Performance Objectives and GE's proposed monitoring to evaluate whether those objectives are being met for each element of the remedy is provided in Appendix M. It should be noted that the IMM framework provided in that appendix has been designed to verify achievement of the Remediation Performance Objectives. It does not include long-term monitoring and assessment of post-restoration conditions of the restored habitats. IMM activities associated with achievement of Restoration Performance Objectives were previously presented in GE's Revised RPOEC, as approved by EPA; and GE's long-term monitoring and assessment proposals for the restored habitats, based on the Revised RPOEC, are presented in Sections 10 and 11.6 of the Restoration Plan. Both of these monitoring programs (covering remediation and restoration) will be described in the full IMM Plan to be prepared in accordance with the Final Revised SOW.

In addition, at the conclusion of all Reach 5A remedial activities, the post-construction monitoring programs that had been initiated for the various subreaches and are ongoing on varying schedules will be coordinated and consolidated into a single program.

Finally, consistent with the adaptive management process described in Section 19, an adaptive management approach will be considered throughout the long-term monitoring and maintenance phase of the project. It is anticipated that the IMM Plan will be modified as needed based on lessons learned, additional data needs, and remediation in RUs subsequent to Reach 5A.

21 References

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Tables

Table 4-1
Applicable or Relevant and Appropriate Requirements for Reach 5A Remediation Activities[1]

Statute/Regulation	Citation	Synopsis of Requirements	Status	Action(s) to Be Taken to Comply with ARARs[2]
Chemical-Specific ARARs				
Federal ARARs				
None				
State ARARs				
Numeric Massachusetts Water Quality Criteria for PCBs—Massachusetts Surface Water Quality Standards for PCBs	314 CMR 4.05(5)(e)	Freshwater chronic aquatic life criterion (based on protection of mink): 0.014 µg/L. Human Health criterion based on human consumption of water and organisms: 0.000064 µg/L.	Relevant and appropriate	Considered by EPA in selecting the remedy and Performance Standards for Reach 5A. The freshwater chronic aquatic life criterion of 0.014 µg/L will be met by the selected remedy. Regarding the human health criterion of 0.000064 µg/L based on human consumption of water and organisms, EPA, in consultation with the Commonwealth, has waived this criterion on the ground that achievement of this ARAR is technically impracticable, given that, based on current data, it is not predicted to be met by the selected remedy or any other sediment remediation alternative in Massachusetts. To be protective of human health and the environment, as specified in the Revised Final Permit, EPA established alternative criteria (that are not ARARs) for this waived criterion.
Connecticut Water Quality Standards for PCBs	Connecticut Water Quality Standards, Sections 22a-426-1 to 22a-426-9	Freshwater chronic aquatic life criterion (based on protection of mink): 0.014 µg/L. Human Health criterion based on human consumption of water and organisms: 0.000064 µg/L.	Relevant and appropriate to overall Rest of River remedy	Considered by EPA in selecting the overall Rest of River remedy, which is intended to contribute to the achievement of the Connecticut water quality standards. However, it is uncertain whether the human health criterion of 0.000064 µg/L will be achieved in Connecticut, as discussed in Attachment C (page C-23) of the Revised Final Permit. These standards do not require any specific actions in Reach 5A.
To Be Considered				
Clean Water Act, National Recommended Water Quality Criteria for PCBs	National Recommended Water Quality Criteria: 2002, EPA-822-R-02-047, EPA Office of Water, Office of Science and Technology (November 2002)	Freshwater chronic aquatic life criterion (based on protection of mink): 0.014 µg/L. Human health criterion based on human consumption of water and organisms: 0.000064 µg/L.	To be considered	See the above entry for the Massachusetts Water Quality Standards.
Cancer Slope Factors	EPA Integrated Risk Information System	Guidance values used to evaluate the potential carcinogenic hazard caused by exposure to PCBs.	To be considered	Considered by EPA in selecting the remedy and Performance Standards for Reach 5A.
Reference Doses	EPA Integrated Risk Information System	Guidance values used to evaluate the noncancer hazards associated with exposure to PCBs.	To be considered	Considered by EPA in selecting the remedy and Performance Standards for Reach 5A.
PCBs: Cancer Dose Response Assessment and Application in Environmental Mixtures (EPA 1996)	EPA/600/P-96/001F (National Center for Environmental Assessment, Office of Research and Development, September 1996)	Guidance describing EPA's reassessment regarding the carcinogenicity of PCBs.	To be considered	Considered by EPA in establishing EPA's Cancer Slope Factors.
Guidelines for Carcinogenic Risk Assessment (EPA 2005)	EPA/630/P-03/001F (EPA Risk Assessment Forum, March 2005)	Framework and guidelines for assessing potential cancer risks from exposure to pollutants and other environmental agents.	To be considered	Considered by EPA in selecting the remedy and Performance Standards for Reach 5A.
Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens	EPA/630/R-03/003F (EPA Risk Assessment Forum, March 2005)	Guidance on issues related to assessing cancer risks associated with early-life exposures, including an adjustment for carcinogens acting through a mutagenic mode of action.	To be considered	Considered by EPA in selecting the remedy and Performance Standards for Reach 5A.
Massachusetts Fish Consumption Advisory	Massachusetts Department of Public Health, Freshwater Fish Consumption Advisory List (2007)	Advises that the public should not consume any fish from the Housatonic River from Dalton to Sheffield due to PCBs; also includes frogs and turtles.	To be considered	Considered by EPA in adopting the Final Revised Permit requirements relating to biota consumption advisories (Section II.B.7.a) and by GE in its Biota Consumption Advisory Outreach Plan for the Housatonic Rest of River in Massachusetts.
Massachusetts Waterfowl Consumption Advisory	Massachusetts Department of Public Health, Provisional Waterfowl Consumption Advisory (1999)	Advises that the public should avoid eating all mallards and wood ducks from the Housatonic River and its impoundments from Pittsfield to Rising Pond.	To be considered	Considered by EPA in adopting the Final Revised Permit requirements relating to biota consumption advisories (Section II.B.7.a) and by GE in its Biota Consumption Advisory Outreach Plan for the Housatonic Rest of River in Massachusetts.

Table 4-1
Applicable or Relevant and Appropriate Requirements for Reach 5A Remediation Activities[1]

Statute/Regulation	Citation	Synopsis of Requirements	Status	Action(s) to Be Taken to Comply with ARARs[2]
Location-Specific ARARs				
Federal ARARs				
Clean Water Act—Section 404 and implementing regulations	33 USC 1344 33 CFR Parts 320-323, 325, and 332 (ACOE) 40 CFR Part 230 (EPA)	For the discharge of dredged or fill material into waters of the U.S., including wetlands, there must be no practicable alternative with less adverse effect on the aquatic ecosystem; the discharge cannot cause or contribute, after consideration of disposal site dilution and dispersion, to violation of any applicable water quality standard, violate an applicable toxic effluent standard, jeopardize existence of endangered or threatened species; or contribute to significant degradation of waters of the U.S. The discharger must take appropriate and practicable steps to minimize potential adverse impacts of the discharge on the aquatic ecosystem. The discharger must evaluate impacts on flood level, flood velocity, and flood storage capacity. Mitigation/restoration is required for unavoidable impacts on resources.	Applicable	Remedial activities that will involve the discharge of dredged or fill material into the Housatonic River, backwaters, other waterbodies, and/or wetlands (including vernal pools) will be conducted in accordance with the substantive requirements of these regulations. EPA has determined that there is no practicable alternative with less adverse effect on the aquatic ecosystem (including wetlands and vernal pools), and that the remedy will not cause or contribute to violation of any applicable water quality standard, violate an applicable toxic effluent standard, jeopardize the existence of endangered or threatened species, or contribute to significant degradation of waters of the U.S. Implementation of the Reach 5A remediation will include appropriate and practicable steps to minimize potential adverse impacts of the discharge on the river, backwaters, other waterbodies and wetlands (including vernal pools). In particular, excavation, capping, filling, and grading work, as well as construction of temporary access roads and staging areas, will be managed in a manner that limits impacts to adjacent site areas and avoids the uncontrolled discharge of stormwater runoff beyond designated areas, and will provide for management of construction-based stormwater. GE will also ensure that there will be no long-term loss of flood storage capacity in the 100-year floodplain. As necessary, mitigation/restoration will be conducted consistent with the substantive requirements of these regulations.
Floodplain Management and Protection of Wetlands	44 CFR Part 9	Regulation sets forth policy, procedures, and responsibilities to implement and enforce Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands.	Relevant and appropriate	The Reach 5A remedial activities, including excavation, backfilling, capping, and placement of a sediment/soil amendment will reduce human health and environmental risks in wetlands and the floodplain. Those activities will be conducted in accordance with the substantive policy, procedure, and responsibilities stated in this regulation. EPA has determined that there are no practicable alternatives that would avoid floodplain or wetlands; and steps will be taken to minimize and/or mitigate impacts on floodplains and wetlands.
Fish and Wildlife Coordination Act	16 USC 662 et seq.	Sets forth requirements for federal actions that may modify a water body, including consultation with federal and state resource agencies.	Applicable to EPA; relevant and appropriate to work in Rest of River waterbodies.	The Reach 5A remedial activities will modify the river, backwaters, and other waterbodies. As part of the remedy, sections of the river may be partially impounded or diverted to facilitate implementation of the sediment removal. If such impoundment or diversion occurs, it would be conducted on a temporary and relatively short-term basis similar to remedial approaches described in EPA's *Contaminated Sediment Remediation Guidance* (December 2005). The U.S. Fish and Wildlife Service and Massachusetts Division of Fisheries and Wildlife are stakeholders for this project and will be included in the review of the remedial design and remedial action documents.
Resource Conservation and Recovery Act (RCRA) requirements for hazardous waste facilities in floodplains	40 CFR 264.1(j)(7) 40 CFR 264.18(b)	Remediation waste management sites must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood, unless procedures are in effect to have waste removed safely before flood waters reach the facility or there will be no adverse effects on human health or the environment if washout occurs.	Potentially relevant and appropriate	The remedy does not include disposal pursuant to these regulations, but will include stockpiling of removed materials at temporary staging areas. Where practicable, these areas will be located outside the 100-year floodplain. To the extent that any are located in the 100-year floodplain, flood protection measures will be implemented to prevent washout.
National Historic Preservation Act (NHPA) and regulations	54 USC 300101 et seq., including Section 306108 (Section 106 of NHPA) 36 CFR Part 800	A federal agency must take into account the project's effect on properties included or eligible for inclusion in the National Register of Historic Places (NRHP).	Applicable to EPA; relevant and appropriate to work that could affect properties included or eligible for inclusion in the NRHP	Pre-design and design activities included a Cultural Resource Assessment (CRA) and Cultural Resource Survey (CRS) to determine whether the remediation or support activities would adversely affect any properties that are included or eligible for inclusion in the NRHP. The CRA and CRS determined that remediation and support activities in Reach 5A will not adversely affect any archaeological or architectural resources that are listed or eligible for listing in the NRHP with the exception that a previously-proposed access road would have impacted an archaeological site that might meet the NRHP eligibility criteria. Since that time, GE has revised the location of that access road so as to avoid that archaeological site (and not impact any other cultural resource). Thus, the substantive provisions of these regulations have been met.
Archaeological and Historic Preservation Act	54 USC 312501 et seq.	When a federal agency finds, or is notified, that its activities in connection with a federal construction project may cause irreparable loss or destruction of significant scientific, prehistorical, historical, or archeological data, such agency shall notify the U.S. Department of the Interior. If the U.S. Department of the Interior determines the data are significant and may be irrevocably lost or destroyed, it is to conduct a survey and other investigation of the affected area and recover and preserve such data as necessary in the public interest.	Applicable to EPA; relevant and appropriate to work in areas where archaeological or historic data may be present	Pre-design and design activities included a CRA and CRS to determine whether the remediation or support activities could cause an irreparable loss or destruction of significant scientific, prehistorical, historical, or archeological data. Those activities showed that the remediation and support activities for Reach 5A would not cause such a loss, given that, as discussed in the preceding entry, the proposed access road that would have impacted an archaeological site has been re-located to avoid that site.
Endangered Species Act and Regulations	16 USC 1536(a)-(d) 50 CFR Part 402, Subparts A&B 50 CFR 17	A federal agency must determine whether a federally authorized project is likely to jeopardize the continued existence of a listed threatened or endangered (T&E) species or result in destruction or adverse modification of its critical habitat. If so, "reasonable and prudent" measures must be taken to avoid and/or minimize such effects.	Applicable to EPA; relevant and appropriate to work that could affect T&E species or their habitat	GE's Baseline Restoration Assessment (BRA) for Reach 5A identified habitat for and the potential presence of one federally listed T&E species within the limits of Reach 5A (the northern long-eared bat, an endangered species), as well as two species proposed for listing (the tricolored bat and the monarch butterfly). However, a site-specific bat survey showed no evidence of the northern long-eared bat in Reach 5A, although it did show the presence of the tricolored bat. In any case, adverse impacts on these bats, if present, will be avoided by limiting tree clearing to the November through March period. Although monarch butterflies have not to date been listed under this Act, to the extent that these butterflies would be temporarily affected, GE will conduct reasonable and prudent measures to mitigate such effects by restoring a favorable habitat for those butterflies (e.g., planting communities of host plants), as discussed in GE's Restoration Plan for Reach 5A.

Table 4-1
Applicable or Relevant and Appropriate Requirements for Reach 5A Remediation Activities[1]

Statute/Regulation	Citation	Synopsis of Requirements	Status	Action(s) to Be Taken to Comply with ARARs[2]
State ARARs				
Massachusetts Waterways Law and Regulations	MGL Ch. 91 310 CMR 9.00, including 9.40	Regulates construction, placement, excavation, alteration, removal, or use of fill or structures in waterways. Among the requirements is 310 CMR 9.40, Standards for Dredging and Dredged Material Disposal, which includes restrictions on improvement dredging.	Applicable	The Reach 5A remedial activities include construction, placement, excavation, alteration, removal, and use activities in the Housatonic River. Except as otherwise provided herein, those activities will meet the substantive environmental standards of these regulations and will limit impacts. The remedy will include sediment removal (dredging) within an Area of Critical Environmental Concern (ACEC). If the dredging in the ACEC is governed by 310 CMR 9.40, it is permitted as an Ecological Restoration Project. If it is deemed not to be an Ecological Restoration Project, EPA, in consultation with the Commonwealth, has waived, pursuant to CERCLA 121(d)(4)(C), the provision of 310 CMR 9.40 that prohibits dredging in an ACEC.
Massachusetts Clean Water Act—Water Quality Certification Regulations	314 CMR 9.00 et seq., including 9.06-9.07	For discharge of dredged or fill material to waters of the U.S within Massachusetts, the criteria in Section 9.06 include, without limitation, the following: (a) no discharge is permitted if there is a practicable alternative that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences; (b) no discharge is permitted unless appropriate and practicable steps have been taken to avoid and minimize potential adverse impacts to bordering or isolated vegetated wetlands or land under water; (c) no discharge is permitted to Outstanding Resource Waters, including certified vernal pools, except as specified in 9.06(3) or 9.08; (d) no discharge is permitted for the impoundment or detention of stormwater for purposes of controlling sedimentation or other pollutant attenuation; (e) stormwater is to be controlled with best management practices (BMPs); and (f) no discharge shall be permitted in rare circumstances where the activity will result in substantial adverse impacts to the physical, chemical, or biological integrity of surface waters. For dredging and dredged material management, the criteria in Section 9.07 include, without limitation, the following: (a) no dredging is allowed if there is a practicable alternative that would have less impact on the aquatic ecosystem; (b) no dredging is permitted unless appropriate and practicable steps have been taken to avoid, minimize or mitigate adverse effects on land under water; (c) no dredging is allowed that will have adverse effect on specified habitat sites of rare species except under certain conditions; (d) dredging and dredged material management must be conducted to ensure protection of human health, public safety, public welfare and the environment,; (e) dredged material shall not be disposed of if a feasible alternative exists that involves the reuse, recycling, or contaminant destruction and/or detoxification; (f) no dredging is permitted in Outstanding Resource Waters (including certified vernal pools) except as provided in 9.07(1)(k); (g) no dredging is permitted in rare circumstances where the activity will result in substantial adverse impacts to the physical, chemical, or biological integrity of waters; (h) dredging must be conducted to meet performance standards in Section 9.07(3) designed to minimize impacts on the aquatic ecosystem and protect human health; and (i) placement of dredged material in an intermediate facility for sediment management (dewatering, processing, etc.) prior to disposal or reuse must meet certain requirements in Section 9.07(4), including requirements governing method of placement/storage of dredged material and siting criteria.	Applicable	The Reach 5A remedial activities that involve discharge of dredged or fill material to waterbodies or wetlands—including dredging, backfilling, capping, and application of a sediment amendment—will be conducted in accordance with the substantive requirements of these regulations. In particular, without limitation: • EPA has determined that there is no practicable alternative to the selected remedy that would have less adverse impact on the aquatic ecosystem. • The remedy includes activities to avoid and minimize potential adverse impacts to bordering or isolated vegetated wetlands or land under water. • Any discharge to Outstanding Resource Waters, including certified vernal pools, would satisfy the substantive requirements of Section 9.08 because all reasonable measures will be taken to avoid, minimize, or mitigate adverse effects on the environment and the remedy is justified by an overriding public interest. • There will be no discharge of dredged or fill material for impoundment or detention of stormwater for purposes of controlling sedimentation or other pollutant attenuation. • The remedy will use BMPs to control stormwater. • The remedy will not include activities that result in substantial adverse impacts to the physical, chemical, or biological integrity of surface waters. The Reach 5A remedial activities that involve dredging or dredged material management – including excavation/dredging of river, backwater, and other waterbody sediments and management of the removed materials – will be conducted in accordance with the substantive requirements of these regulations. In particular, without limitation: • EPA has determined that there is no practicable alternative to the selected remedy that would have less adverse impact on the aquatic ecosystem. • The remedy includes appropriate and practicable steps to avoid, minimize or mitigate adverse effects on land under water. • Remedial work that may affect the specified habitat of state-listed rare species will be carried out in accordance with the substantive requirements of the Massachusetts Endangered Species Act (MESA), including, where necessary, the requirement for a conservation and management plan. See entry below on MESA. • Dredging and dredged material management will be conducted in a manner that ensures protection of human health, public safety, public welfare, and the environment. • There is no feasible alternative to the disposal of dredged material involving reuse, recycling, or contaminant destruction and/or detoxification. • Any dredging in Outstanding Resource Waters (including certified vernal pools) will satisfy the substantive requirements of Section 9.07(1)(k) because it will constitute an Ecological Restoration Project. • The dredging will not result in substantial adverse impacts to the physical, chemical, or biological integrity of waters. • The dredging will meet the dredging performance standards in Section 9.07(3) through design and implementation requirements approved by EPA. • Temporary staging areas for removed sediments and soils will meet the requirements for an intermediate facility in 314 CMR 9.07(4) except as otherwise approved by EPA. In particular, those temporary staging areas will not have a permanent adverse impact on rare species habitat or the ACEC.

Table 4-1
Applicable or Relevant and Appropriate Requirements for Reach 5A Remediation Activities[1]

Statute/Regulation	Citation	Synopsis of Requirements	Status	Action(s) to Be Taken to Comply with ARARs[2]
Massachusetts Wetlands Protection Act and Regulations	MGL c. 131, Section 40 310 CMR 10.00, including 10.53	These requirements govern removal, dredging, filling, or altering of "Resource Areas," including riverbanks, Riverfront Areas, inland wetlands, land subject to flooding and certain other areas. Provisions include Section 10.53(3), which authorizes certain projects as "limited projects," including, in 10.53(3)(q), actions responding to a release or threat of release of oil and/or hazardous materials in accordance with the Massachusetts Contingency Plan (MCP), where (a) there is no practicable alternative consistent with the MCP that would be less damaging to Resource Areas, and (b) steps are taken to avoid or minimize impacts to Resource Areas, including meeting specific standards to the maximum extent practicable. Further, under 310 CMR 10.59, the action must have no adverse effect on estimated habitat of state-listed rare wildlife species.	Applicable	The Reach 5A remedial activities that will affect Resource Areas under this Act will meet the substantive requirements of these regulations. In particular, those activities, as CERCLA response actions and thus considered adequately regulated under the MCP, will constitute limited projects under these regulations and will meet the requirements for such projects. Specifically, EPA has determined that there is no practicable alternative consistent with the MCP that would be less damaging to Resource Areas; and steps will be taken to avoid or minimize impacts to Resource Areas, including meeting the specific standards in the regulations to the maximum extent practicable. Where the remedial activities affect the estimated habitat of state-listed wildlife species, such activities will be carried out in accordance with the substantive requirements of MESA, including, where necessary, the requirement for a conservation and management plan, so as to comply with 310 CMR 10.59. See entry below on MESA.
Massachusetts Site Suitability Criteria	310 CMR 16.40(3),(4)	Site suitability criteria for solid waste handling facilities, including facility-specific and general site suitability criteria.	Potentially applicable to the temporary management of excavated materials	The Reach 5A remedy will include the temporary management of excavated materials at temporary staging areas prior to transport for disposal. To the extent that the criteria in Section 16.40 apply to such temporary management of materials during implementation of the remedy and that the materials temporarily managed on-site constitute solid waste under these regulations, the substantive provisions of these criteria will be met except as follows: For any such requirements that would prohibit or restrict such temporary solid waste management locations during implementation of the remedy—including the prohibition on the location of such management facilities within the ACEC (or at locations outside of but adjacent to the ACEC where such locations would fail to protect the outstanding resources of the ACEC) or in a Resource Area or Riverfront Area—EPA, in consultation with the Commonwealth, has waived those requirements pursuant to CERCLA 121(d)(4)(B) on the ground that compliance with them would create a greater risk to human health and the environment than implementation of the selected remedy.
Massachusetts Facility Location Standards	310 CMR 30.700-708	Location standards for hazardous waste management facilities, including temporary storage units for waste defined by the state regulations as hazardous waste. They include, are not limited to, a prohibition on the location of any such facility in the 100-year floodplain or in an ACEC, as well as various other locational requirements for the active portion of the facility. Note that waste containing PCBs at a concentration equal to or greater 50 mg/kg constitutes hazardous waste under the Massachusetts regulations. Note further that these regulations exempt: (a) temporary storage of dredged materials at an intermediate facility when managed under a state water quality certification and under Section 404 of the federal Clean Water Act; or (b) facilities for wastes with a PCB concentration equal to or greater than 50 mg/kg if such facilities comply with EPA's TSCA regulations (40 CFR Part 761) except with respect to a facility located in an ACEC (see 310 CMR 30.501(3)(a)).	Potentially applicable to the temporary management of excavated materials	The Reach 5A remedy will include the temporary management of excavated materials at temporary staging areas prior to transport for disposal. To the extent that the provisions of these regulations apply to the temporary management of materials during implementation of the remedy, that the materials temporarily managed on site constitute hazardous waste under these regulations, and that their temporary management is not subject to any regulatory exemption, the substantive provisions of these location requirements will be met except as follows: For any such requirements that would prohibit or restrict such temporary hazardous waste management locations during implementation of the remedy – including the prohibition on the location of such management facilities within the ACEC (or at the locations outside of but adjacent to or in close proximity to the ACEC where such locations would not be protective of the outstanding resources of the ACEC) – EPA, in consultation with the Commonwealth, has waived those requirements pursuant to CERCLA 121(d)(4)(B) on the ground that compliance with them would create a greater risk to human health and the environment than implementation of the selected remedy. It should be noted that, wherever practicable, temporary staging areas for excavated material will be located outside the 100-year floodplain. Where this is not practicable due to lack of access or topography considerations, floodproofing will used to prevent floodwaters from coming into contact with hazardous waste.
Massachusetts Historical Commission Act and Regulations	MGL c. 9, Section 27C 950 CMR 71.07	If the Massachusetts Historical Commission (MHC) determines that a state-authorized project could cause a change in the historical, architectural, archaeological, or cultural qualities of a property on the State Register of Historic Places (SRHP), these provisions establish a process for notification, determination of adverse impact, and evaluation of alternatives to avoid, minimize, or mitigate such impacts	Relevant and appropriate	Pre-design and design activities included a CRA and CRS to determine whether the remediation or support activities could cause a change in the historical, architectural, archaeological, or cultural qualities of a property on the SRHP. Those activities did not identify any such adverse impact on a property listed in the SRHP. Thus, the substantive requirements of these regulations have been met.

Table 4-1
Applicable or Relevant and Appropriate Requirements for Reach 5A Remediation Activities[1]

Statute/Regulation	Citation	Synopsis of Requirements	Status	Action(s) to Be Taken to Comply with ARARs[2]
Massachusetts Endangered Species Act (MESA) and Regulations	MGL c. 131A 321 CMR 10.00, Parts I, II, and V 321 CMR 10.00, Part IV	Under Parts I, II, and V, a proposed activity in mapped Priority Habitat for a state-listed threatened or endangered species or species of special concern, or other area where such a species has occurred may not result in a "take" of such species, unless it has been authorized by a conservation and management permit. A conservation and management permit may be issued provided that an adequate assessment of alternatives to both temporary and permanent impacts to state-listed species has taken place, an insignificant portion of the local population would be impacted by the project or activity, and the project proponent agrees to carry out a conservation and management plan is carried out that provides a long-term net benefit to the conservation of the state-listed species. Under Part IV, projects that will alter a designated Significant Habitat must be reviewed to ensure that they will not reduce the viability of the habitat to sustain an endangered or threatened species.	Applicable	As determined during the BRA for Reach 5A, some of the Reach 5A remedial activities will take place in Priority Habitats for state-listed species, and Species Habitat maps provided by the Massachusetts Natural Heritage and Endangered Species Program (MNHESP) identify the presence of or habitat for a number of state-listed plant and animal species in Reach 5A. Site-specific surveys for state-listed species in Reach 5A showed the presence of a number of such species, but not others. GE will implement measures to avoid a take of some state-listed species identified as present and will implement measure to minimize the impacts on other state-listed species, as shown in GE's Restoration Plan for Reach 5A . In addition, the development of Core Habitat Areas, in consultation with the Commonwealth, and implementation of the Revised Final Permit's requirements relating to such Core Habitat Areas will result in the avoidance or minimization of adverse impacts to such species in many areas. However, there are still a number of state-listed species for which the Reach 5A remediation and/or support activities will result in an unavoidable take. For these species,, although a conservation and management permit is not required, GE will comply with the substantive provisions of these regulations by implementing mitigation measures that constitute a conservation and management plan providing for a long-term net benefit to the affected state-listed species. Those mitigation measures and conservation and management plan are included in GE's Restoration Plan for Reach 5A. There are no designated Significant Habitats in Reach 5A. To the extent that a Significant Habitat is designated in that area in the future, this provision will be complied with.
Massachusetts ACEC	301 CMR 12.11(1)(c)	Provides for establishment of ACEC in the state. ACEC designation affects other state laws and regulations.	Relevant and appropriate	The ACEC regulations pertain to state agency actions and are not applicable to the federal EPA action. However, the Reach 5A remedy will comply with the substantive requirements of 301 CMR 12.11(1)(c), which may be relevant and appropriate, by advancing the values of 301 CMR 12.11(1)(c), while avoiding adverse effects on identified values in Section 12.11(1)(c).
Action-Specific ARARs				
Federal ARARs				
TSCA Regulations on Cleanup of PCB Remediation Waste	40 CFR 761.61(c)	Provides for risk-based approval of PCB sampling, cleanup, storage, and disposal methods through an EPA determination that such method(s) will not pose an unreasonable risk of injury to health or the environment	Applicable	Attachment D to the Revised Final Permit contains a risk-based determination by EPA under this provision that the remedy specified in the Revised Final Permit will not pose an unreasonable risk of injury to health or the environment as long as it complies with the conditions set out in that determination, which the Reach 5A remedy will do.
TSCA Regulations on Storage of PCB Remediation Waste	40 CFR 761.50 40 CFR 761.65 40 CFR 761.61(c)	General and specific requirements for storage of PCB Remediation Waste. Regulations include specific provisions for storage of PCB Remediation Waste in piles at the cleanup site or site of generation for up to 180 days (761.65(c)(9)). Also allows for risk-based approval by EPA of alternate storage method (761.61(c)), based on demonstration that it will not pose an unreasonable risk of injury to health or the environment.	Applicable	The Reach 5A remedy will comply with these provisions. The remedy will include temporary storage of excavated PCB-containing sediments and soils on-site. EPA's risk-based approval contained in Attachment D to the Revised Final Permit covers the storage of such materials in accordance with the requirements of the Revised Final Permit. The temporary storage of PCB-containing sediments and soils excavated in Reach 5A will meet the applicable requirements established in or under the Revised Final Permit for such storage.
TSCA Regulations on Discharge of PCB-containing Water	40 CFR 761.50(a)(3)	Prohibits discharge of water containing PCBs to navigable waters unless PCB concentration is <3 mg/L or discharge is in accordance with NPDES discharge limits.	Applicable	Any discharge to navigable waters will comply with this provision.
TSCA Regulations on Decontamination	40 CFR 761.79	Establishes decontamination standards and procedures for removing PCBs from water, organic liquids, and various types of surfaces.	Applicable	Any decontamination activities conducted as part of the Reach 5A remedy will comply with these requirements.
Clean Water Act and NPDES Regulations	33 USC 1342 40 CFR 122, including, but not limited to, 122.3(d) and 122.44(a) and (e) 40 CFR 125.1-125.3	These standards include that point source discharge must meet technology-based effluent limitations (including those based on best available technology for toxic and non-conventional pollutants and those based on best conventional technology for conventional pollutants) and effluent limitations and conditions necessary to meet state water quality standards, except that discharges in compliance with instructions of the EPA On-Scene Coordinator (OSC) are exempt from these requirements (122.3(d)).	Applicable	The Reach 5A remedy will include dewatering of excavated sediments and wetland soils. It is currently anticipated that water from the remedial activities, such as from dewatering or other processing of sediments and wetland soils, will be then discharged into the river from staging areas after treatment. As a potential backup, some such water may be transported to GE's water treatment plant in Pittsfield or the water treatment facility to be constructed at the UDF for treatment. Any discharge of water from Reach 5A remedial activities into the river will meet the substantive requirements of these regulations, including any alternative discharge requirements established by the EPA OSC (such as was done for the remediation of the 1.5 Mile Reach of the Housatonic River).
Clean Water Act—NPDES Regulations (stormwater discharges)	40 CFR 122.26(c)(1)(ii)(C) 40 CFR 122.44(k)	BMPs must be employed to control pollutants in stormwater discharges during construction activities.	Applicable	Erosion and sedimentation control measures and BMPs will be implemented to comply with the substantive requirements of these stormwater regulations.
RCRA Regulations on Identification of Hazardous Waste	40 CFR 261	Establishes standards for determining whether a waste constitutes hazardous waste under RCRA.	Potentially applicable	Waste characterization sampling of soils, sediments, and debris (as applicable) subject to removal has been or will be conducted consistent with these requirements to determine whether they constitute hazardous waste under RCRA.
RCRA Regulations for Generators of Hazardous Waste	40 CFR 262.30-33	Pre-transportation requirements for generators of hazardous waste.	Potentially applicable	If RCRA hazardous wastes are identified and these materials are removed from the Area of Contamination but remain on site during Reach 5A remedy implementation, the substantive requirements of these regulations will be met.
RCRA regulations on Less-than-90-day Accumulation of Hazardous Waste	40 CFR 262.34	Provides for on-site accumulation of hazardous waste in certain circumstances, provided compliance with other specified requirements.	Potentially applicable	If RCRA hazardous wastes are identified and these materials are removed from the Area of Contamination but remain on site during Reach 5A remedy implementation, the substantive requirements of these regulations will be met.

Table 4-1
Applicable or Relevant and Appropriate Requirements for Reach 5A Remediation Activities[1]

Statute/Regulation	Citation	Synopsis of Requirements	Status	Action(s) to Be Taken to Comply with ARARs[2]
RCRA Regulations for Hazardous Waste Management Facilities—General	40 CFR 264.1(j)	General requirements for hazardous waste management facilities (waste analysis, security, precautions regarding ignition or reaction of wastes, preventing washout of units)	Potentially applicable	If RCRA hazardous wastes are identified and these materials are removed from the Area of Contamination but remain on site during Reach 5A remedy implementation, the substantive requirements of these regulations will be met.
State ARARs				
Massachusetts Clean Waters Act—Water Quality Certification Regulations	314 CMR 9.01-9.08	See synopsis of requirements in the location-specific entry for this ARAR.	Applicable	See the location-specific entry for this ARAR.
Massachusetts Clean Water Act and Wetlands Protection Act—Stormwater Management Standards	310 CMR 10.05(6)(k) 314 CMR 9.06(6)(a)	Projects subject to regulation under the Wetlands Protection Act or that involve discharge of dredged or fill material must incorporate stormwater BMPs to attenuate pollutants in stormwater discharges, as well as to provide a setback from receiving waters and wetlands, in accordance with 10 specified stormwater management standards.	Applicable	Erosion and sedimentation control measures and BMPs will be implemented to comply with the substantive requirements of these stormwater regulations.
Massachusetts Hazardous Waste Regulations on Identification and Listing of Hazardous Waste	310 CMR 30.100	Establishes criteria and lists for determining whether a waste is a hazardous waste under state law. Note: Waste containing PCBs at a concentration equal to or greater 50 mg/kg constitutes a listed hazardous waste under the Massachusetts regulations, but the Massachusetts hazardous waste regulations do not apply to facilities for such waste that comply with EPA's TSCA regulations (40 CFR Part 761) except with respect to a facility located in an ACEC (see 310 CMR 30.501(3)(a)).	Applicable	Waste characterization sampling of soils, sediments, and debris (as applicable) subject to removal has been or will be conducted consistent with these regulations to determine whether they constitute hazardous waste under state law on a basis other than containing PCB concentrations at or above 50 mg/kg. Note: With respect to the waste containing PCB concentrations at or above 50 mg/kg, any facilities for the storage of such waste as part of the Reach 5A remedy will comply with the TSCA regulations (by virtue of EPA's risk-based determination in Attachment D to the Revised Final Permit), and the prohibition on the location of such a facility in an ACEC has been waived by EPA, after consultation with the Commonwealth, pursuant to CERCLA 121(d)(4)(B).
Massachusetts hazardous waste regulations for generators	310 CMR 30.321-324	Pre-transport requirements for generators of hazardous waste	Potentially applicable	To the extent that non-PCB hazardous wastes under state law are identified and these materials are removed from the Area of Contamination but remain on site during Reach 5A remedy implementation, the substantive provisions of these pre-transport requirements will be met.
Massachusetts hazardous waste management—general requirements	310 CMR 30.513, 514, 524, 560	General requirements for hazardous waste management facilities	Potentially applicable	To the extent that non-PCB hazardous wastes under state law are identified and these materials are removed from the Area of Contamination but remain on site during Reach 5A remedy implementation, the substantive provisions of these general requirements will be met.
Massachusetts hazardous waste regulations—technical requirements for storage	310 CMR 602, 640, 580, 660.	Requirements related to storage of hazardous waste.	Potentially applicable	To the extent that non-PCB hazardous wastes under state law are identified and these materials are removed from the Area of Contamination but remain on site during Reach 5A remedy implementation, the substantive provisions of these storage requirements will be met.
Massachusetts Air Pollution Control Regulations	310 CMR 7.00, 7.01, 7.06, 7.09, 7.10, and 7.11	These provisions regulate air emissions, dust, odor, and noise, among other things.	Applicable	The Reach 5A remedial activities will comply with the substantive requirements of these regulations. They will do so through compliance with the air monitoring and air emission control requirements set forth in the Second Revised Quality of Life Compliance Plan and in the Ambient Air Monitoring Plan included in the Project Operations Plan, and will comply with the noise and odor monitoring and control requirements set forth in the Second Revised Quality of Life Compliance Plan. In addition, control and mitigation of dust emissions will be implemented, as needed, during construction of staging areas and access roads, floodplain excavations, and soil/sediment handling operations.
To Be Considered				
TSCA PCB Spill Cleanup Policy	40 CFR Part 761, Subpart G	Policy used to determine adequacy of cleanup of spills resulting from the release of materials containing PCBs at concentration of 50 mg/kg or greater.	To be considered	Will be considered in the event of any new spill that results from the release of PCBs at a concentration of 50 mg/kg or greater during the Reach 5A remedial construction.
EPA Contaminated Sediment Remediation Guidance	EPA-540-R-05-012 OSWER 9355.0-85 (December 2005)	Provides guidance on remediation of contaminated sediment sites.	To be considered	The guidance was considered by EPA in remedy selection. In addition, in accordance with Section II.B.2.i of the Revised Final Permit, this guidance has been and will continue to be considered during design of the engineered cap for Reach 5A sediments, and it has been and will be considered in identification of sediment removal methods within the main channel and for operation and maintenance planning.
EPA Guidance for In-Situ Subaqueous Capping of Contaminated Sediments	EPA 905-B96-004, Great Lakes National Program Office (September 1998)	Provides technical guidance for subaqueous, in-situ capping as a remediation technique for contaminated sediments.	To be considered	In accordance with Section II.B.2.i of the Revised Final Permit, this guidance has been and will continue to be considered during design of the engineered cap for Reach 5A sediments.

Notes:

1. This table has been adapted from Attachment C of the Revised Final Permit with a number of modifications and updates. Note that this table does not include ARARs for the Upland Disposal Facility design, construction, or operation. Those ARARs were presented in the Upland Disposal Facility Conceptual Design Plan (Arcadis 2022) submitted to EPA on December 6, 2022.
2. Compliance with ARARs refers to compliance with the substantive requirements, criteria, or limitations of each provision, not any administrative, procedural, or permitting requirements included therein.

µg: microgram
ACEC: Area of Critical Environmental Concern
ARAR: applicable or relevant and appropriate requirement
BMP: best management practice
BRA: Baseline Restoration Assessment
CFR: Code of Federal Regulations

Table 4-1
Applicable or Relevant and Appropriate Requirements for Reach 5A Remediation Activities[1]

CMR: Code of Massachusetts Regulations
CRA: Cultural Resource Assessment
CRS: Cultural Resource Survey
EPA: U.S. Environmental Protection Agency
GE: General Electric Company
kg: kilogram
L: liter
MCP: Massachusetts Contingency Plan
MESA: Massachusetts Endangered Species Act
mg: milligram
MGL: Massachusetts General Law
MHC: Massachusetts Historical Commission
NHPA: National Historic Preservation Act
NPDES: National Pollutant Discharge Elimination System
NRHP: National Register of Historic Places
OSC: On-Scene Coordinator
PCB: polychlorinated biphenyl
RCRA: Resource Conservation and Recovery Act
SRHP: State Register of Historic Places
T&E: threatened or endangered
TSCA: Toxic Substances Control Act
USC: United States Code

Table 8-1
Reach 5A Shoreline Elevations

Shoreline Station Group	Shoreline Elevation (North American Vertical Datum of 1988, Feet)
00+00 to 03+00	958.0
03+00 to 07+50	957.8
07+50 to 12+50	957.4
12+50 to 17+50	957.2
17+50 to 22+50	957.0
22+50 to 27+50	956.6
27+50 to 32+50	956.5
32+50 to 37+50	956.1
37+50 to 42+50	955.9
42+50 to 47+50	955.5
47+50 to 55+00	955.3
55+00 to 65+00	955.2
65+00 to 75+00	955.1
75+00 to 82+50	955.0
82+50 to 87+50	954.9
87+50 to 92+75	954.8
92+75 to 97+50	954.7
97+50 to 99+50	954.6
99+50 to 107+00	954.0
107+00 to 113+50	953.7
113+50 to 116+00	953.2
116+00 to 123+00	952.8
123+00 to 127+50	952.4
127+50 to 134+00	952.3
134+00 to 144+75	952.1
144+75 to 153+40	951.7
153+40 to 162+50	951.6
162+50 to 168+50	951.5
168+50 to 173+00	951.3
173+00 to 186+00	950.9
186+00 to 195+60	950.7
195+60 to 200+00	950.5
200+00 to 207+50	950.2
207+50 to 218+00	949.8
218+00 to 224+00	949.6
224+00 to 237+00	949.5
237+00 to 245+00	949.3

Table 8-2
Estimated Sediment Removal Volumes for River Channel

CCU ID[1,2]	River Stations	Area (SF)	Area (acre)	Estimated Design Removal Volume (CY)[3]	Estimated Overdredge Removal Volume (CY)[4]	Assumed Construction Season	Total Area per Assumed Construction Season (acre)	Estimated Design Removal Volume per Assumed Construction Season (CY)	Estimated Overdredge Removal Volume per Assumed Construction Season (CY)	Estimated Total Removal Volume per Assumed Construction Season (CY)[5]
CCU-01	0+00 to 3+00	16,387	0.38	582	202	Year 1	7.08	18,627	3,805	22,432
CCU-02	3+00 to 6+00	21,766	0.50	2,162	269					
CCU-03	6+00 to 9+00	18,162	0.42	1,295	224					
CCU-04	9+00 to 12+00	17,930	0.41	1,659	221					
CCU-05	12+00 to 15+00	17,716	0.41	796	219					
CCU-06	15+00 to 18+00	19,271	0.44	1,311	238					
CCU-07	18+00 to 21+00	19,276	0.44	691	238					
CCU-08	21+00 to 24+00	18,069	0.41	618	223					
CCU-09	24+00 to 27+00	19,274	0.44	1,474	238					
CCU-10	27+00 to 30+00	19,719	0.45	956	243					
CCU-11	30+00 to 33+00	20,280	0.47	1,128	250					
CCU-12	33+00 to 36+00	19,667	0.45	1,131	243					
CCU-13	36+00 to 39+00	20,198	0.46	1,315	249					
CCU-14	39+00 to 42+00	21,185	0.49	1,291	262					
CCU-15	42+00 to 45+00	19,618	0.45	1,331	242					
CCU-16	45+00 to 48+00	19,716	0.45	887	243					
CCU-17	48+00 to 51+00	24,252	0.56	2,311	299	Year 2	7.32	27,319	3,936	31,255
CCU-18	51+00 to 54+00	21,668	0.50	2,149	268					
CCU-19	54+00 to 57+00	16,820	0.39	2,057	208					
CCU-20	57+00 to 60+00	21,705	0.50	3,189	268					
CCU-21	60+00 to 63+00	22,230	0.51	3,216	274					
CCU-22	63+00 to 66+00	21,036	0.48	2,812	260					
CCU-23	66+00 to 69+00	18,719	0.43	2,369	231					
CCU-24	69+00 to 72+00	21,651	0.50	2,395	267					
CCU-25	72+00 to 75+00	21,537	0.49	628	266					
CCU-26	75+00 to 78+00	20,166	0.46	524	249					
CCU-27	78+00 to 81+00	18,994	0.44	1,117	234					
CCU-28	81+00 to 84+00	15,991	0.37	857	197					
CCU-29	84+00 to 87+00	18,306	0.42	891	226					
CCU-30	87+00 to 90+00	16,633	0.38	524	205					
CCU-31	90+00 to 93+00	20,938	0.48	1,187	258					
CCU-32	93+00 to 96+00	18,196	0.42	1,095	225					

Table 8-2
Estimated Sediment Removal Volumes for River Channel

CCU ID[1,2]	River Stations	Area (SF)	Area (acre)	Estimated Design Removal Volume (CY)[3]	Estimated Overdredge Removal Volume (CY)[4]	Assumed Construction Season	Total Area per Assumed Construction Season (acre)	Estimated Design Removal Volume per Assumed Construction Season (CY)	Estimated Overdredge Removal Volume per Assumed Construction Season (CY)	Estimated Total Removal Volume per Assumed Construction Season (CY)[5]
CCU-33	96+00 to 99+00	21,892	0.50	1,260	270	Year 3	7.98	19,253	4,290	23,543
CCU-34	99+00 to 102+00	22,907	0.53	854	283					
CCU-35	102+00 to 105+00	22,236	0.51	1,244	275					
CCU-36	105+00 to 108+00	18,447	0.42	580	228					
CCU-37	108+00 to 111+00	22,204	0.51	1,188	274					
CCU-38	111+00 to 114+00	21,293	0.49	1,322	263					
CCU-39	114+00 to 117+00	20,846	0.48	1,164	257					
CCU-40	117+00 to 120+00	22,746	0.52	649	281					
CCU-41	120+00 to 123+00	23,119	0.53	1,575	285					
CCU-42	123+00 to 126+00	18,186	0.42	767	225					
CCU-43	126+00 to 129+00	26,437	0.61	1,945	326					
CCU-44	129+00 to 132+00	24,123	0.55	933	298					
CCU-45	132+00 to 135+00	20,273	0.47	1,410	250					
CCU-46	135+00 to 138+00	20,585	0.47	1,880	254					
CCU-47	138+00 to 141+00	21,208	0.49	812	262					
CCU-48	141+00 to 144+00	20,954	0.48	1,670	259					
CCU-49	144+00 to 147+00	21,395	0.49	597	264	Year 4	8.13	15,666	4,370	20,036
CCU-50	147+00 to 150+00	24,573	0.56	1,131	303					
CCU-51	150+00 to 153+00	18,495	0.42	583	228					
CCU-52	153+00 to 156+00	22,934	0.53	331	283					
CCU-53	156+00 to 159+00	22,383	0.51	1,006	276					
CCU-54	159+00 to 162+00	20,204	0.46	581	249					
CCU-55	162+00 to 165+00	21,220	0.49	1,626	262					
CCU-56	165+00 to 168+00	24,935	0.57	1,215	308					
CCU-57	168+00 to 171+00	22,007	0.51	859	272					
CCU-58	171+00 to 174+00	21,802	0.50	1,296	269					
CCU-59	174+00 to 177+00	18,534	0.43	734	229					
CCU-60	177+00 to 180+00	23,463	0.54	625	290					
CCU-61	180+00 to 183+00	26,511	0.61	1,539	327					
CCU-62	183+00 to 186+00	22,485	0.52	821	278					
CCU-63	186+00 to 189+00	21,367	0.49	1,144	264					
CCU-64	189+00 to 192+00	21,704	0.50	1,577	268					

Table 8-2
Estimated Sediment Removal Volumes for River Channel

CCU ID[1,2]	River Stations	Area (SF)	Area (acre)	Estimated Design Removal Volume (CY)[3]	Estimated Overdredge Removal Volume (CY)[4]	Assumed Construction Season	Total Area per Assumed Construction Season (acre)	Estimated Design Removal Volume per Assumed Construction Season (CY)	Estimated Overdredge Removal Volume per Assumed Construction Season (CY)	Estimated Total Removal Volume per Assumed Construction Season (CY)[5]
CCU-65	192+00 to 195+00	23,034	0.53	2,708	284	Year 5	8.79	18,582	4,726	23,308
CCU-66	195+00 to 198+00	22,367	0.51	2,014	276					
CCU-67	198+00 to 201+00	22,280	0.51	1,172	275					
CCU-68	201+00 to 204+00	23,423	0.54	891	289					
CCU-69	204+00 to 207+00	20,869	0.48	1,278	258					
CCU-70	207+00 to 210+00	18,353	0.42	951	227					
CCU-71	210+00 to 213+00	21,582	0.50	1,243	266					
CCU-72	213+00 to 216+00	21,496	0.49	595	265					
CCU-73	216+00 to 219+00	20,520	0.47	1,263	253					
CCU-74	219+00 to 222+00	20,079	0.46	488	248					
CCU-75	222+00 to 225+00	18,766	0.43	855	232					
CCU-76	225+00 to 228+00	23,966	0.55	870	296					
CCU-77	228+00 to 231+00	20,312	0.47	877	251					
CCU-78	231+00 to 234+00	18,597	0.43	587	230					
CCU-79	234+00 to 237+00	23,236	0.53	784	287					
CCU-80	237+00 to 240+00	26,481	0.61	1,129	327					
CCU-81	240+00 to 243+00	20,906	0.48	541	258					
CCU-82	243+00 to 245+00	16,553	0.38	336	204					
TOTAL	**0+00 to 245+00**	**1,711,355**	**39.29**	**99,446**	**21,128**	**Year 1 to 5**	**39.29**	**99,446**	**21,128**	**120,574**

Notes:

1. For River Stations 0+00 to 48+00, the lateral boundaries of the CCUs are based on the modified shoreline developed using the NCD grading design.
2. For River Stations 48+00 to 245+00, the lateral boundaries of the CCUs are based on existing shoreline and will be updated in a future design submittal once the NCD grading design is finalized for those sections of the river. CCUs for River Stations 48+00 to 245+00 are subject to revision based upon the finalized NCD grading design.
3. The design removal volumes represent in-place quantities based on target removal depths and do not include any over-dredging allowance.
4. The estimated overdredge volumes assume an average 4 inch overdredge within each CCU.
5. The assumed construction seasons assume completing 16 CCUs each of the first four construction seasons and completing 18 CCUs in the final construction season.

CCU: Cap Certification Unit
CY: cubic yard
NCD: Natural Channel Design
SF: square feet

Table 9-2
Estimated Riverbank Removal Volumes

RCU ID	River Stations	Area (SF)	Area (acre)	Estimated Removal Volume (CY)	Assumed Construction Season	Total Area per Assumed Construction Season (ac)	Total Estimated Removal Volume per Assumed Construction Season (CY)
RCU-01L	0+00 to 3+00	6,775	0.16	400			
RCU-01R	0+00 to 3+00	795	0.02	11			
RCU-02L	3+00 to 6+00	1,976	0.05	72			
RCU-02R	3+00 to 6+00	8,995	0.21	812			
RCU-03L	6+00 to 9+00	5,434	0.12	401			
RCU-03R	6+00 to 9+00	5,384	0.12	467			
RCU-04L	9+00 to 12+00	7,363	0.17	681			
RCU-04R	9+00 to 12+00	1,484	0.03	9			
RCU-05L	12+00 to 15+00	1,978	0.05	33			
RCU-05R	12+00 to 15+00	2,477	0.06	2			
RCU-06L	15+00 to 18+00	8,325	0.19	551			
RCU-06R	15+00 to 18+00	3,317	0.08	36			
RCU-07L	18+00 to 21+00	7,562	0.17	360			
RCU-07R	18+00 to 21+00	1,313	0.03	2			
RCU-08L	21+00 to 24+00	2,370	0.05	9			
RCU-08R	21+00 to 24+00	1,806	0.04	92			
RCU-09L	24+00 to 27+00	2,495	0.06	156	Year 1	2.73	6,558
RCU-09R	24+00 to 27+00	5,394	0.12	57			
RCU-10L	27+00 to 30+00	3,585	0.08	221			
RCU-10R	27+00 to 30+00	5,352	0.12	200			
RCU-11L	30+00 to 33+00	6,973	0.16	562			
RCU-11R	30+00 to 33+00	1,868	0.04	2			
RCU-12L	33+00 to 36+00	7,043	0.16	693			
RCU-12R	33+00 to 36+00	178	0.00	0			
RCU-13L	36+00 to 39+00	3,817	0.09	(123)			
RCU-13R	36+00 to 39+00	871	0.02	6			
RCU-14L	39+00 to 42+00	4,975	0.11	365			
RCU-14R	39+00 to 42+00	982	0.02	8			
RCU-15L	42+00 to 45+00	4,889	0.11	427			
RCU-15R	42+00 to 45+00	1,547	0.04	6			
RCU-16L	45+00 to 48+00	1,247	0.03	41			
RCU-16R	45+00 to 48+00	307	0.01	1			
RCU-17L	48+00 to 51+00	126	0.00	1			
RCU-17R	48+00 to 51+00	1,893	0.04	137			
RCU-18L	51+00 to 54+00	197	0.00	1			
RCU-18R	51+00 to 54+00	4,801	0.11	286			
RCU-19L	54+00 to 57+00	108	0.00	0			
RCU-19R	54+00 to 57+00	2,622	0.06	(64)			
RCU-20L	57+00 to 60+00	1	0.00	0			
RCU-21L	60+00 to 63+00	6,587	0.15	522			
RCU-21R	60+00 to 63+00	25	0.00	3			
RCU-22L	63+00 to 66+00	3,054	0.07	185			
RCU-22R	63+00 to 66+00	5,142	0.12	465			
RCU-23L	66+00 to 69+00	586	0.01	14			
RCU-23R	66+00 to 69+00	86	0.00	1			
RCU-24R	69+00 to 72+00	4,183	0.10	249			
RCU-25L	72+00 to 75+00	74	0.00	1			
RCU-25R	72+00 to 75+00	1,706	0.04	112	Year 2	2.05	8,685
RCU-26L	75+00 to 78+00	353	0.01	4			
RCU-26R	75+00 to 78+00	735	0.02	5			
RCU-27L	78+00 to 81+00	8	0.00	0			
RCU-27R	78+00 to 81+00	9,334	0.21	925			
RCU-28L	81+00 to 84+00	45	0.00	-			
RCU-28R	81+00 to 84+00	6,784	0.16	833			
RCU-29L	84+00 to 87+00	8,484	0.19	835			
RCU-29R	84+00 to 87+00	199	0.00	3			
RCU-30L	87+00 to 90+00	9,430	0.22	1,388			
RCU-30R	87+00 to 90+00	1,781	0.04	115			
RCU-31L	90+00 to 93+00	86	0.00	0			
RCU-31R	90+00 to 93+00	8,764	0.20	1,130			
RCU-32L	93+00 to 96+00	9,732	0.22	1,386			
RCU-32R	93+00 to 96+00	2,455	0.06	147			

Table 9-2
Estimated Riverbank Removal Volumes

RCU ID	River Stations	Area (SF)	Area (acre)	Estimated Removal Volume (CY)	Assumed Construction Season	Total Area per Assumed Construction Season (ac)	Total Estimated Removal Volume per Assumed Construction Season (CY)
RCU-33L	96+00 to 99+00	4,963	0.11	473			
RCU-33R	96+00 to 99+00	5,257	0.12	416			
RCU-34L	99+00 to 102+00	544	0.01	22			
RCU-34R	99+00 to 102+00	950	0.02	21			
RCU-35L	102+00 to 105+00	110	0.00	8			
RCU-35R	102+00 to 105+00	6,951	0.16	437			
RCU-36L	105+00 to 108+00	889	0.02	31			
RCU-36R	105+00 to 108+00	2,402	0.06	139			
RCU-37L	108+00 to 111+00	2,032	0.05	61			
RCU-37R	108+00 to 111+00	4,759	0.11	432			
RCU-38L	111+00 to 114+00	176	0.00	5			
RCU-38R	111+00 to 114+00	7,962	0.18	1,079			
RCU-39L	114+00 to 117+00	1,763	0.04	91			
RCU-39R	114+00 to 117+00	2,936	0.07	126			
RCU-40L	117+00 to 120+00	5,593	0.13	590			
RCU-40R	117+00 to 120+00	2,254	0.05	246	Year 3	2.70	9,889
RCU-41L	120+00 to 123+00	4,019	0.09	293			
RCU-41R	120+00 to 123+00	4,019	0.09	285			
RCU-42L	123+00 to 126+00	1,492	0.03	53			
RCU-42R	123+00 to 126+00	8,560	0.20	664			
RCU-43L	126+00 to 129+00	2,196	0.05	116			
RCU-43R	126+00 to 129+00	3,942	0.09	118			
RCU-44L	129+00 to 132+00	403	0.01	4			
RCU-44R	129+00 to 132+00	2,434	0.06	119			
RCU-45L	132+00 to 135+00	8,244	0.19	1,002			
RCU-45R	132+00 to 135+00	1,922	0.04	95			
RCU-46L	135+00 to 138+00	5,618	0.13	619			
RCU-46R	135+00 to 138+00	8,429	0.19	696			
RCU-47L	138+00 to 141+00	289	0.01	-			
RCU-47R	138+00 to 141+00	6,909	0.16	625			
RCU-48L	141+00 to 144+00	4,310	0.10	462			
RCU-48R	141+00 to 144+00	5,262	0.12	561			
RCU-49L	144+00 to 147+00	175	0.00	1			
RCU-49R	144+00 to 147+00	4,988	0.11	401			
RCU-50L	147+00 to 150+00	3,706	0.09	232			
RCU-50R	147+00 to 150+00	1,283	0.03	81			
RCU-51L	150+00 to 153+00	1,519	0.03	44			
RCU-51R	150+00 to 153+00	195	0.00	1			
RCU-52L	153+00 to 156+00	3,194	0.07	50			
RCU-52R	153+00 to 156+00	382	0.01	1			
RCU-53L	156+00 to 159+00	4,385	0.10	(2)			
RCU-53R	156+00 to 159+00	4,008	0.09	447			
RCU-54L	159+00 to 162+00	4,740	0.11	11			
RCU-54R	159+00 to 162+00	10,018	0.23	1,656			
RCU-55L	162+00 to 165+00	93	0.00	0			
RCU-55R	162+00 to 165+00	4,238	0.10	585			
RCU-56L	165+00 to 168+00	114	0.00	0			
RCU-56R	165+00 to 168+00	316	0.01	5	Year 4	2.06	7,484
RCU-57L	168+00 to 171+00	526	0.01	6			
RCU-57R	168+00 to 171+00	32	0.00	1			
RCU-58L	171+00 to 174+00	6,516	0.15	390			
RCU-58R	171+00 to 174+00	1,721	0.04	99			
RCU-59L	174+00 to 177+00	448	0.01	1			
RCU-59R	174+00 to 177+00	407	0.01	2			
RCU-60L	177+00 to 180+00	384	0.01	2			
RCU-60R	177+00 to 180+00	42	0.00	0			
RCU-61L	180+00 to 183+00	3,940	0.09	155			
RCU-61R	180+00 to 183+00	3,081	0.07	230			
RCU-62L	183+00 to 186+00	516	0.01	9			
RCU-62R	183+00 to 186+00	6,009	0.14	585			
RCU-63L	186+00 to 189+00	3,800	0.09	456			
RCU-63R	186+00 to 189+00	13,291	0.31	1,592			
RCU-64L	189+00 to 192+00	4,110	0.09	273			
RCU-64R	189+00 to 192+00	1,687	0.04	170			
RCU-65L	192+00 to 195+00	5,321	0.12	357			

Table 9-2
Estimated Riverbank Removal Volumes

RCU ID	River Stations	Area (SF)	Area (acre)	Estimated Removal Volume (CY)	Assumed Construction Season	Total Area per Assumed Construction Season (ac)	Total Estimated Removal Volume per Assumed Construction Season (CY)
RCU-65R	192+00 to 195+00	655	0.02	15			
RCU-66L	195+00 to 198+00	3,046	0.07	170			
RCU-66R	195+00 to 198+00	3,207	0.07	206			
RCU-67L	198+00 to 201+00	3,564	0.08	327			
RCU-67R	198+00 to 201+00	2,155	0.05	89			
RCU-68L	201+00 to 204+00	26	0.00	1			
RCU-68R	201+00 to 204+00	6,593	0.15	611			
RCU-69L	204+00 to 207+00	6,743	0.15	635			
RCU-69R	204+00 to 207+00	576	0.01	0			
RCU-70L	207+00 to 210+00	2,704	0.06	131			
RCU-70R	207+00 to 210+00	4,677	0.11	356			
RCU-71L	210+00 to 213+00	356	0.01	8			
RCU-71R	210+00 to 213+00	23	0.00	0			
RCU-72L	213+00 to 216+00	321	0.01	5			
RCU-72R	213+00 to 216+00	270	0.01	6			
RCU-73L	216+00 to 219+00	609	0.01	8			
RCU-73R	216+00 to 219+00	6,090	0.14	379	Year 5	2.32	8,141
RCU-74L	219+00 to 222+00	570	0.01	1			
RCU-74R	219+00 to 222+00	3,380	0.08	231			
RCU-75L	222+00 to 225+00	1,661	0.04	40			
RCU-75R	222+00 to 225+00	8,220	0.19	1,002			
RCU-76L	225+00 to 228+00	449	0.01	8			
RCU-76R	225+00 to 228+00	3,326	0.08	344			
RCU-77L	228+00 to 231+00	3,462	0.08	184			
RCU-77R	228+00 to 231+00	382	0.01	5			
RCU-78L	231+00 to 234+00	4,798	0.11	488			
RCU-78R	231+00 to 234+00	124	0.00	1			
RCU-79L	234+00 to 237+00	3,435	0.08	307			
RCU-79R	234+00 to 237+00	5,505	0.13	415			
RCU-80L	237+00 to 240+00	6,563	0.15	568			
RCU-80R	237+00 to 240+00	97	0.00	2			
RCU-81L	240+00 to 243+00	8,057	0.18	922			
RCU-81R	240+00 to 243+00	40	0.00	-			
RCU-82L	243+00 to 245+00	3,441	0.08	302			
RCU-82R	243+00 to 245+00	456	0.01	17			
TOTAL	**0+00 to 245+00**	**516,612**	**11.86**	**40,757**	**Year 1 to 5**	**11.86**	**40,757**

Notes:

1. For River Stations 0+00 to 48+00, the lateral boundaries of the RCUs are based on the modified shoreline developed using the NCD grading design.
2. For River Stations 48+00 to 245+00, the lateral boundaries of the RCUs are based on existing shoreline and will be updated in a future design submittal once the NCD grading design is finalized for those sections of the river. RCUs for River Stations 48+00 to 245+00 are subject to revision based upon the finalized NCD grading design.
3. The removal volumes account for riverbank removal volumes within the RCUs based on the NCD grading design plus areas where additional soil removal is required in riverbank remediation areas not addressed by the NCD grading. The estimated volumes presented in this table do include in the the volume of floodplain soil where there is an overlap between the NCD grading design and the floodplain remediation areas.
4. The assumed construction seasons assume completing 16 CCUs (and adjacent RCUs) each of the first four construction seasons and completing 18 CCUs (and adjacent RCUs) in the final construction season.

CCU: Cap Certification Unit
CY: cubic yard
RCU: Riverbank Certification Unit
NCD: Natural Channel Design
SF: square feet

Table 12-1
Proposed Effluent Discharge Criteria
Final RD/RA Work Plan for Reach 5A
Housatonic River – Rest of River
Pittsfield, Massachusetts

Parameter[1]	Reach 5A Proposed Discharge Criteria (ppb)[2]	Criteria Source
VOCs		
Acetone	7,970	App E to EPA's DRGP
SVOCs		
Acenaphthylene	40	MCP GW-3
Benzo(a)anthracene	1,000	MCP GW-3
Benzo(a)pyrene	500	MCP GW-3
Benzo(b)fluoranthene	400	MCP GW-3
Benzo(g,h,i)perylene	20	MCP GW-3
Benzo(k)fluoranthene	100	MCP GW-3
Chrysene	70	MCP GW-3
Fluoranthene	200	MCP GW-3
Indeno(1,2,3-cd)pyrene	100	MCP GW-3
Phenanthrene	10,000	MCP GW-3
Pyrene	20	MCP GW-3
Total Metals		
Aluminum	--	No applicable standard
Arsenic	104	App E to EPA's DRGP
Barium	2,000	Mass 310 CMR 22.00 MMCL
Beryllium	4	Mass 310 CMR 22.00 MMCL
Cadmium	10.2	App E to EPA's DRGP
Calcium	--	No applicable standard
Chromium	323	App E to EPA's DRGP
Cobalt	--	No applicable standard
Copper	242	App E to EPA's DRGP
Iron	5,000	App E to EPA's DRGP
Lead	160	App E to EPA's DRGP
Magnesium	--	No applicable standard
Manganese	--	No applicable standard
Mercury	0.739	App E to EPA's DRGP
Molybdenum	--	No applicable standard
Nickel	1,450	App E to EPA's DRGP
Potassium	--	No applicable standard
Selenium	235.8	App E to EPA's DRGP
Silver	35.1	App E to EPA's DRGP
Sodium	--	No applicable standard
Titanium	--	No applicable standard
Vanadium	4,000	MCP GW-3
Zinc	420	App E to EPA's DRGP
PCBs		
Total PCBs	0.25	December 20, 2024 CAL

Table 12-1
Proposed Effluent Discharge Criteria
Final RD/RA Work Plan for Reach 5A
Housatonic River – Rest of River
Pittsfield, Massachusetts

Parameter[1]	Reach 5A Proposed Discharge Criteria (ppb)[2]	Criteria Source

Notes:

1 Only those analytes detected during the Reach 5A sediment dewatering treatability study are shown.

2 Proposed discharge criteria are generally based on the guidelines provided in EPA's June 11, 2025 CAL for the December 20, 2024 Proposed Dewatering and Water Treatment Systems for Upland Disposal Facility Area and the

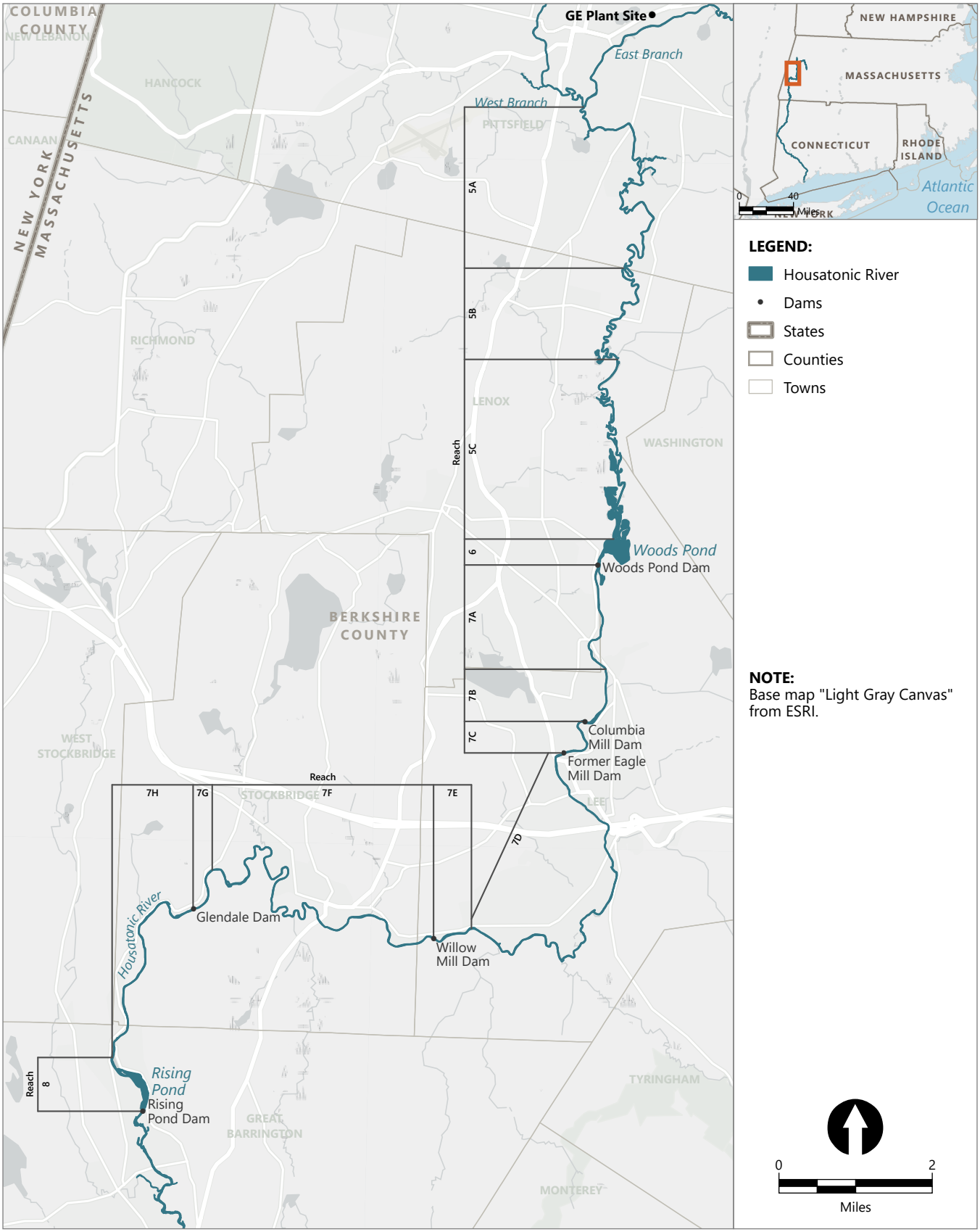
- For non-PCB analytes, proposed effluent discharge criteria are listed for analytes detected during the treatability study and based upon the applicable effluent discharge limitations contained in Appendix E to EPA's August 2, 2022 DRGP, as amended. If no value is provided for an analyte in Appendix E to EPA's DRGP, proposed effluent discharge criteria are based upon the MMCL in 310 CMR 22.00 or the Massachusetts Contingency Plan's GW-3 values, both as amended. Non-PCB criteria are established as benchmarks; if any such benchmark exceedances occur, GE will notify EPA and propose corrective actions or explain why corrective actions are not necessary.

- For PCBs, EPA Method 608.3 will be used for the analysis of PCB Aroclors in treated effluent water, with a minimum required Reporting Limit of 0.25 ug/L. If there are any results in the treated effluent water above the limit of 0.25 µg/L, GE will notify EPA and propose corrective actions or explain why such actions are not necessary. In addition, if there are detections above the laboratory-specific method detection limit but below the limit of 0.25 µg/L, GE shall notify EPA and propose corrective actions or explain why such actions are not necessary.

Abbreviations:

CAL = conditional approval letter
DRGP = Dewatering and Remediation General Permit
EPA = Environmental Protection Agency
MCP = Massachusetts Contingency Plan
MMCL = Massachusetts Maximum Contaminant Levels
TBD = no prior standard; to be determined based on forthcoming treatability study testing
PCB = polychlorinated biphenyl
ppb = parts per billion; equivalent to microgram per liter (ug/L)
SVOC = semi-volatile organic compounds
VOC = volatile organic compounds

Figures



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section2.aprx | RDWP Fig 2-1 Reaches 5 to 8

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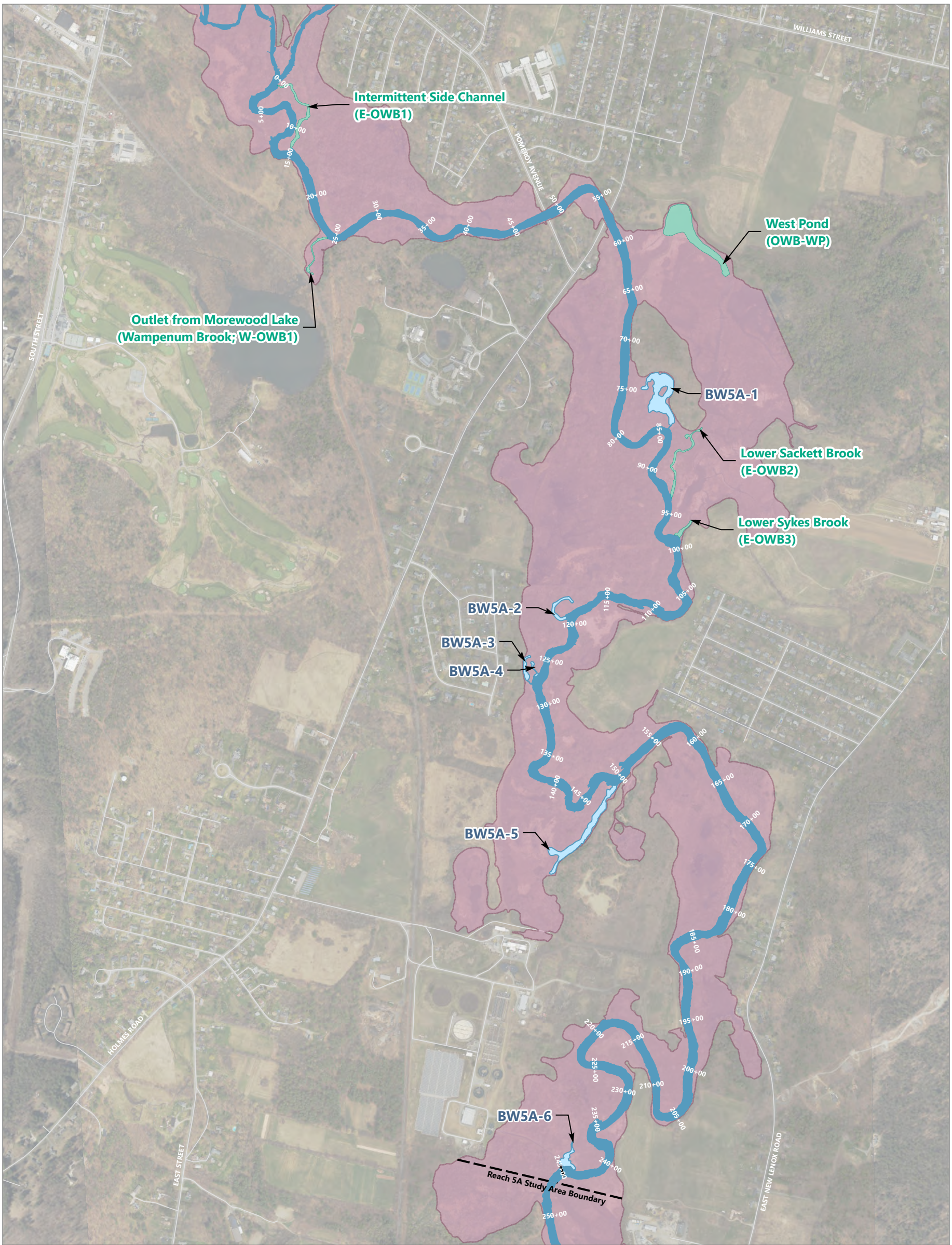
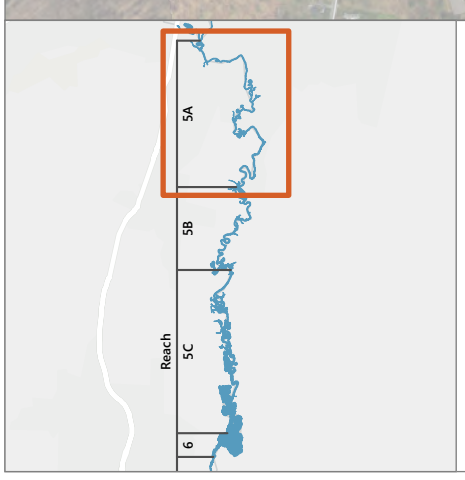
Figure 2-1
Housatonic River Map (Subreaches in Reaches 5 through 8)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River





LEGEND:

0+00 River Stationing

1 mg/kg PCB Isopleth

Housatonic River

Backwaters

Other Waterbody

NOTES:
BW: Backwater
OWB: Other Waterbody
WP: West Pond
WWTP: Wastewater Treatment Plant

1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.

0 1,000
Feet

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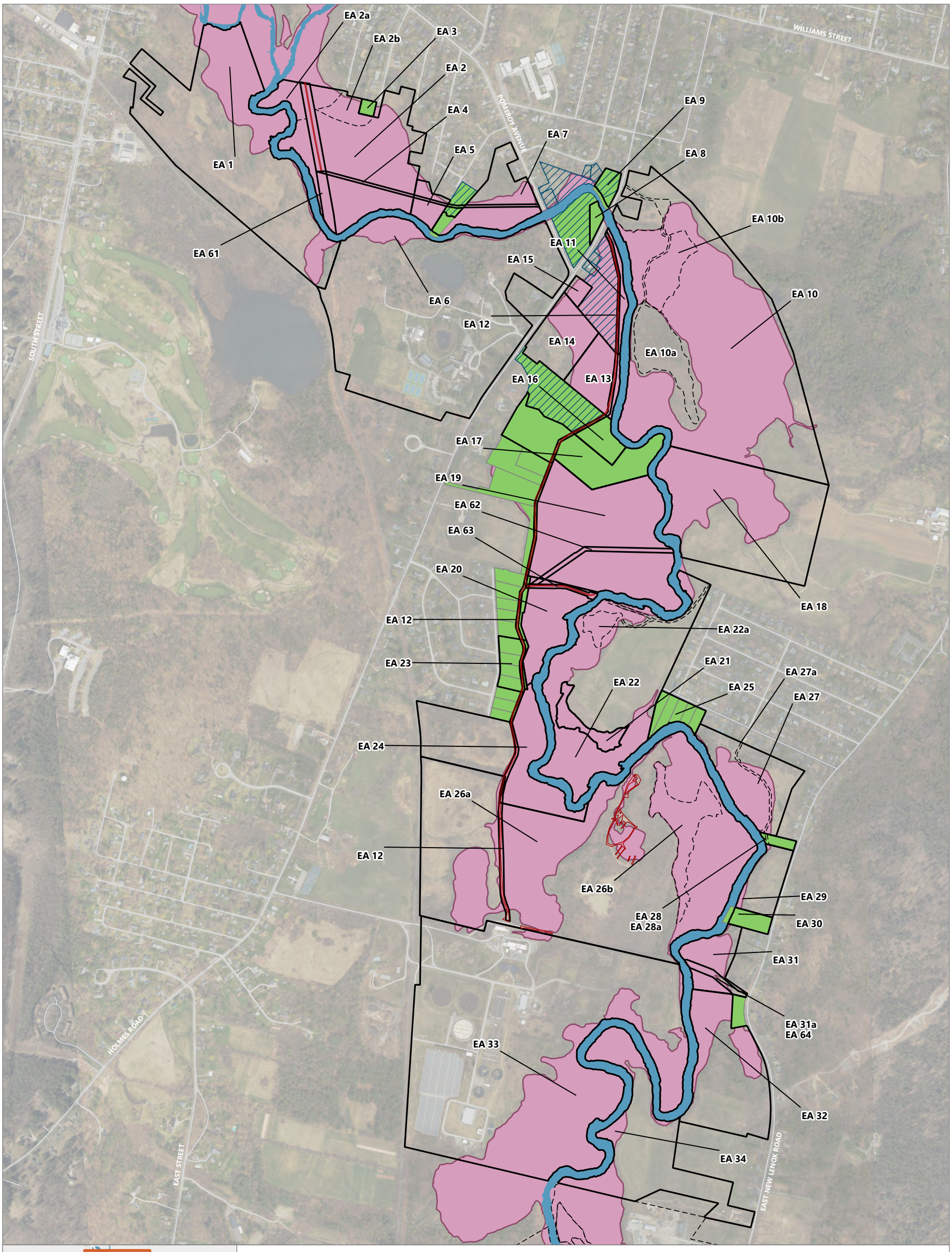
Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section2.aprx | RDWP Fig 2-2 Reach 5A

ANCHOR QEA

Figure 2-2
Reach 5A Site Map

Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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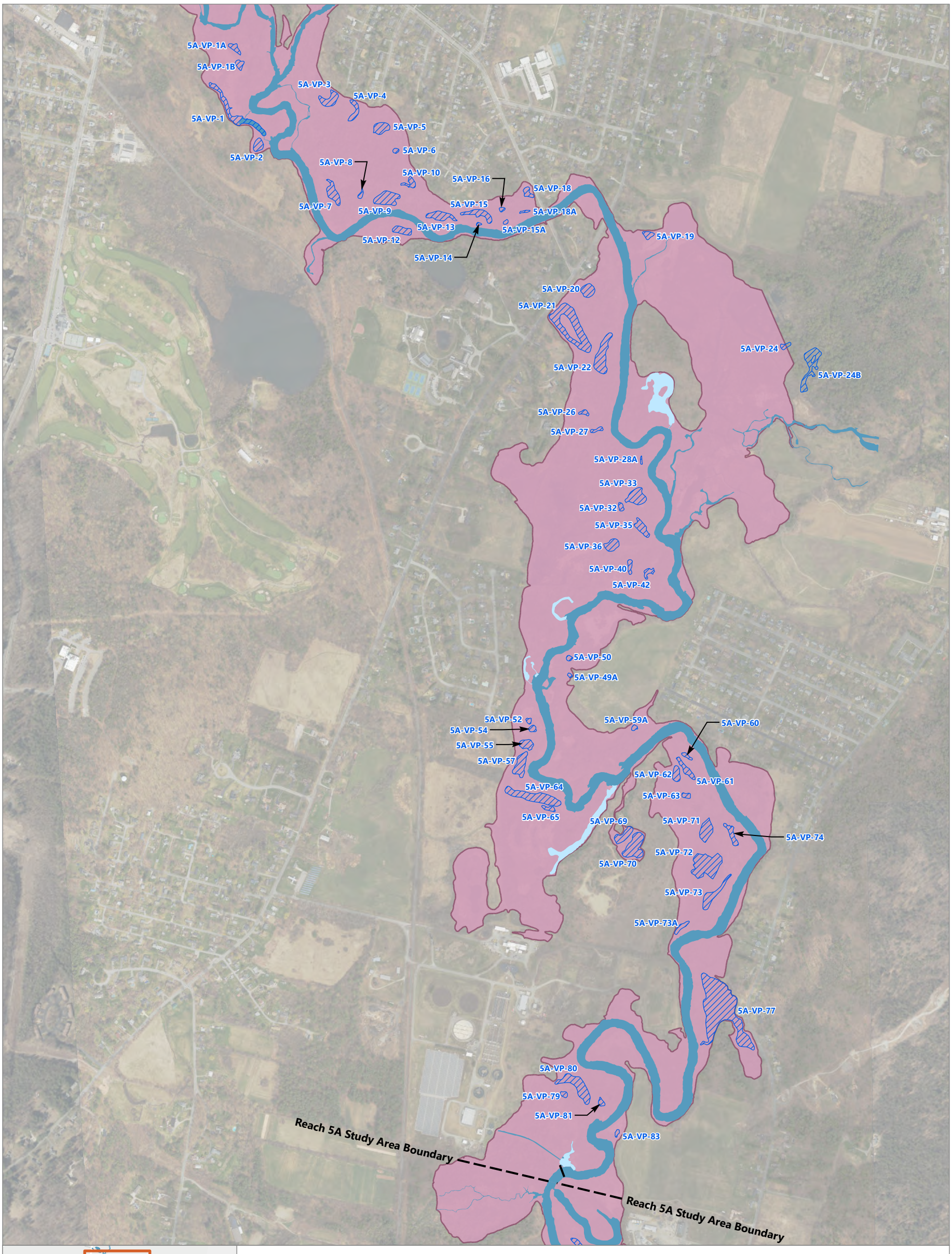
ANCHOR QEA

Figure 2-3
Floodplain Exposure Areas, Subareas, and Frequently Used Subareas in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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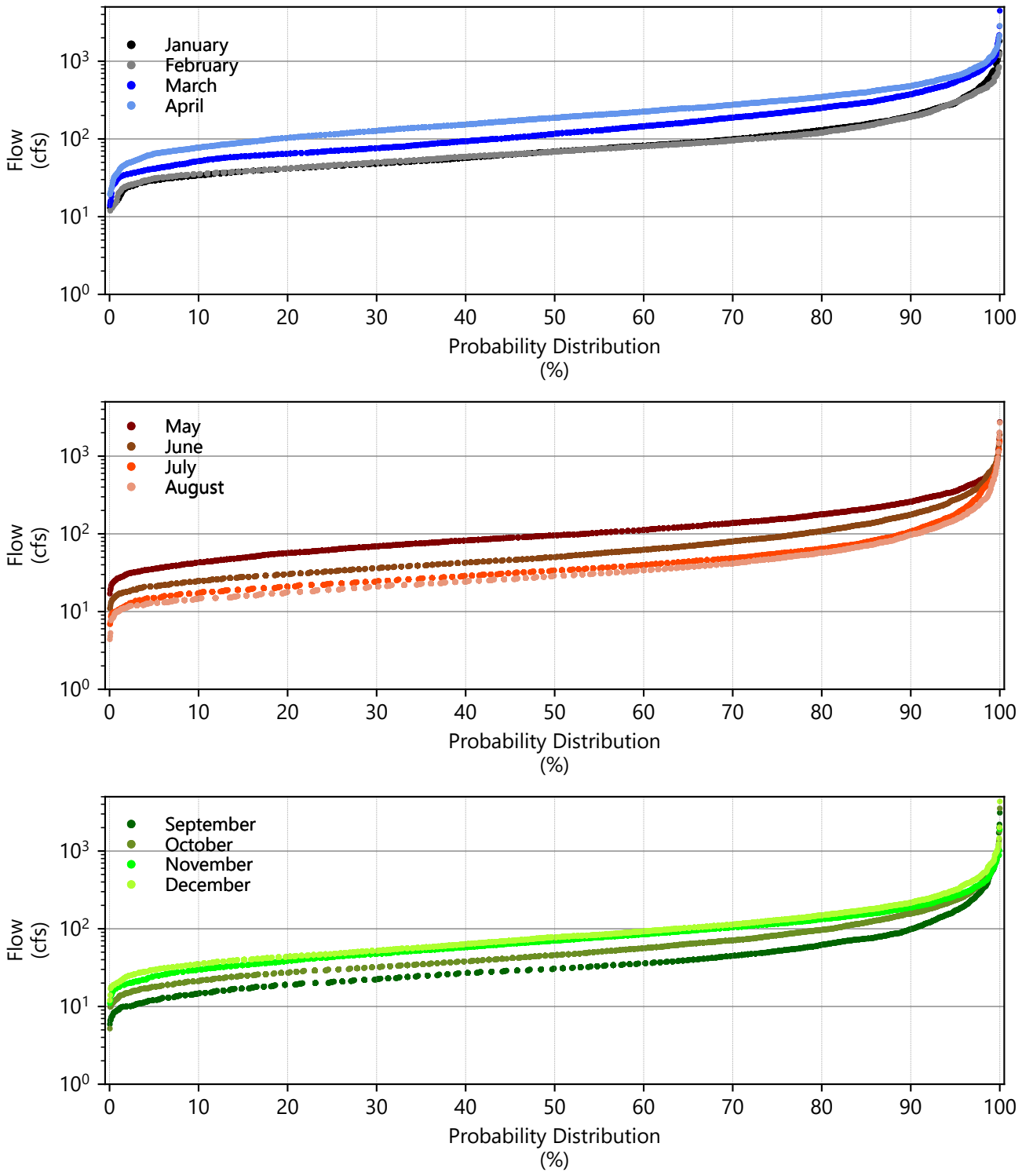
ANCHOR QEA

Figure 2-4
Vernal Pools in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



Data shown: March 8, 1936 - December 31, 2025. Each point represents a daily average flow.

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Figure 2-5
Probability Distribution of Flow at USGS Coltsville Gage by Month



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section5.aprx | RDWP Fig 5-1 Bathymetry

ANCHOR QEA

Figure 5-1a
Reach 5A Bathymetry

Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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ANCHOR QEA

Figure 5-1b
Reach 5A Bathymetry
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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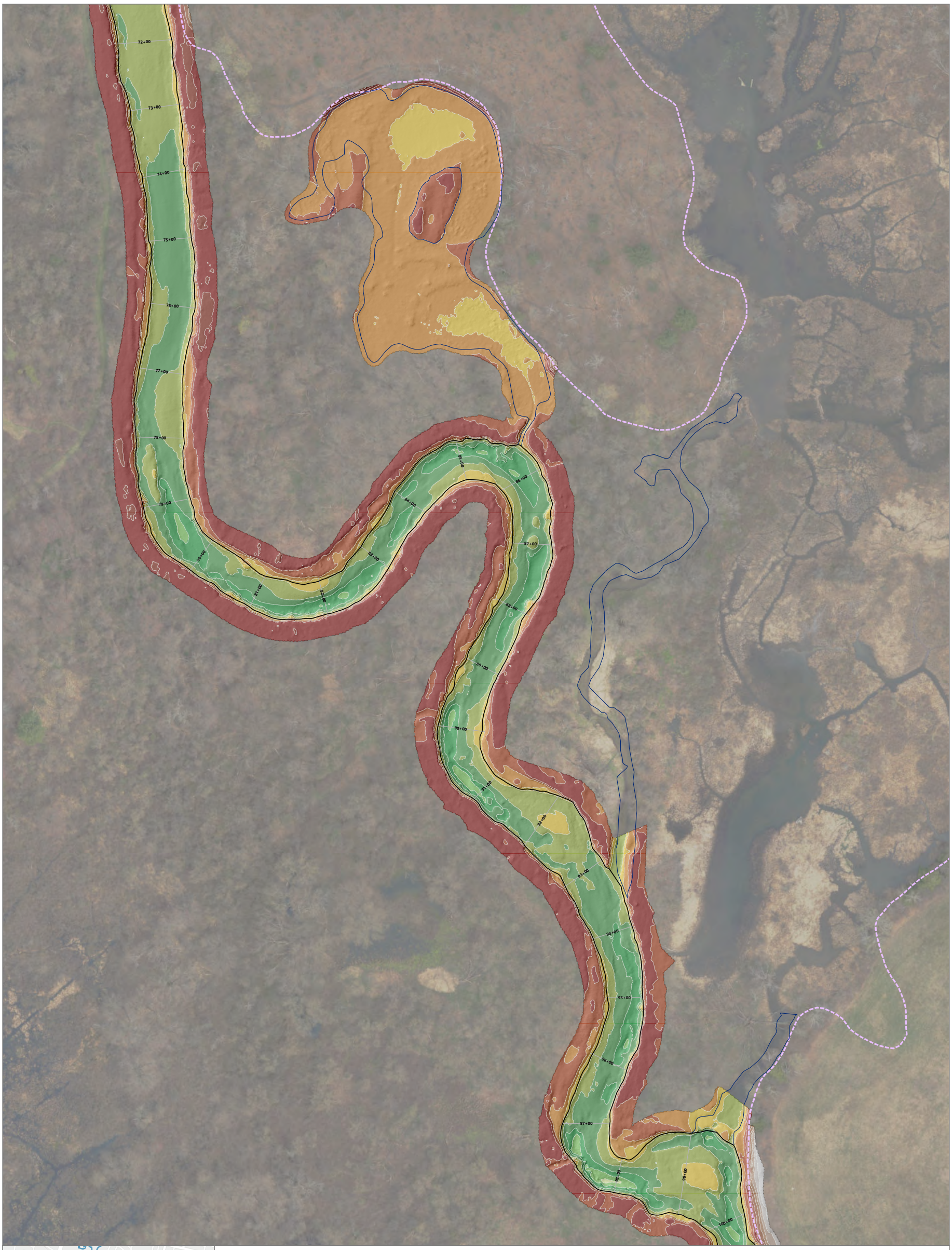
ANCHOR QEA

Figure 5-1c
Reach 5A Bathymetry

Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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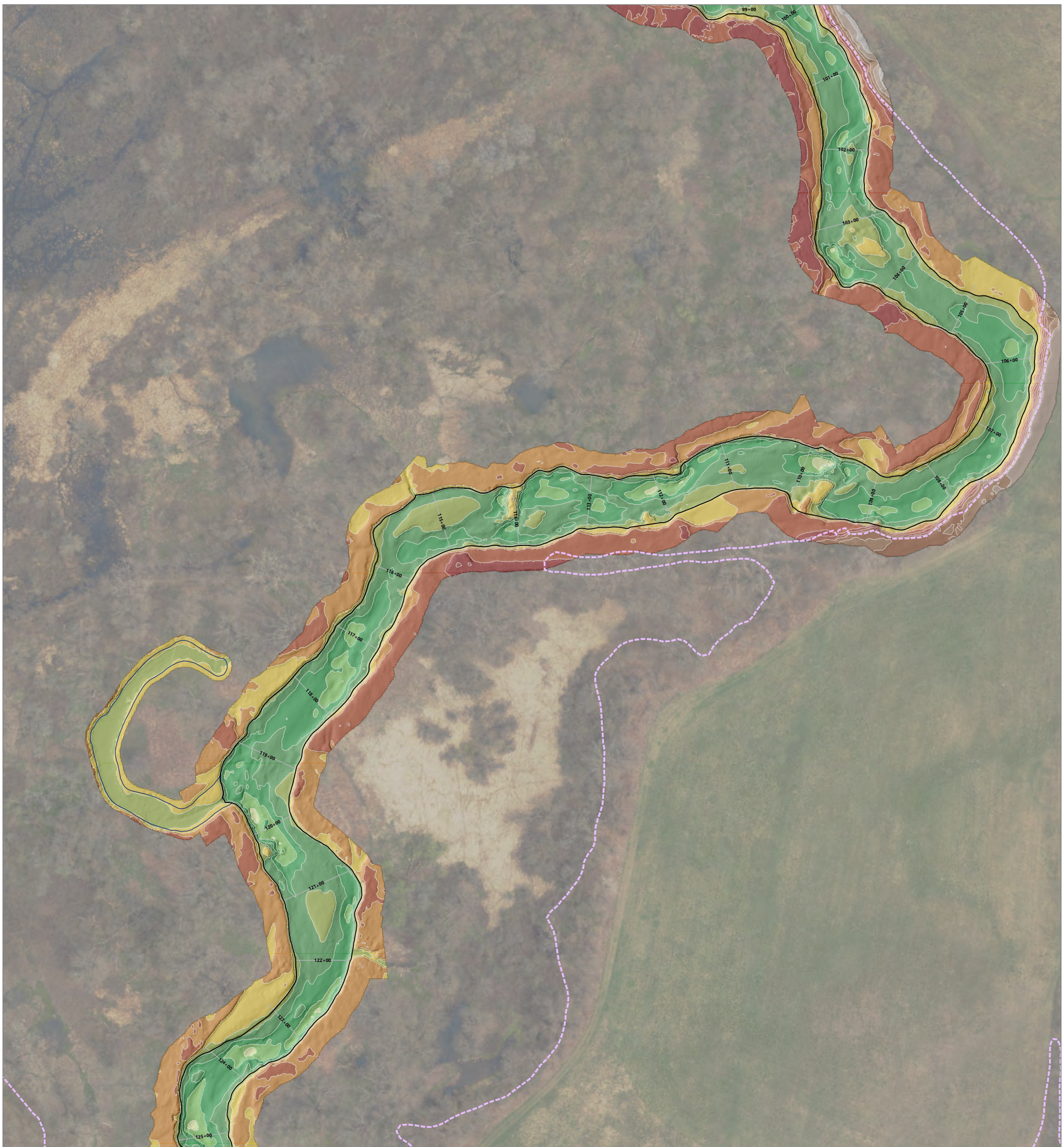
ANCHOR QEA

Figure 5-1d
Reach 5A Bathymetry
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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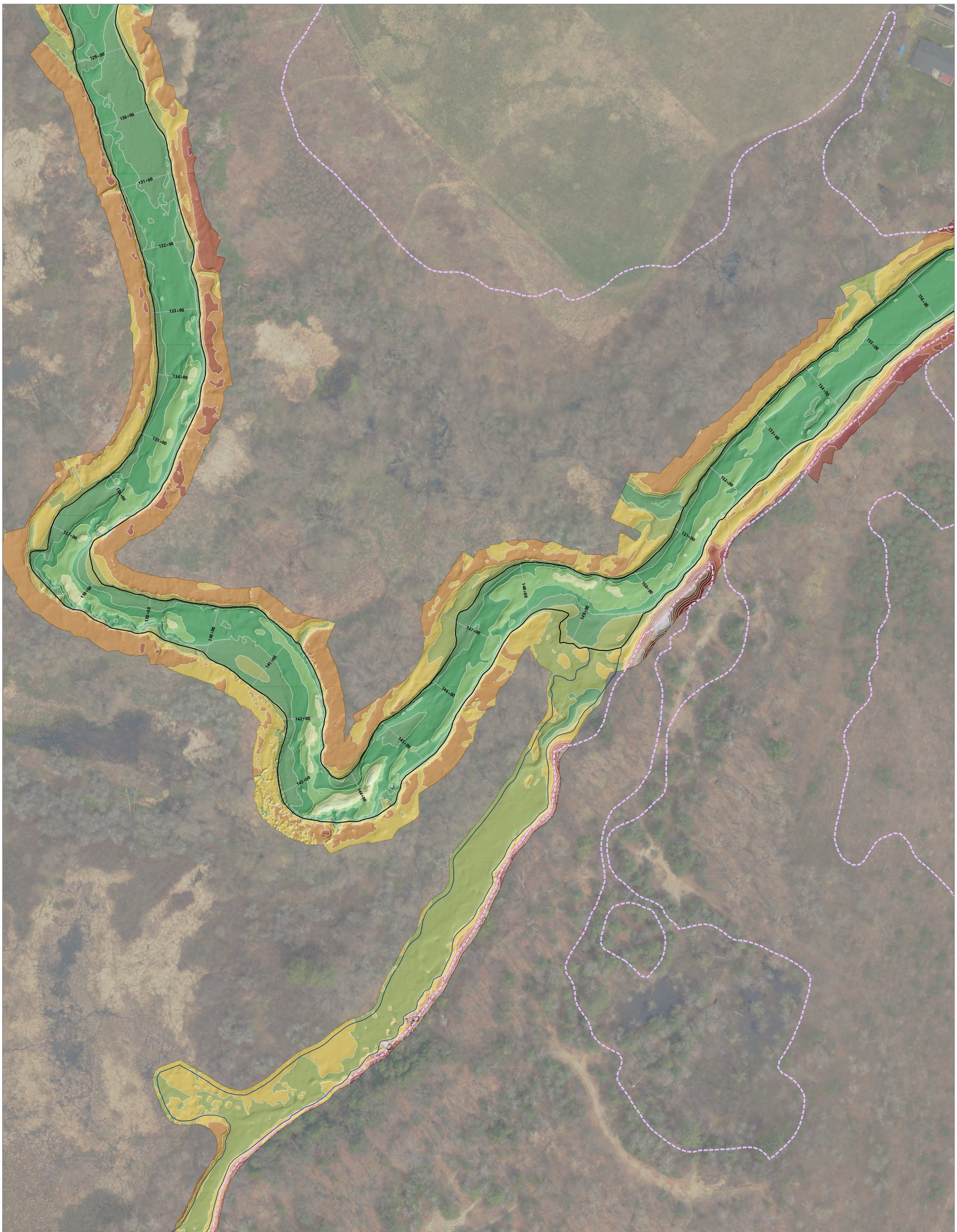
ANCHOR QEA

Figure 5-1e
Reach 5A Bathymetry

Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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ANCHOR QEA

Figure 5-1f
Reach 5A Bathymetry
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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Figure 5-1g
Reach 5A Bathymetry

Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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Figure 5-1h
Reach 5A Bathymetry
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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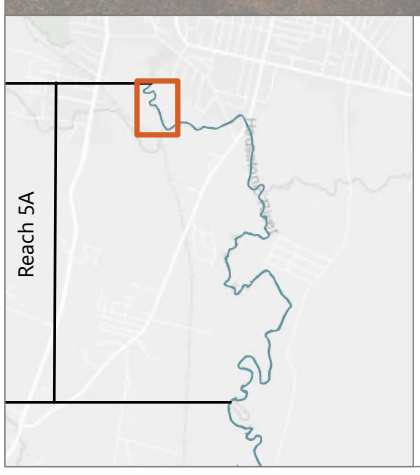
ANCHOR QEA

Figure 5-1i
Reach 5A Bathymetry
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River





LEGEND:

- Channel Feature
- Roads
- 0+00 River Stationing
- 1 mg/kg PCB Isopleth
- River Channel - Existing Shoreline

Water Depth (@ 63 cfs)

- <0
- 0-1
- 1-2
- 2-3
- 3-4
- 4-5
- 5+

NOTE:

1. Aerial Imagery collected by Bluesky Geospatial, April 2025.
2. Estimated water depths calculated based on comparison of topobathymetric LiDAR survey data (collected by Whiteout Solutions in May and December 2025) and water surface elevations estimated from the two-dimensional HEC-RAS model at a flow of 63 cfs at the USGS Coltsville gage.

0 150
Feet

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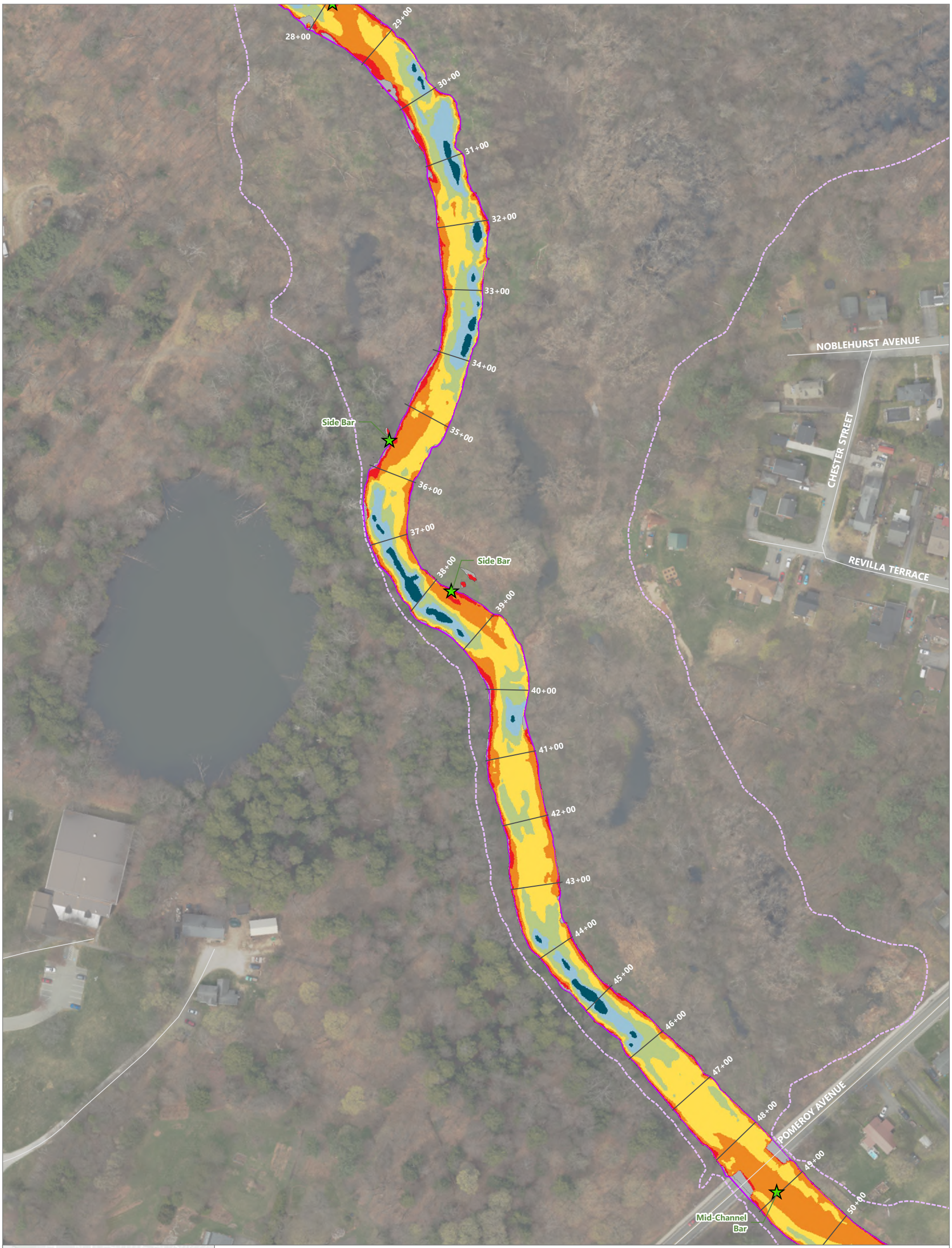
ANCHOR QEA

Figure 5-2a
Reach 5A Water Depths at 63 cfs at USGS Coltsville Gage
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River - Rest of River



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ANCHOR QEA

Figure 5-2b
Reach 5A Water Depths at 63 cfs at USGS Coltsville Gage
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River - Rest of River



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Figure 5-2c
Reach 5A Water Depths at 63 cfs at USGS Coltsville Gage
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River - Rest of River

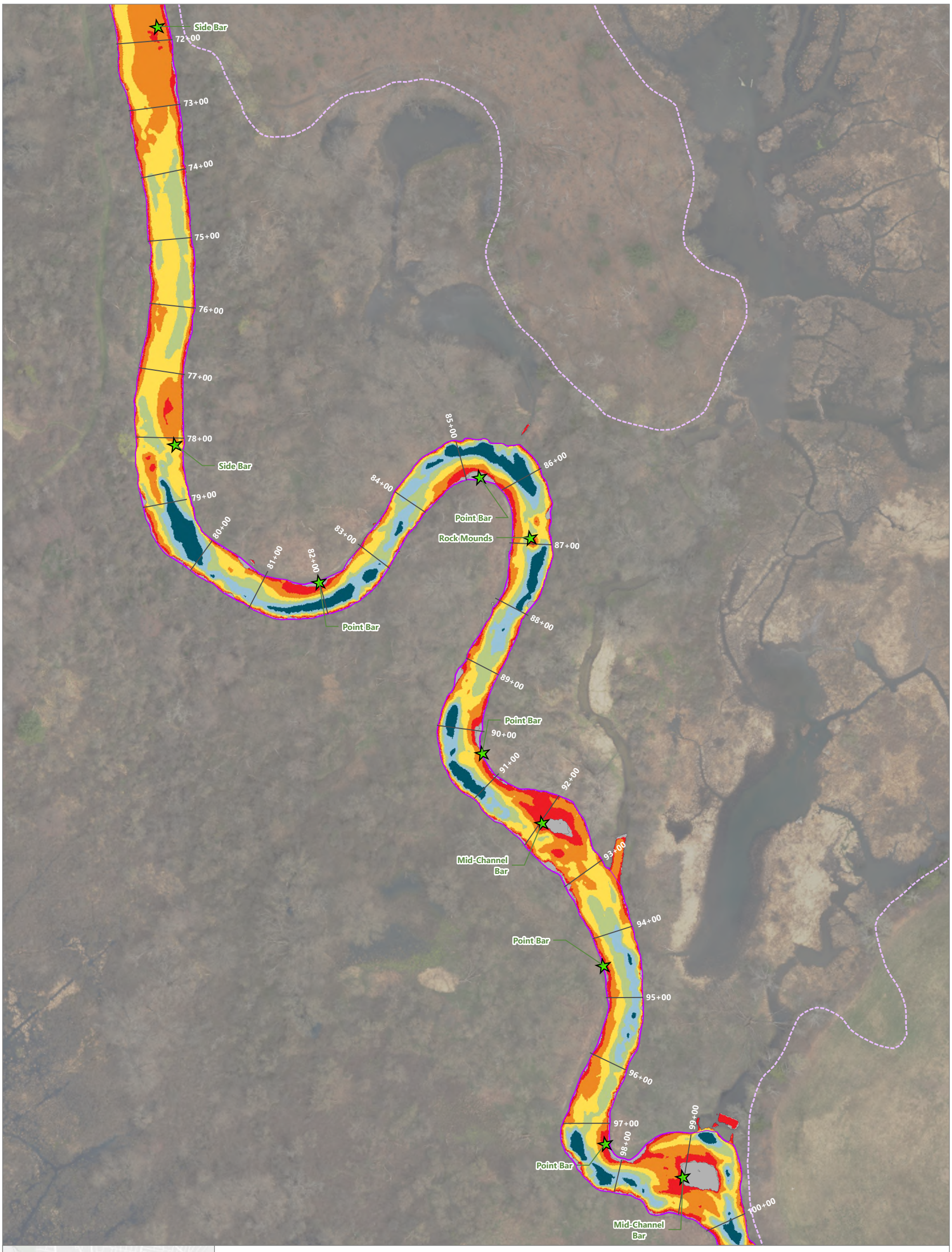

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Figure 5-2d
Reach 5A Water Depths at 63 cfs at USGS Coltsville Gage
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River - Rest of River

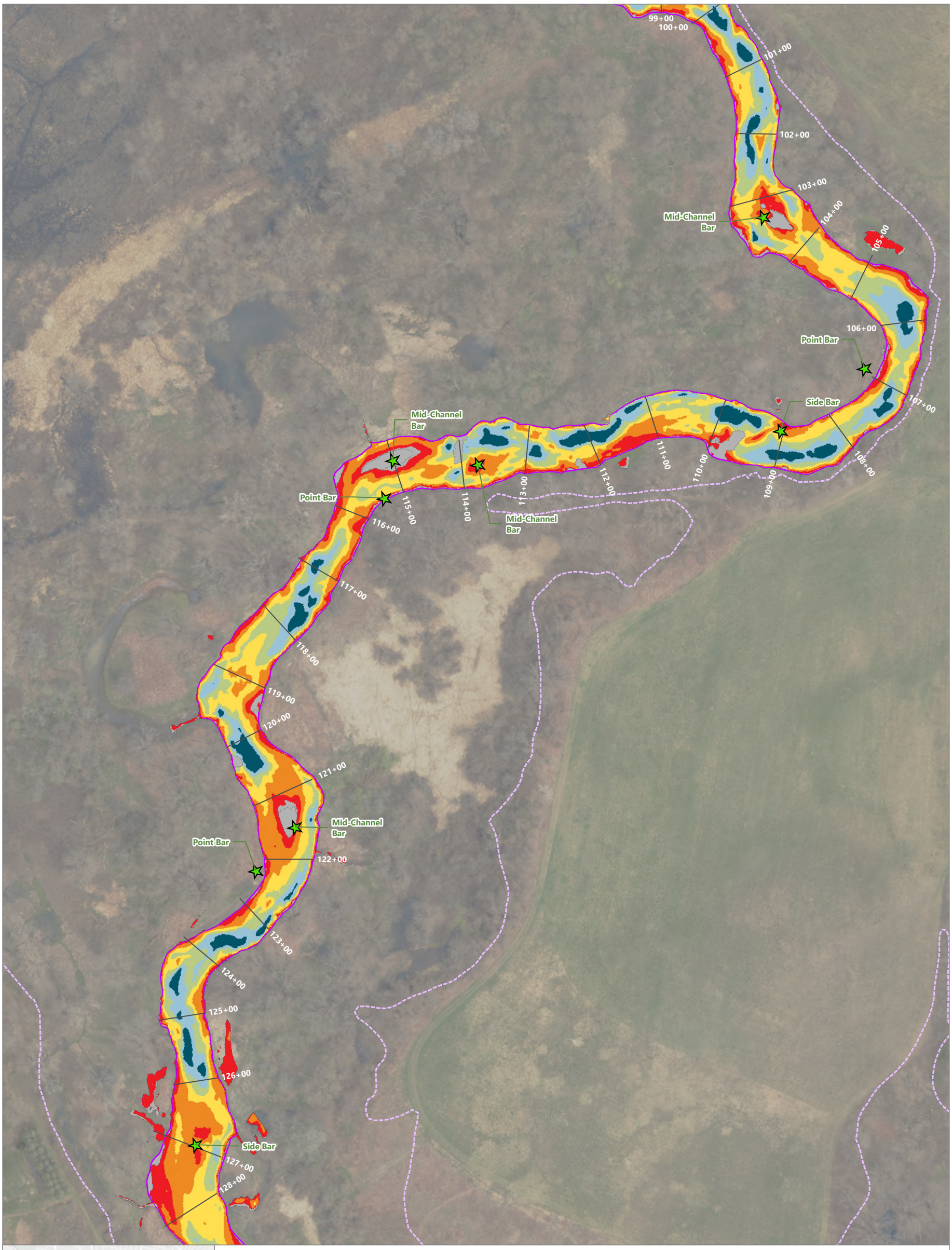

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Figure 5-2e
Reach 5A Water Depths at 63 cfs at USGS Coltsville Gage
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River - Rest of River

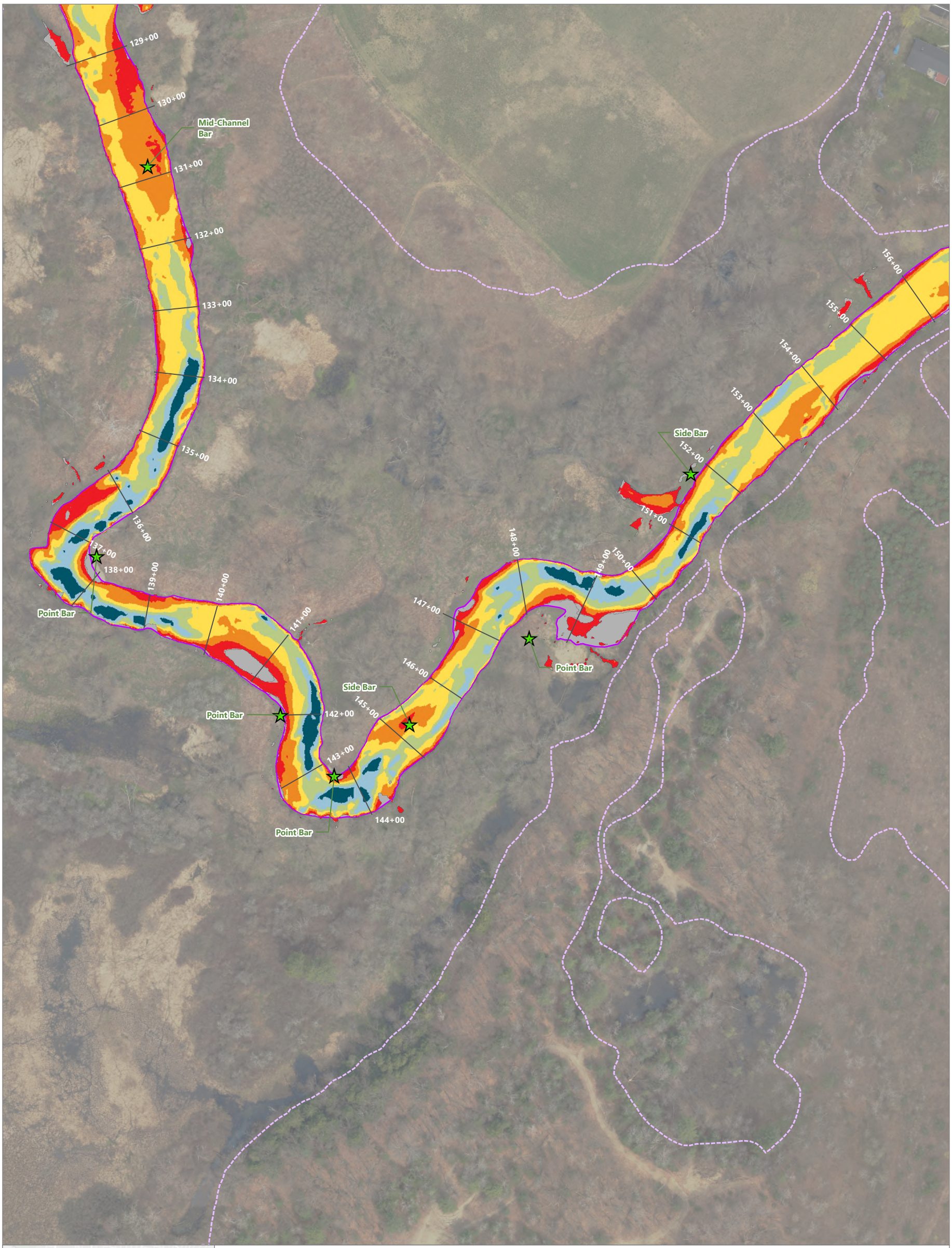

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Figure 5-2f
Reach 5A Water Depths at 63 cfs at USGS Coltsville Gage
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River - Rest of River



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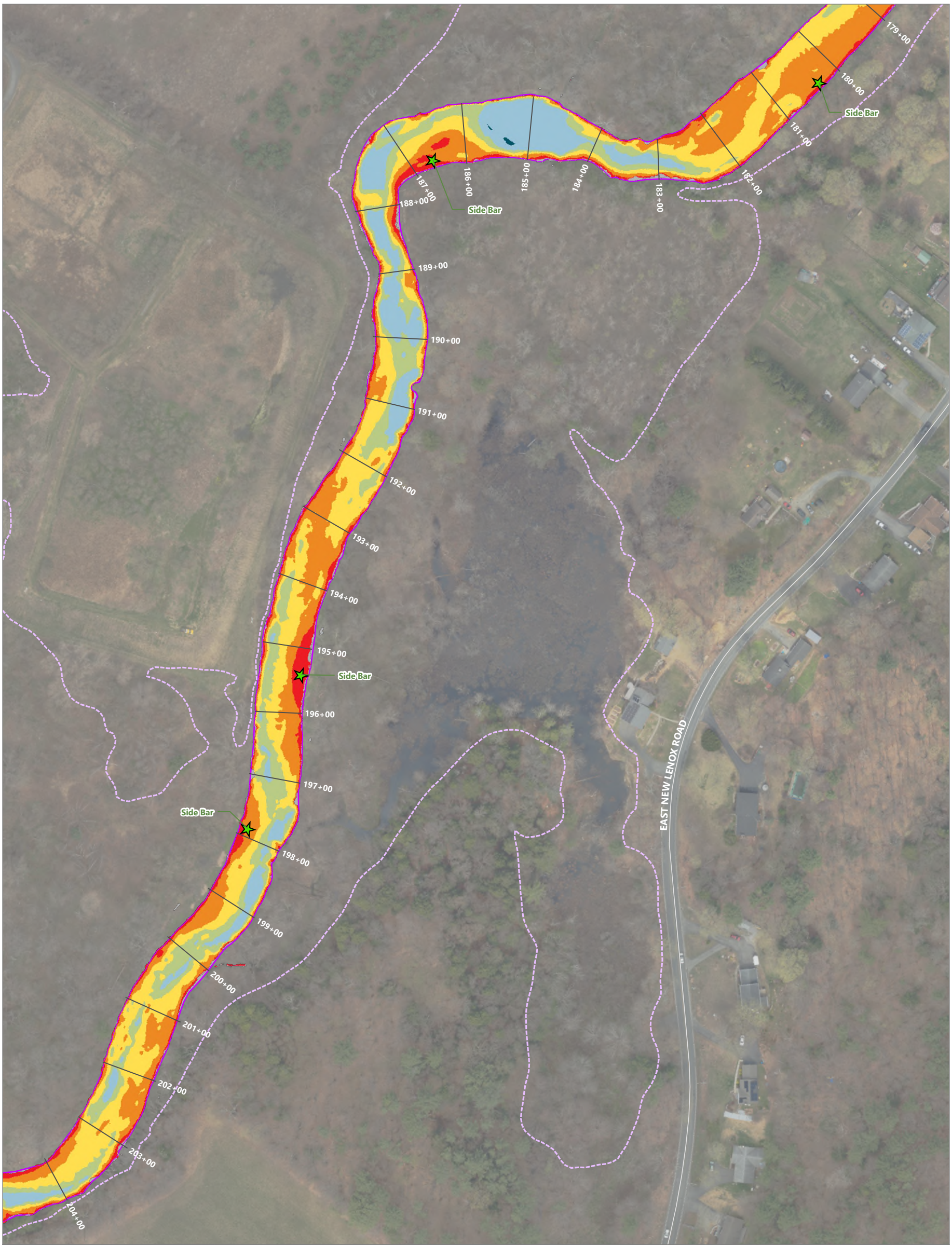
Figure 5-2g
Reach 5A Water Depths at 63 cfs at USGS Coltsville Gage
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River - Rest of River



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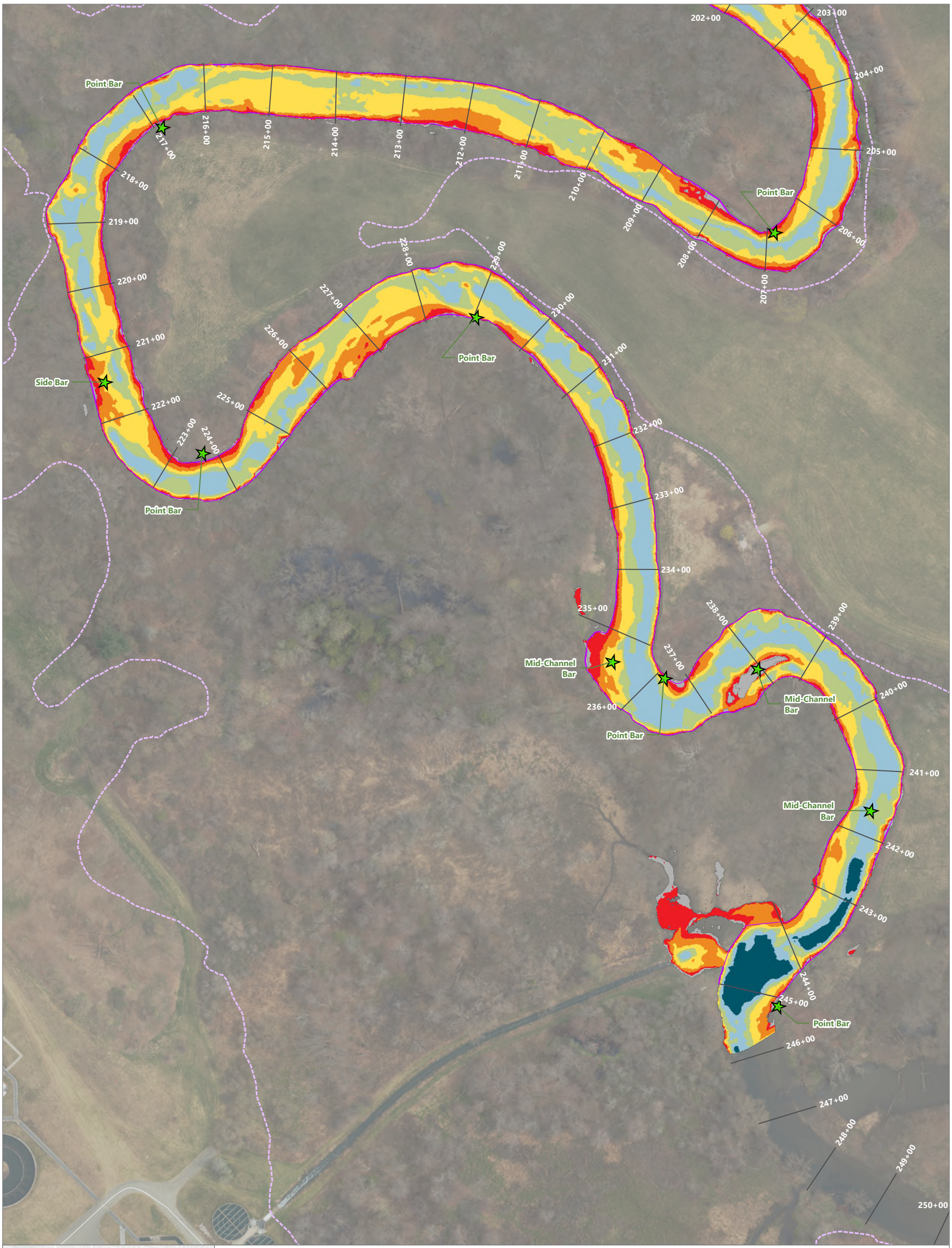
ANCHOR QEA

Figure 5-2h
Reach 5A Water Depths at 63 cfs at USGS Coltsville Gage
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River - Rest of River



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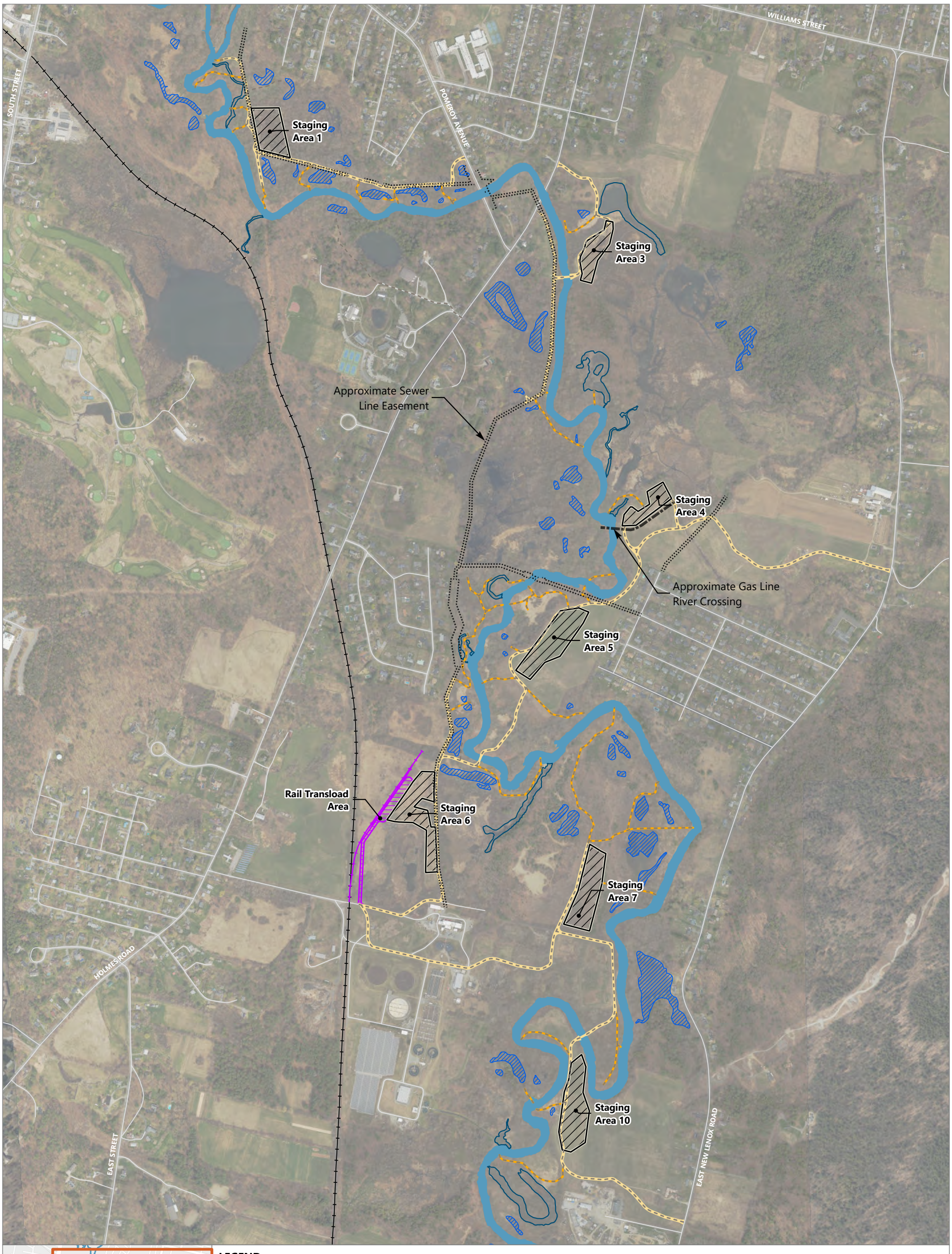
ANCHOR QEA

Figure 5-2i
Reach 5A Water Depths at 63 cfs at USGS Coltsville Gage
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River - Rest of River



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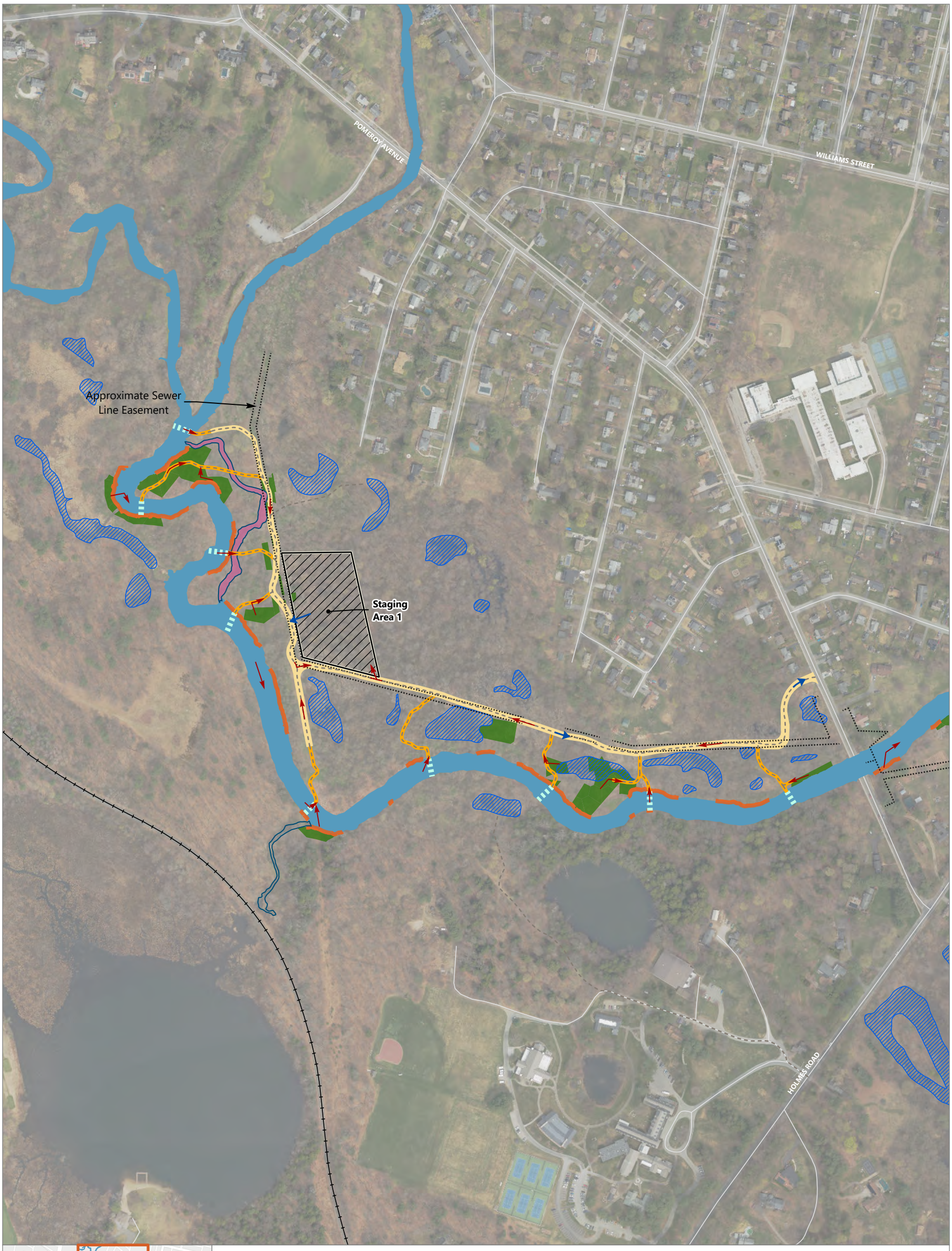
ANCHOR QEA

Figure 7-1a
Reach 5A Temporary Access Roads and Staging Areas
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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ANCHOR QEA

Figure 7-1b
Reach 5A Temporary Access Roads and Staging Areas (Staging Area 1)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

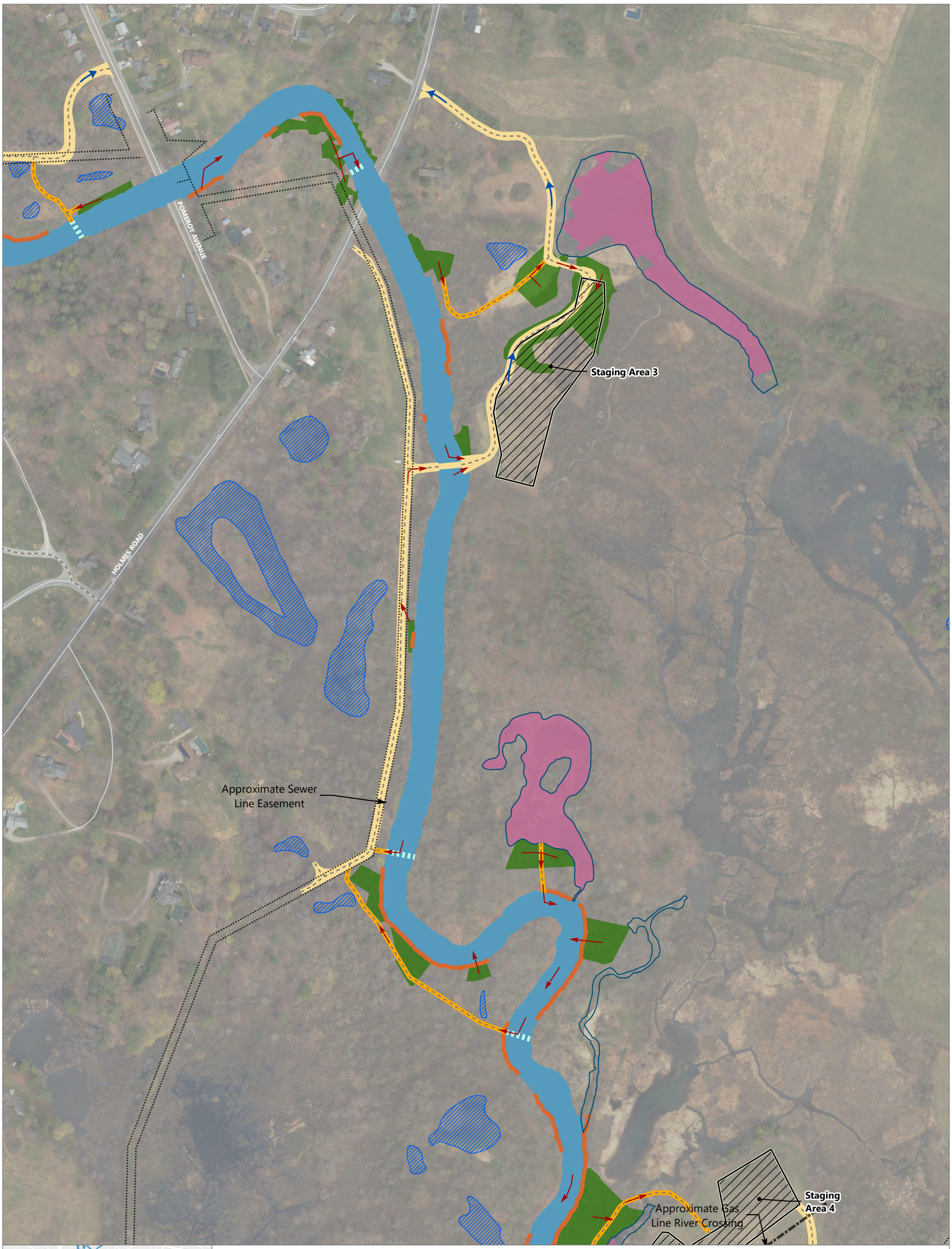

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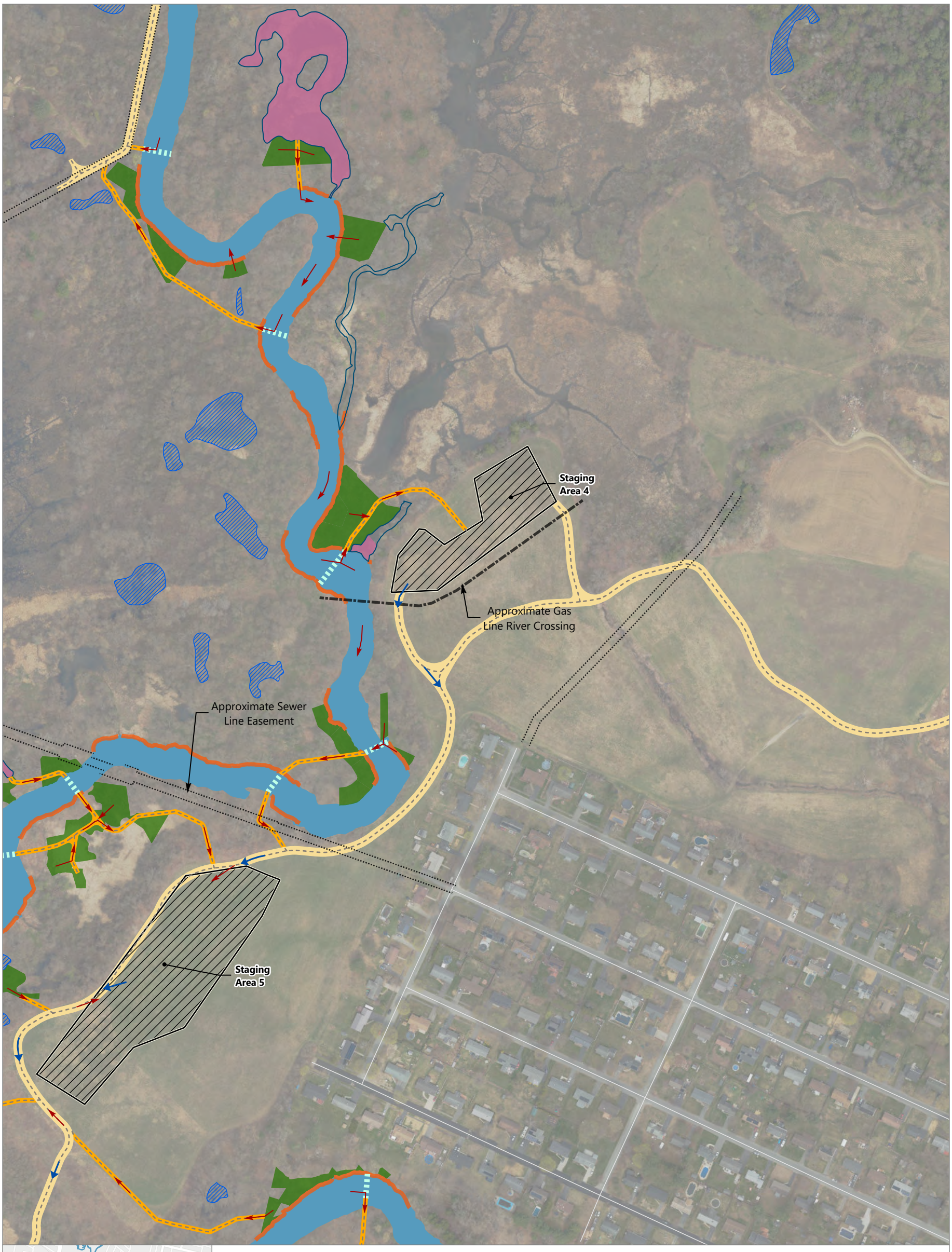
Figure 7-1c
Reach 5A Temporary Access Roads and Staging Areas (Staging Area 3)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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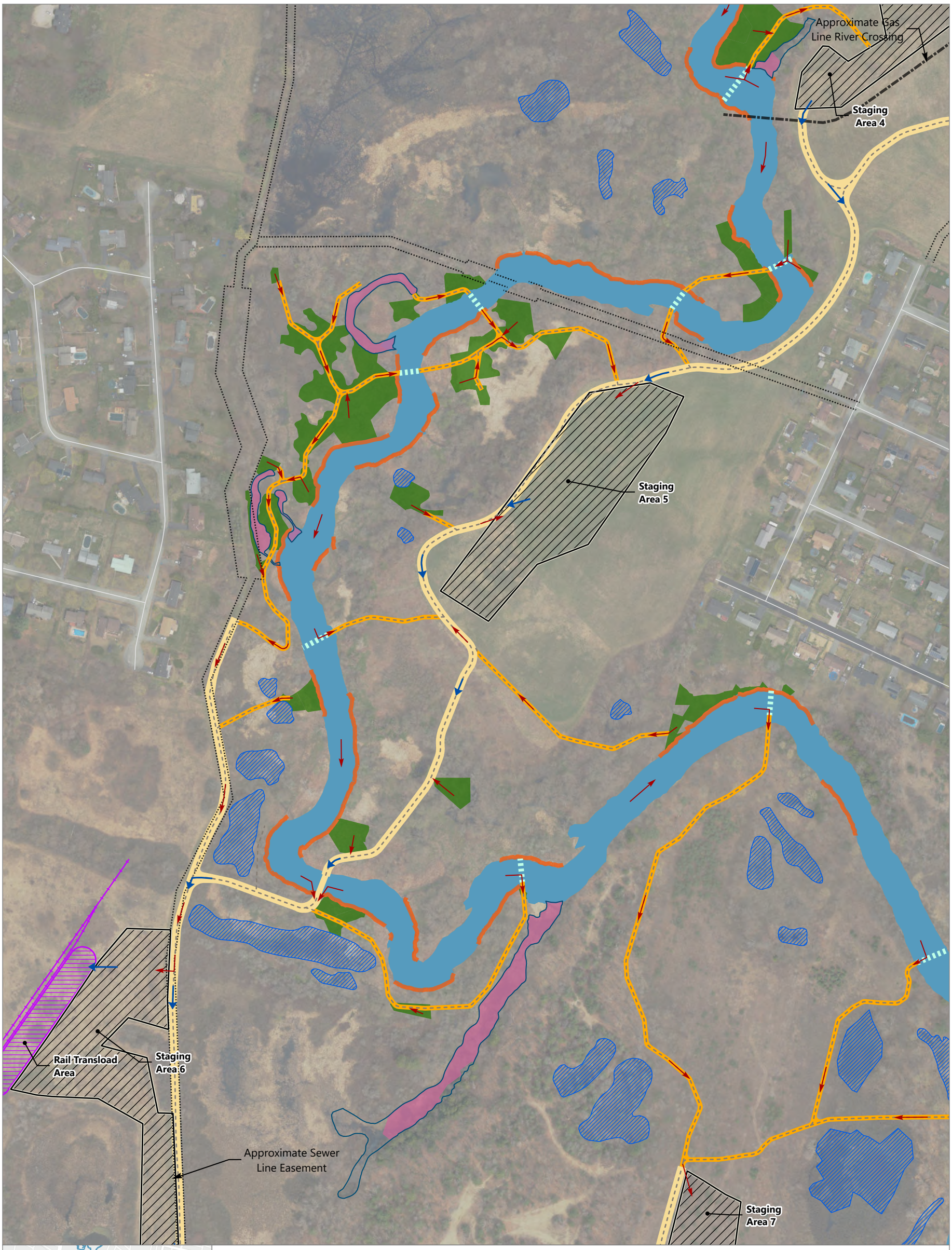
ANCHOR QEA

Figure 7-1d
Reach 5A Temporary Access Roads and Staging Areas (Staging Area 4)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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ANCHOR QEA

Figure 7-1e
Reach 5A Temporary Access Roads and Staging Areas (Staging Area 5)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

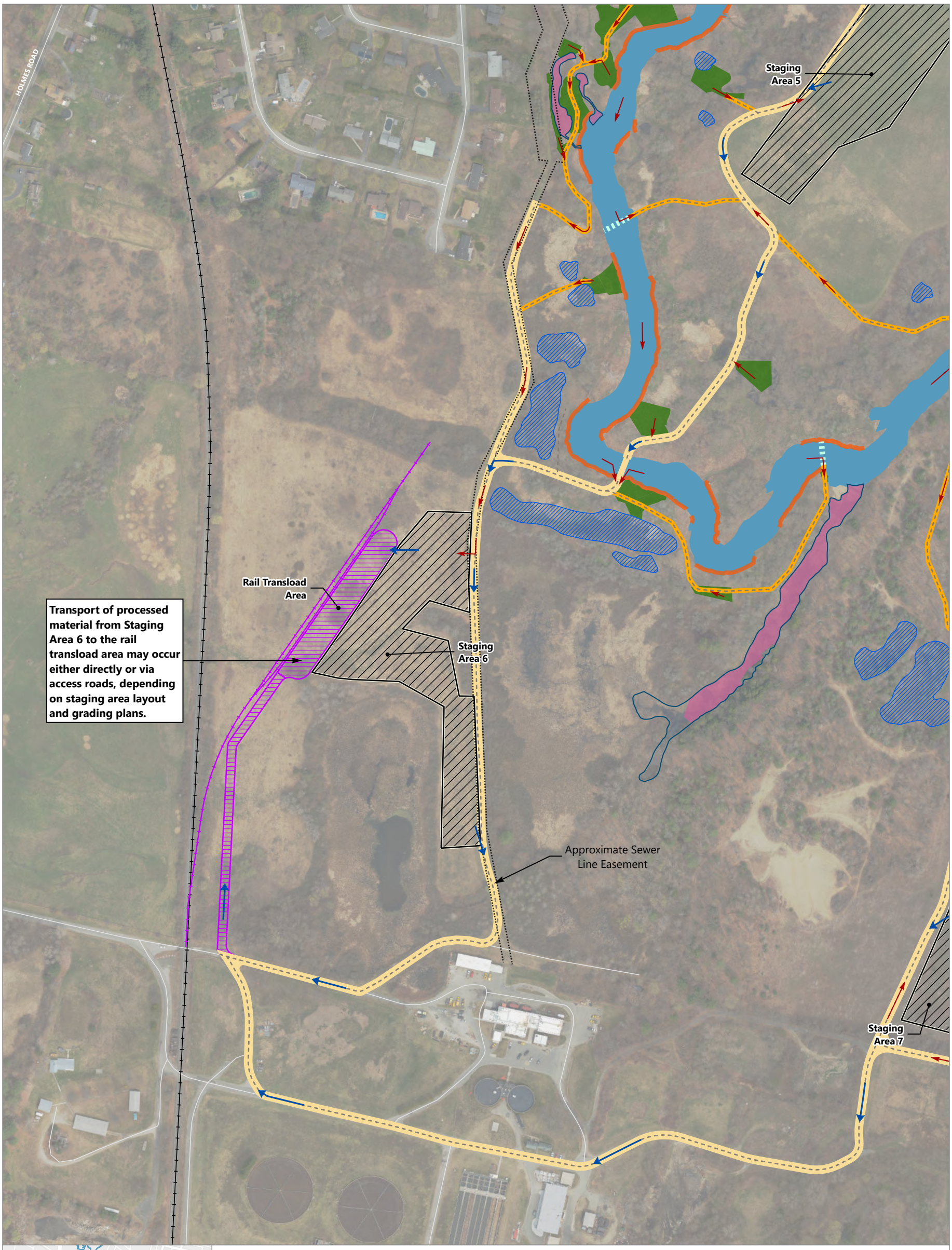

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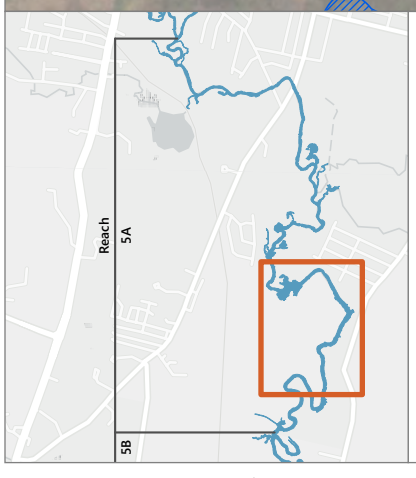
Figure 7-1f
Reach 5A Temporary Access Roads and Staging Areas (Staging Area 6)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

Approximate Sewer Line Easement

Staging Area 7

EAST NEW LENOX ROAD



LEGEND:

- Housatonic River
- Roads
- Railroad
- Vernal Pools
- Backwaters and Other Waterbodies
- Staging Area
- Primary Access Roads
- Secondary Access Roads
- At Grade River Crossing
- Approximate Sewer Line Easement
- Floodplain Soil Removal
- Riverbank Soil Remediation
- Backwaters and Other Waterbodies Remediation
- Conceptual Flow of Excavated/Dredged Material to Staging Area
- Flow of Processed Material from Staging Area for Transport and Disposal

NOTES:

1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. Conceptual flow directions generally illustrate the transport routes conveying excavated and dredged materials from remediation areas to the staging area for processing. Actual transport routes subject to change based on Contractor input and layout of Staging Area.

0 300

Feet

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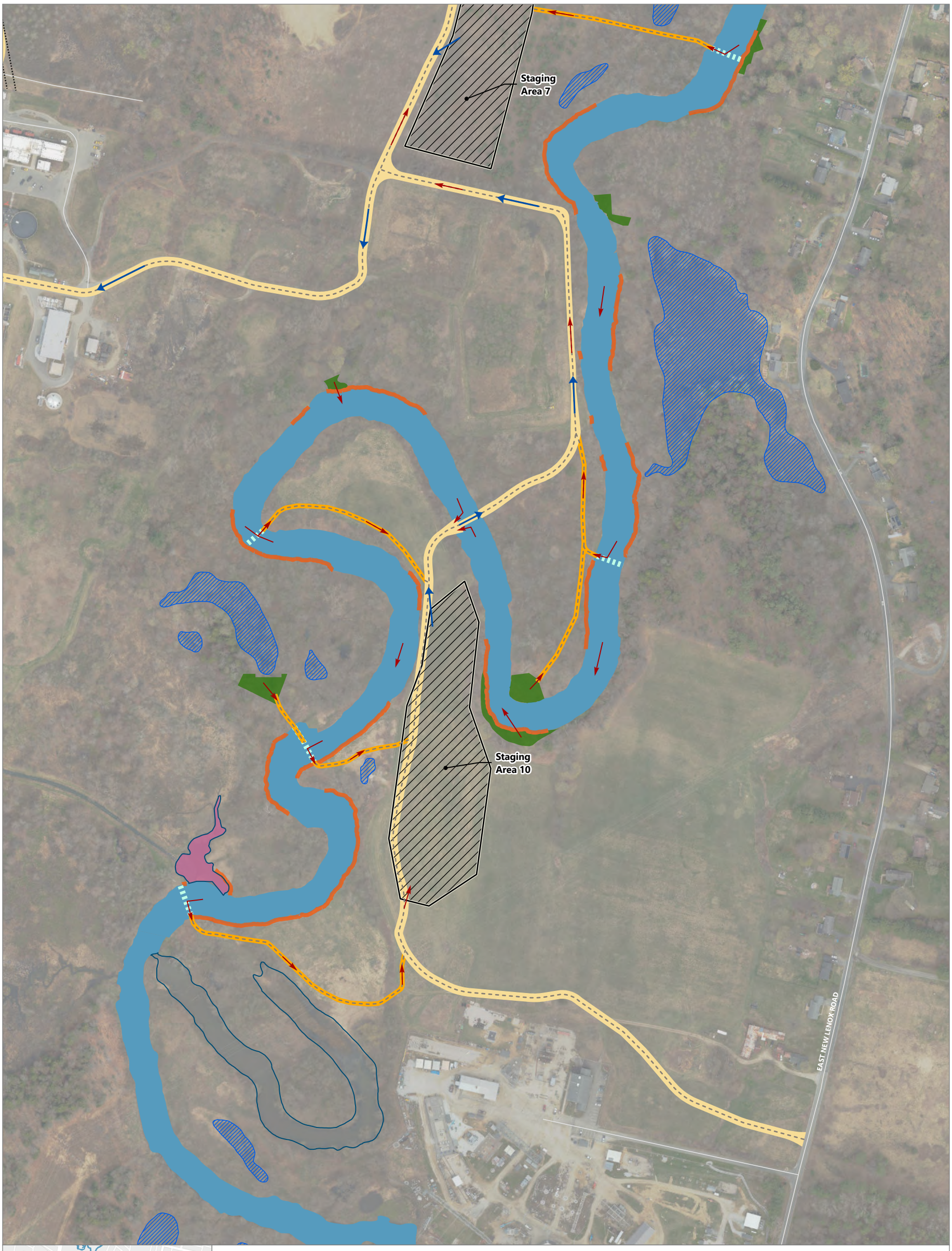
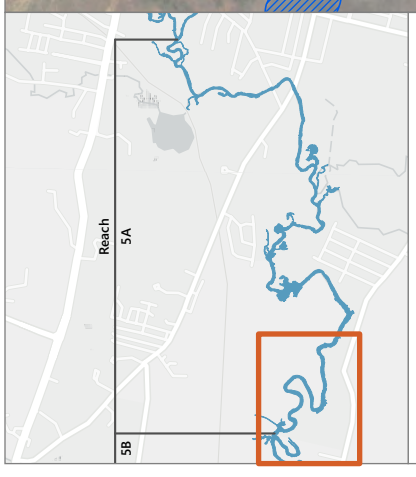
Figure 7-1g
Reach 5A Temporary Access Roads and Staging Areas (Staging Area 7)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River





LEGEND:

- Housatonic River
- Roads
- Railroad
- Vernal Pools
- Backwaters and Other Waterbodies
- Staging Area
- Primary Access Roads
- Secondary Access Roads
- At Grade River Crossing
- Approximate Sewer Line Easement
- Floodplain Soil Removal
- Riverbank Soil Remediation
- Backwaters and Other Waterbodies Remediation
- Conceptual Flow of Excavated/Dredged Material to Staging Area
- Flow of Processed Material from Staging Area for Transport and Disposal

NOTES:

1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. Conceptual flow directions generally illustrate the transport routes conveying excavated and dredged materials from remediation areas to the staging area for processing. Actual transport routes subject to change based on Contractor input and layout of Staging Area.

0 300
Feet

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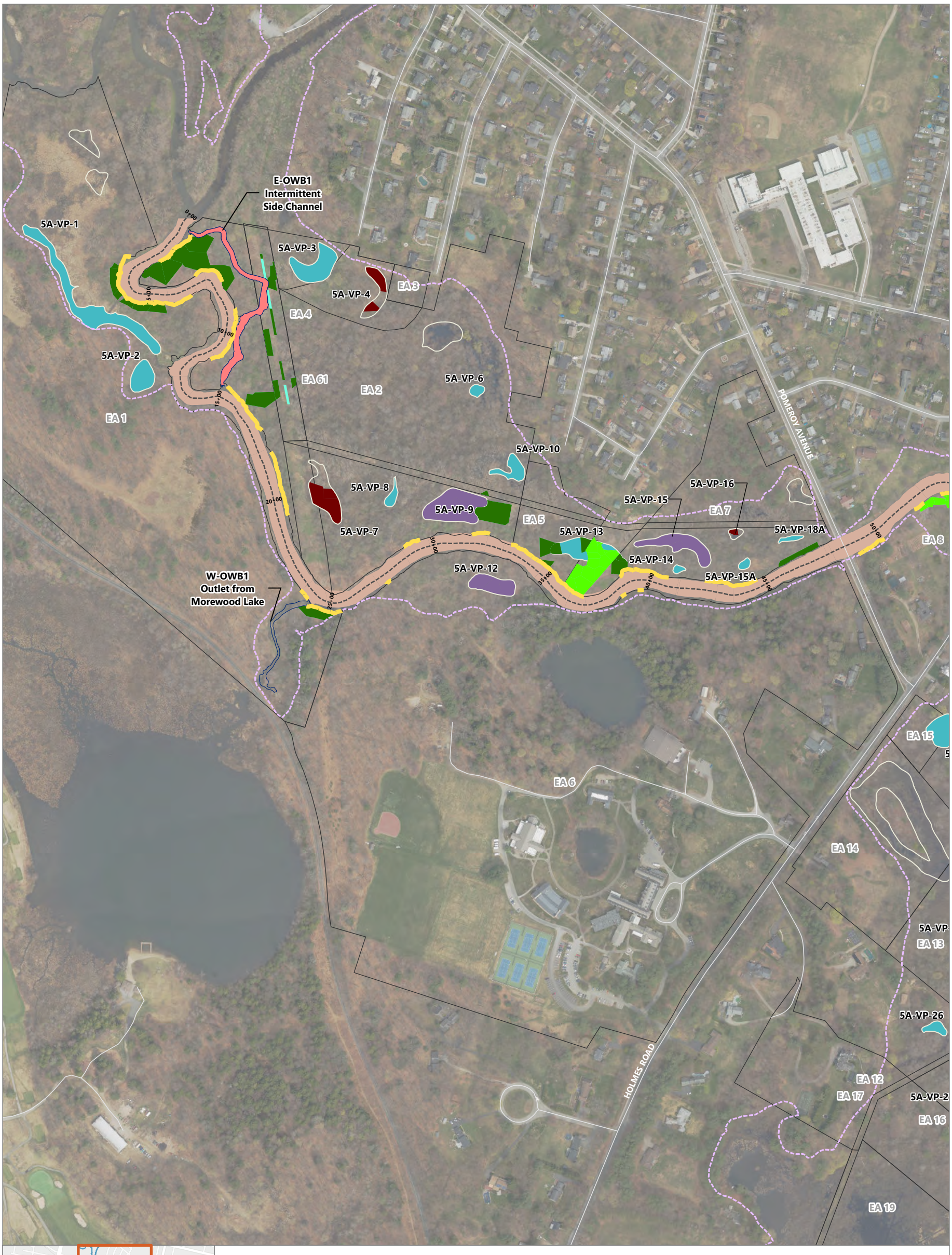
Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section7.aprx | RDWP Fig 7-1 Access and Staging

ANCHOR QEA

Figure 7-1h
Reach 5A Temporary Access Roads and Staging Areas (Staging Area 10)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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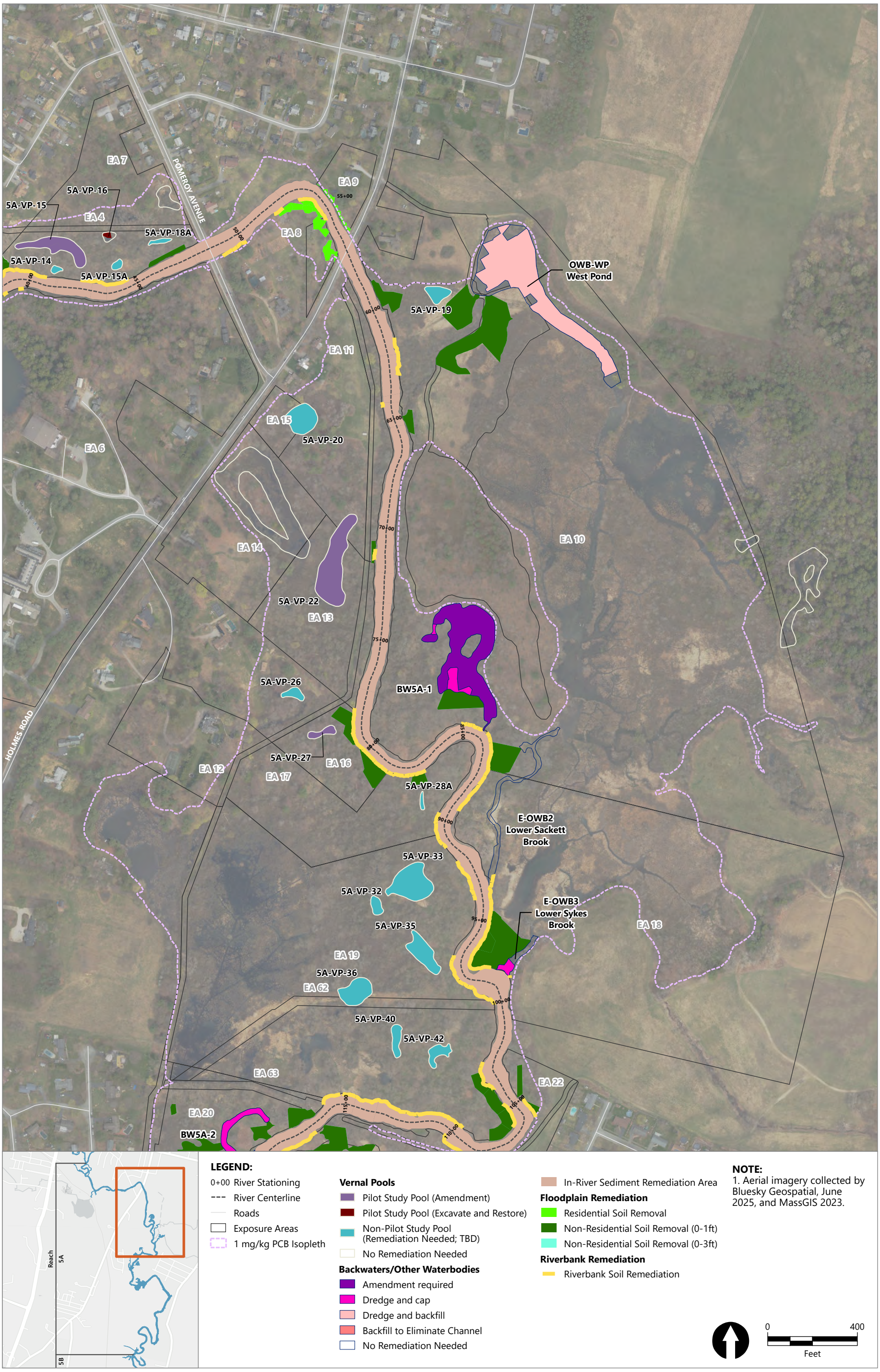
Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section8.aprx | RDWP Fig 8-1 Remediation

ANCHOR QEA

Figure 8-1a
Remediation Areas for Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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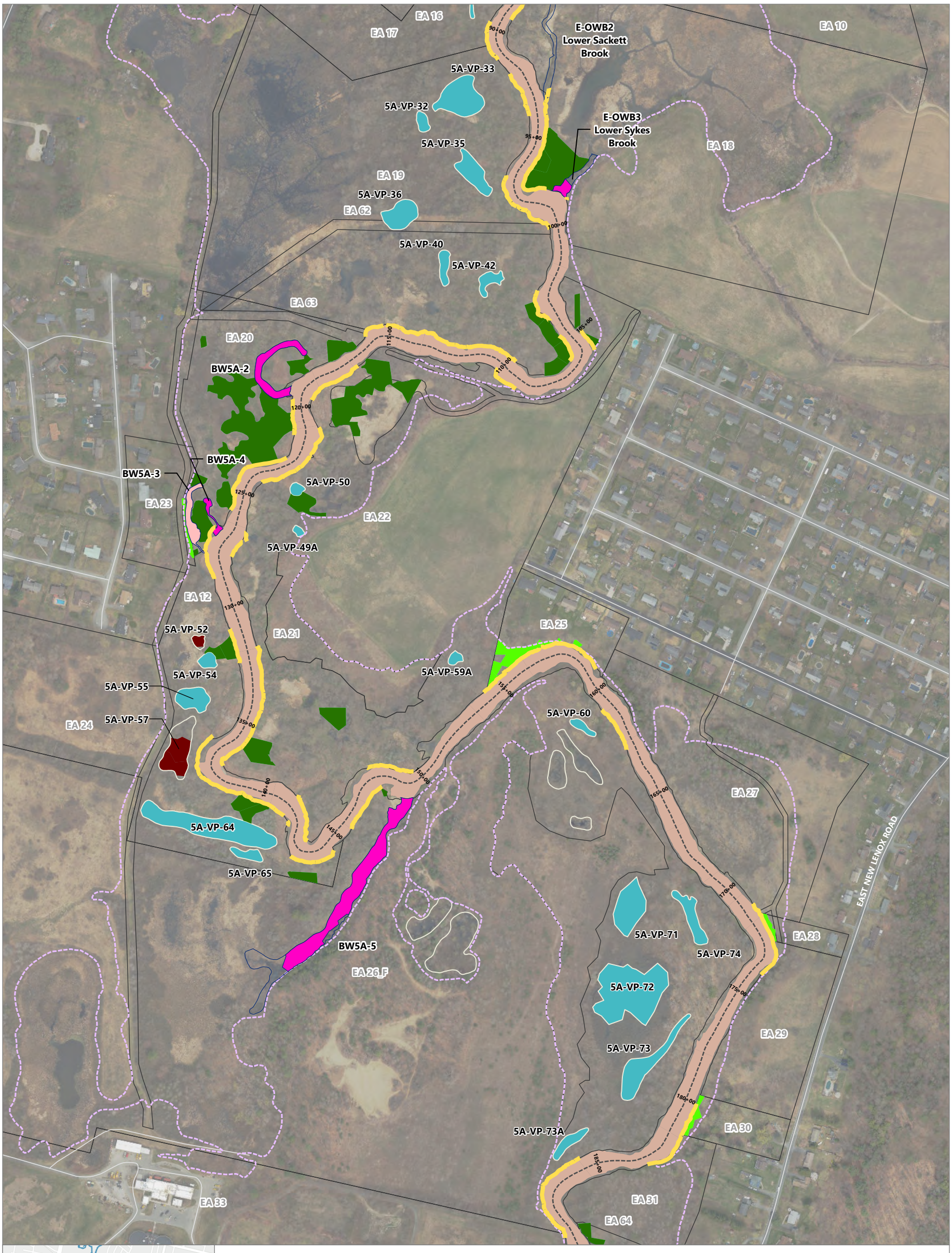
Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section8.aprx | RDWP Fig 8-1 Remediation

ANCHOR QEA

Figure 8-1b
Remediation Areas for Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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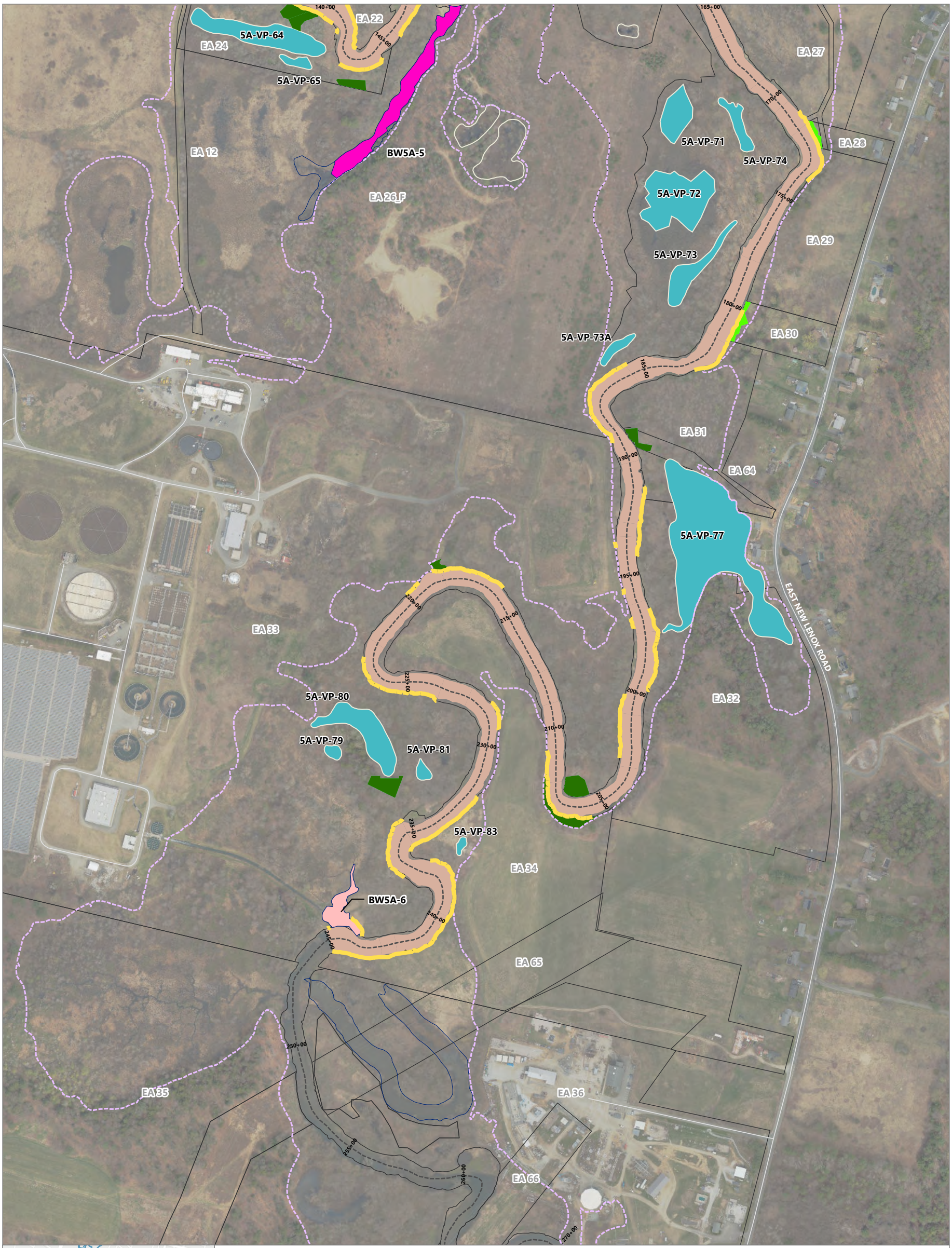
Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section8.aprx | RDWP Fig 8-1 Remediation

ANCHOR QEA

Figure 8-1c
Remediation Areas for Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section8.aprx | RDWP Fig 8-1 Remediation

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Figure 8-1d
Remediation Areas for Reach 5A

Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section8.aprx | RDWP Fig 8-2 Shoreline Survey

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Figure 8-2a
Shoreline Boundary and Surveyed Shoreline Stakes in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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ANCHOR QEA

Figure 8-2b
Shoreline Boundary and Surveyed Shoreline Stakes in Reach 5A

Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

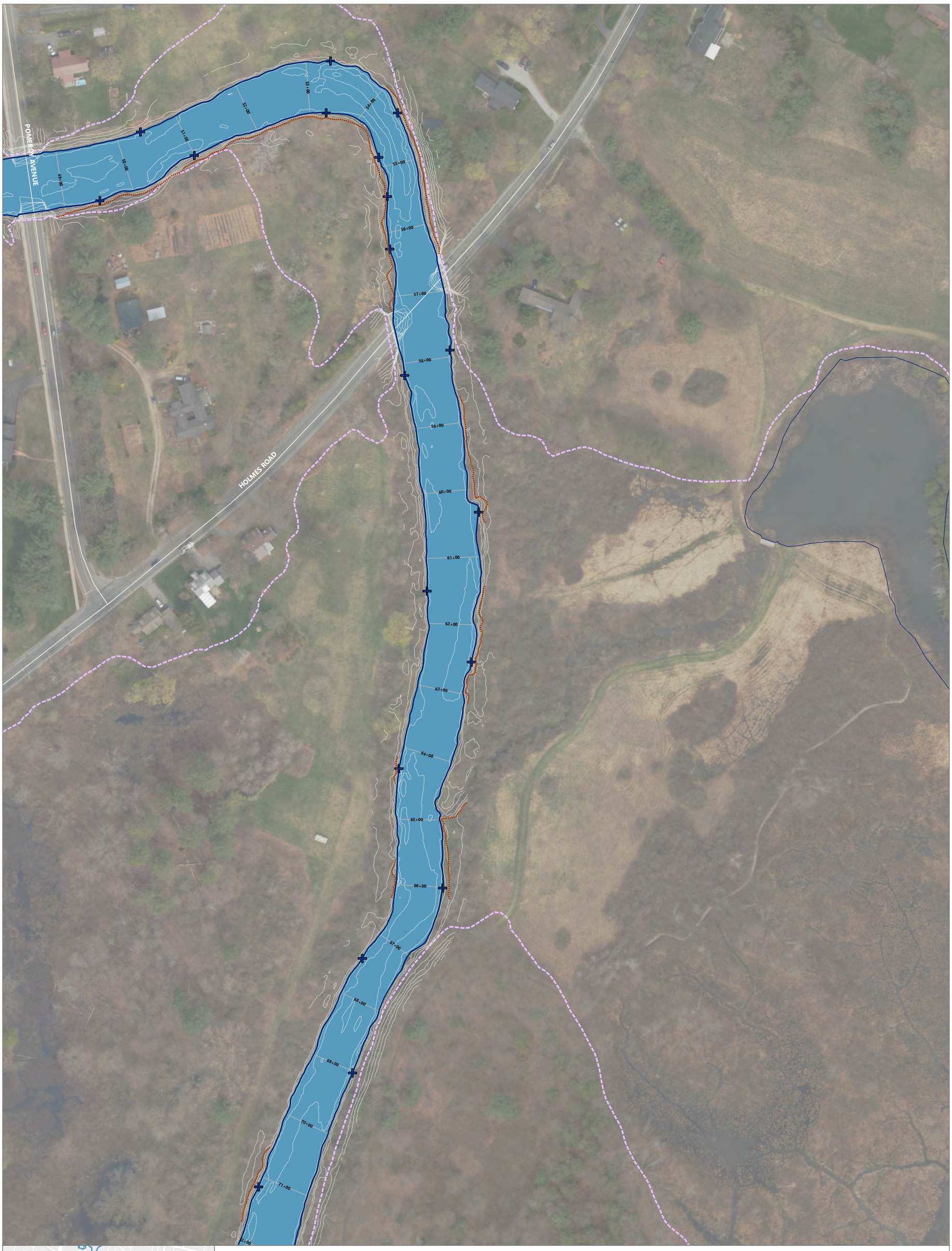

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Figure 8-2c
Shoreline Boundary and Surveyed Shoreline Stakes in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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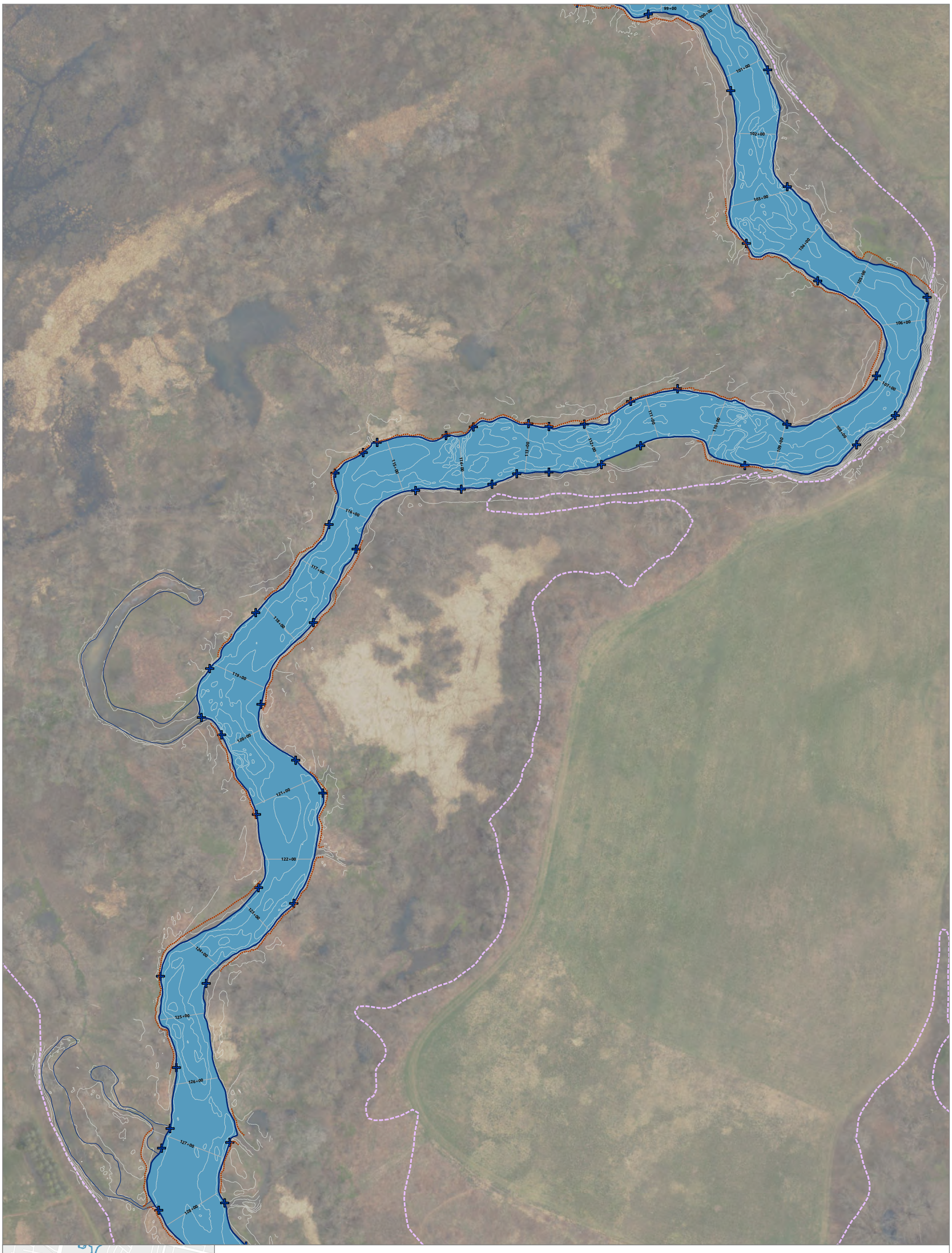
ANCHOR QEA

Figure 8-2d
Shoreline Boundary and Surveyed Shoreline Stakes in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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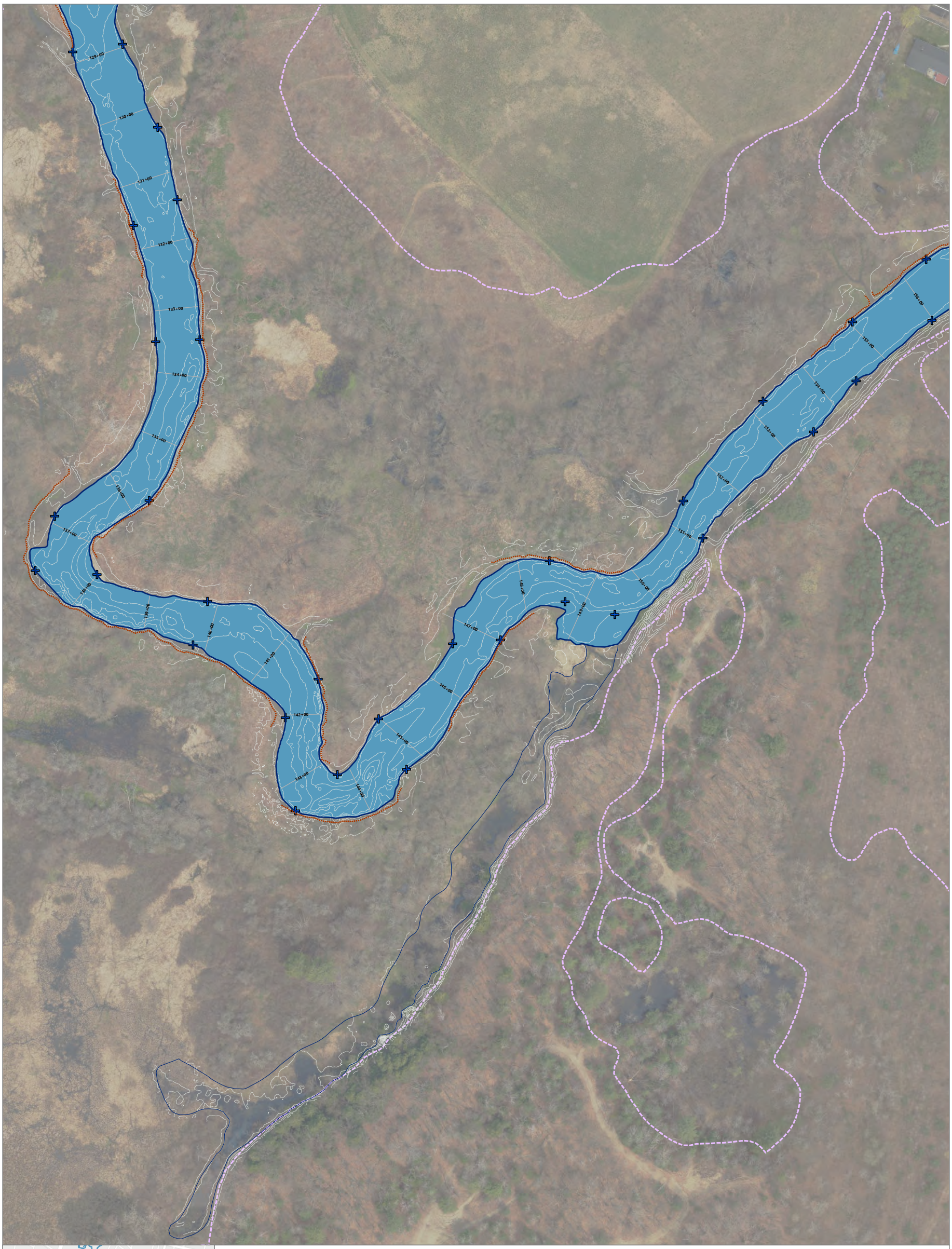
Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section8.aprx | RDWP Fig 8-2 Shoreline Survey

ANCHOR QEA

Figure 8-2e
Shoreline Boundary and Surveyed Shoreline Stakes in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



LEGEND:

- Housatonic River
- 0+00 River Stationing
- 1 mg/kg PCB Isopleth
- 2-foot Elevation Contours (ft NAVD88)
- Shoreline Stake
- Top of Bank
- Bottom of Bank

NOTES:

1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. In-River and Bank LIDAR data collected by Whiteout Solutions, May and December 2025.
3. Shoreline stake survey conducted by CT Male in October and November 2025. Field reviews were conducted by GE and EPA representatives in November 2025 to review the shoreline stakes.
4. Top of bank surveyed only in areas of riverbank or floodplain soil remediation from Station 0+00 to Station 48+00.

0 150
Feet

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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section8.aprx | RDWP Fig 8-2 Shoreline Survey

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Figure 8-2f
Shoreline Boundary and Surveyed Shoreline Stakes in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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Figure 8-2g
Shoreline Boundary and Surveyed Shoreline Stakes in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section8.aprx | RDWP Fig 8-2 Shoreline Survey

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Figure 8-2h
Shoreline Boundary and Surveyed Shoreline Stakes in Reach 5A



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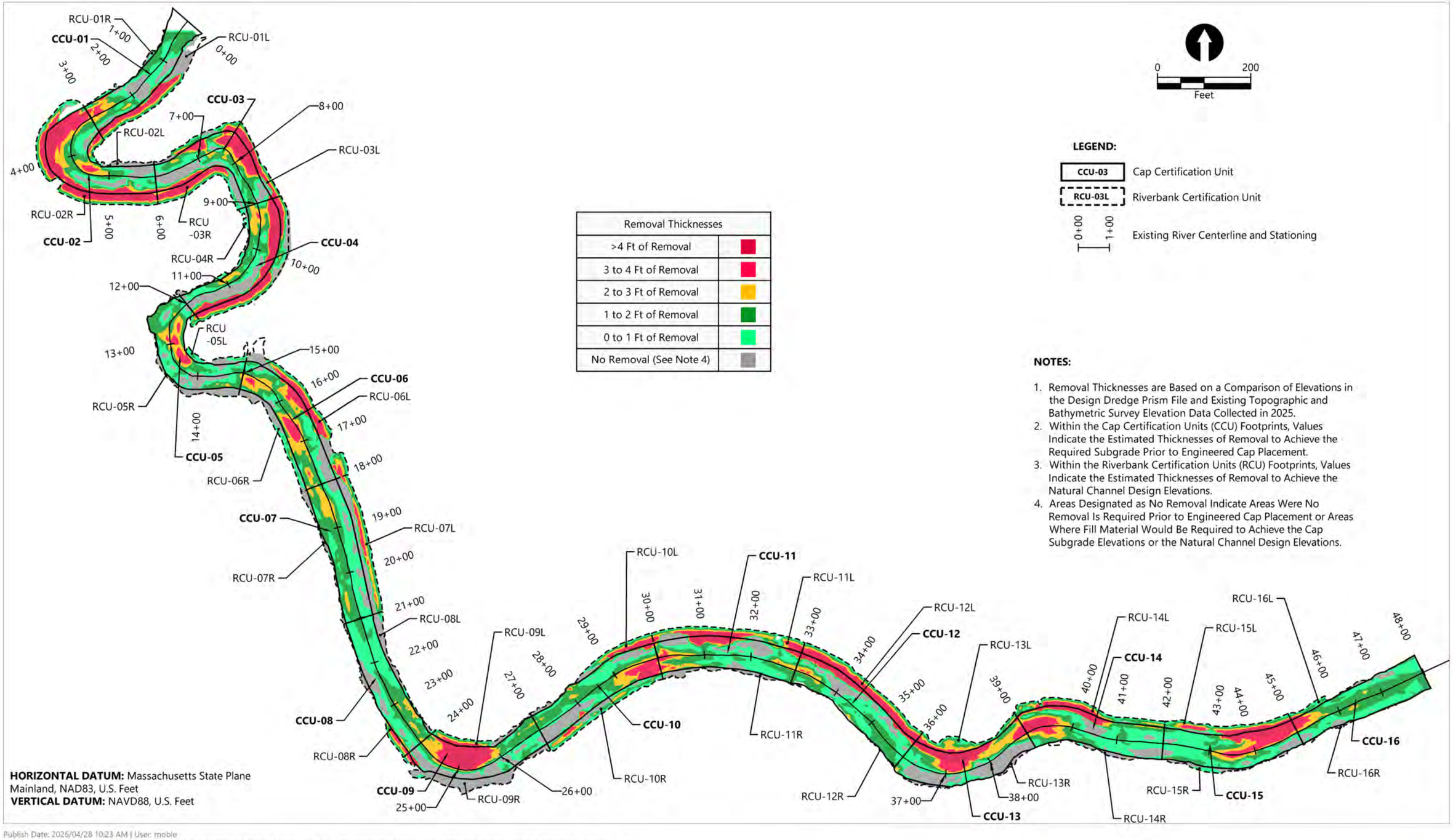
ANCHOR QEA

Figure 8-2i
Shoreline Boundary and Surveyed Shoreline Stakes in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



Removal Thicknesses	
>4 Ft of Removal	
3 to 4 Ft of Removal	
2 to 3 Ft of Removal	
1 to 2 Ft of Removal	
0 to 1 Ft of Removal	
No Removal (See Note 4)	

LEGEND:

- CCU-03 — Cap Certification Unit
- RCU-03L — Riverbank Certification Unit
- 0+00 / 1+00 — Existing River Centerline and Stationing

NOTES:

1. Removal Thicknesses are Based on a Comparison of Elevations in the Design Dredge Prism File and Existing Topographic and Bathymetric Survey Elevation Data Collected in 2025.
2. Within the Cap Certification Units (CCU) Footprints, Values Indicate the Estimated Thicknesses of Removal to Achieve the Required Subgrade Prior to Engineered Cap Placement.
3. Within the Riverbank Certification Units (RCU) Footprints, Values Indicate the Estimated Thicknesses of Removal to Achieve the Natural Channel Design Elevations.
4. Areas Designated as No Removal Indicate Areas Were No Removal Is Required Prior to Engineered Cap Placement or Areas Where Fill Material Would Be Required to Achieve the Cap Subgrade Elevations or the Natural Channel Design Elevations.

HORIZONTAL DATUM: Massachusetts State Plane Mainland, NAD83, U.S. Feet
VERTICAL DATUM: NAVD88, U.S. Feet

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Filepath: K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\0469-RP-029 Main Channel Sediment and Riverbank Soil Removal Thicknesses.dwg | Figure 8-3

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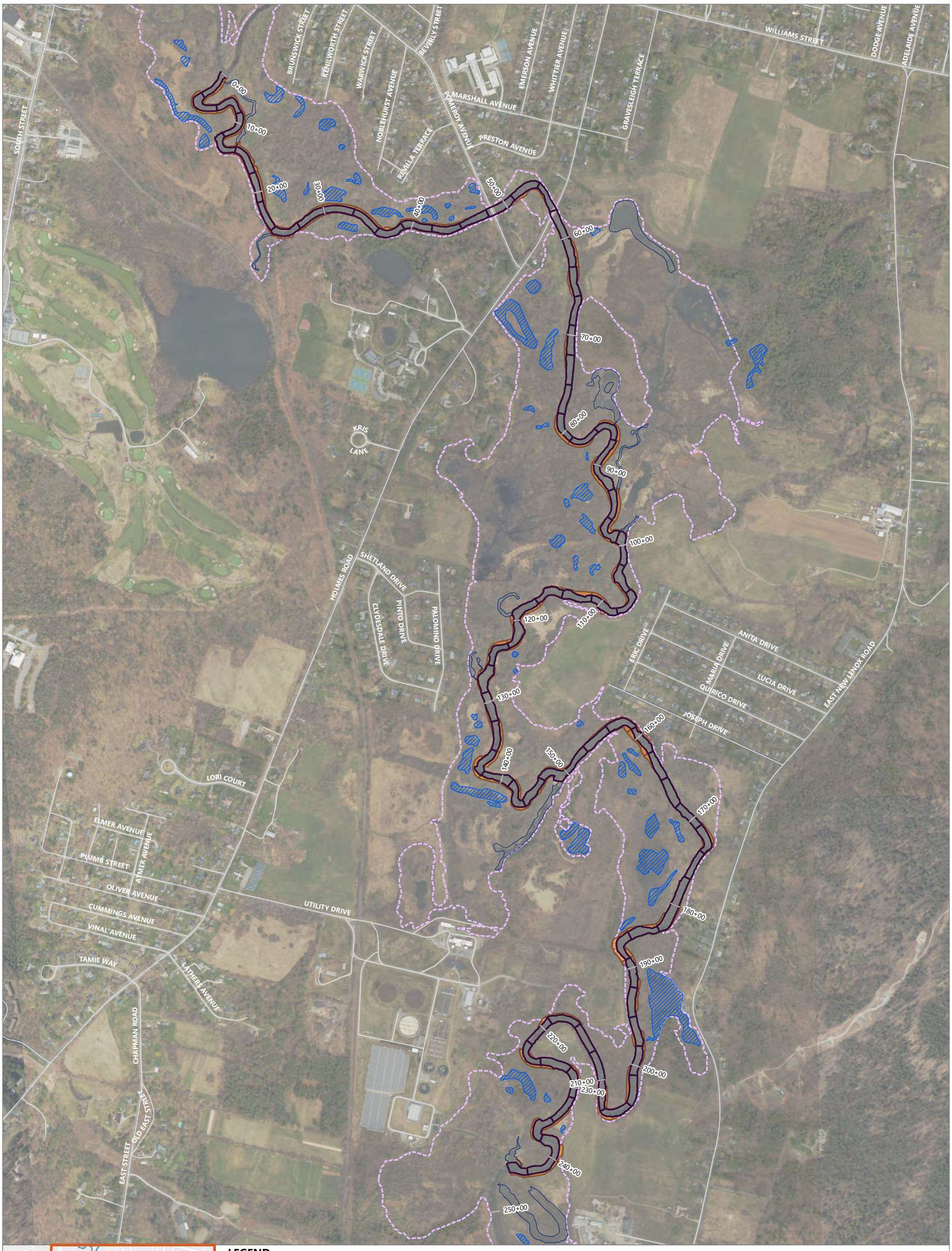
Figure 8-3
Main Channel Sediment and Riverbank Soil Removal Thicknesses – Stations 0+00 to 48+00



LEGEND:

- 0+00 River Stationing
- Roads
- 1 mg/kg PCB Isopleth
- Vernal Pools
- Cap Certification Units
- Riverbank Certification Units

NOTE:
1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.

0 1,000
Feet

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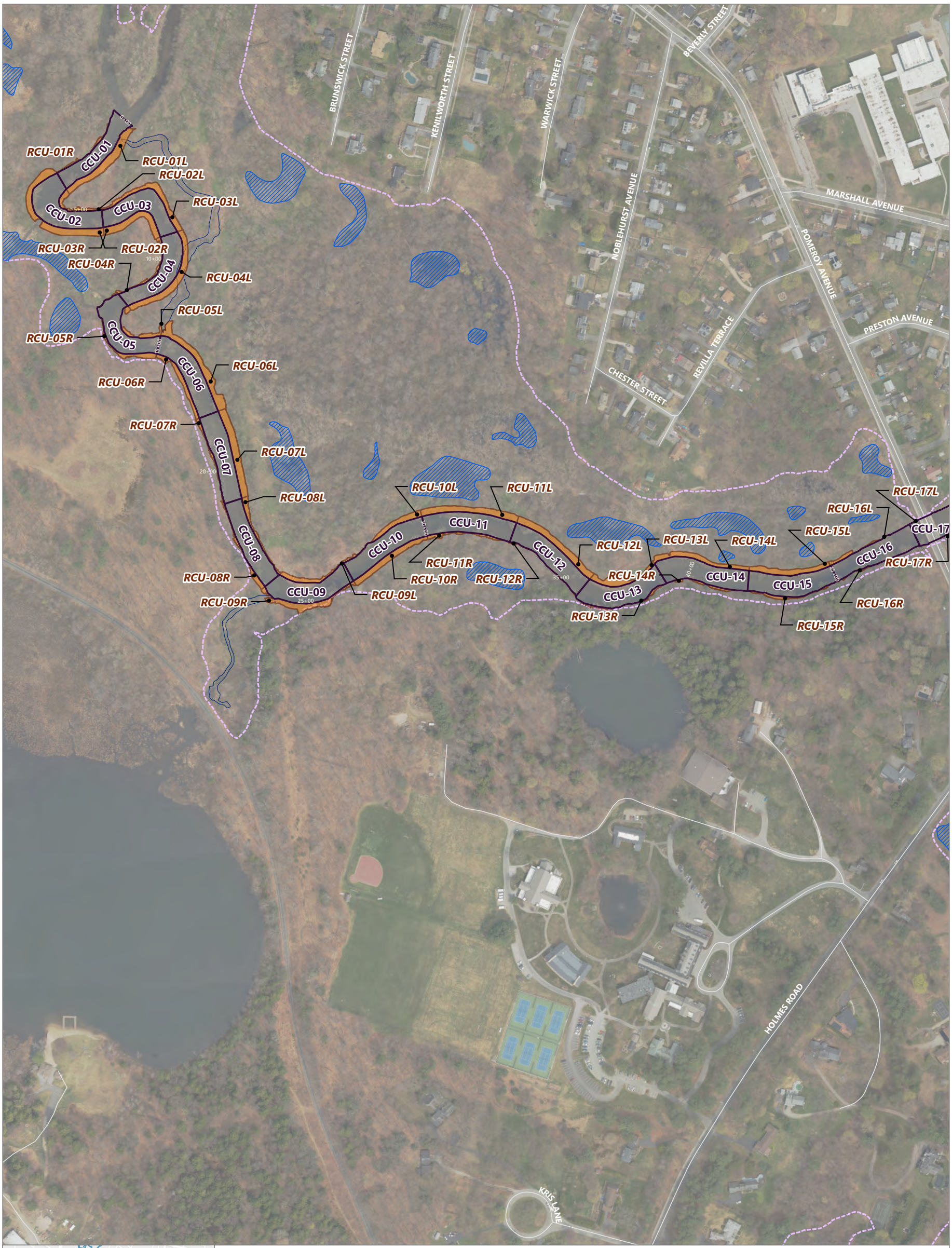
Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section8.aprx | RDWP Fig 8-4 Certification Units

ANCHOR QEA

Figure 8-4a
Cap and Riverbank Certification Units for in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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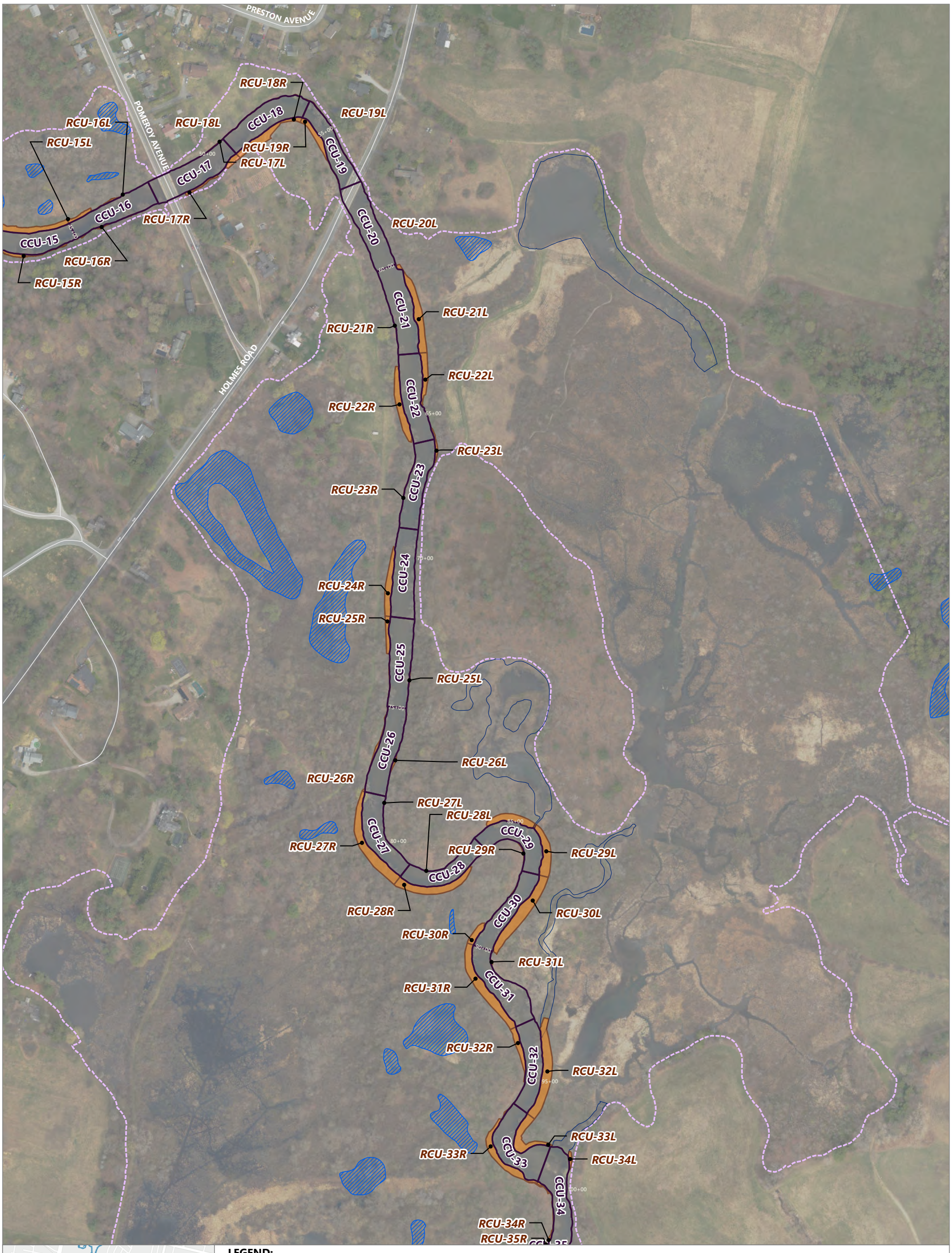
ANCHOR QEA

Figure 8-4b
Cap and Riverbank Certification Units for in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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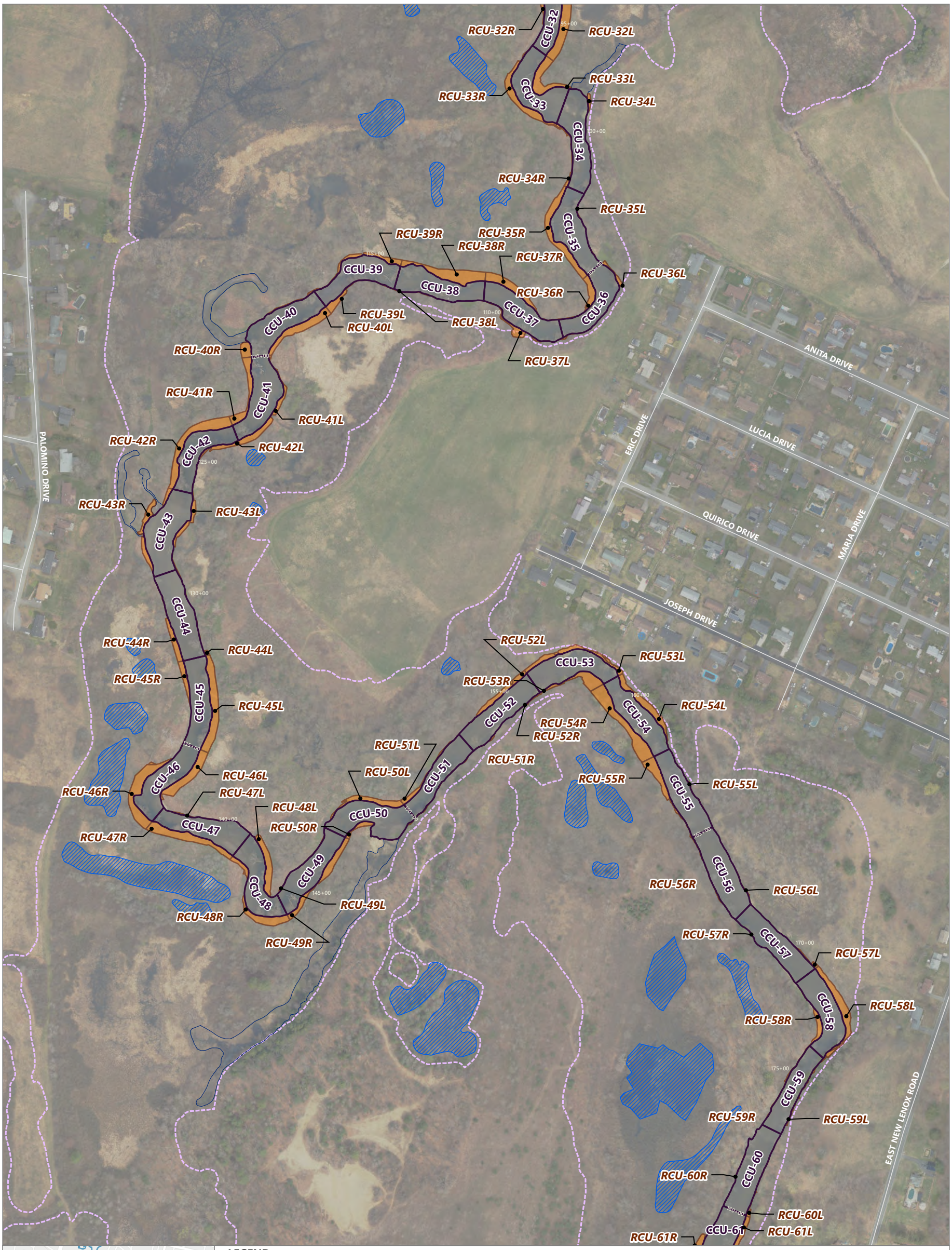
ANCHOR QEA

Figure 8-4c
Cap and Riverbank Certification Units for in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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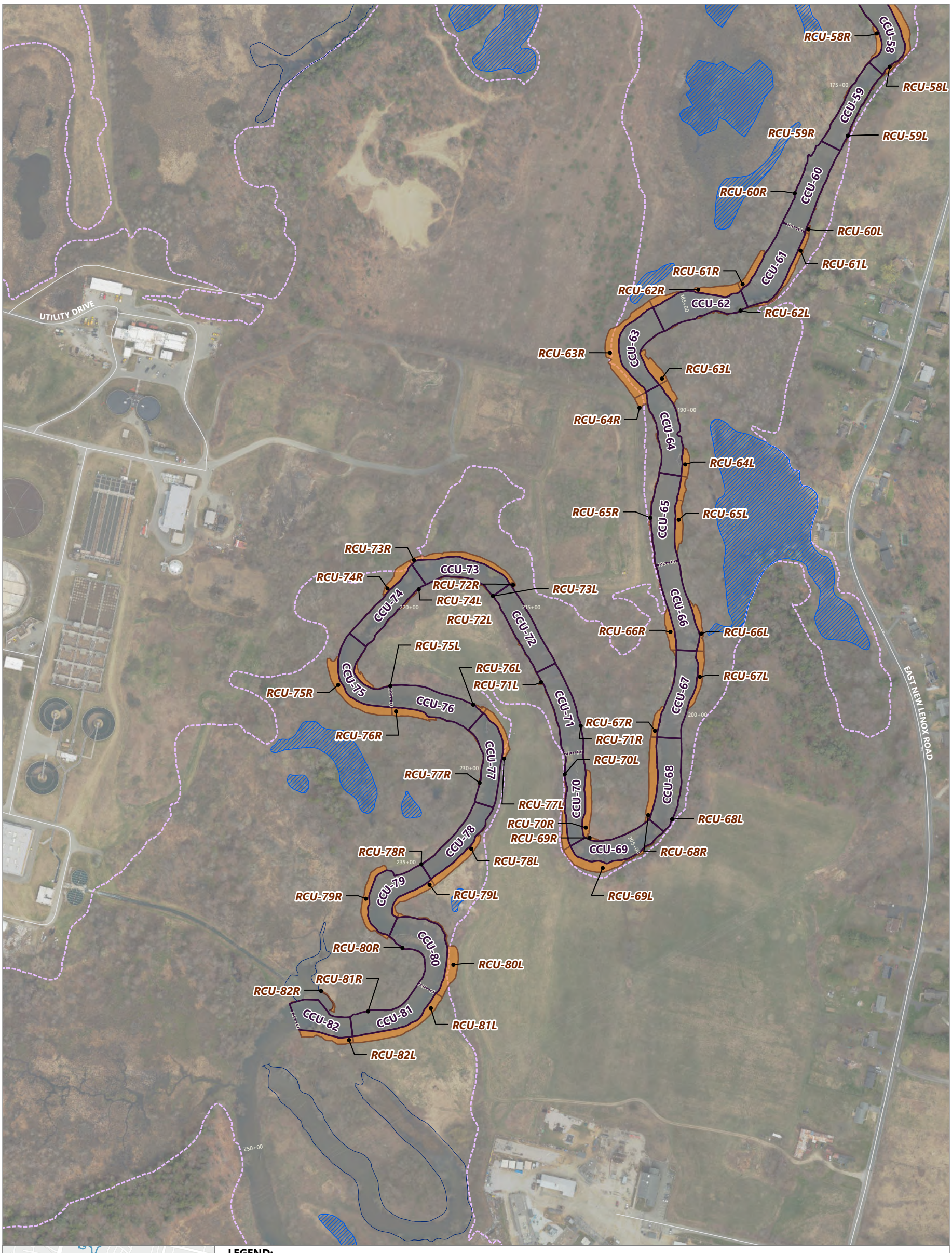
ANCHOR QEA

Figure 8-4d
Cap and Riverbank Certification Units for in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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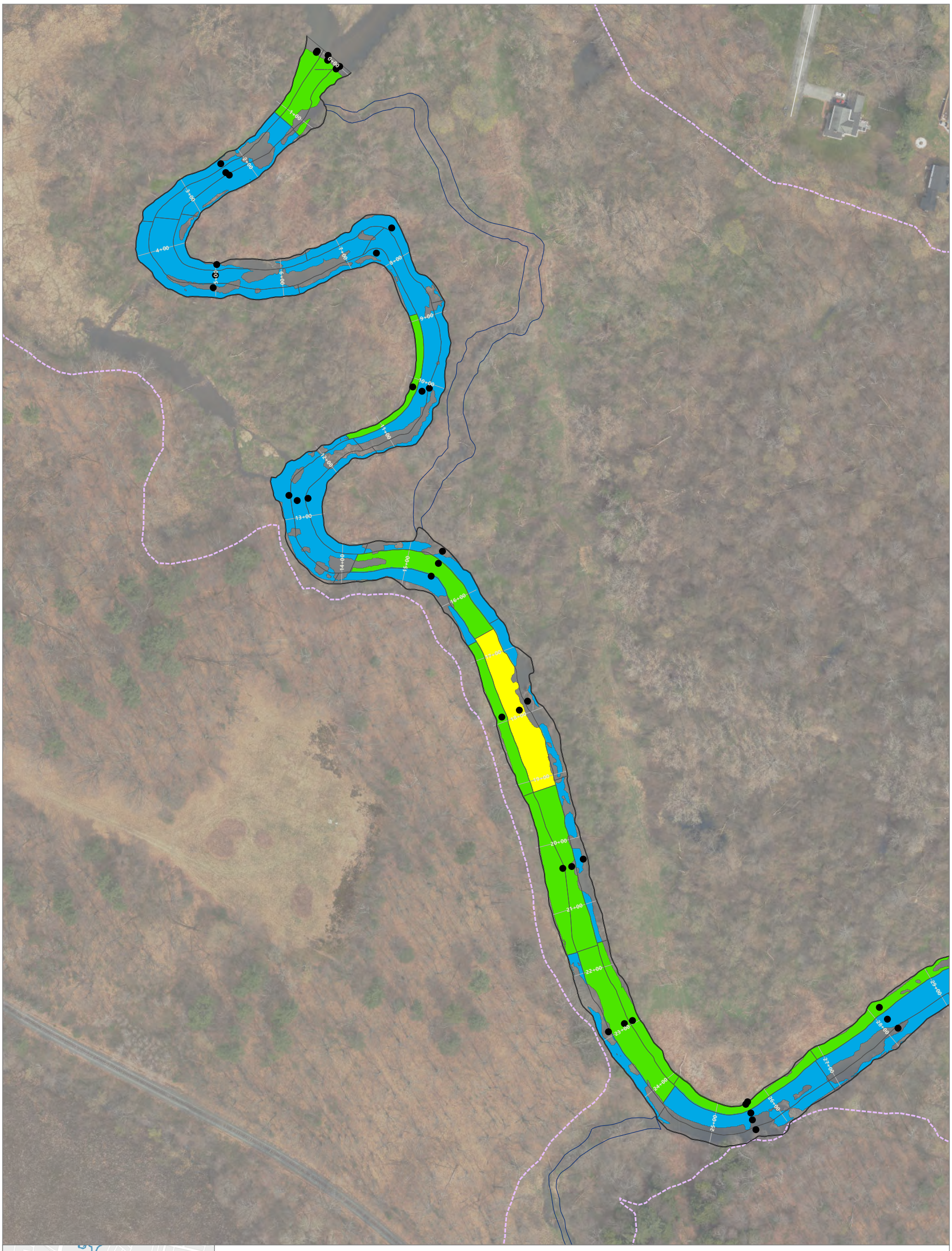
ANCHOR QEA

Figure 8-4e
Cap and Riverbank Certification Units for in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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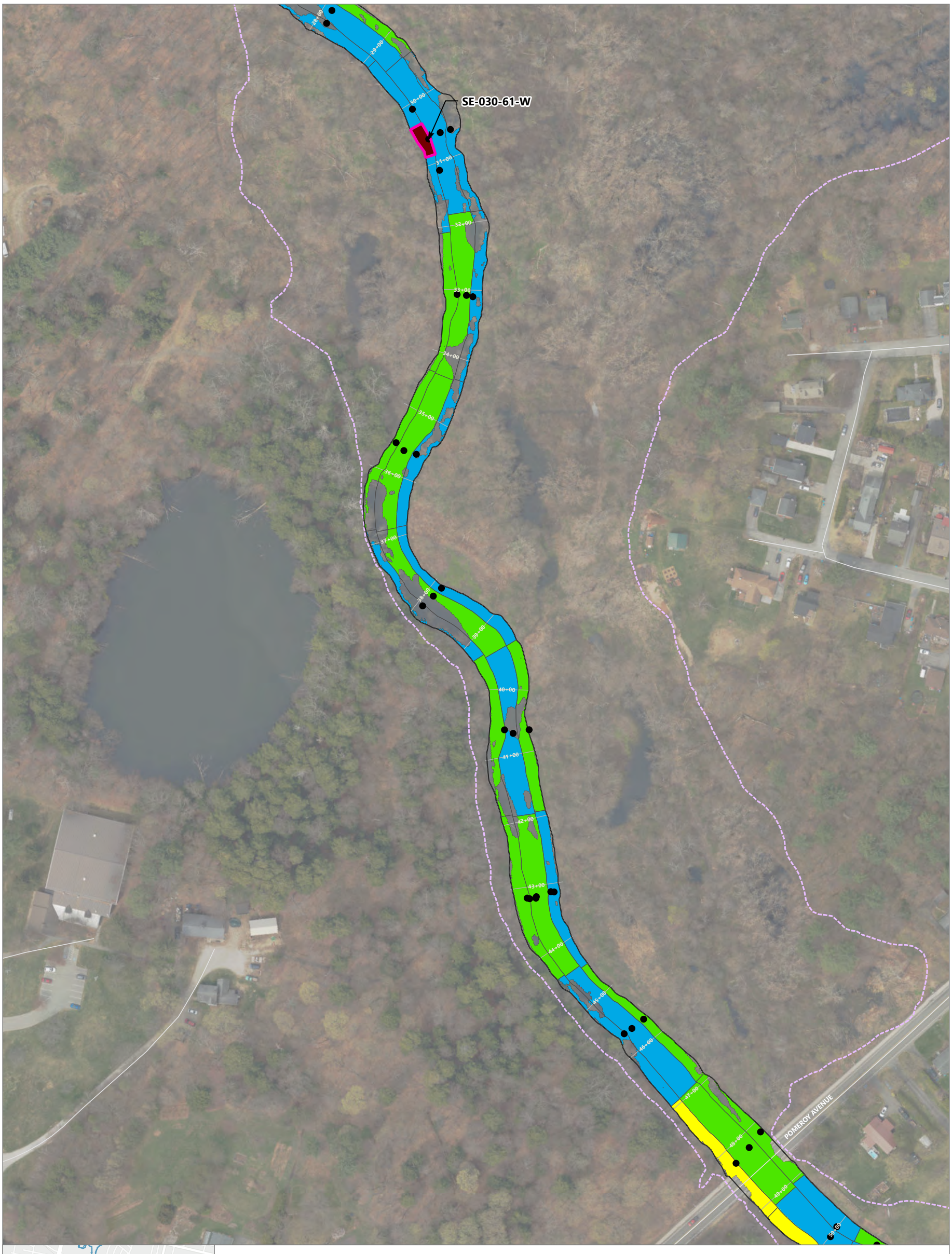
ANCHOR QEA

Figure 8-5a
Main River Channel Thiessen Polygon Depth-Weighted Average PCB Concentrations
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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ANCHOR QEA

Figure 8-5b
Main River Channel Thiessen Polygon Depth-Weighted Average PCB Concentrations
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

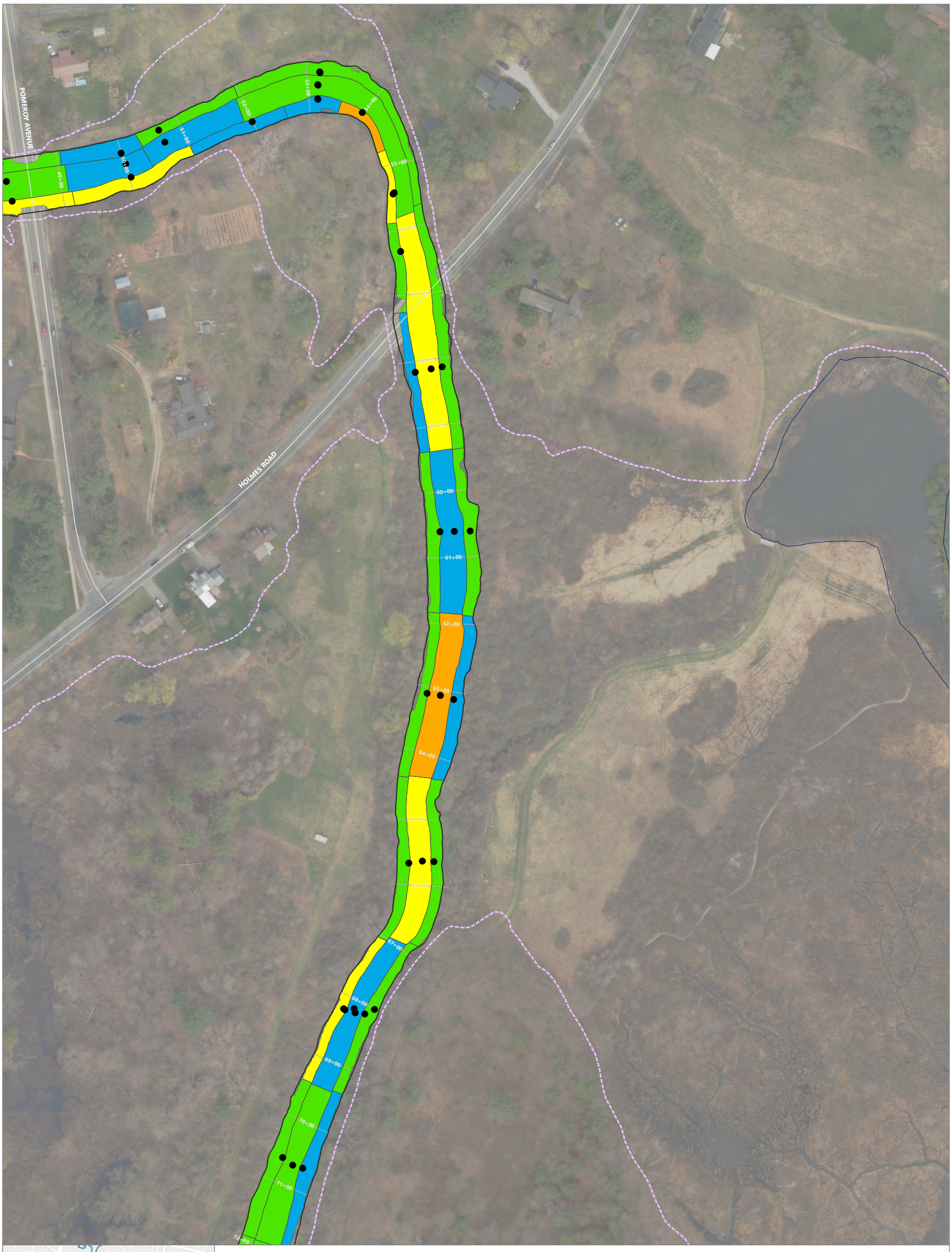

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Figure 8-5c
Main River Channel Thiessen Polygon Depth-Weighted Average PCB Concentrations
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

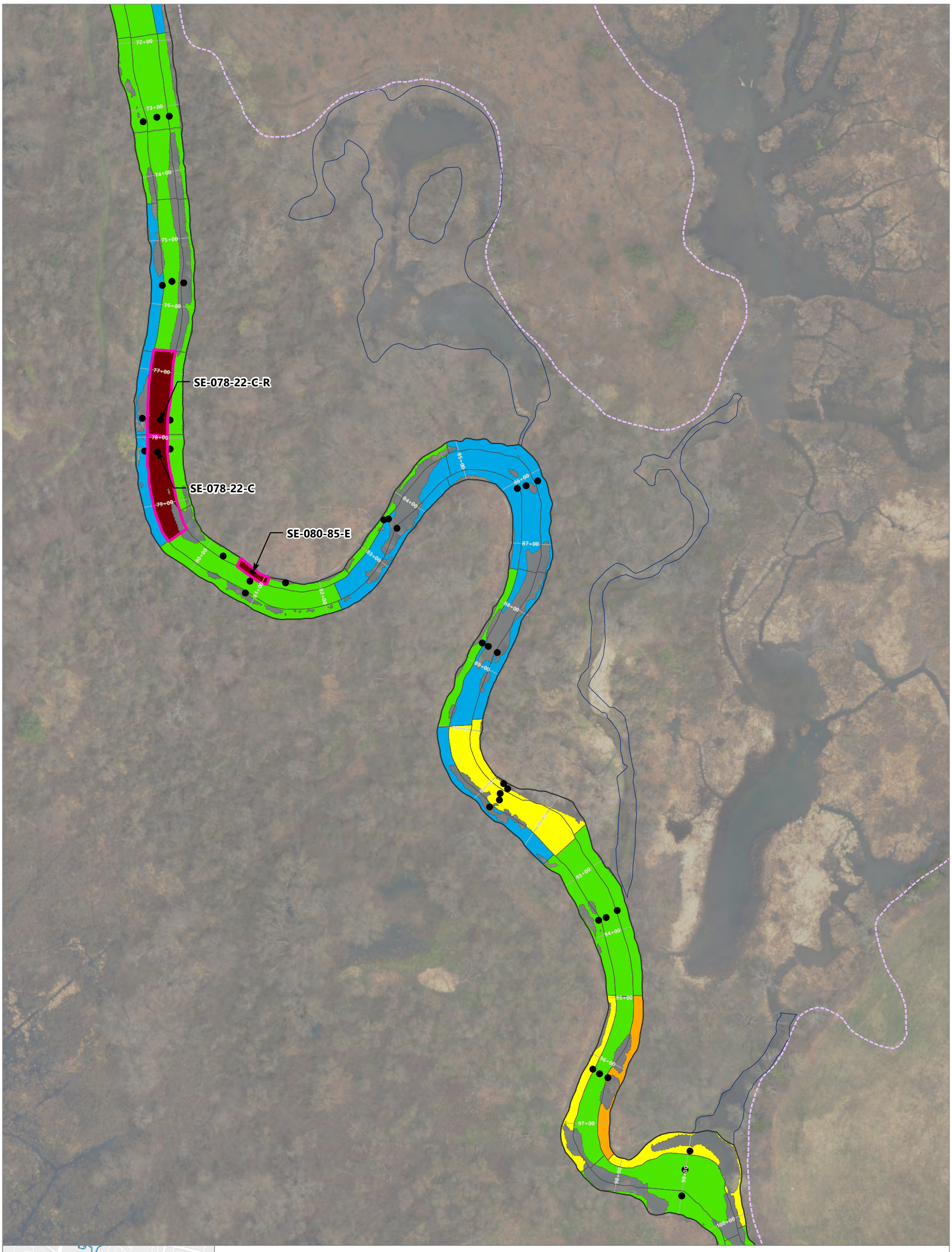

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Figure 8-5d
Main River Channel Thiessen Polygon Depth-Weighted Average PCB Concentrations
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

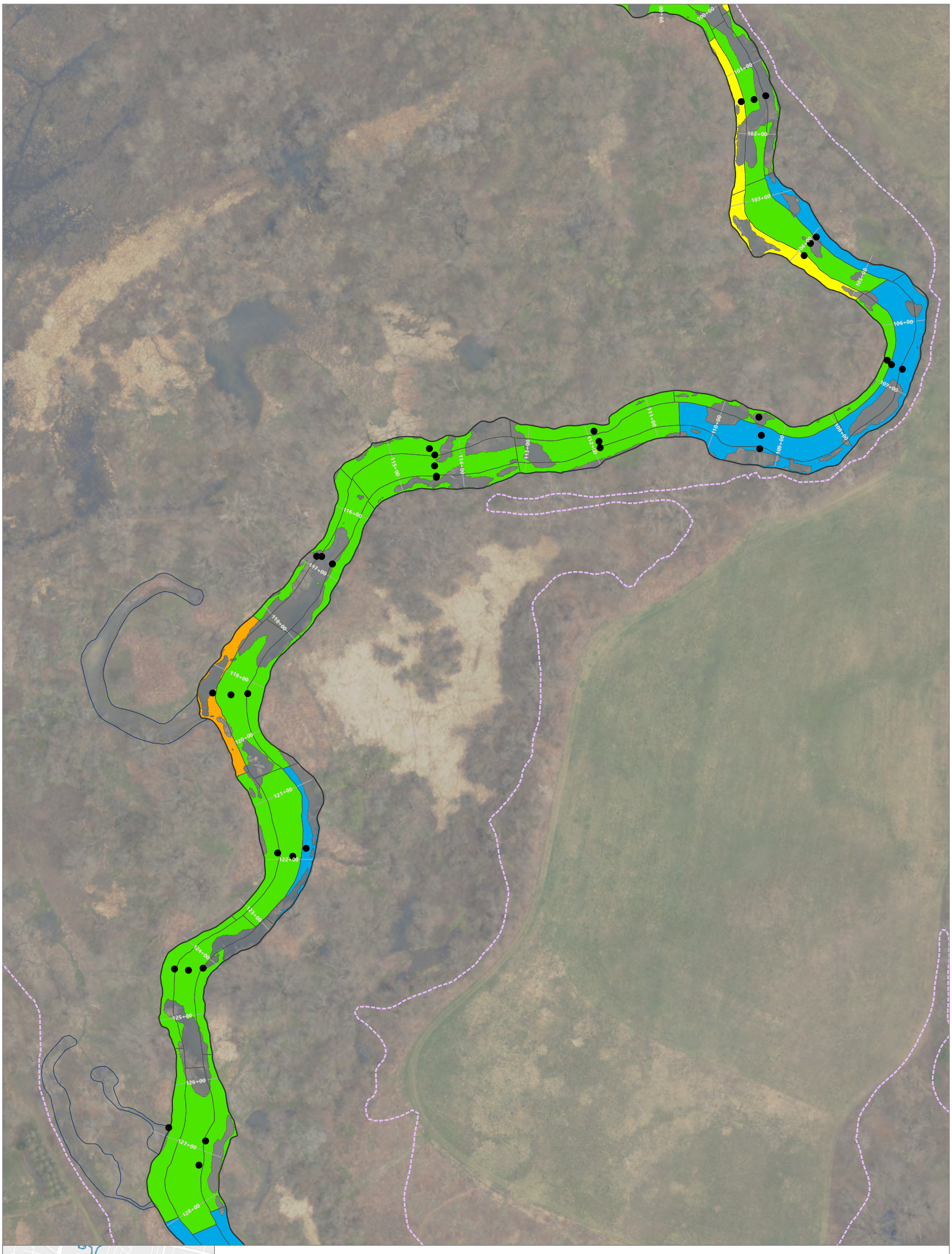

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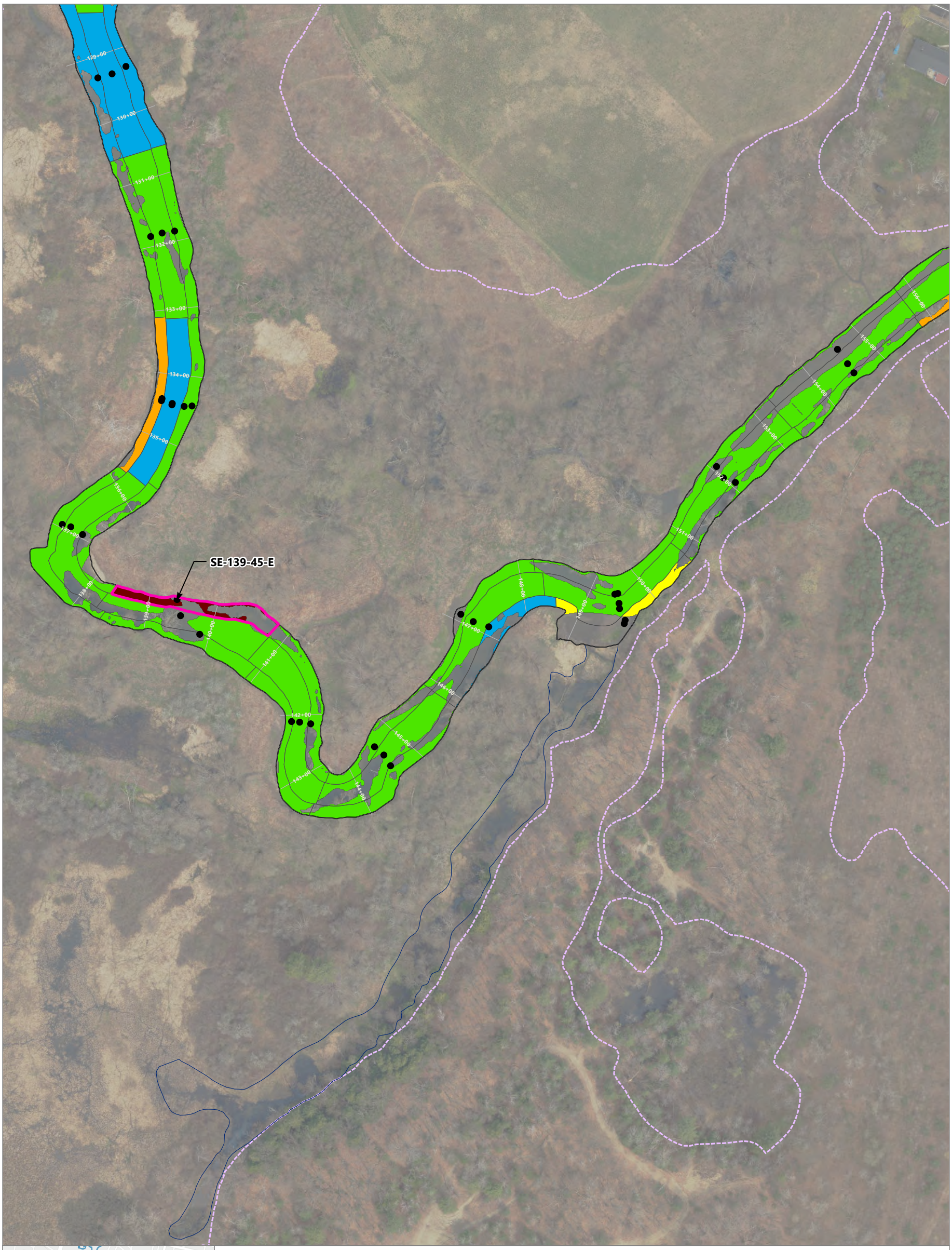
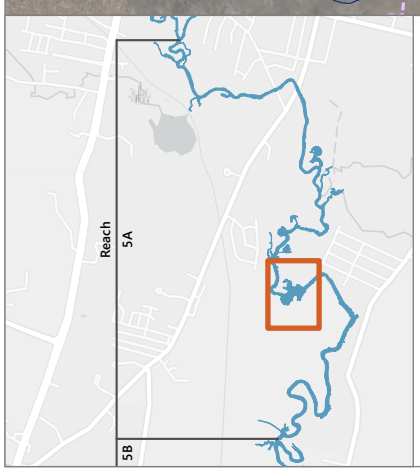
Figure 8-5e
Main River Channel Thiessen Polygon Depth-Weighted Average PCB Concentrations
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River





LEGEND:

- 0+00 River Stationing
- 1 mg/kg PCB Isopleth
- Bottom of Bank
- Sediment Sample Location
- Thiessen Polygons
- Areas Designated for Off-Site Disposal

Thiessen Polygon Average Total PCB Aroclors (mg/kg) in Dredged Material

- ≤1
- 1.1 - 10
- 10.1 - 25
- 25.1 - 50
- 50.1 - 100
- >100

0 150
Feet

NOTES:
1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. LiDAR data collected by Whiteout Solutions, April 2025.
3. The PCB concentrations shown represent the depth-weighted average PCB concentrations of the Thiessen polygons for each core location based on the target removal depths in the dredge prism developed to achieve subgrade elevations for the engineered cap or to achieve the Natural Channel Design grading plan elevations. Downstream of Station 48+00, the engineered cap and Natural Channel Design grading are preliminary and subject to revision.
4. Areas where no average PCB concentration is shown represent areas where no removal would be required to achieve subgrade elevations for the engineered cap or to achieve the Natural Channel Design grading plan elevations.
5. Dredged material from areas where the depth-weighted average PCB concentrations exceed 100 mg/kg will be designated for off-site disposal. Dredged material from other locations will be designated for disposal at the Upland Disposal Facility.
6. Core locations that have depth-weighted average PCB concentrations that exceed 100 mg/kg are labeled with their corresponding location ID.

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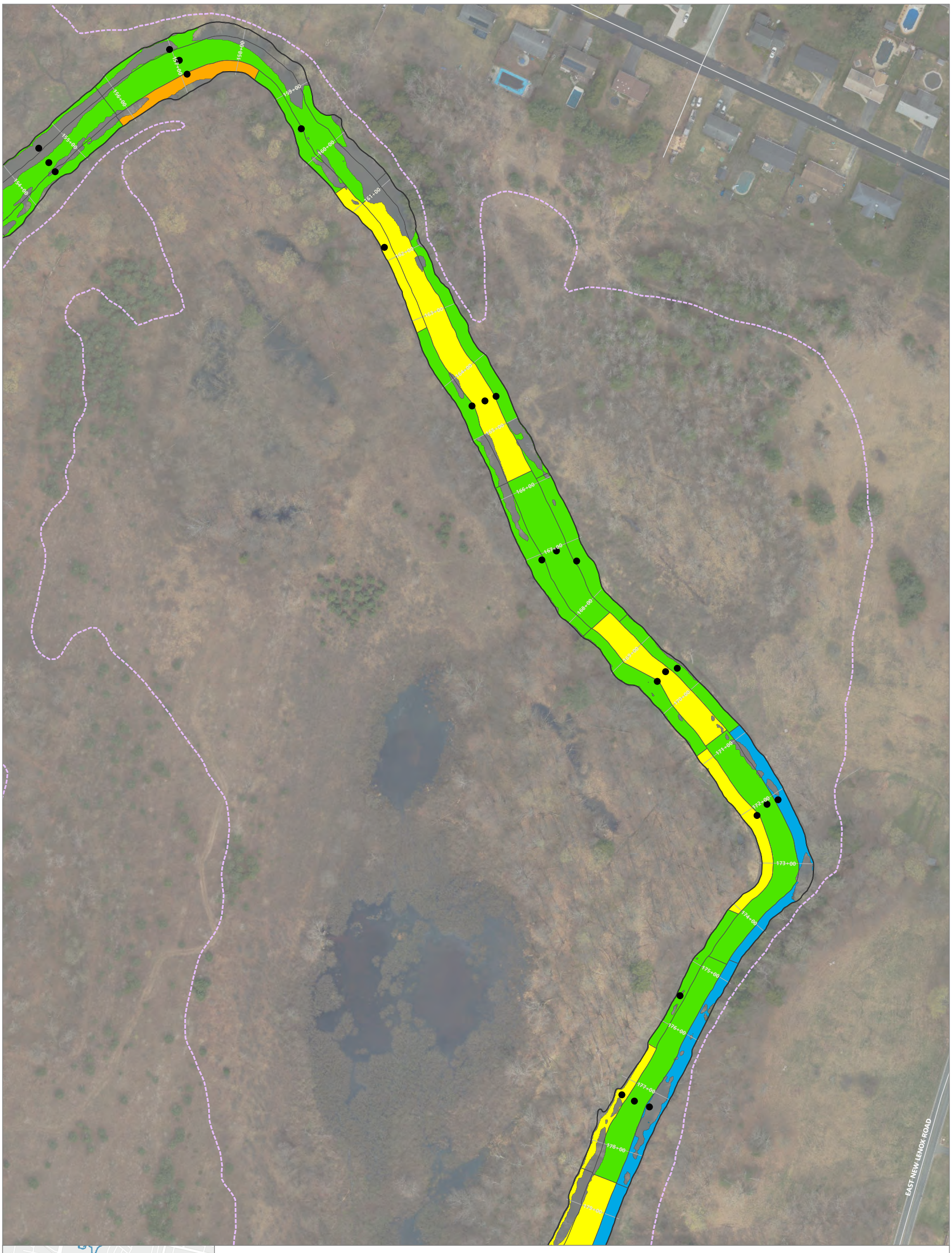
ANCHOR QEA

Figure 8-5f
Main River Channel Thiessen Polygon Depth-Weighted Average PCB Concentrations
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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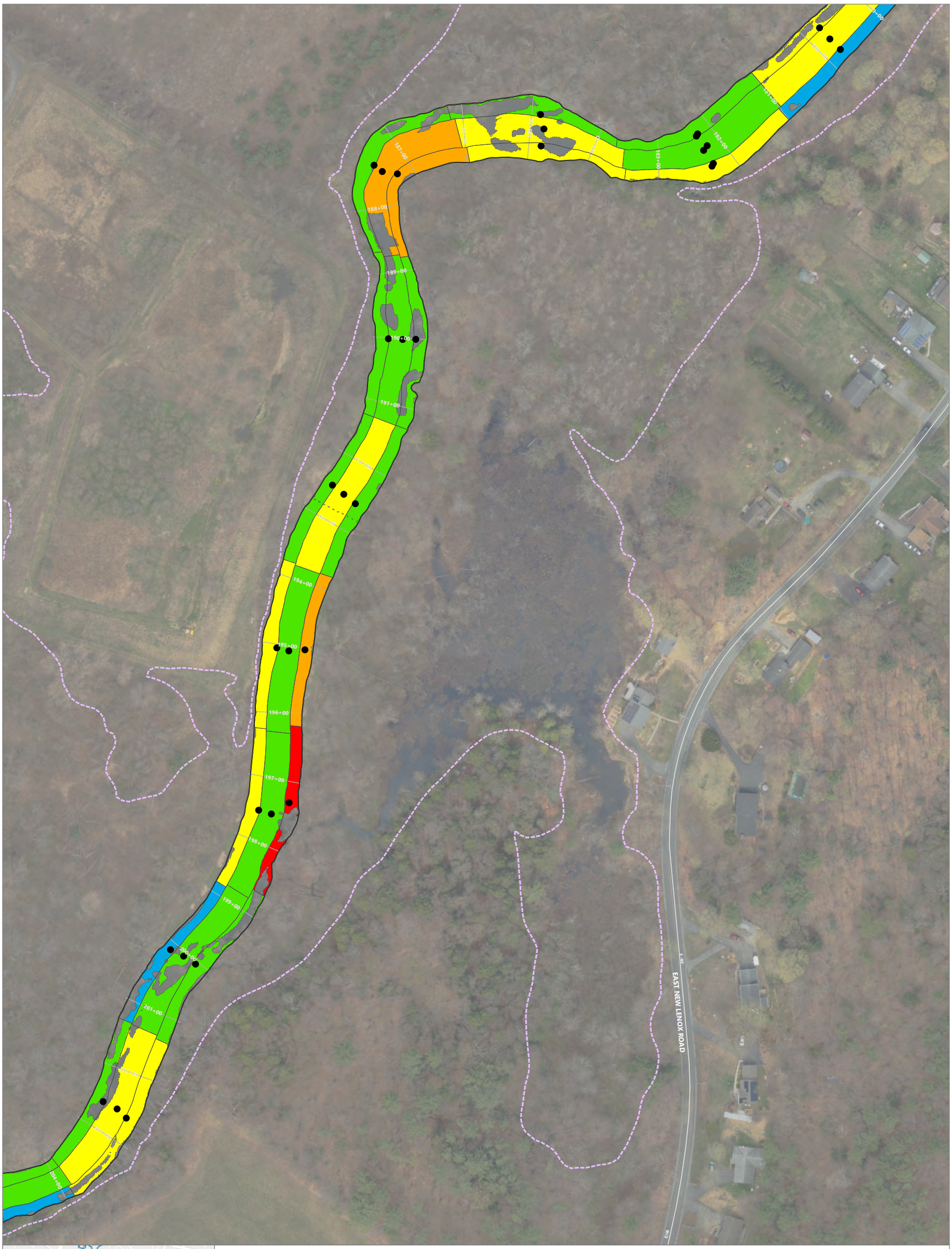
Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section8.aprx | RDWP Fig 8-5 Depth-Weighted PCBs

ANCHOR QEA

Figure 8-5g
Main River Channel Thiessen Polygon Depth-Weighted Average PCB Concentrations
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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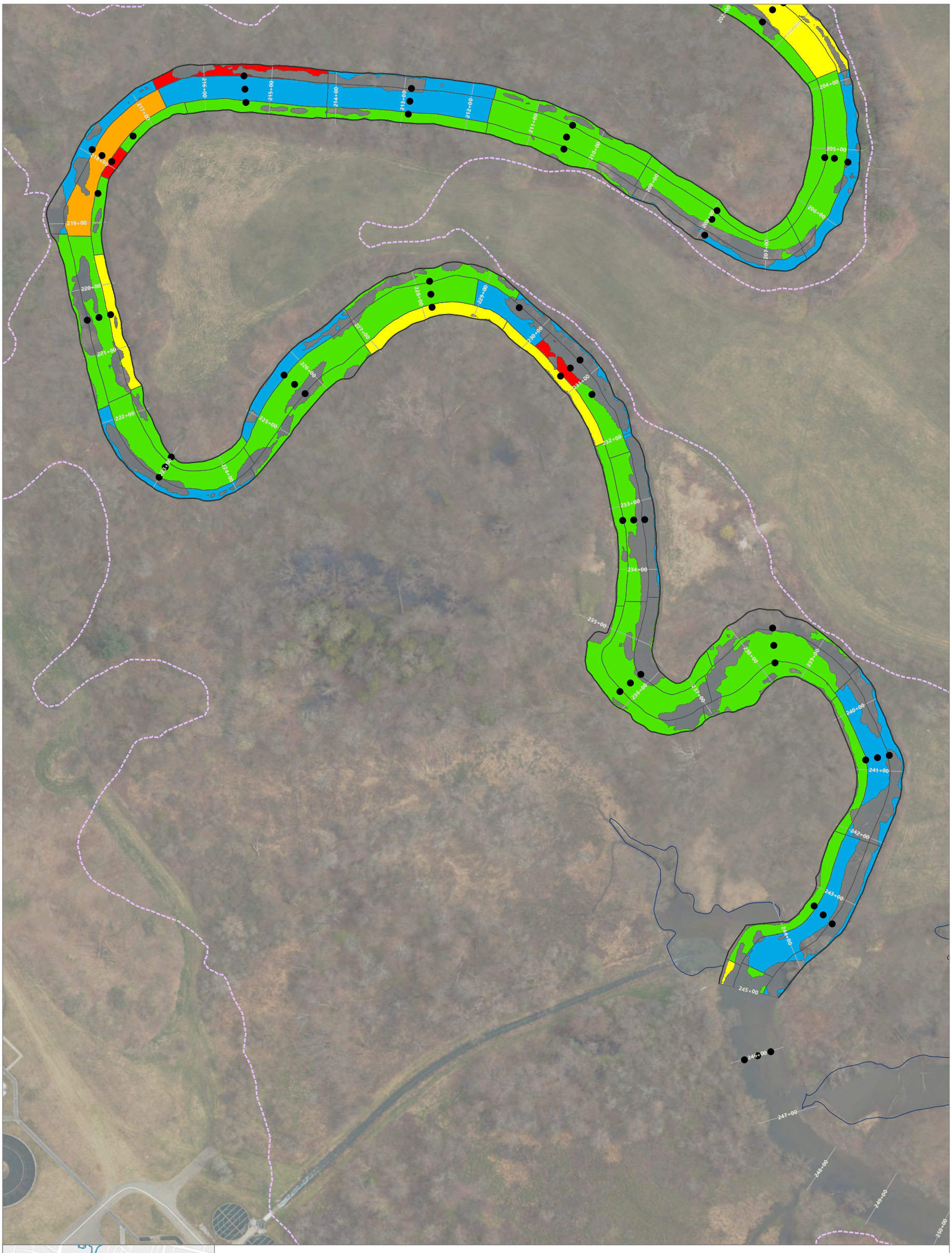
Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section8.aprx | RDWP Fig 8-5 Depth-Weighted PCBs

ANCHOR QEA

Figure 8-5h
Main River Channel Thiessen Polygon Depth-Weighted Average PCB Concentrations
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section8.aprx | RDWP Fig 8-5 Depth-Weighted PCBs

ANCHOR QEA

Figure 8-5i
Main River Channel Thiessen Polygon Depth-Weighted Average PCB Concentrations
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

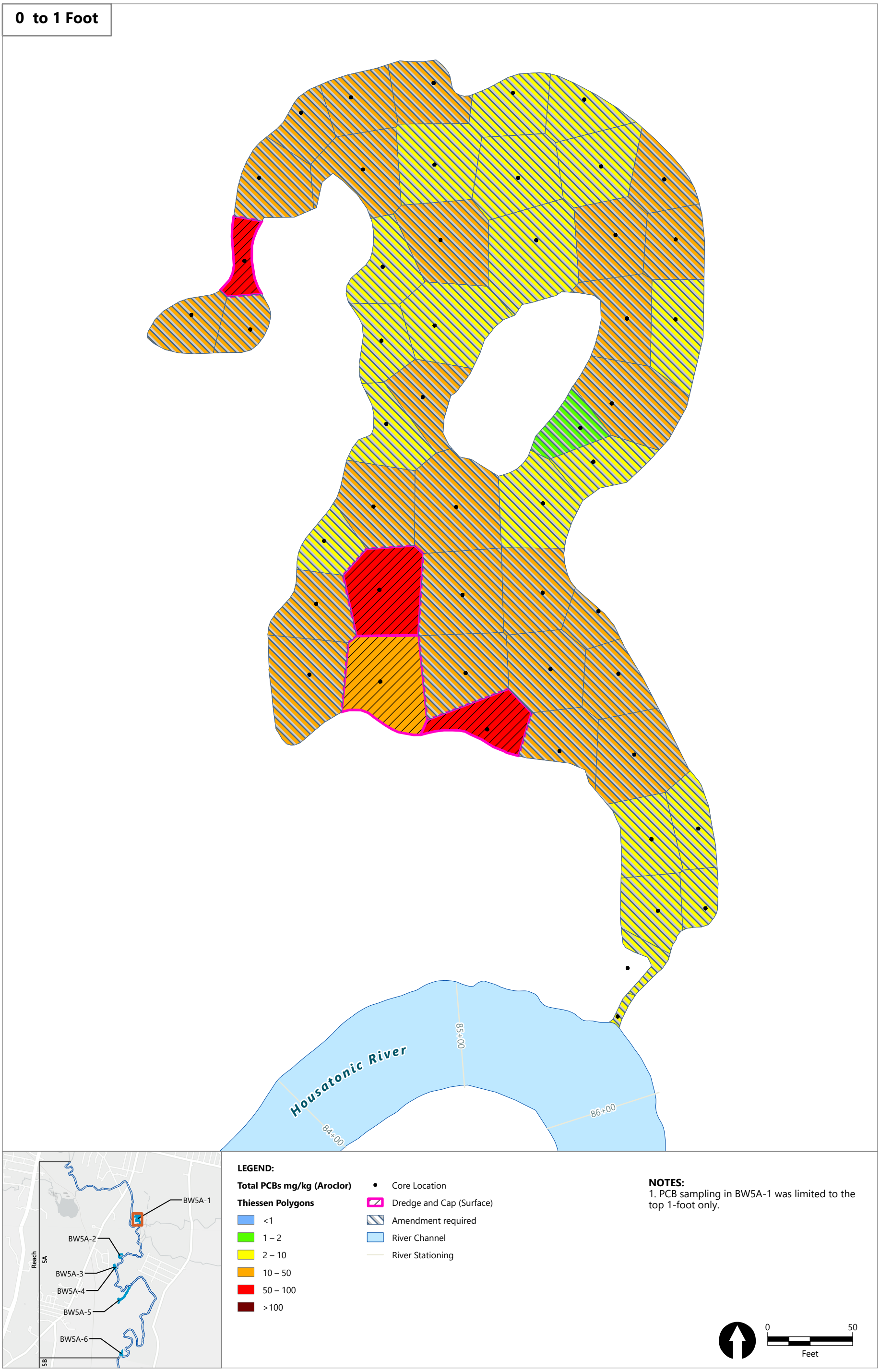

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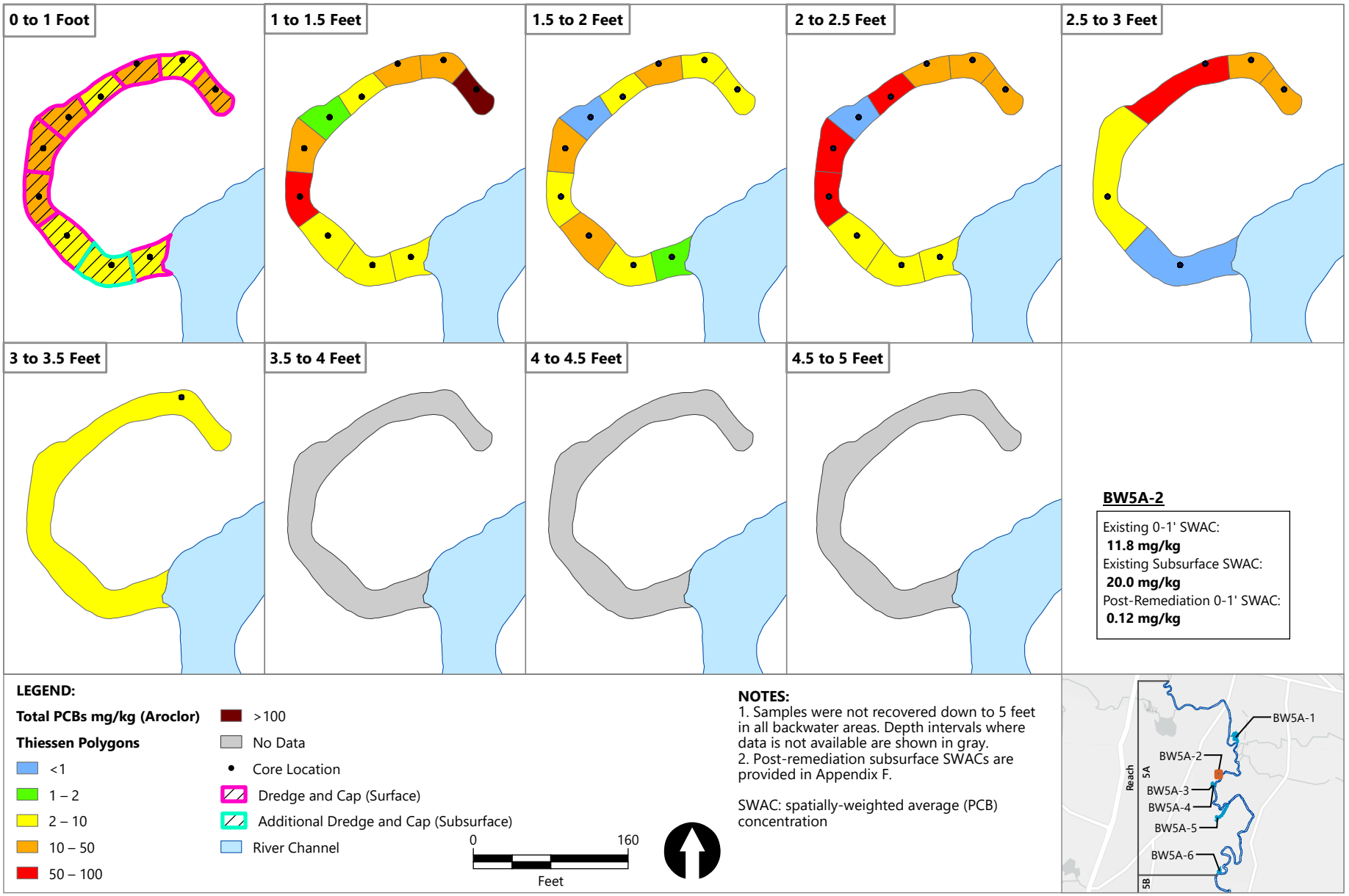
Figure 8-6a
Backwater Remedial Extents and Sediment PCB Concentrations by Depth (BW5A-1)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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ANCHOR QEA

Figure 8-6b
Backwater Remedial Extents and Sediment PCB Concentrations by Depth (BW5A-2)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

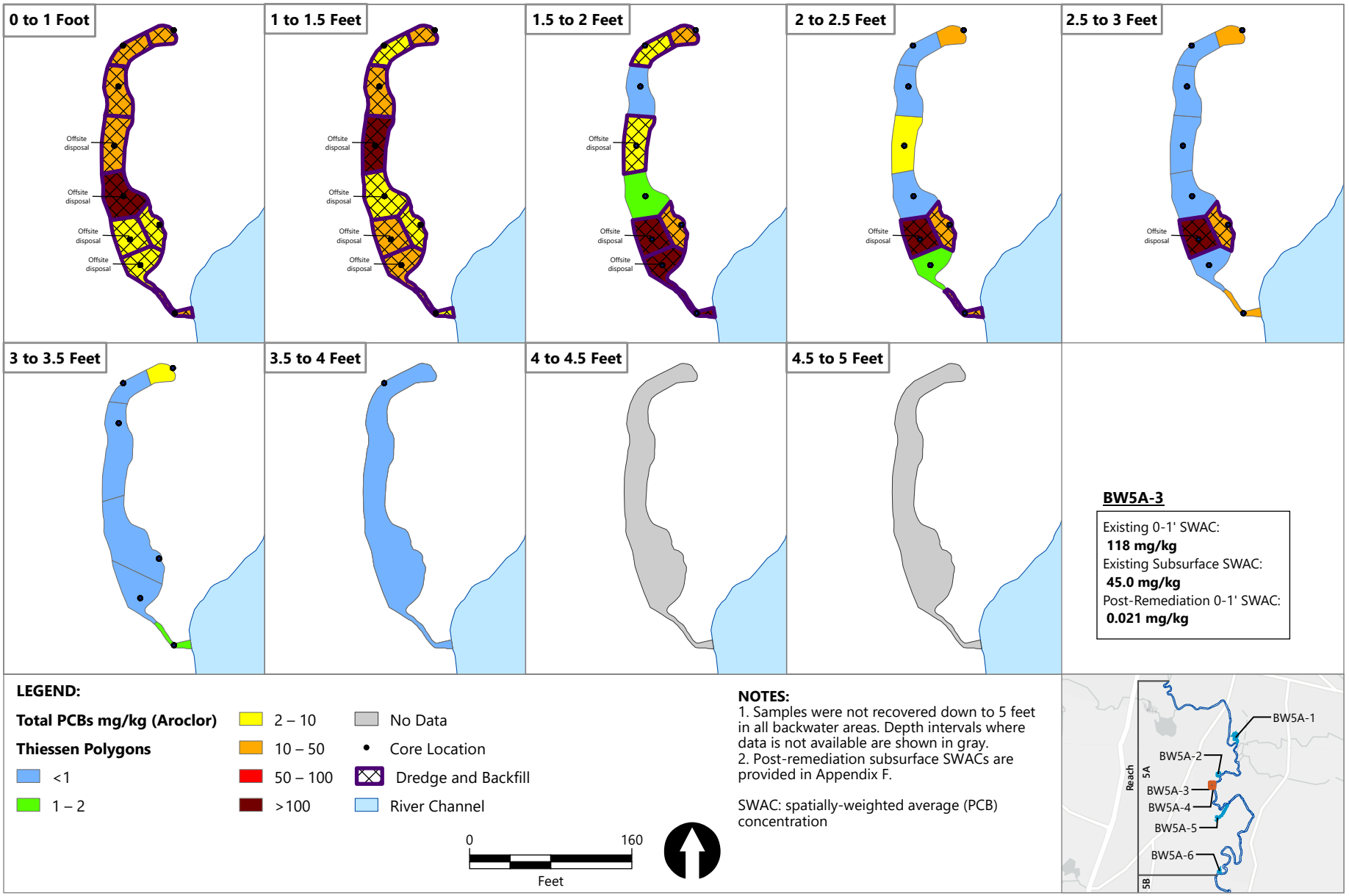

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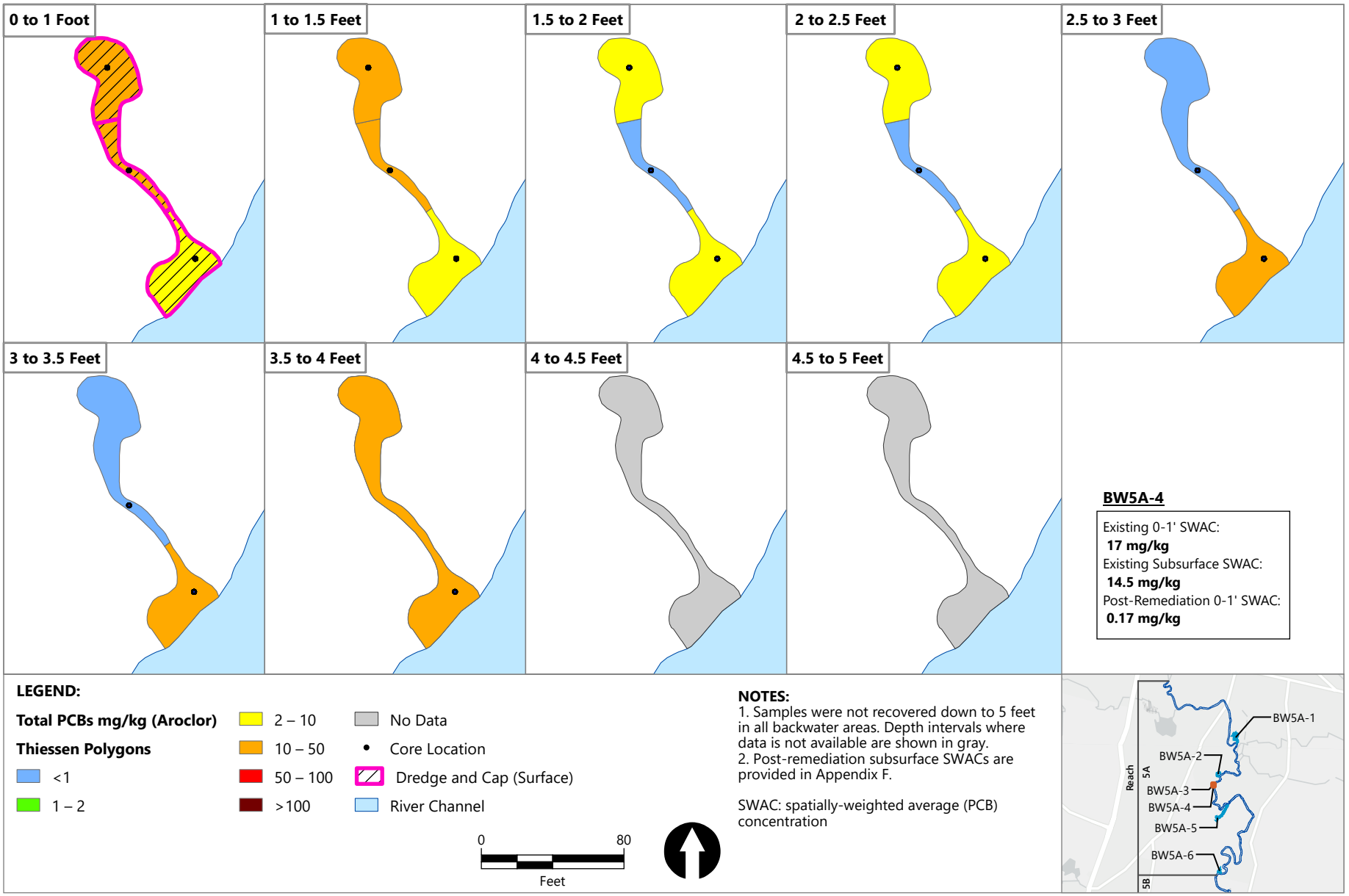
Figure 8-6c
Backwater Remedial Extents and Sediment PCB Concentrations by Depth (BW5A-3)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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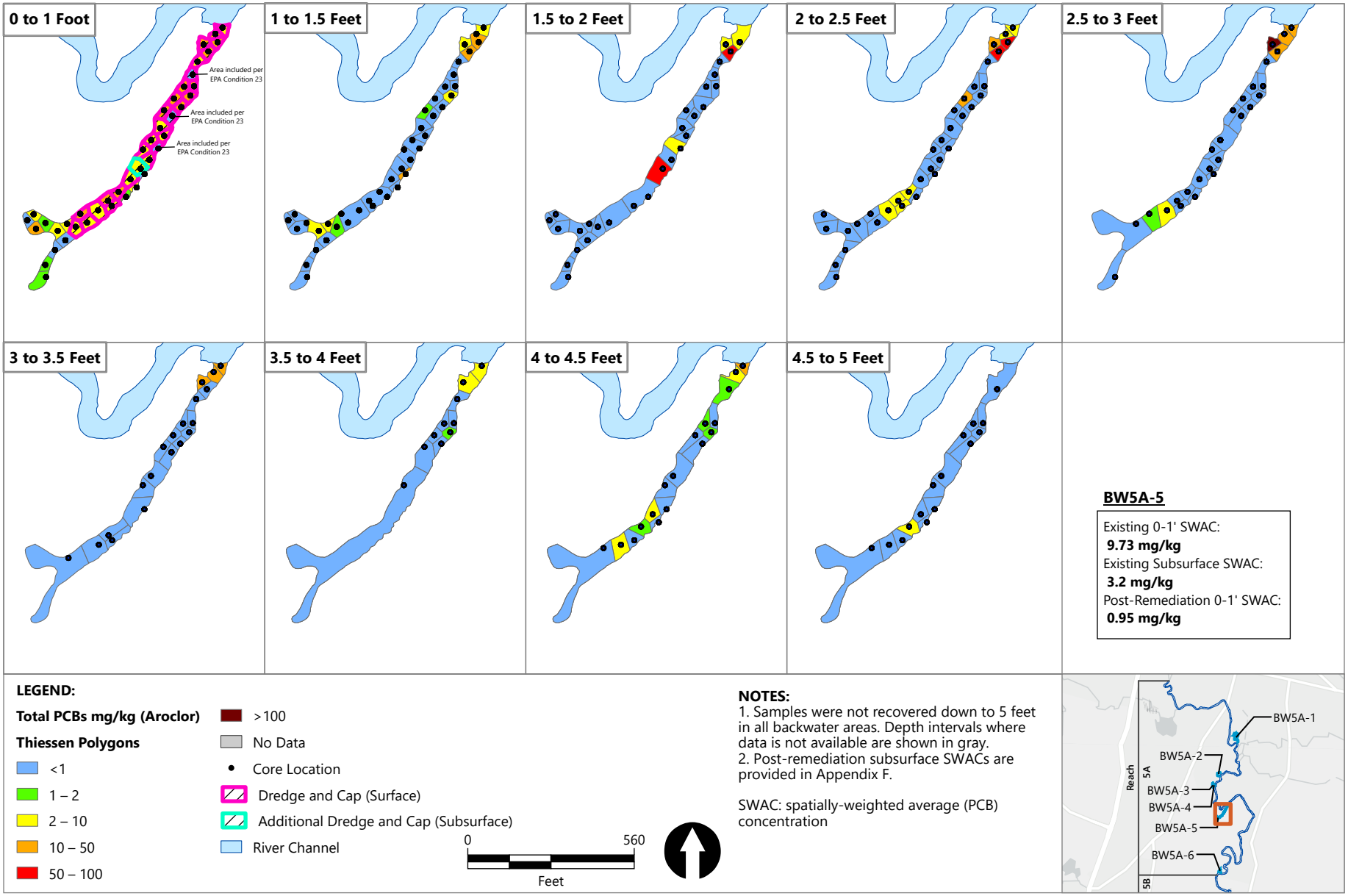
ANCHOR QEA

Figure 8-6d
Backwater Remedial Extents and Sediment PCB Concentrations by Depth (BW5A-4)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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ANCHOR QEA

Figure 8-6e
Backwater Remedial Extents and Sediment PCB Concentrations by Depth (BW5A-5)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

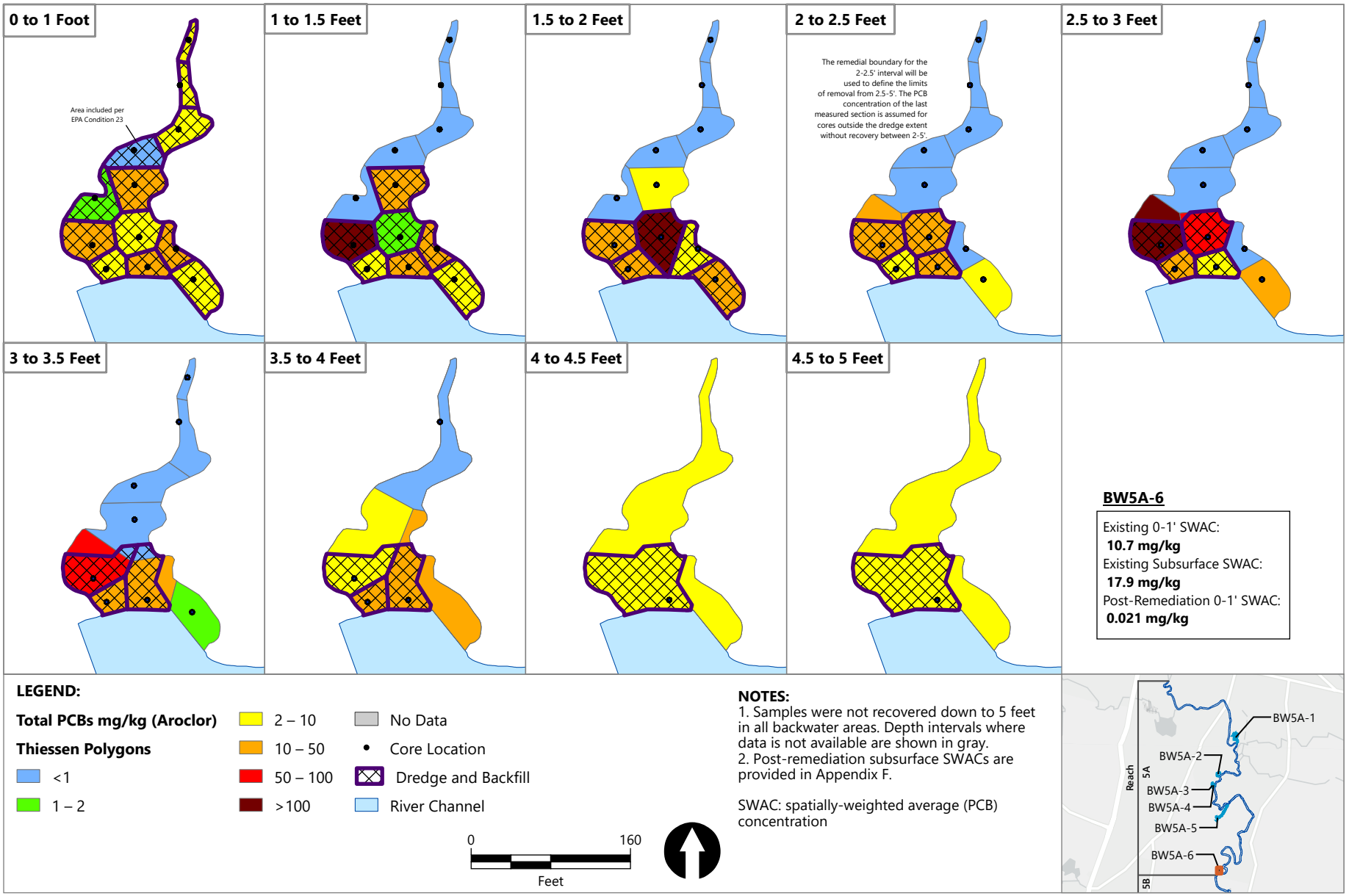

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Figure 8-6f
Backwater Remedial Extents and Sediment PCB Concentrations by Depth (BW5A-6)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

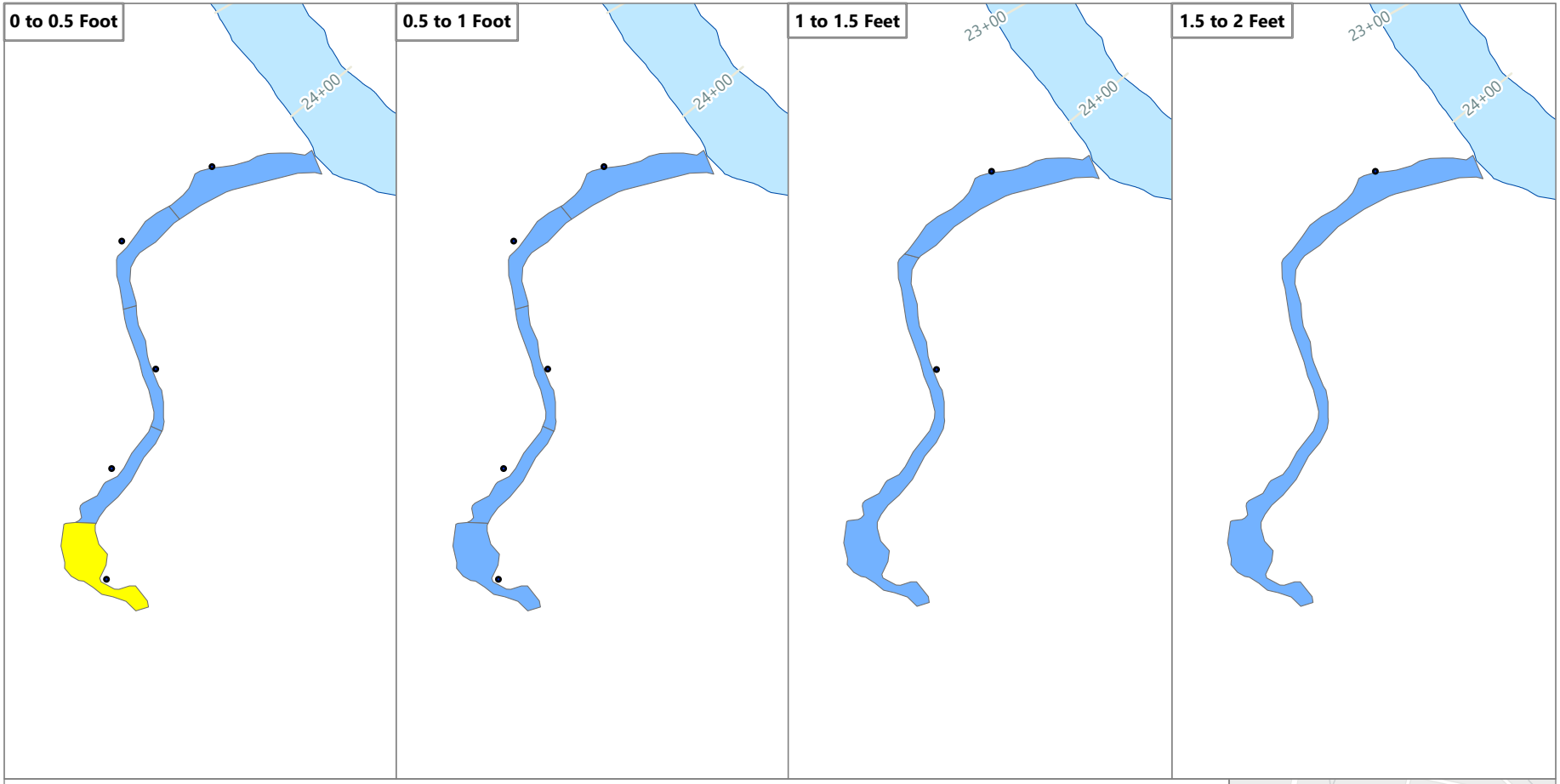

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Figure 8-7a

Other Waterbody Remedial Extents and Sediment PCB Concentrations by Depth (Outlet from Morewood Lake; W-OWB1)

Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

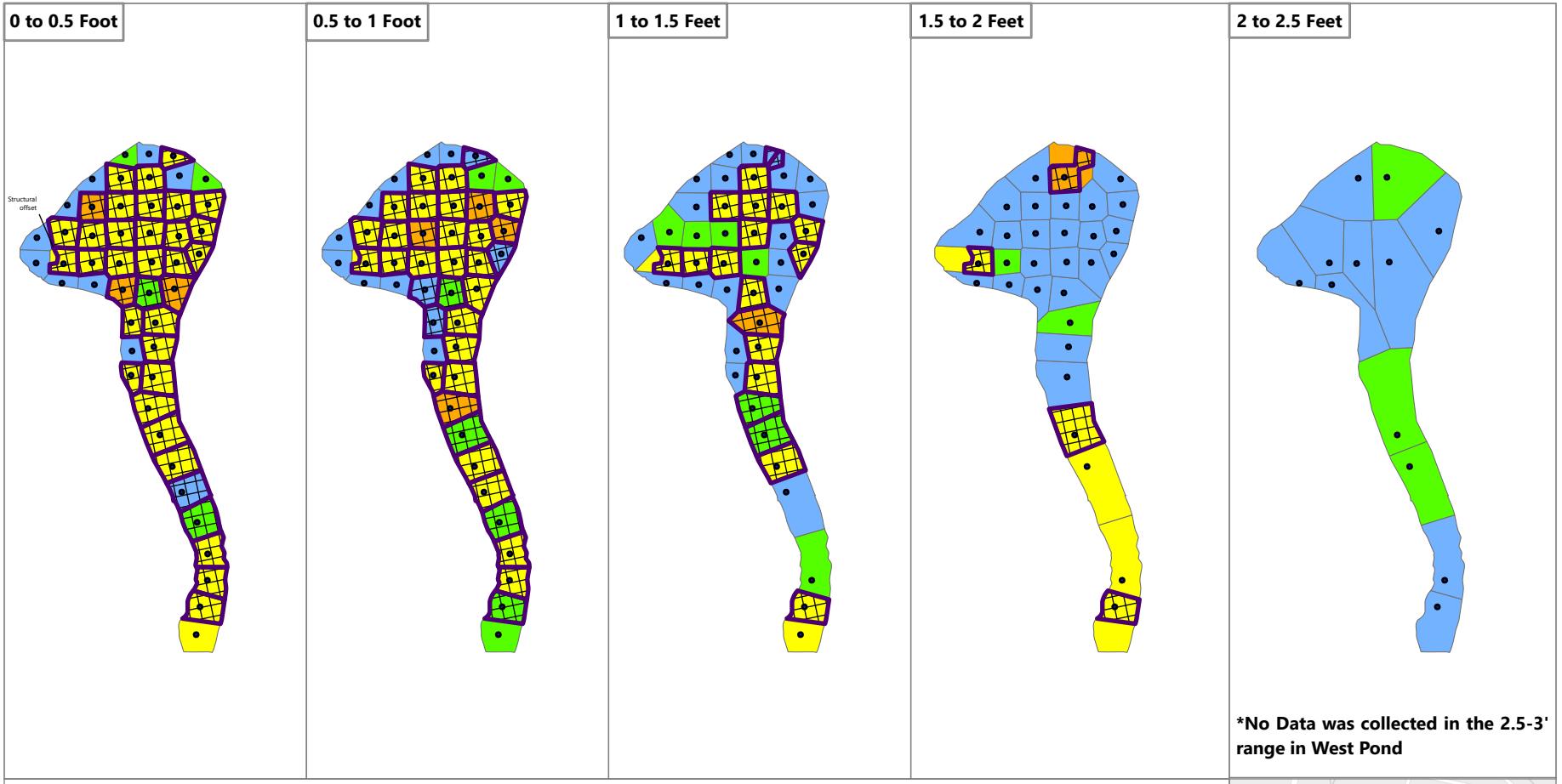

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Figure 8-7b
Other Waterbody Remedial Extents and Sediment PCB Concentrations by Depth (West Pond; OWB-WP)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

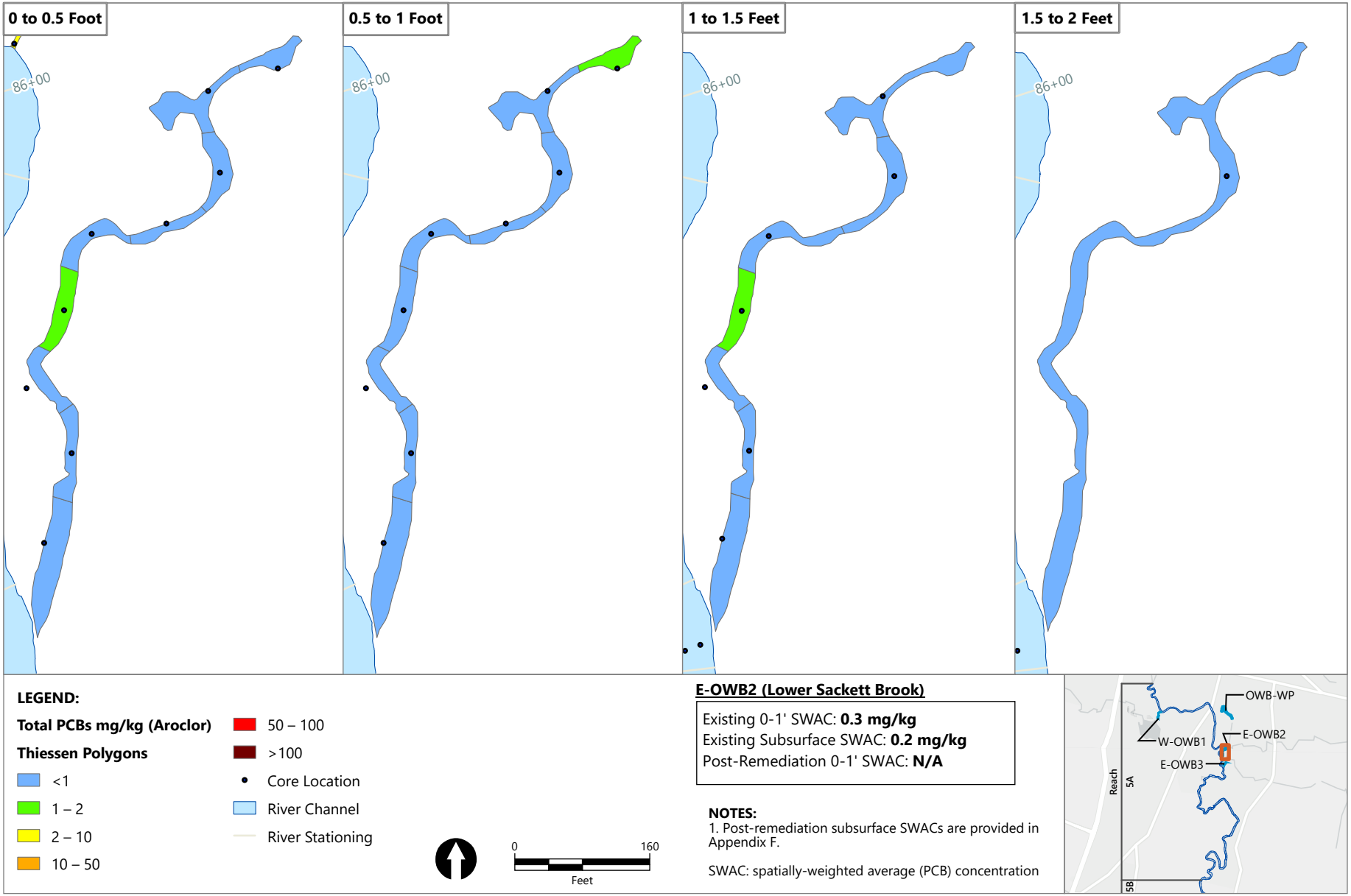

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Figure 8-7c
Other Waterbody Remedial Extents and Sediment PCB Concentrations by Depth (Lower Sackett Brook; E-OWB2)

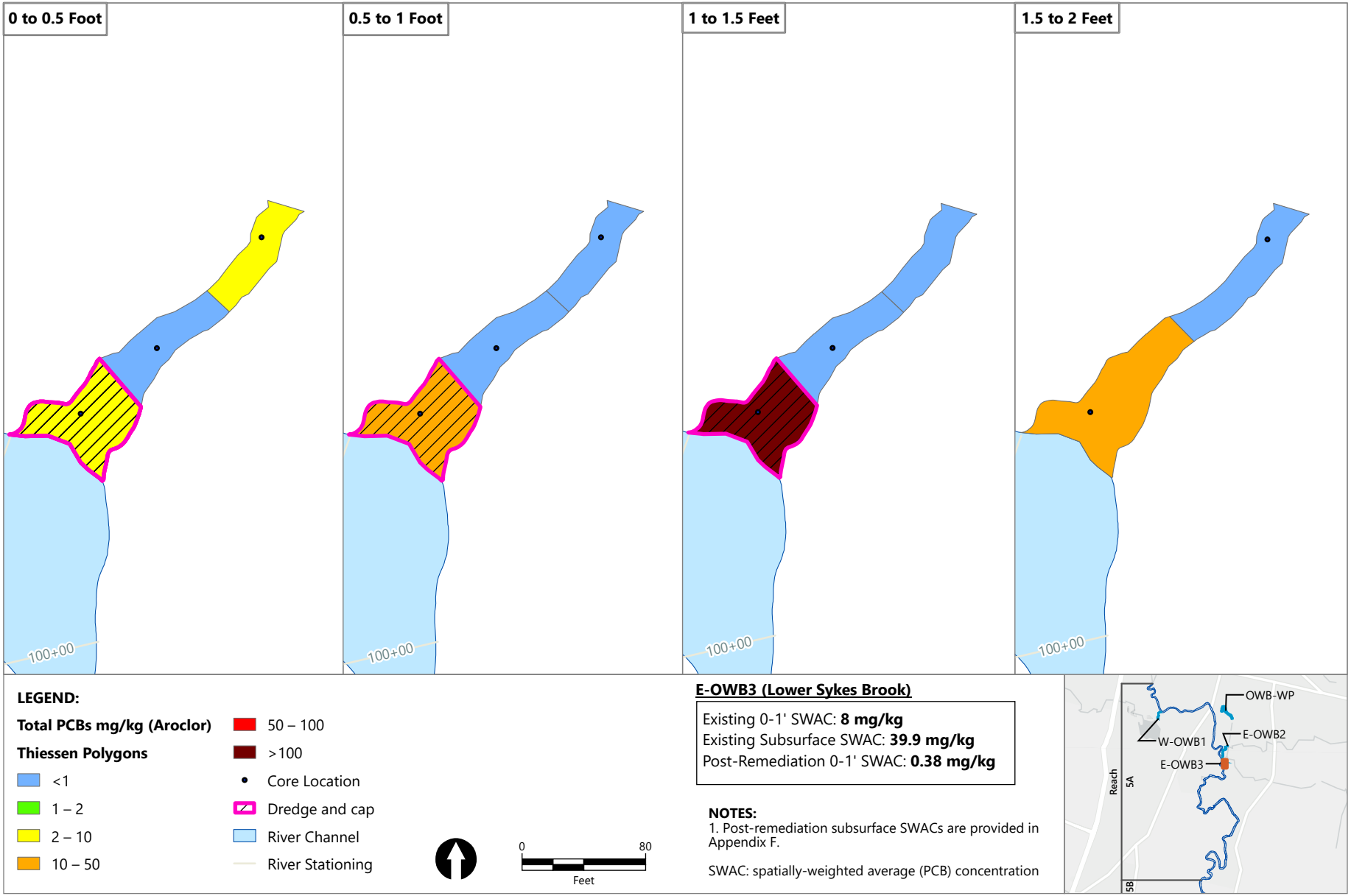

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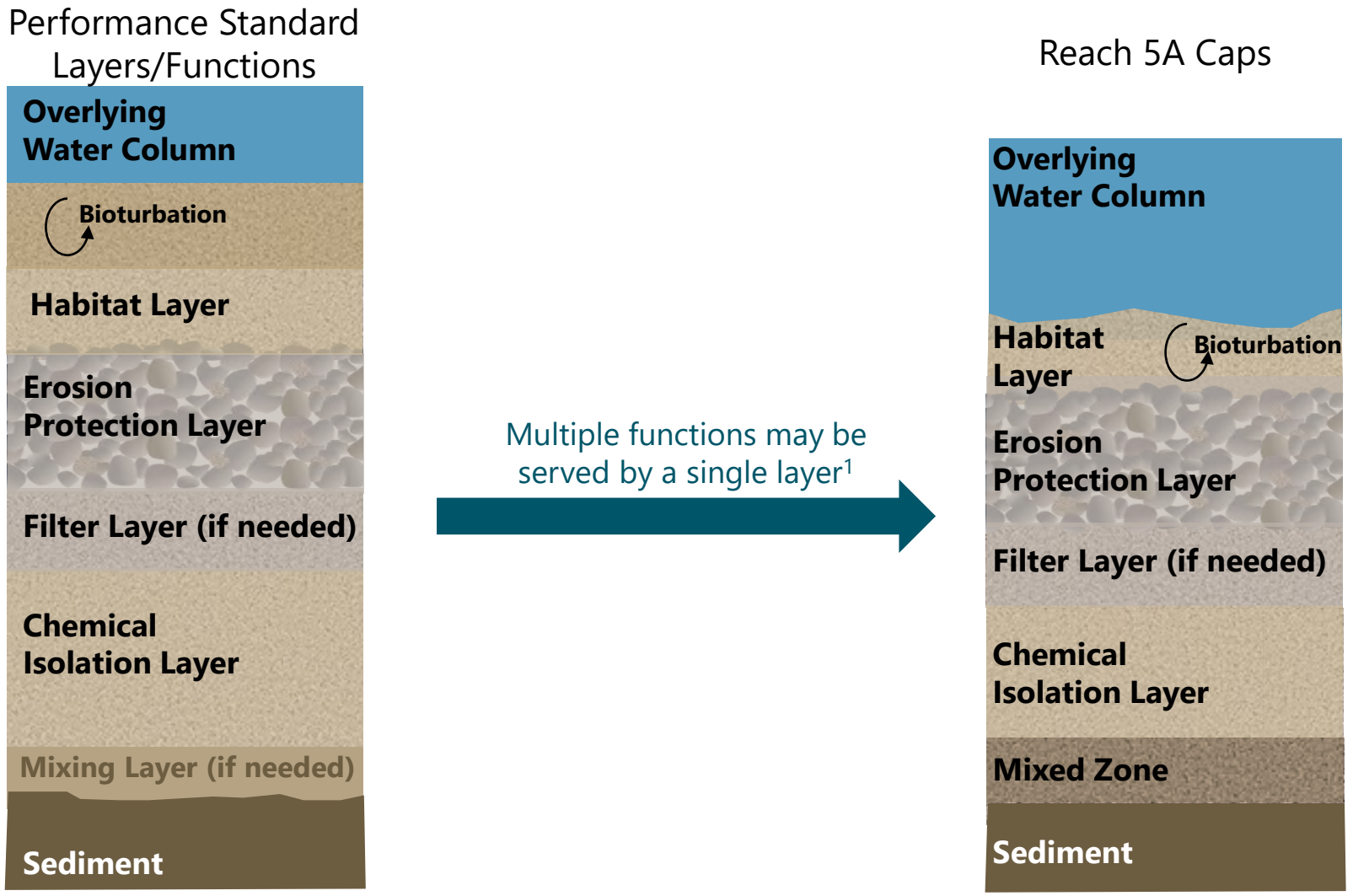
Figure 8-7d
Other Waterbody Remedial Extents and Sediment PCB Concentrations by Depth (Lower Sykes Brook; E-OWB3)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



1. The Revised Final Permit indicates that a single layer may serve multiple functions, which is consistent with EPA (1998) guidance on cap design.

Filepath: \\WCL-FS1\Syracuse\Projects\GE\Housatonic_Rest-of-River\Remedial_Design\Reach_5A\DOCUMENTS\Concept_RDRA_Work_Plan\Figures\Figure 5-1 Perf Stand Cap Design.pptx

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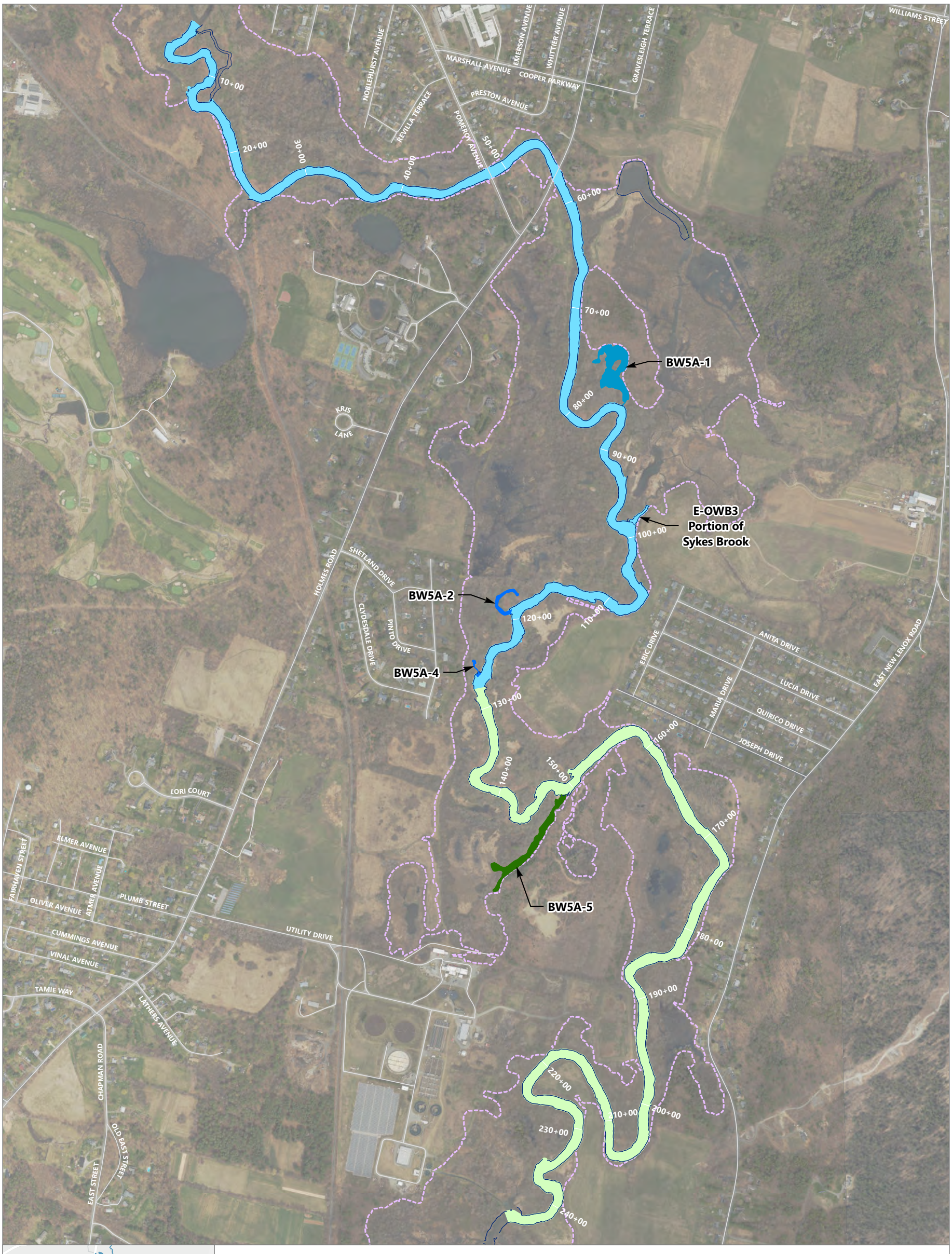
Figure 8-8
Performance Standards and Cap Design for Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



LEGEND:

- Roads
- 0+00 River Stationing
- 1 mg/kg PCB Isopleth

Cap Simulation

Upper Portion of Reach 5A

- Main Channel Reach 5A and Lower Portion of Sykes Brook
- BW5A-1
- BW5A-2 and BW5A-4

Lower Portion of Reach 5A

- Main Channel Reach 5A
- BW5A-5

NOTE:
1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.

0 1,020 Feet

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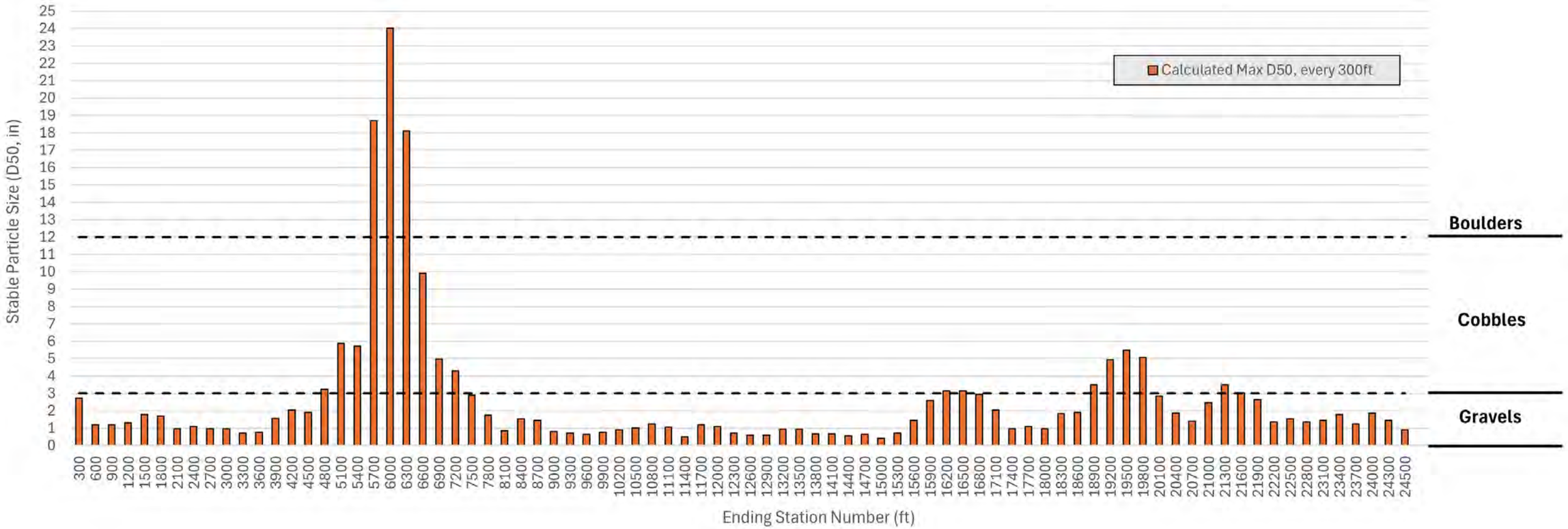
Figure 8-9
Extents of Cap Model Simulation Areas in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



Filepath: https://anchorqea.sharepoint.com/sites/HousatonicRiver-portal/Reach 5A/Design/R5A_Final_RD_RA/__Work Plan/Figures/Figure 8-10.docx

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Figure 8-10
Calculated Maximum Stable Particle Sizes for Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

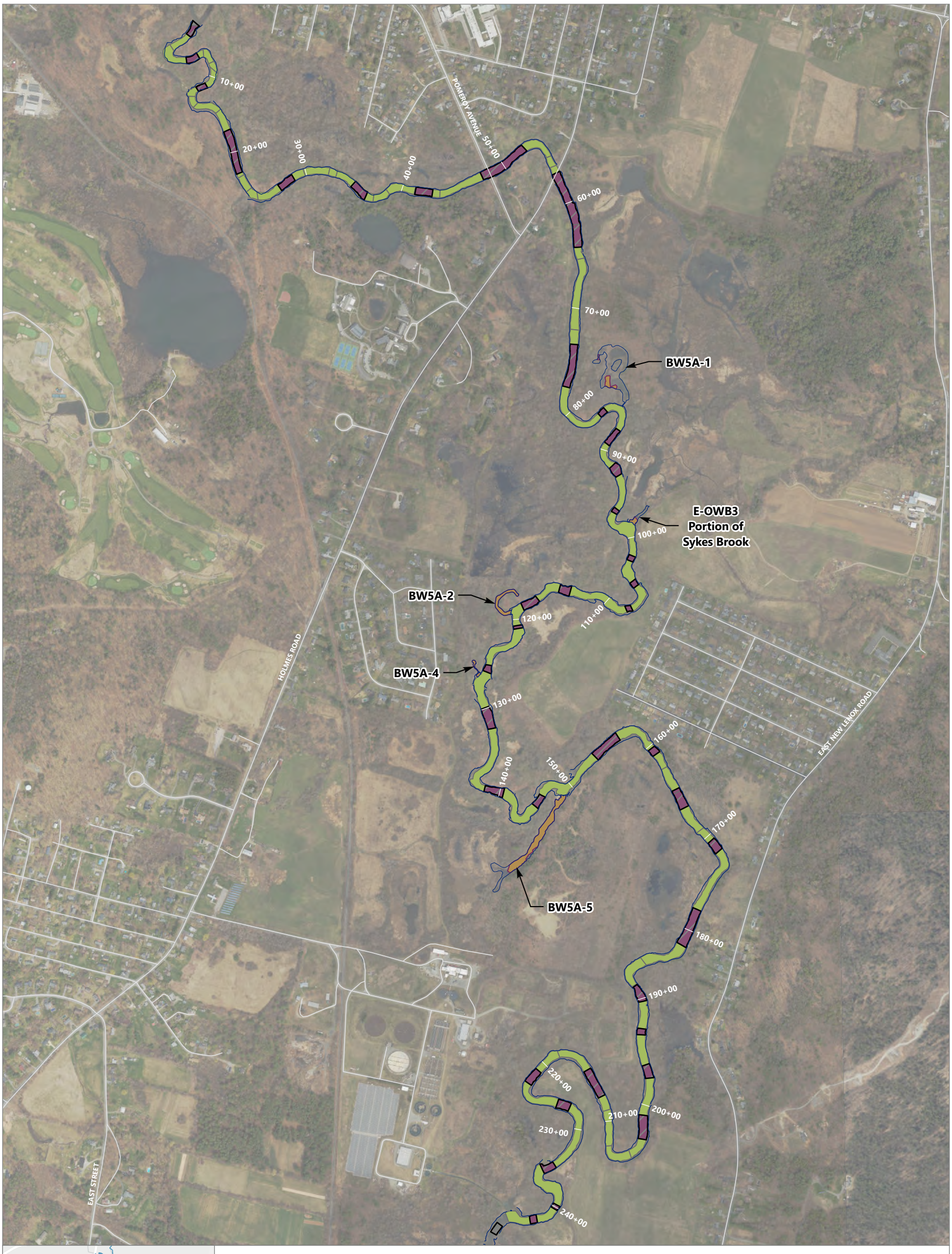

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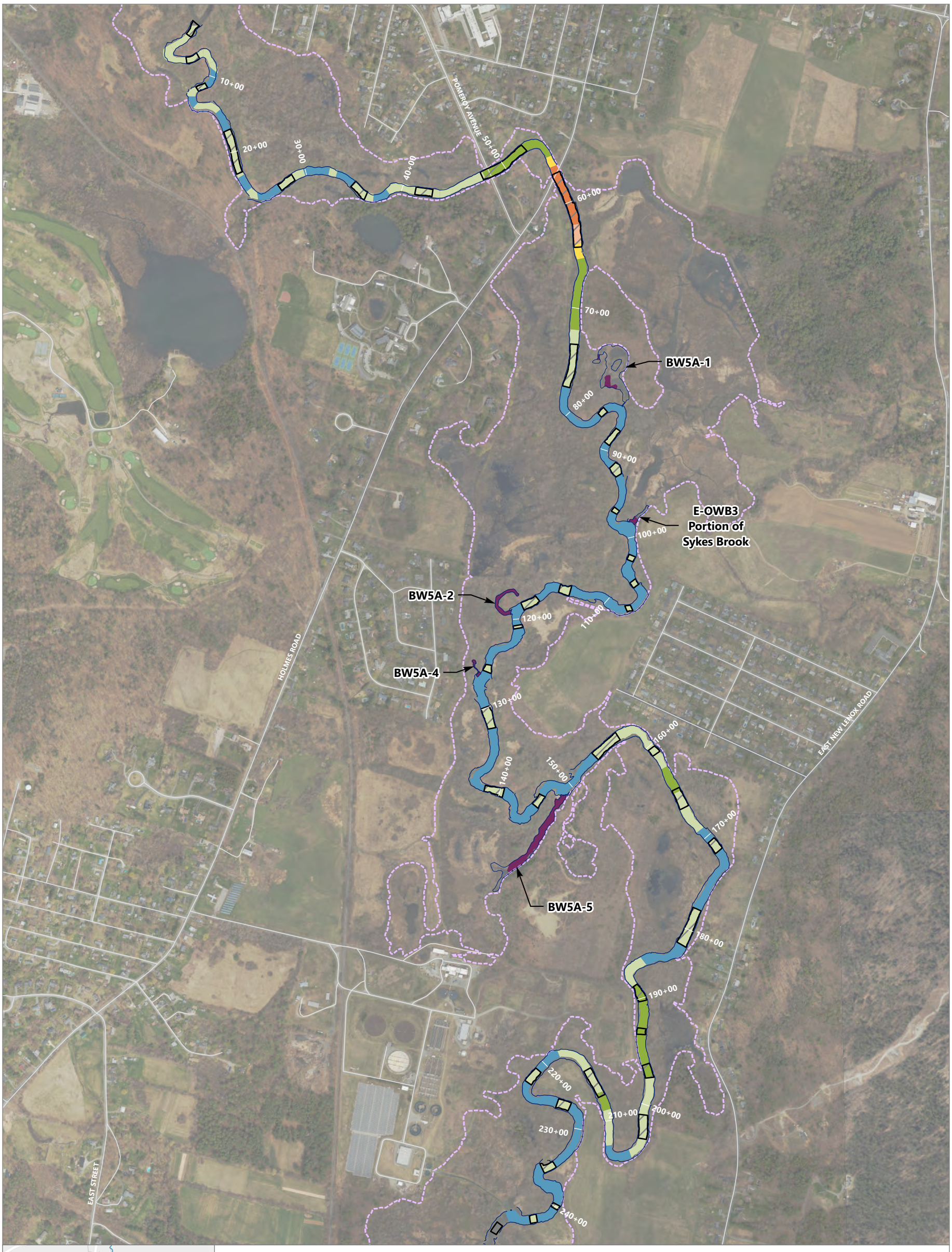
Figure 8-11
Reach 5A Engineered Cap Habitat Layer Types
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section8.aprx | RDWP Fig 8-12 Cap Types

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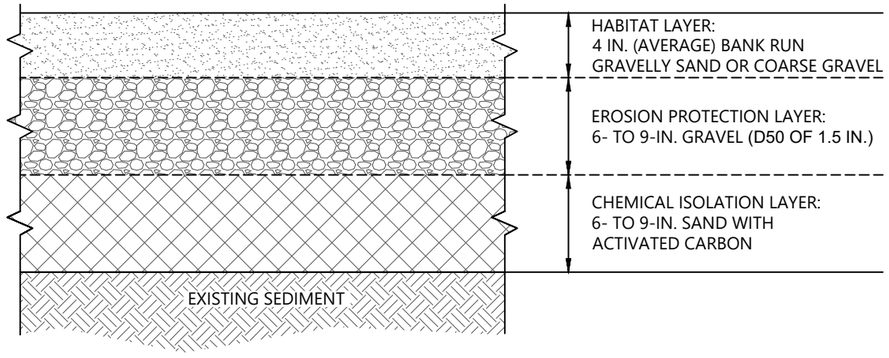
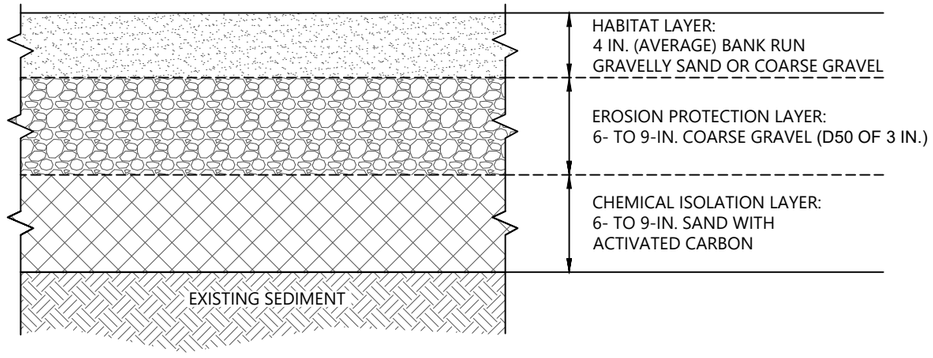
Figure 8-12
Extents of Cap Types in Reach 5A
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



TYPE A: GRAVEL ARMOR CAP
(TOTAL CAP THICKNESS ~ 22 INCHES)
NOT TO SCALE



TYPE B: COARSE GRAVEL ARMOR CAP
(TOTAL CAP THICKNESS ~ 22 INCHES)
NOT TO SCALE

NOTES:

1. DETAILS ARE FOR ILLUSTRATIVE PURPOSES AND NOT TO SCALE.

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Filepath: K:\Projects\0469-General Electric\Housatonic - Rest of River Remedial Design\0469-RP-038 - Conceptual Cap Types.dwg Figure 8-13

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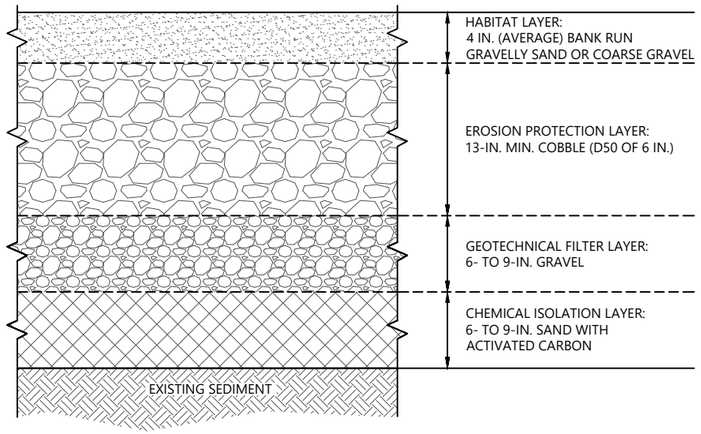
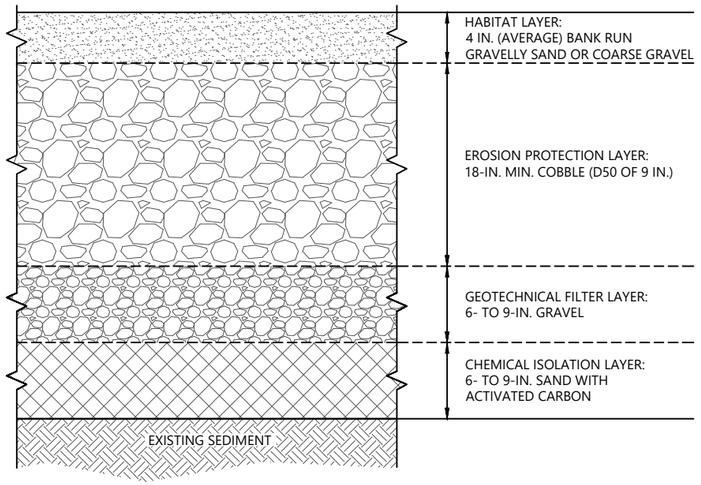
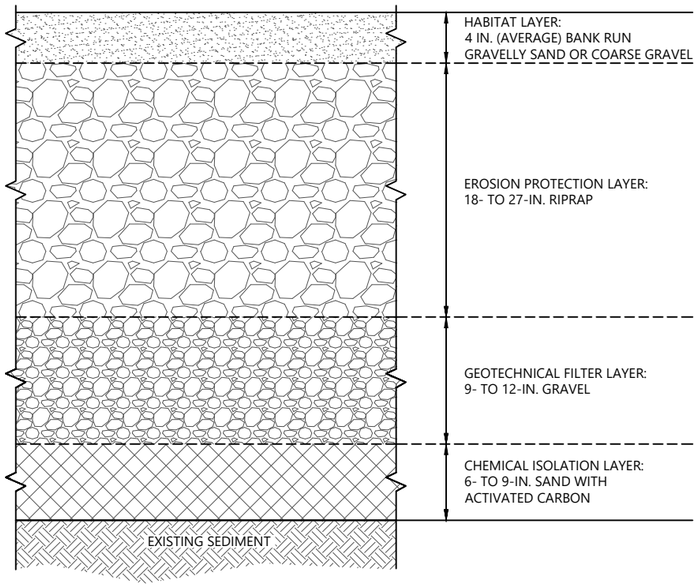
Figure 8-13
Schematic Cross Sections for Cap Types A and B



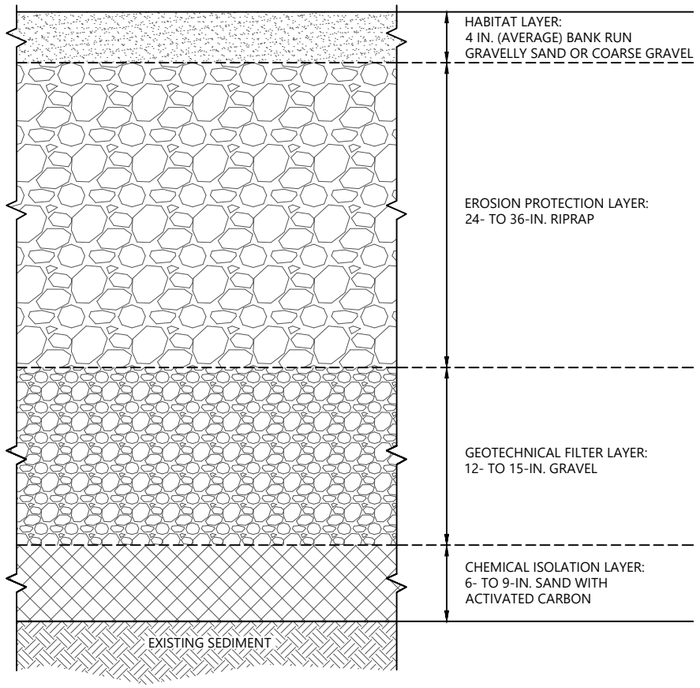
TYPE C: COBBLE ARMOR CAP
NOT TO SCALE



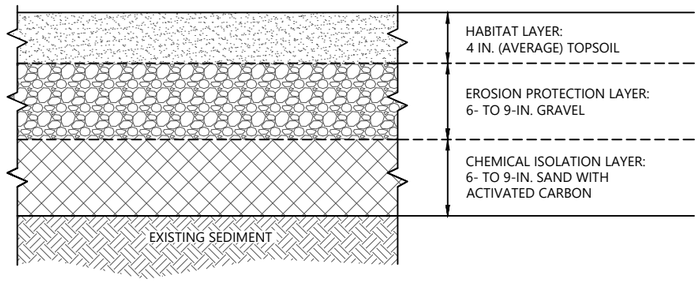
TYPE D: COBBLE ARMOR CAP
NOT TO SCALE



TYPE E: MEDIUM RIPRAP ARMOR CAP
NOT TO SCALE



TYPE F: LARGE RIPRAP ARMOR CAP
NOT TO SCALE



TYPE G: BACKWATER CAP
NOT TO SCALE

NOTES:

1. DETAILS ARE FOR ILLUSTRATIVE PURPOSES AND NOT TO SCALE.
2. CAP TYPES A AND B WILL ALSO BE APPLIED TO APPLICABLE AREAS DOWNSTREAM OF STATION 48+00.
3. THE PRELIMINARY CAP TYPES IDENTIFIED FOR AREAS DOWNSTREAM OF STATION 48+00 ARE SUBJECT TO REVISION AS THE DESIGN PROGRESSES ONCE THE NATURAL CHANNEL DESIGN FOR THIS PORTION OF THE RIVER IS FINALIZED. DETAILS OF THE FINAL CAP TYPES WILL BE PROVIDED IN A FUTURE REVISION OF OR ADDENDUM TO THE RD/RA WORK PLAN.

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Filepath: K:\Projects\0469-General Electric\Housatonic - Rest of River Remedial Design\0469-RP-038 - Conceptual Cap Types.dwg Figure 8-14

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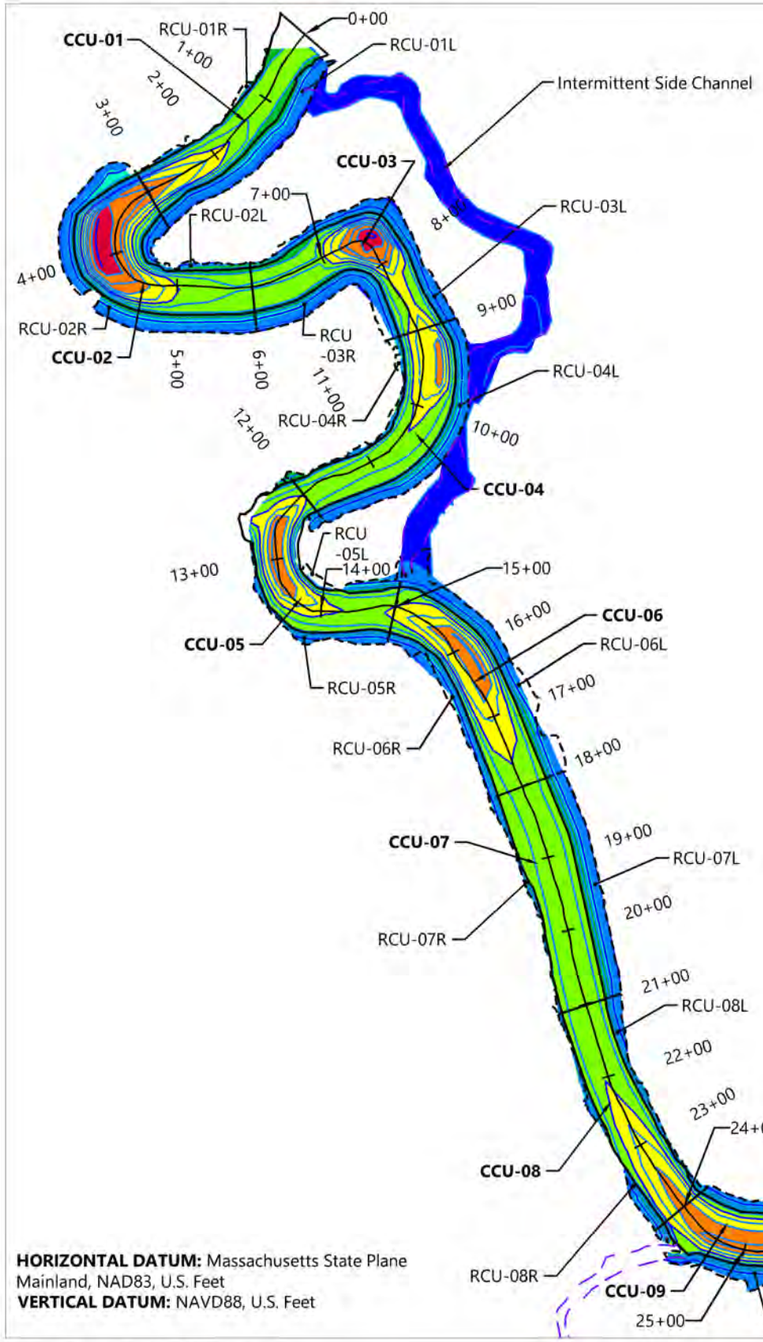
Figure 8-14
Schematic Cross Sections for Cap Types C through G (Preliminary)



Elevation (Ft NAVD88)	
Range (ft)	Color
949.0 to 951.0	
951.0 to 953.0	
953.0 to 955.0	
955.0 to 957.0	
957.0 to 959.0	
959.0 to 961.0	
961.0 to 963.0	
963.0 to 965.0	
965.0 to 967.0	

0 200
Feet

LEGEND:

- Proposed Contours-Post-Cap AECOM NCD Grading Elevations (1' Interval)
- CCU-03 — Cap Certification Unit
- RCU-03L — Riverbank Certification Unit
- 0+00 1+00 — Existing River Centerline and Stationing
- Other Waterbodies

HORIZONTAL DATUM: Massachusetts State Plane Mainland, NAD83, U.S. Feet
VERTICAL DATUM: NAVD88, U.S. Feet

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Filepath: K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\0469-RP-030 Natural Channel Design Grading Surface.dwg | Figure 8-15

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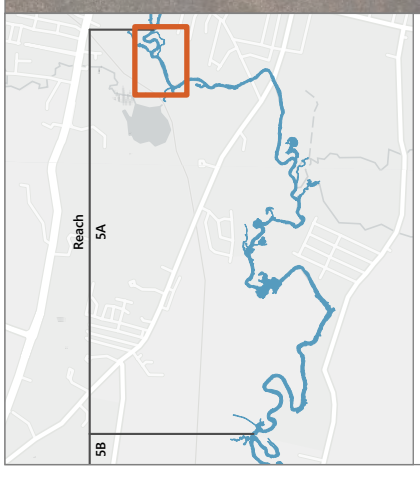
Figure 8-15
Natural Channel Design Grading Surface Elevations- Stations 0+00 to 48+00





LEGEND:

- 0+00 River Stationing
- 1 mg/kg PCB Isopleth
- Backwaters and Other Waterbodies
- Bottom of Bank
- Channel Features[2]
- Riverbank Soil Remediation

PDI Riverbank Soil Sample[3]

Average Total PCBs (mg/kg)

- <1
- 1 – 5
- 5 – 10
- 10 – 25
- 25 – 50
- 50 – 100
- > 100

NOTES:

1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. Channel features observed during bank erosion surveys conducted in 2022.
3. The PCB riverbank soil sampling results shown are average concentrations for surficial (0- to 12-inch) samples collected from the toe, midpoint, and top of the riverbank at each location.

BEHI: Bank Erodibility Hazard Index
NBS: Near Bank Stress

0 150
Feet

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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section9.aprx | RDWP Fig 9-1 Riverbank

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Figure 9-1a
Riverbank Soil PCB Results, Riverbank Erodibility, and Riverbank Remedial Extents
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



LEGEND:

- 0+00 River Stationing
- 1 mg/kg PCB Isopleth
- Backwaters and Other Waterbodies
- Bottom of Bank
- Channel Features[2]
- Riverbank Soil Remediation

PDI Riverbank Soil Sample[3]

Average Total PCBs (mg/kg)

- <1
- 1 – 5
- 5 – 10
- 10 – 25
- 25 – 50
- 50 – 100
- > 100

NOTES:

1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. Channel features observed during bank erosion surveys conducted in 2022.
3. The PCB riverbank soil sampling results shown are average concentrations for surficial (0- to 12-inch) samples collected from the toe, midpoint, and top of the riverbank at each location.

BEHI: Bank Erodibility Hazard Index
NBS: Near Bank Stress

0 150
Feet

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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section9.aprx | RDWP Fig 9-1 Riverbank

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Figure 9-1b
Riverbank Soil PCB Results, Riverbank Erodibility, and Riverbank Remedial Extents
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



LEGEND:

- 0+00 River Stationing
- 1 mg/kg PCB Isopleth
- Backwaters and Other Waterbodies
- Bottom of Bank
- Channel Features[2]
- Riverbank Soil Remediation

PDI Riverbank Soil Sample[3]

Average Total PCBs (mg/kg)

- <1
- 1 – 5
- 5 – 10
- 10 – 25
- 25 – 50
- 50 – 100
- > 100

NOTES:

1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. Channel features observed during bank erosion surveys conducted in 2022.
3. The PCB riverbank soil sampling results shown are average concentrations for surficial (0- to 12-inch) samples collected from the toe, midpoint, and top of the riverbank at each location.

BEHI: Bank Erodibility Hazard Index
NBS: Near Bank Stress

0 150
Feet

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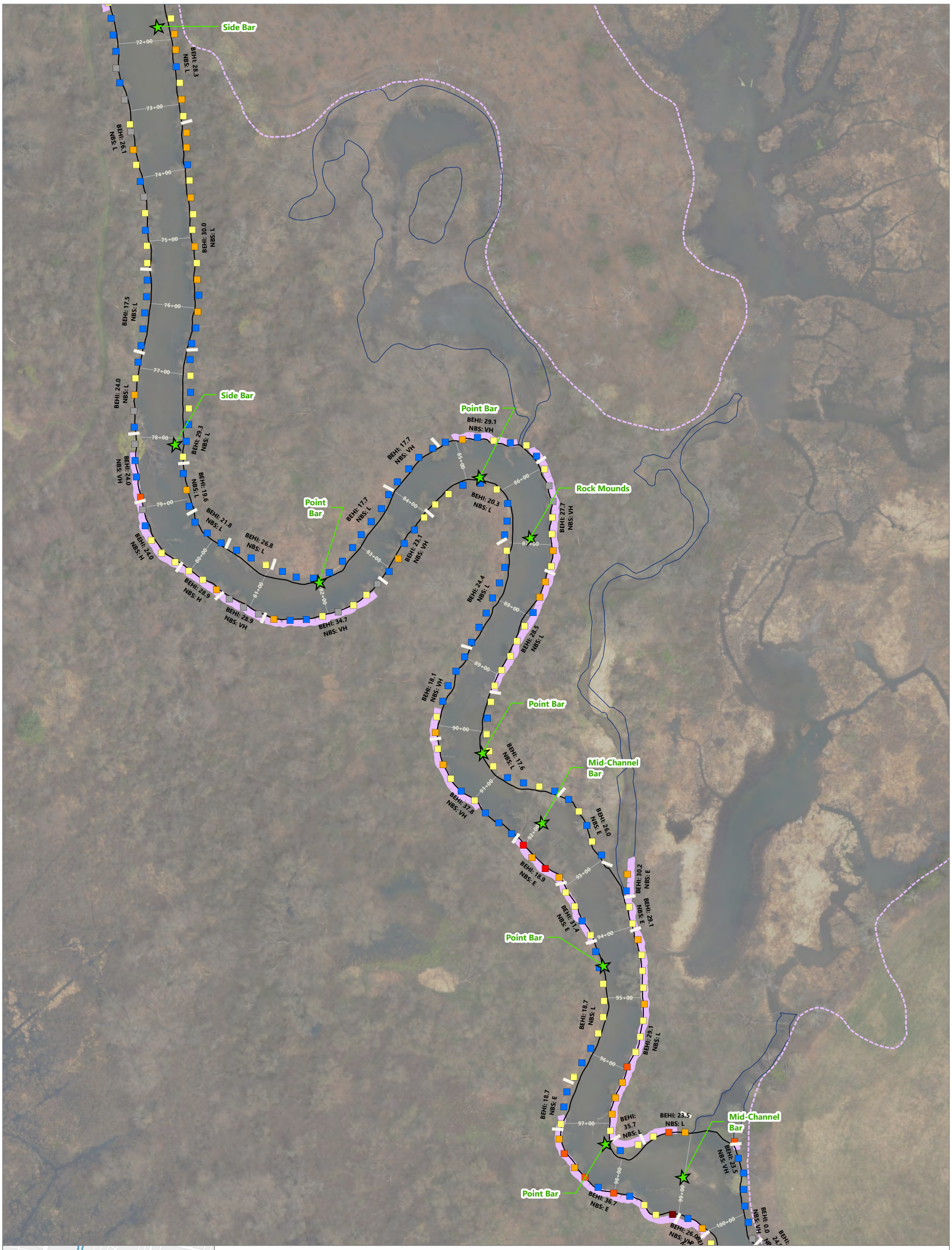
Figure 9-1c
Riverbank Soil PCB Results, Riverbank Erodibility, and Riverbank Remedial Extents
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



LEGEND:

- 0+00 River Stationing
- 1 mg/kg PCB Isopleth
- Backwaters and Other Waterbodies
- Bottom of Bank
- Channel Features[2]
- Riverbank Soil Remediation

PDI Riverbank Soil Sample[3]

Average Total PCBs (mg/kg)

- <1
- 1 – 5
- 5 – 10
- 10 – 25
- 25 – 50
- 50 – 100
- > 100

NOTES:

1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. Channel features observed during bank erosion surveys conducted in 2022.
3. The PCB riverbank soil sampling results shown are average concentrations for surficial (0- to 12-inch) samples collected from the toe, midpoint, and top of the riverbank at each location.

BEHI: Bank Erodibility Hazard Index
NBS: Near Bank Stress

0 150
Feet

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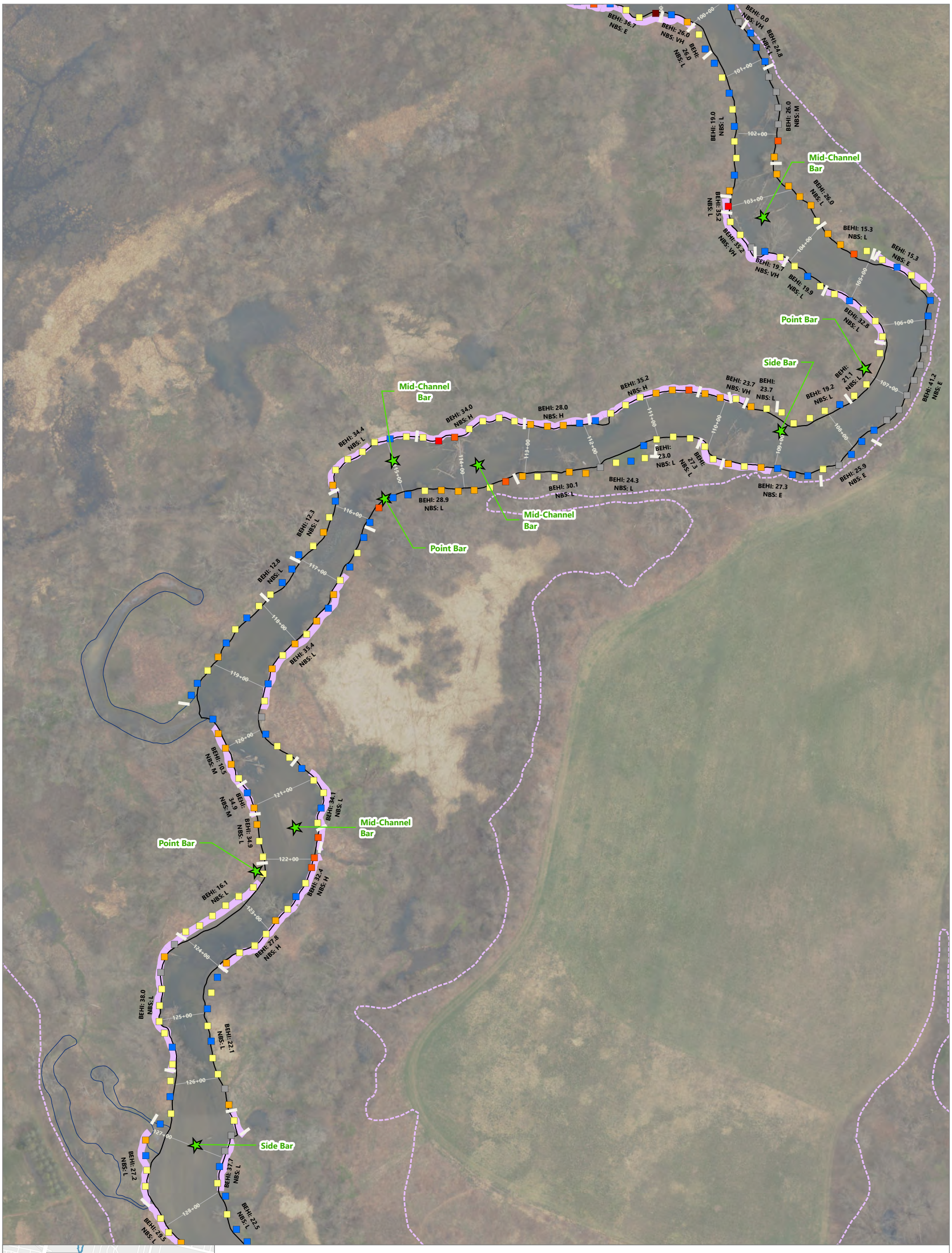
Figure 9-1d
Riverbank Soil PCB Results, Riverbank Erodibility, and Riverbank Remedial Extents
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section9.aprx | RDWP Fig 9-1 Riverbank

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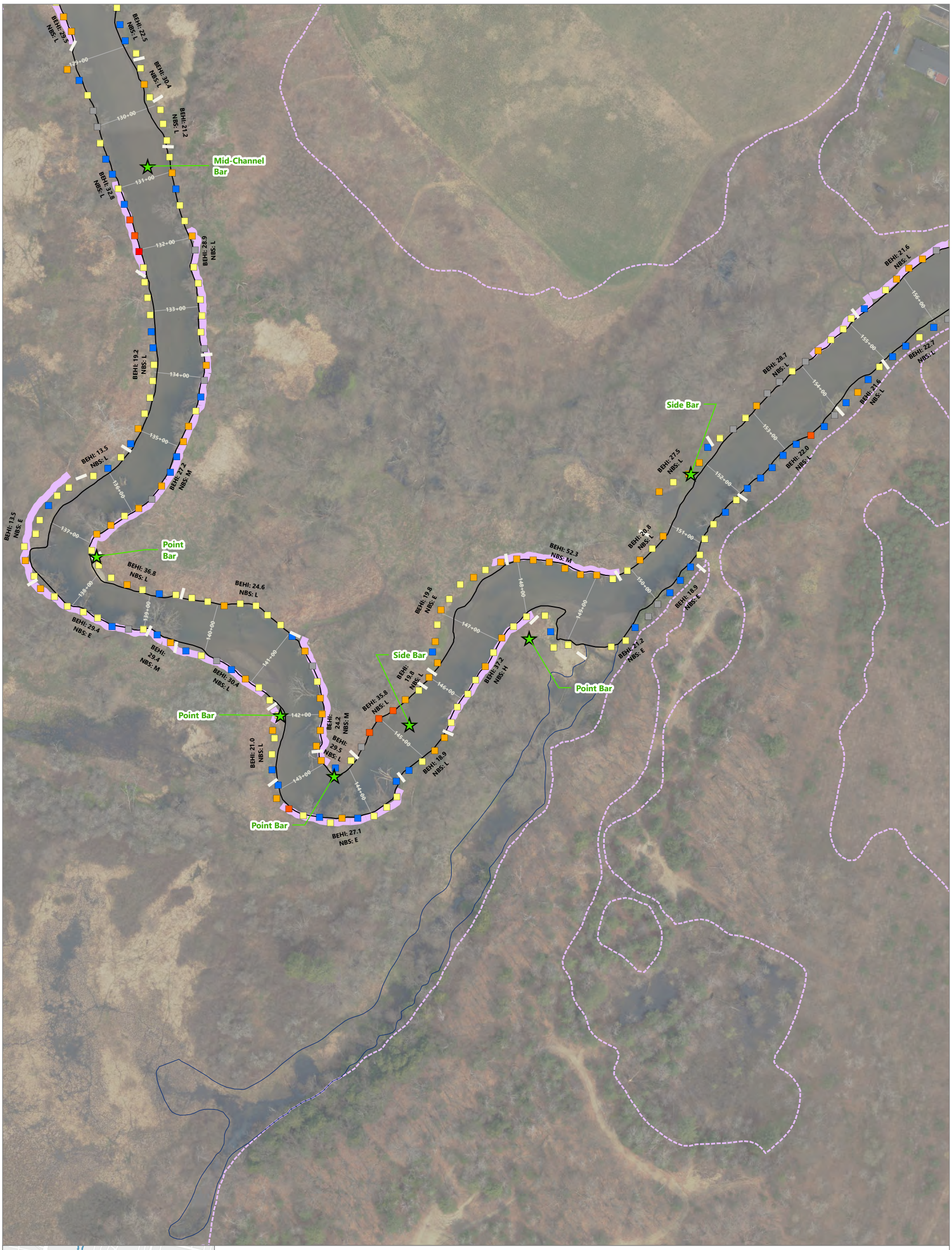
Figure 9-1e
Riverbank Soil PCB Results, Riverbank Erodibility, and Riverbank Remedial Extents
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



LEGEND:

- 0+00 River Stationing
- 1 mg/kg PCB Isopleth
- Backwaters and Other Waterbodies
- Bottom of Bank
- Channel Features[2]
- Riverbank Soil Remediation

PDI Riverbank Soil Sample[3]

Average Total PCBs (mg/kg)

- <1
- 1 – 5
- 5 – 10
- 10 – 25
- 25 – 50
- 50 – 100
- > 100

NOTES:

1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. Channel features observed during bank erosion surveys conducted in 2022.
3. The PCB riverbank soil sampling results shown are average concentrations for surficial (0- to 12-inch) samples collected from the toe, midpoint, and top of the riverbank at each location.

BEHI: Bank Erodibility Hazard Index
NBS: Near Bank Stress

0 150
Feet

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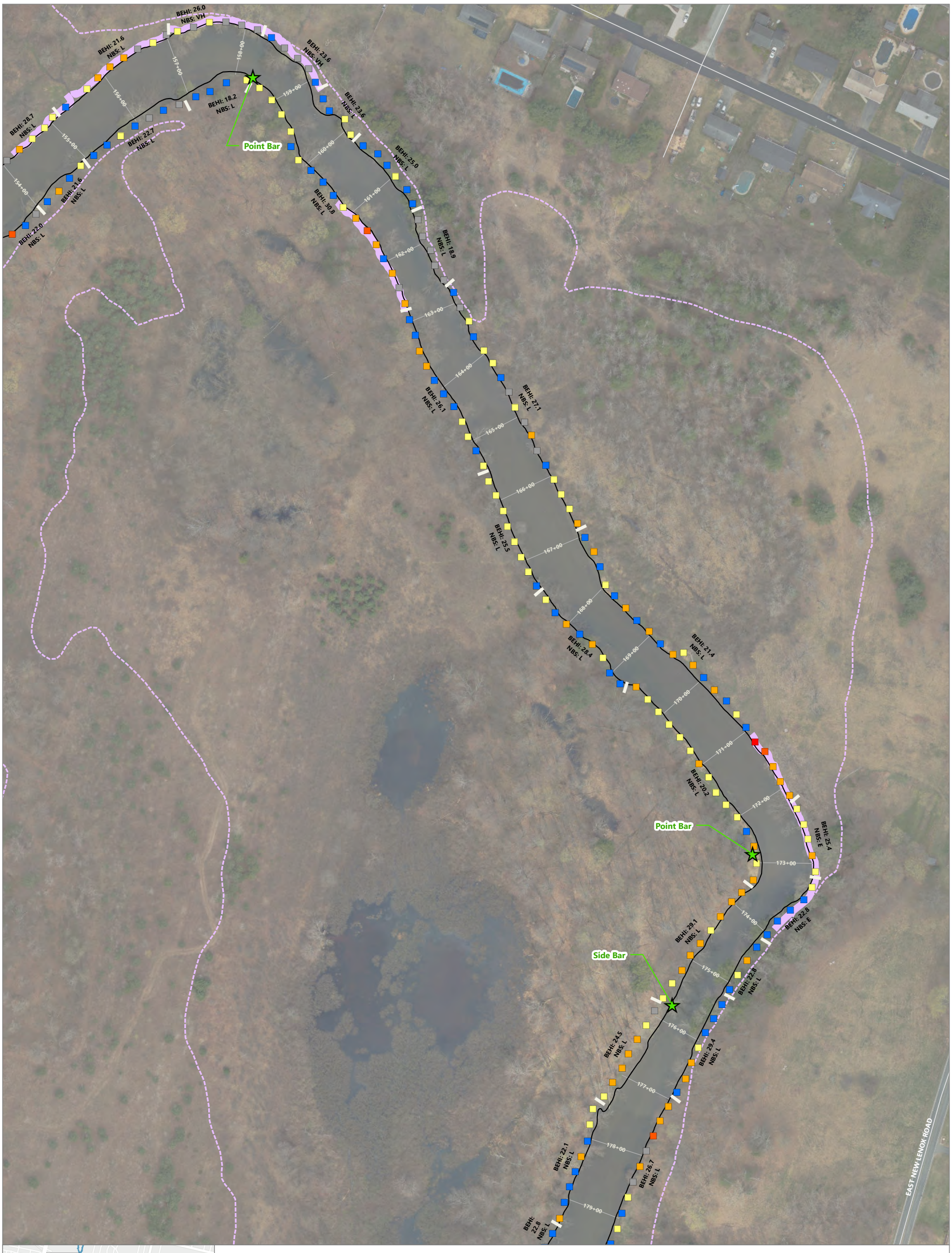
Figure 9-1f
Riverbank Soil PCB Results, Riverbank Erodibility, and Riverbank Remedial Extents
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



LEGEND:

- 0+00 River Stationing
- 1 mg/kg PCB Isopleth
- Backwaters and Other Waterbodies
- Bottom of Bank
- Channel Features[2]
- Riverbank Soil Remediation

PDI Riverbank Soil Sample[3]

Average Total PCBs (mg/kg)

- <1
- 1 – 5
- 5 – 10
- 10 – 25
- 25 – 50
- 50 – 100
- > 100

NOTES:

1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. Channel features observed during bank erosion surveys conducted in 2022.
3. The PCB riverbank soil sampling results shown are average concentrations for surficial (0- to 12-inch) samples collected from the toe, midpoint, and top of the riverbank at each location.

BEHI: Bank Erodibility Hazard Index
NBS: Near Bank Stress

0 150
Feet

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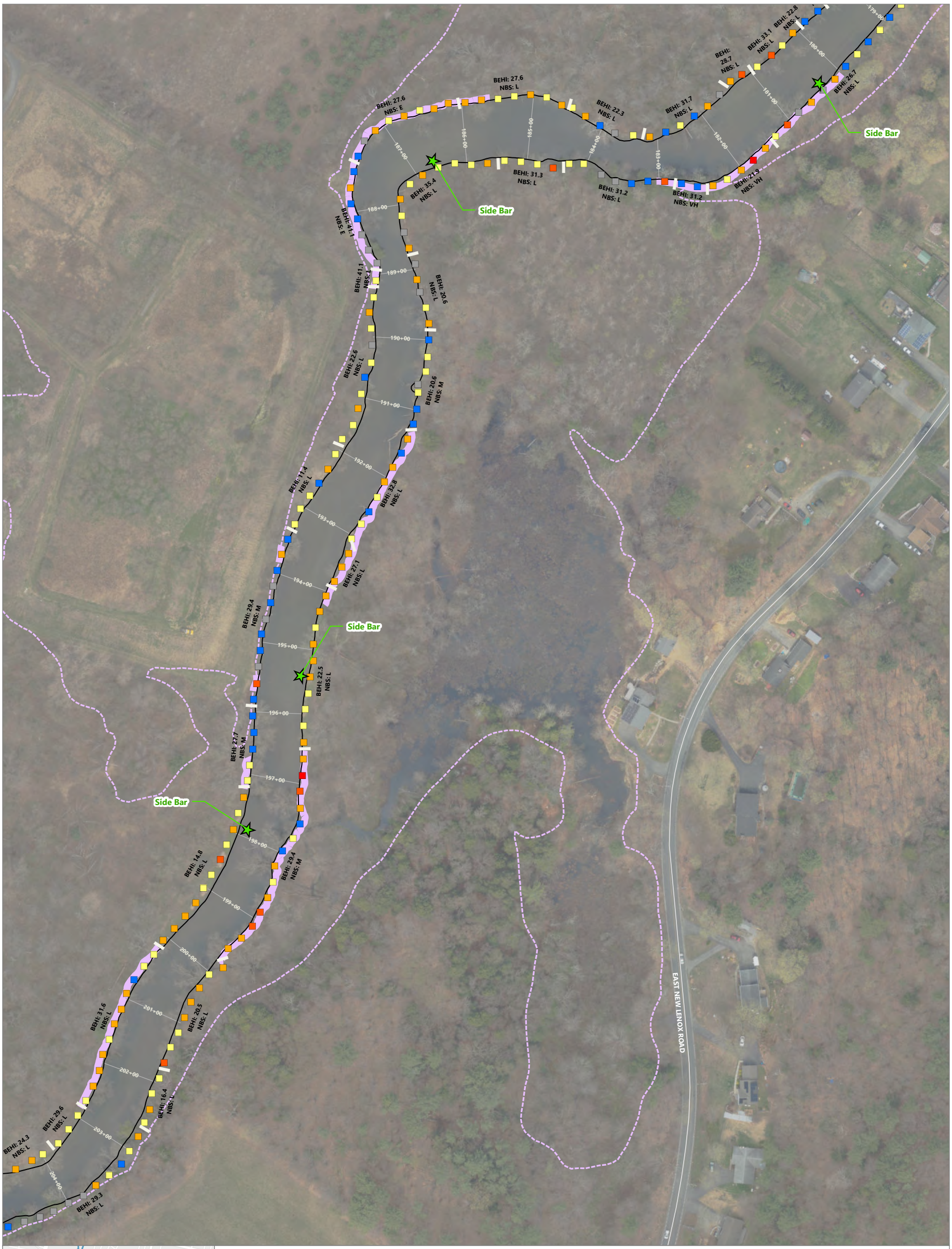
Figure 9-1g
Riverbank Soil PCB Results, Riverbank Erodibility, and Riverbank Remedial Extents
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



LEGEND:

- 0+00 River Stationing
- 1 mg/kg PCB Isopleth
- Backwaters and Other Waterbodies
- Bottom of Bank
- Channel Features[2]
- Riverbank Soil Remediation

PDI Riverbank Soil Sample[3]

Average Total PCBs (mg/kg)

- <1
- 1 – 5
- 5 – 10
- 10 – 25
- 25 – 50
- 50 – 100
- > 100

NOTES:

1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. Channel features observed during bank erosion surveys conducted in 2022.
3. The PCB riverbank soil sampling results shown are average concentrations for surficial (0- to 12-inch) samples collected from the toe, midpoint, and top of the riverbank at each location.

BEHI: Bank Erodibility Hazard Index
NBS: Near Bank Stress

0 150
Feet

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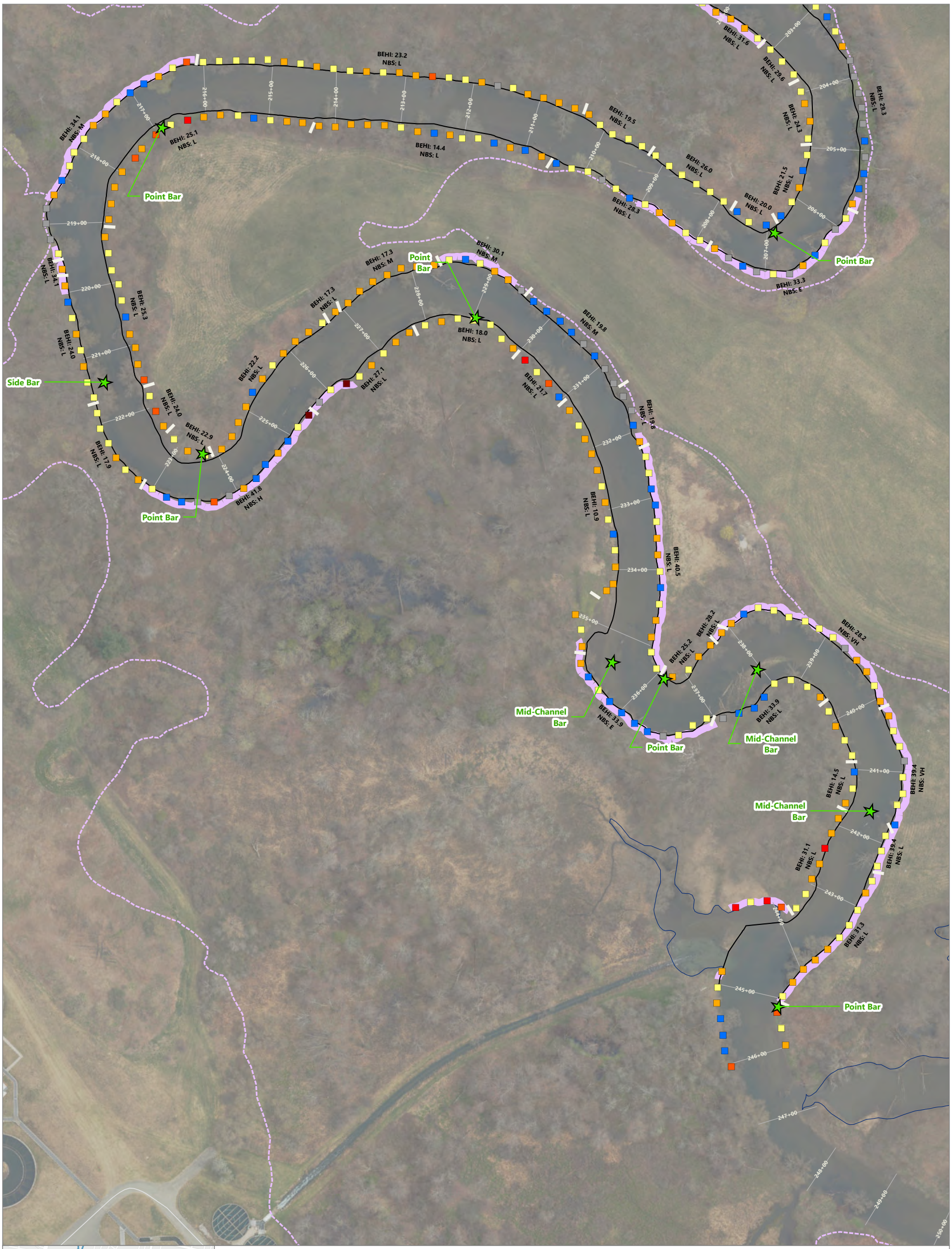
Figure 9-1h
Riverbank Soil PCB Results, Riverbank Erodibility, and Riverbank Remedial Extents
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



LEGEND:

- 0+00 River Stationing
- 1 mg/kg PCB Isopleth
- Backwaters and Other Waterbodies
- Bottom of Bank
- Channel Features[2]
- Riverbank Soil Remediation

PDI Riverbank Soil Sample[3]

Average Total PCBs (mg/kg)

- <1
- 1 – 5
- 5 – 10
- 10 – 25
- 25 – 50
- 50 – 100
- > 100

NOTES:

1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. Channel features observed during bank erosion surveys conducted in 2022.
3. The PCB riverbank soil sampling results shown are average concentrations for surficial (0- to 12-inch) samples collected from the toe, midpoint, and top of the riverbank at each location.

BEHI: Bank Erodibility Hazard Index
NBS: Near Bank Stress

0 150
Feet

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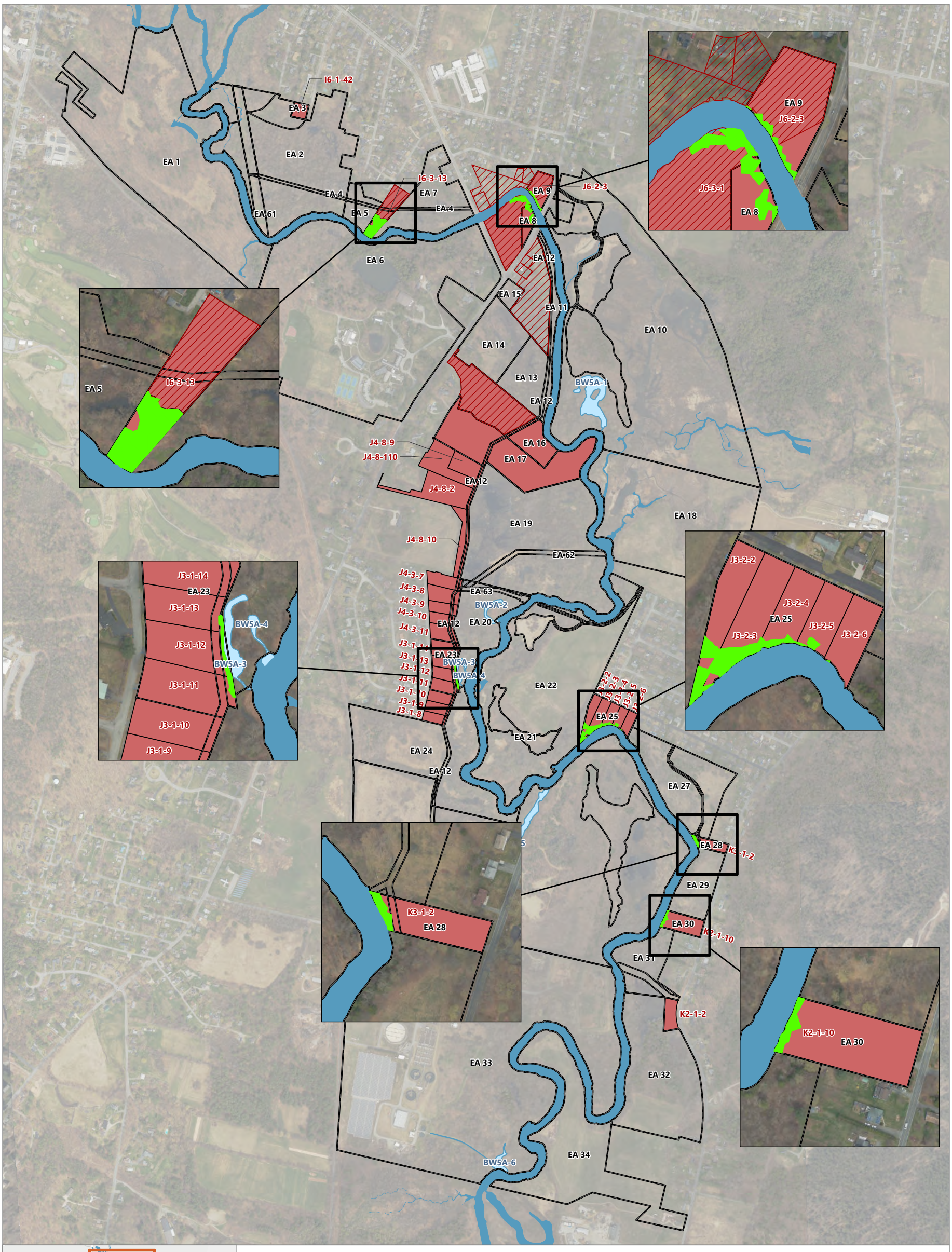
Figure 9-1i
Riverbank Soil PCB Results, Riverbank Erodibility, and Riverbank Remedial Extents
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section10.aprx | RDWP Fig 10-1 Residential Removal

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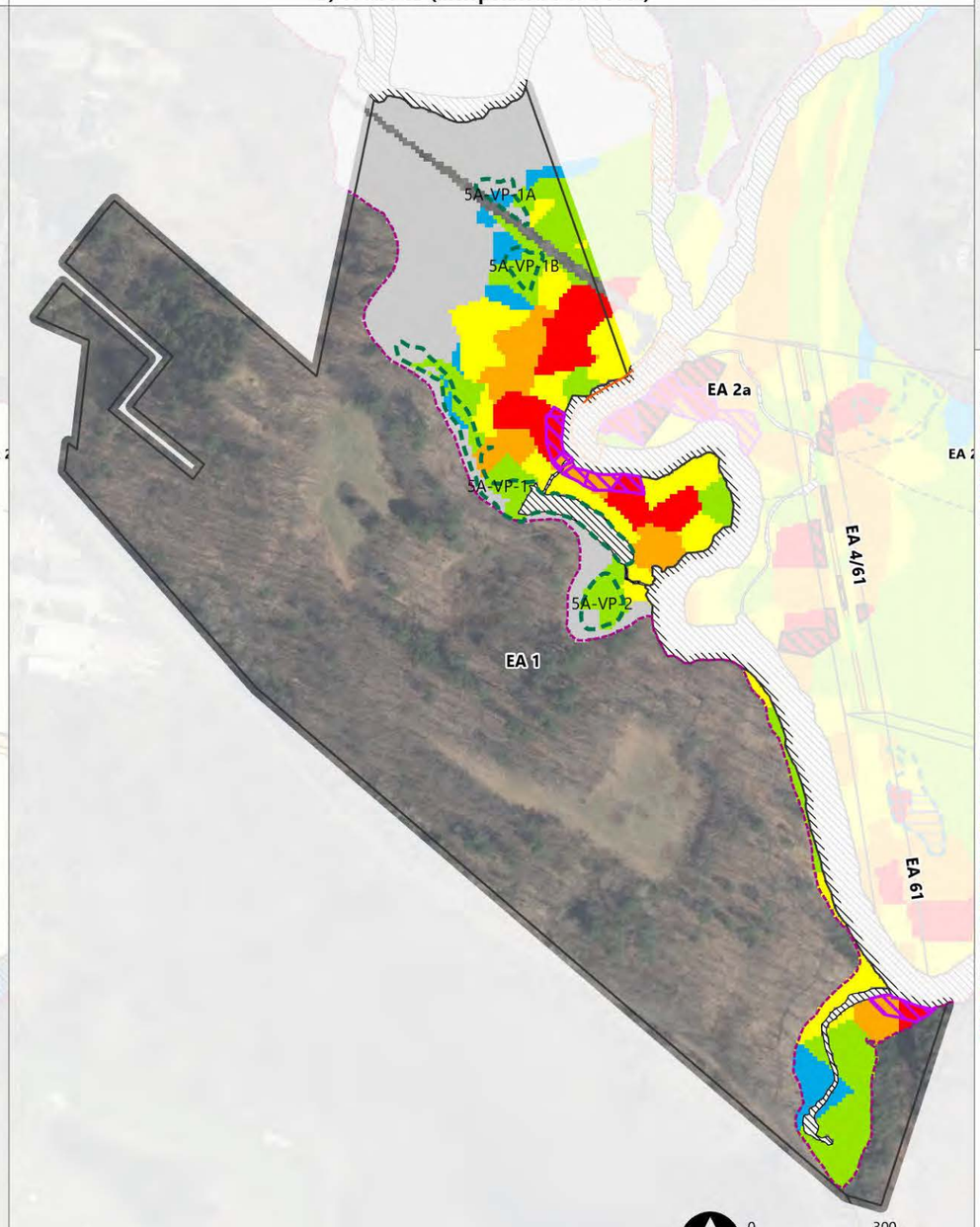
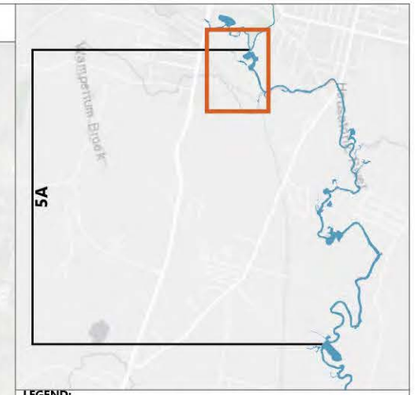
Figure 10-1
Residential Floodplain Remediation Areas
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:
- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)
- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access
- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)
- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas
- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

0 300
Feet

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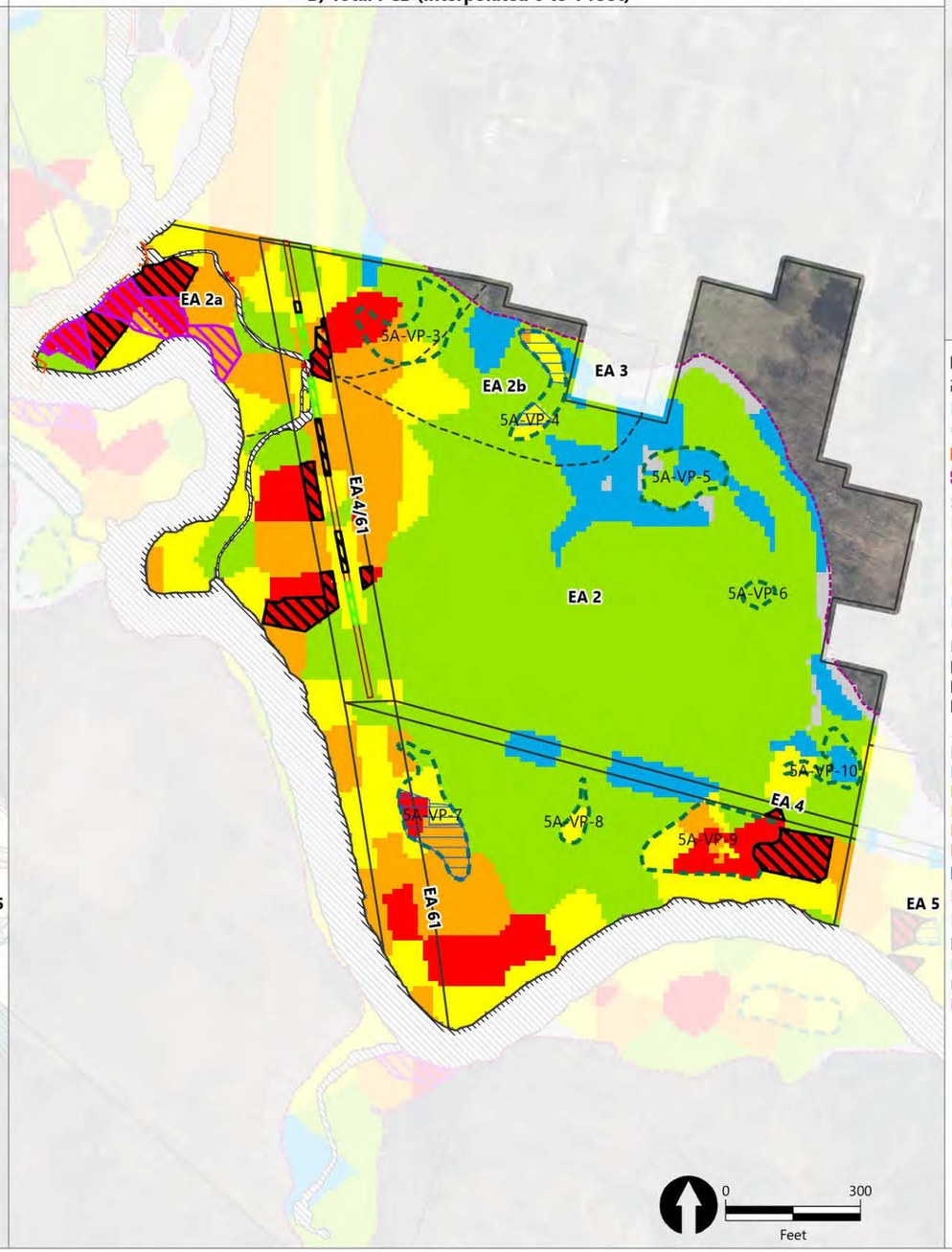
Figure 10-2a
Non-Residential Floodplain Remediation Areas (Exposure Area 1)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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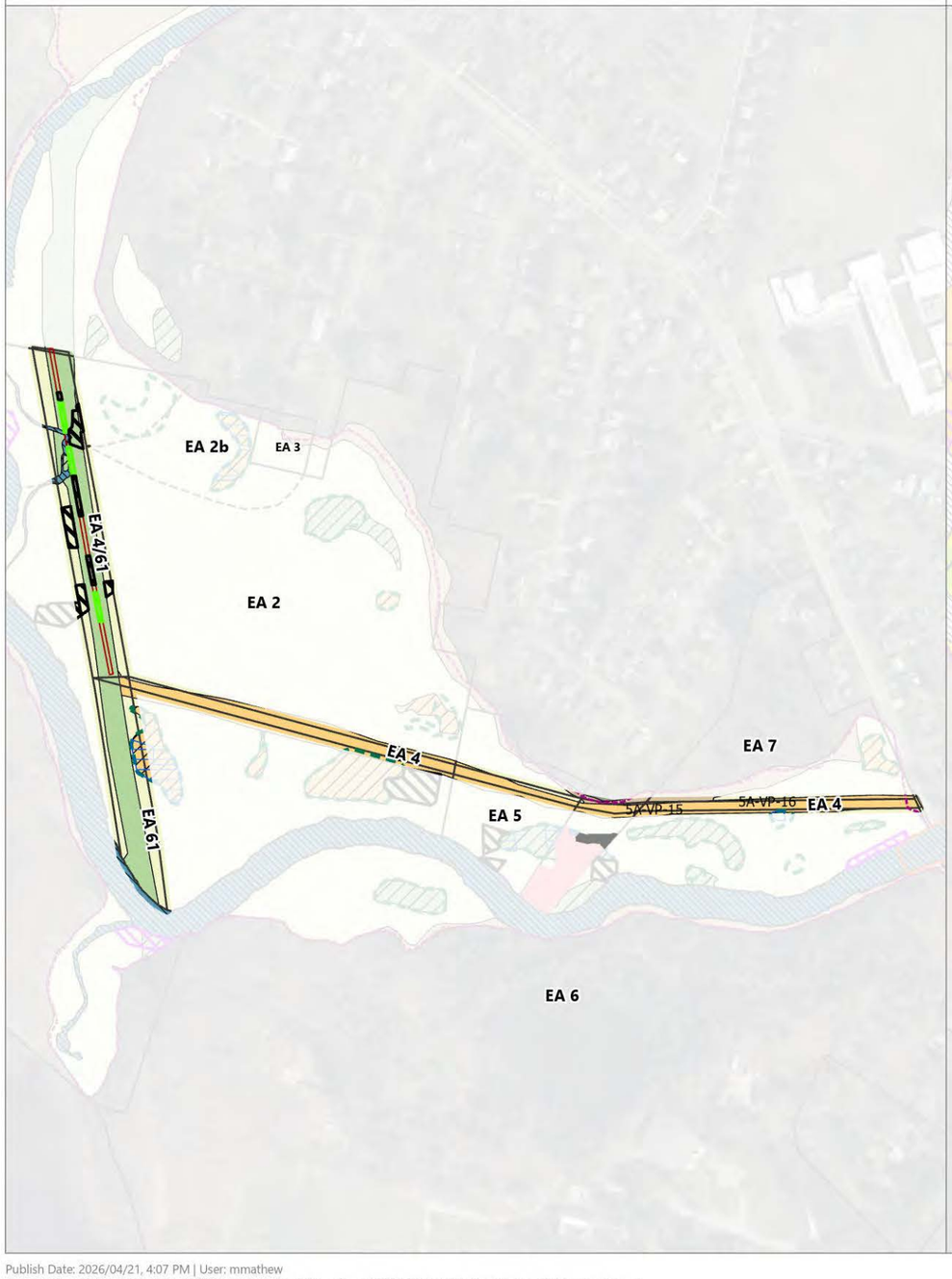
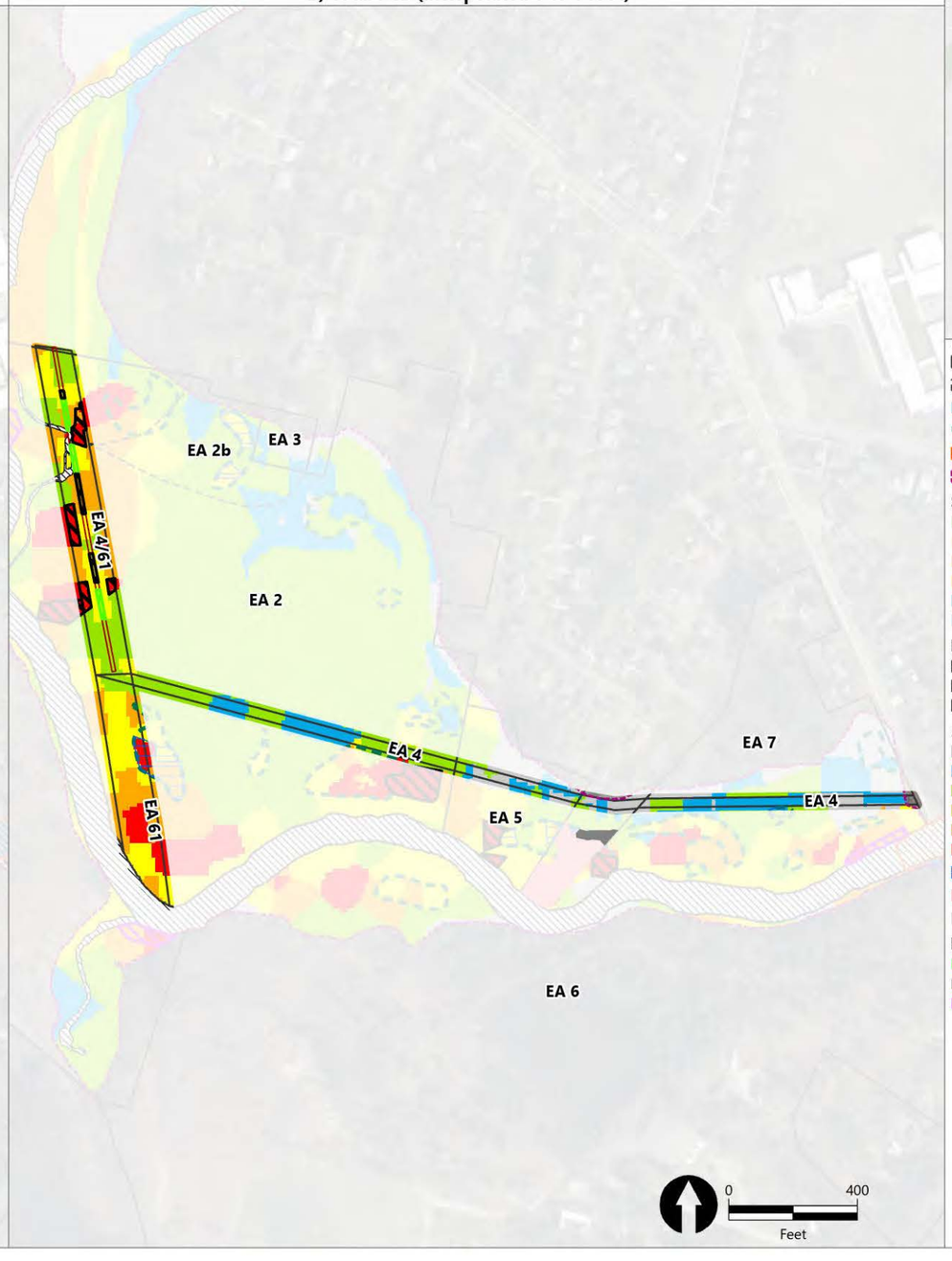
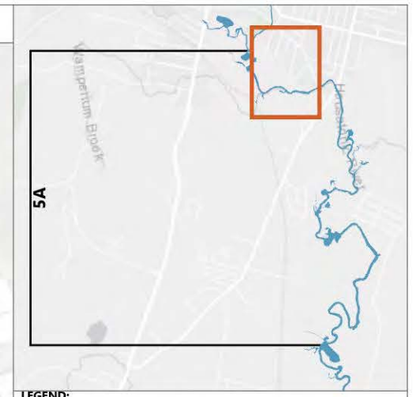
Figure 10-2b
Non-Residential Floodplain Remediation Areas (Exposure Area 2)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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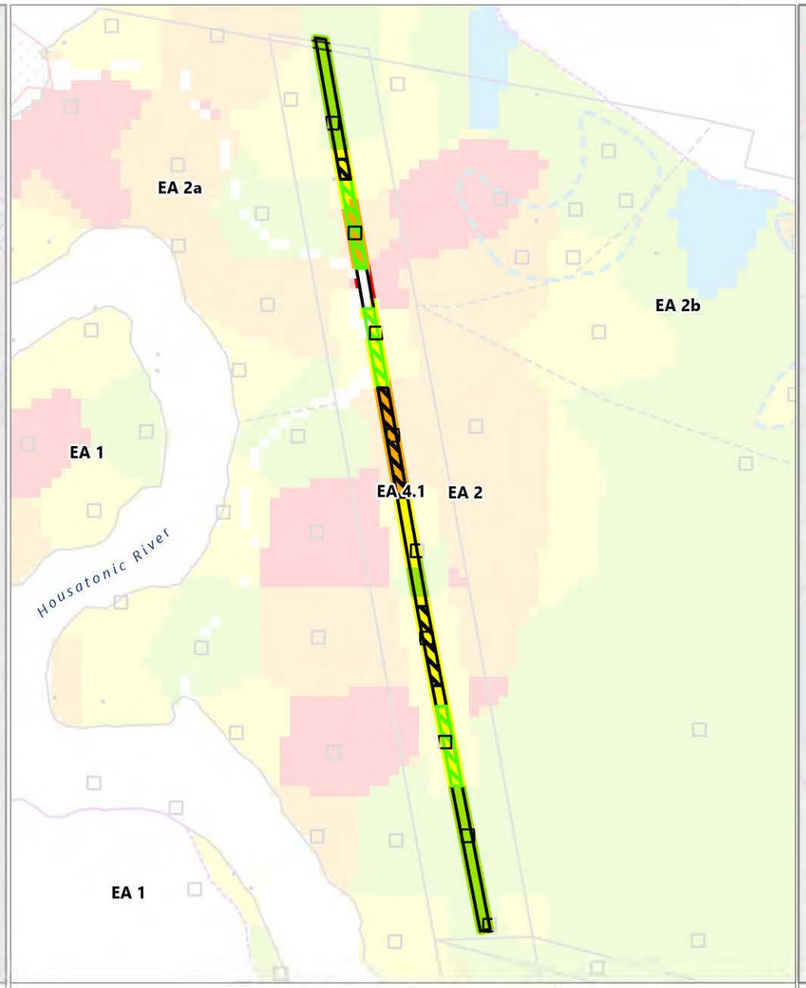
Figure 10-2c
Non-Residential Floodplain Remediation Areas (Exposure Areas 4 and 61)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



Super Habitats



Total PCB (0 to 1 foot)[1]



Total PCB (0 to 3 feet)

LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- 1 mg/kg PCB Isopleth
- Frequently Used Subarea
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

NOTES:
1. PCB concentrations represent the average concentration in the top 0 to 1 foot of soil based on 0- to 0.5-foot and 0.5- to 1-foot layers.
2. Aerial imagery from MassGIS 2021.

0 160
Feet

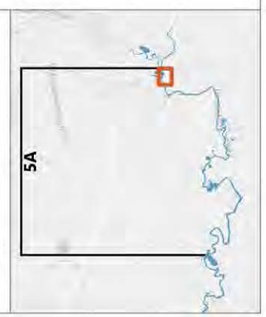


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Figure 10-2d
Non-Residential Remediation in Frequently Used Subarea (Exposure Area 4/61)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)

5A-VP-10

EA 5

5A-VP-13

5A

LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

0 60 Feet

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Figure 10-2e
Non-Residential Floodplain Remediation Areas (Exposure Area 5)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)

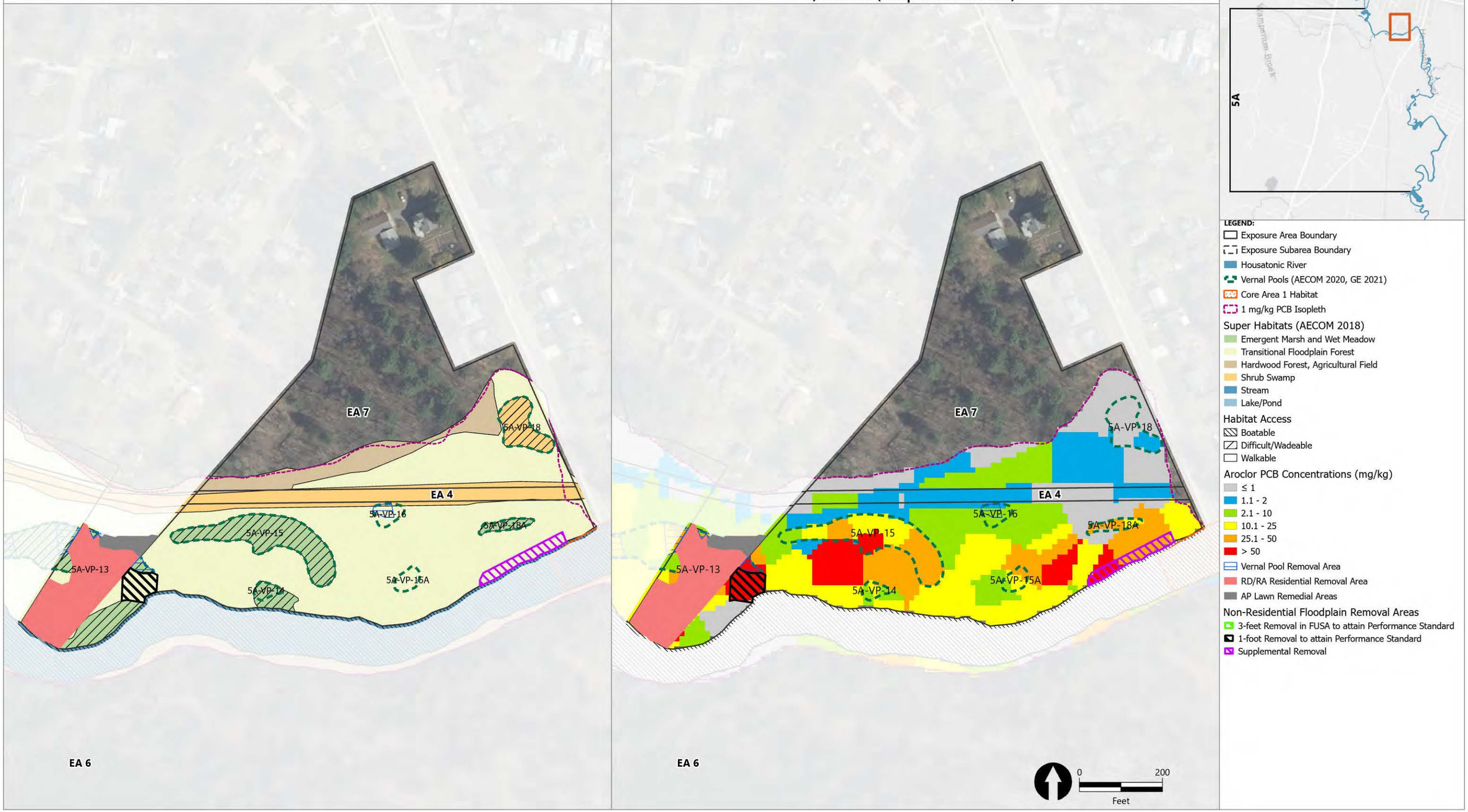

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Figure 10-2f
Non-Residential Floodplain Remediation Areas (Exposure Area 7)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)

EA 9
EA 8
EA 12
EA 10b
EA 11
EA 10
EA 10a
EA 13
EA 16
5A-VP-19
5A-VP-24
5A-VP-24B

5A

LEGEND:
- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)
- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access
- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)
- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas
- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

0 400
Feet

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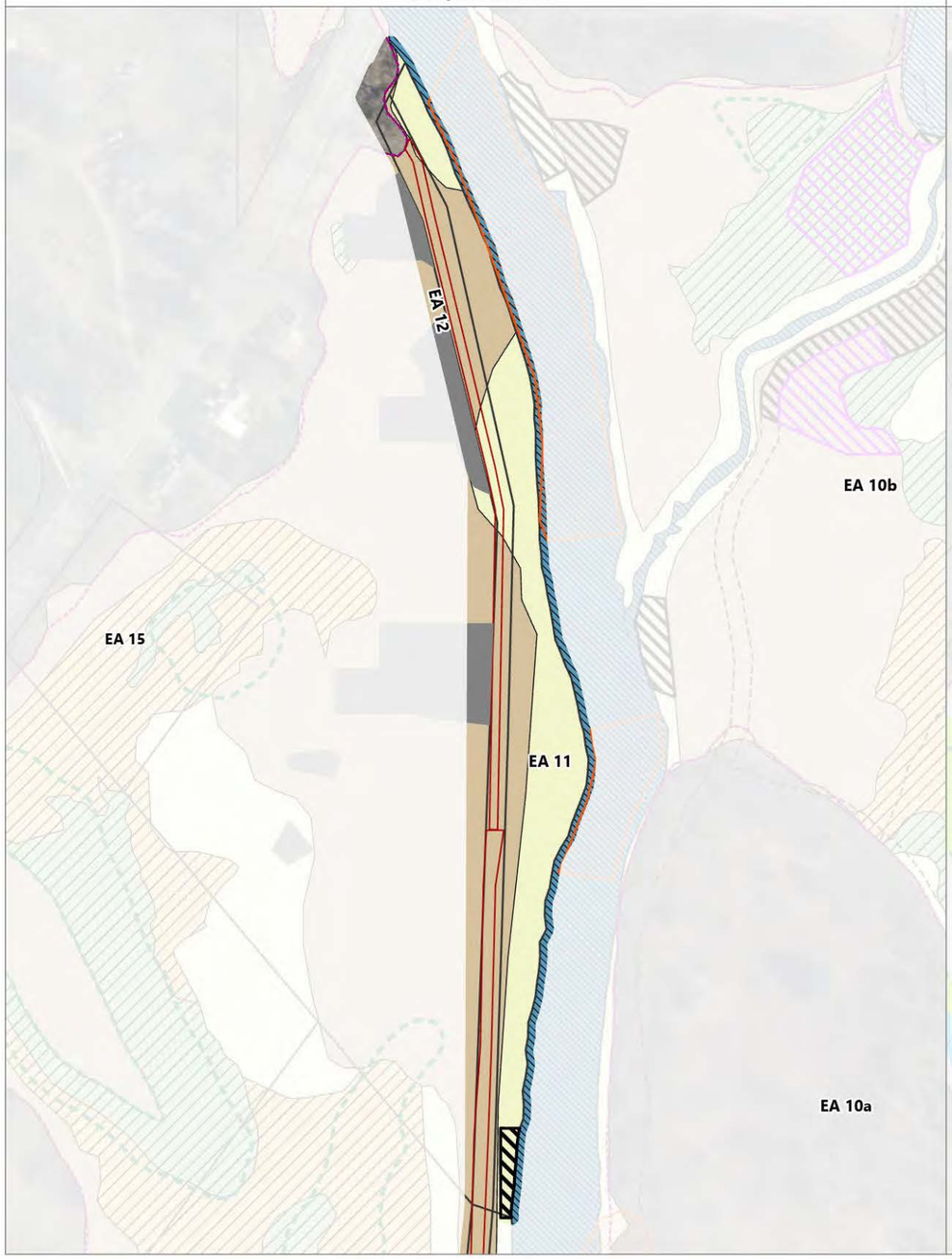
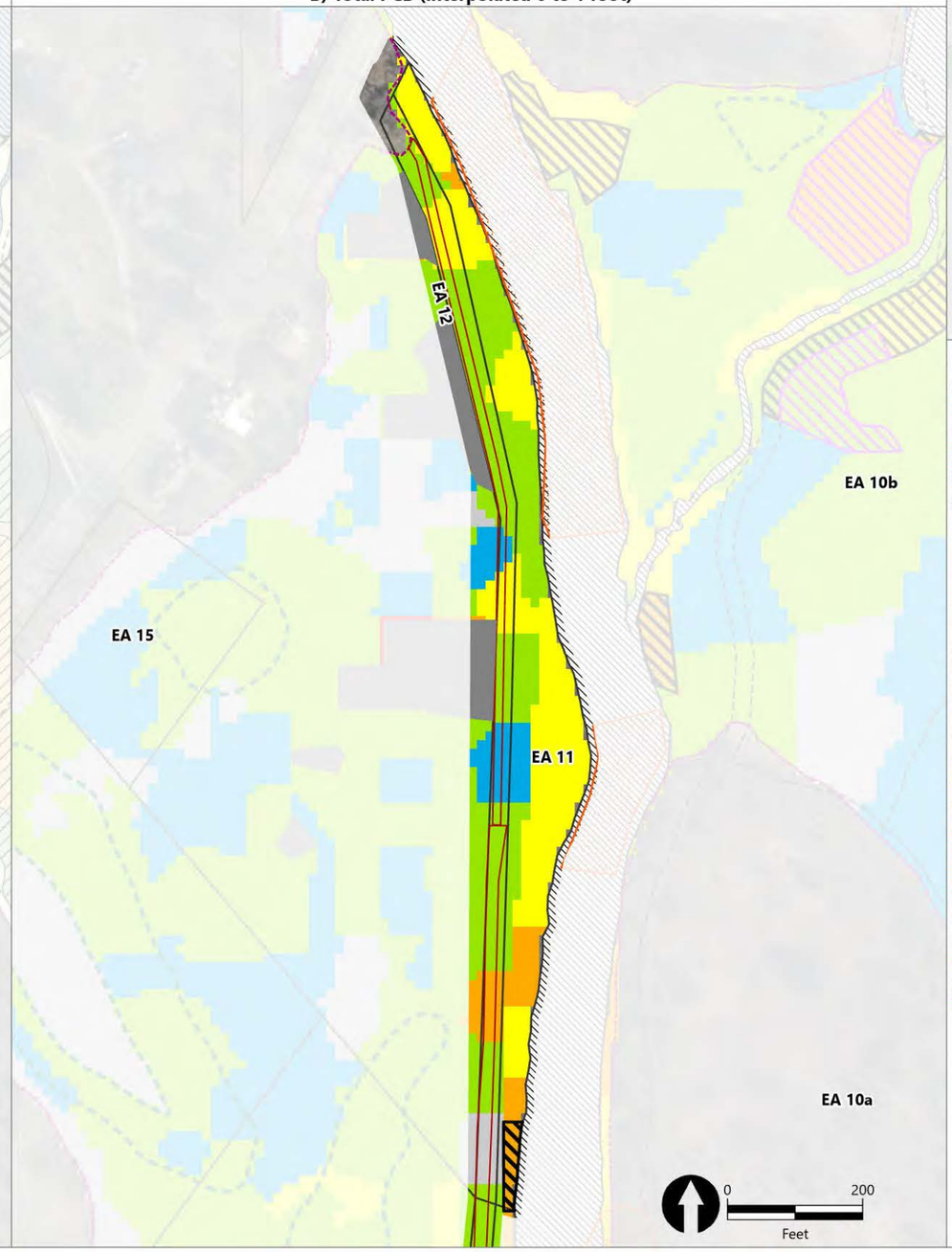
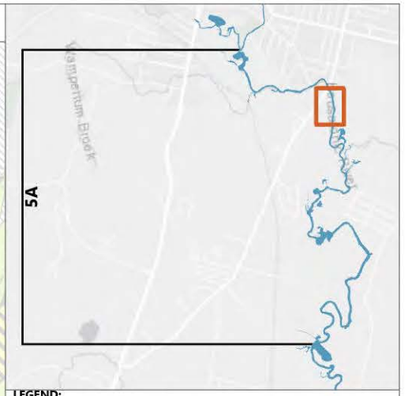
Figure 10-2g
Non-Residential Floodplain Remediation Areas (Exposure Area 10)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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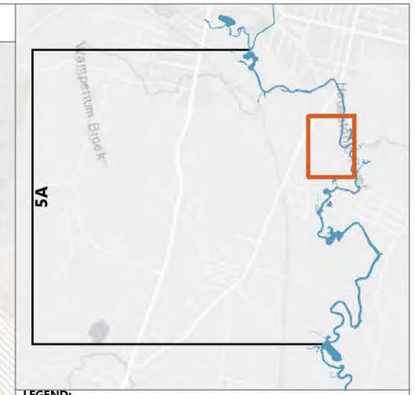
Figure 10-2h
Non-Residential Floodplain Remediation Areas (Exposure Area 11)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)

EA 14
EA 10a
EA 13
EA 12
5A-VP-27
EA 16
EA 17
5A-VR-28A
EA 19
EA 62



LEGEND:
- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)
- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access
- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)
- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas
- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

0 200 Feet

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Figure 10-2i
Non-Residential Floodplain Remediation Areas (Exposure Areas 16 and 17)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)

EA-18

EA 18

5A

LEGEND:

Exposure Area Boundary
Exposure Subarea Boundary
Housatonic River
Vernal Pools (AECOM 2020, GE 2021)
Core Area 1 Habitat
1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

Emergent Marsh and Wet Meadow
Transitional Floodplain Forest
Hardwood Forest, Agricultural Field
Shrub Swamp
Stream
Lake/Pond

Habitat Access

Boatable
Difficult/Wadeable
Walkable

Aroclor PCB Concentrations (mg/kg)

≤ 1
1.1 - 2
2.1 - 10
10.1 - 25
25.1 - 50
> 50
Vernal Pool Removal Area
RD/RA Residential Removal Area
AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

3-feet Removal in FUSA to attain Performance Standard
1-foot Removal to attain Performance Standard
Supplemental Removal

0 300
Feet

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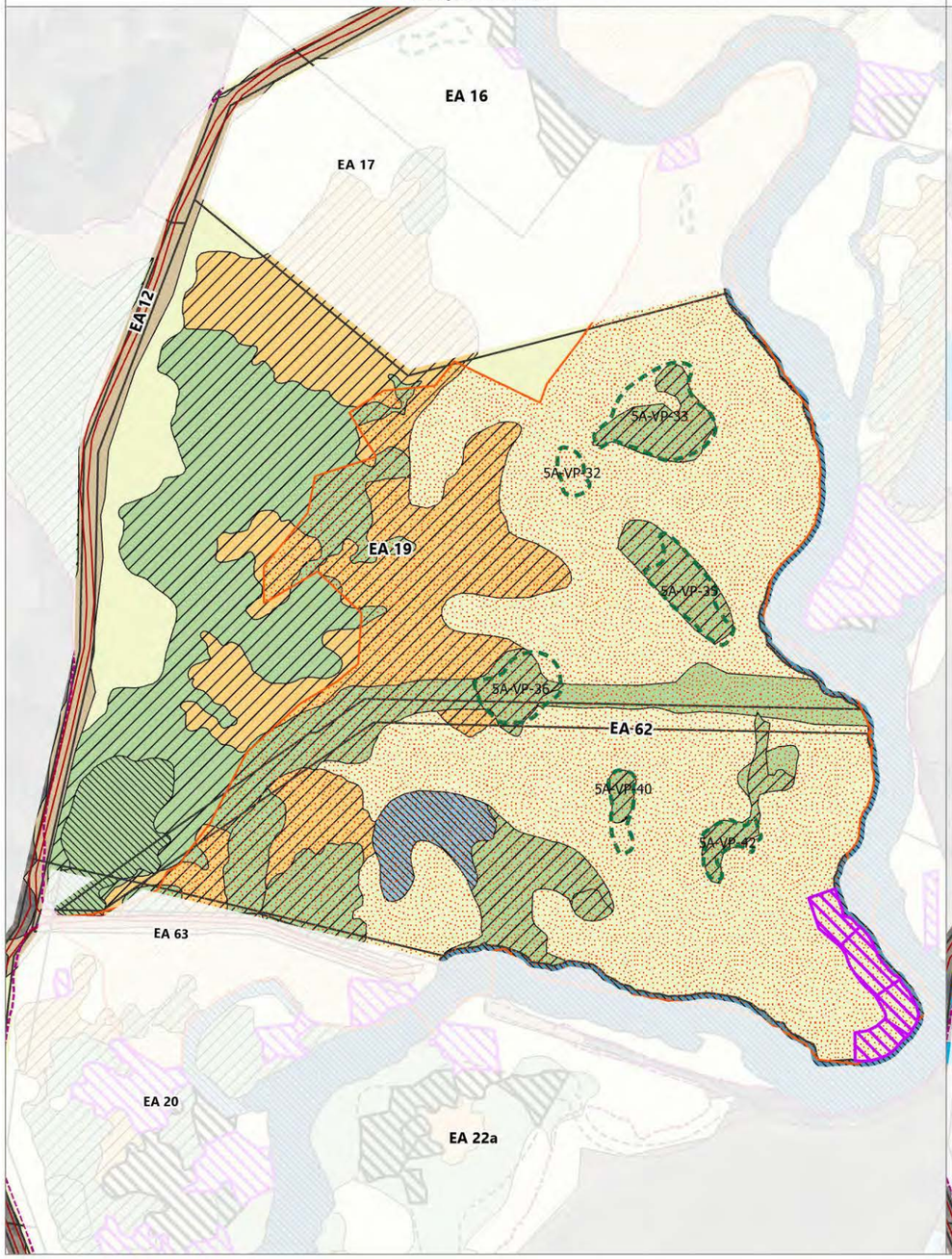
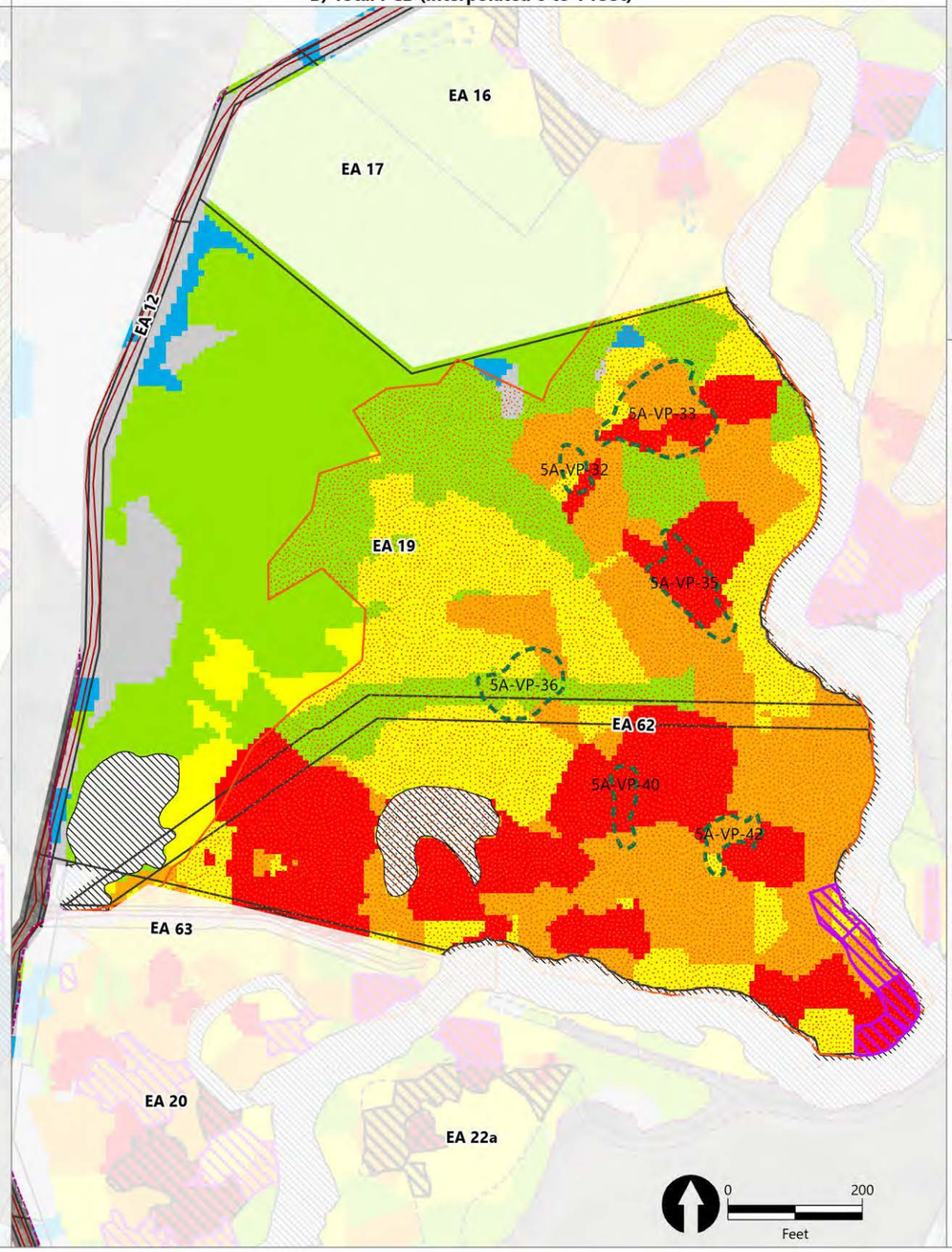
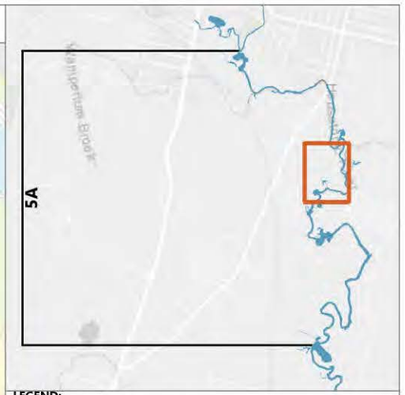
Figure 10-2j
Non-Residential Floodplain Remediation Areas (Exposure Area 18)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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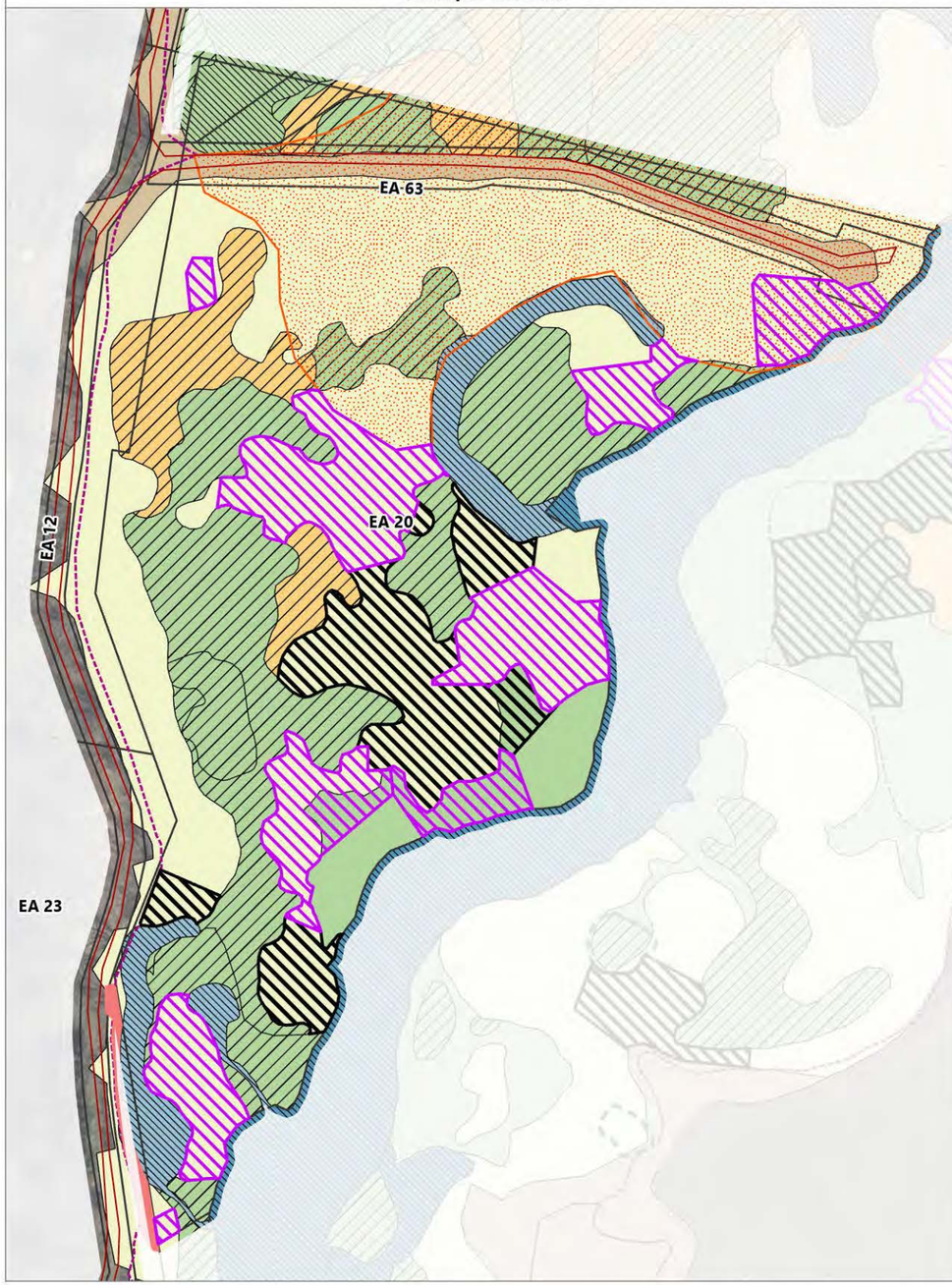
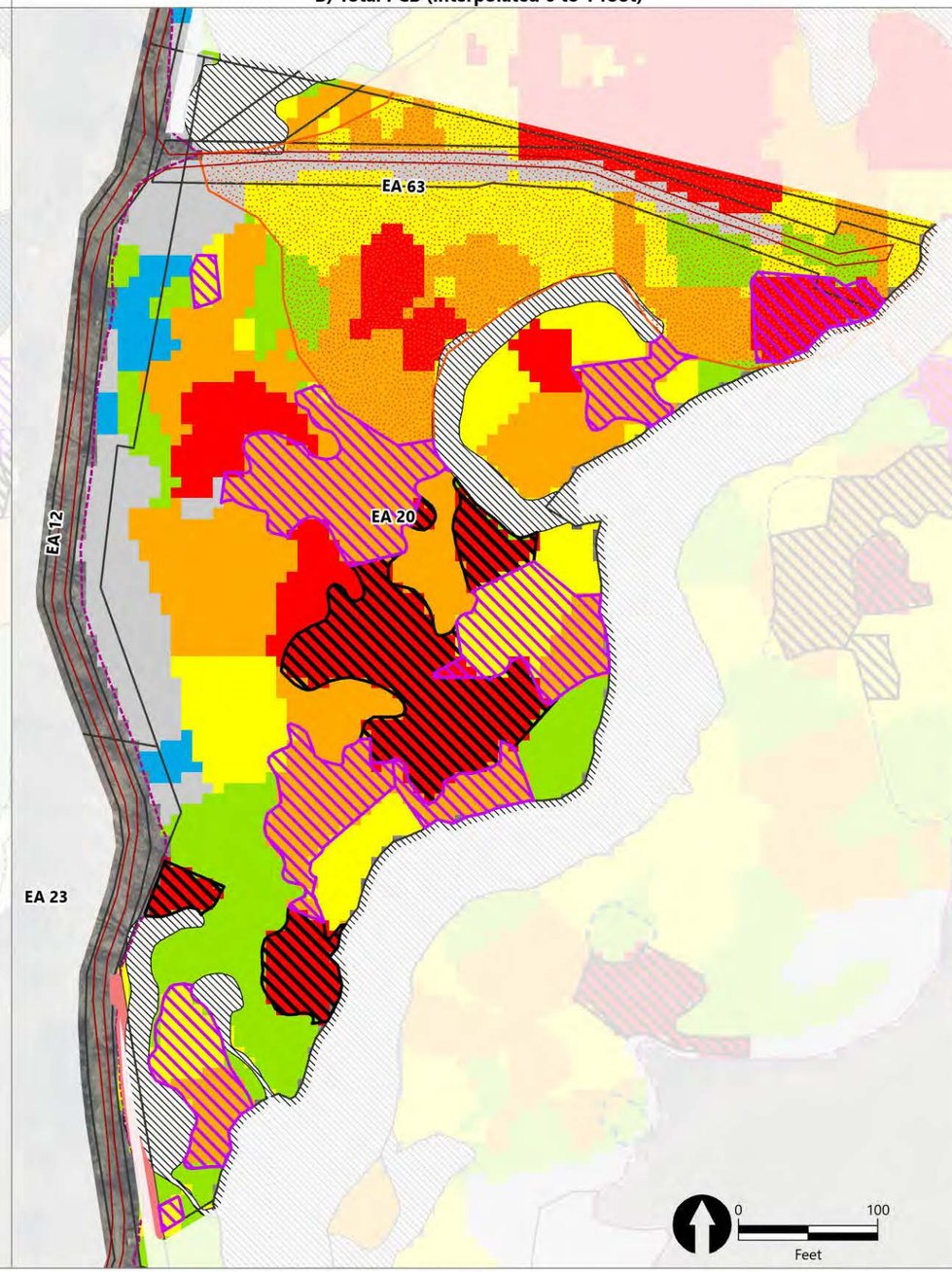
Figure 10-2k
Non-Residential Floodplain Remediation Areas (Exposure Area 19)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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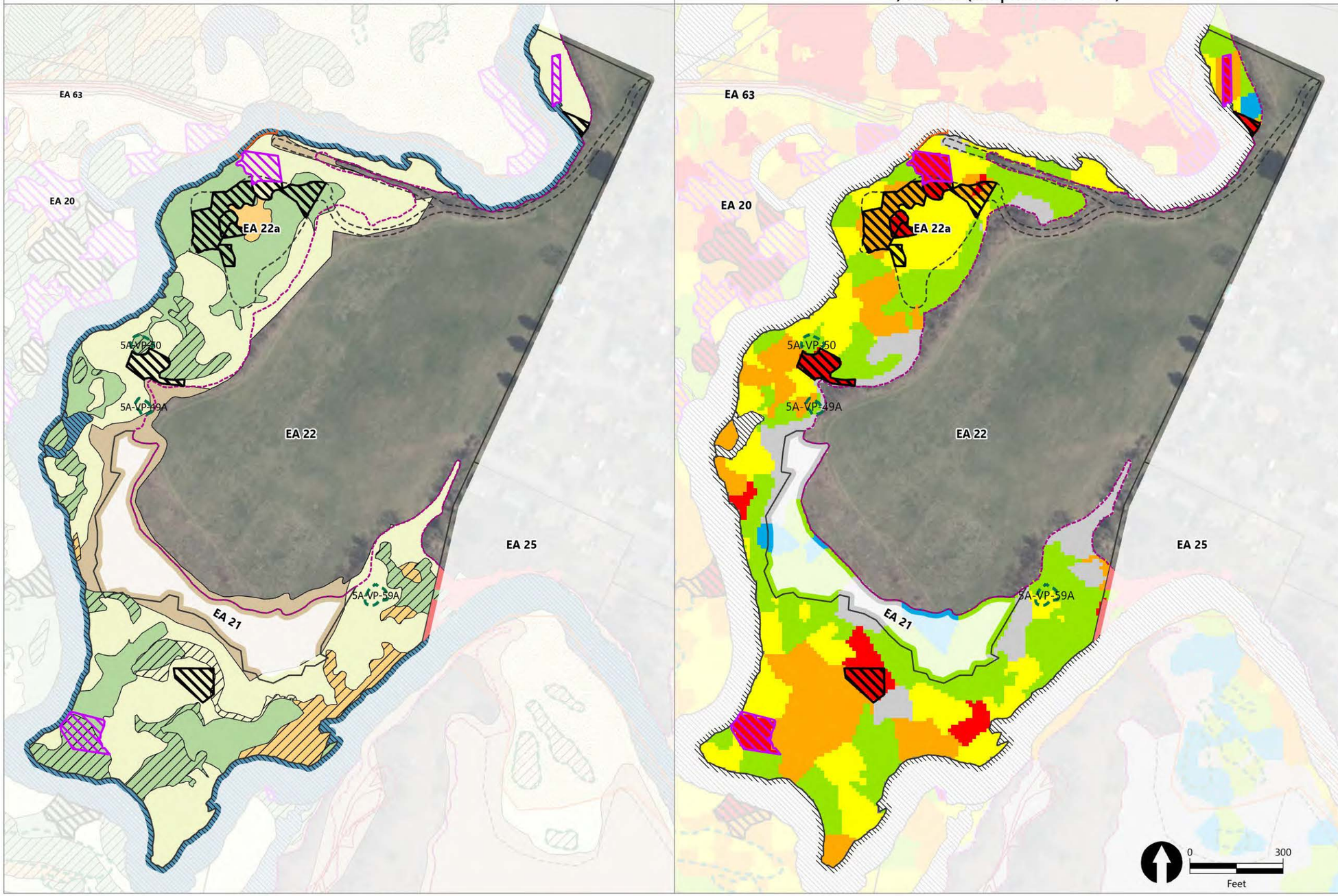
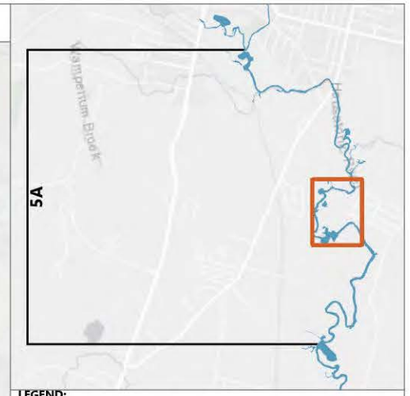
Figure 10-2l
Non-Residential Floodplain Remediation Areas (Exposure Area 20)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)





LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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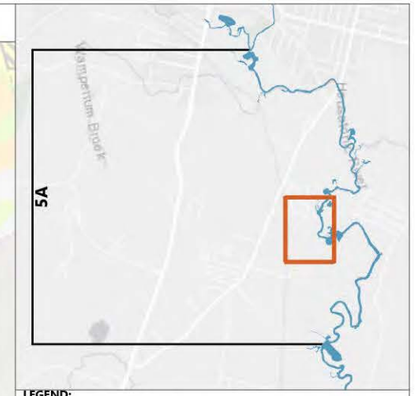
Figure 10-2m
Non-Residential Floodplain Remediation Areas (Exposure Area 22)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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Figure 10-2n
Non-Residential Floodplain Remediation Areas (Exposure Area 24)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

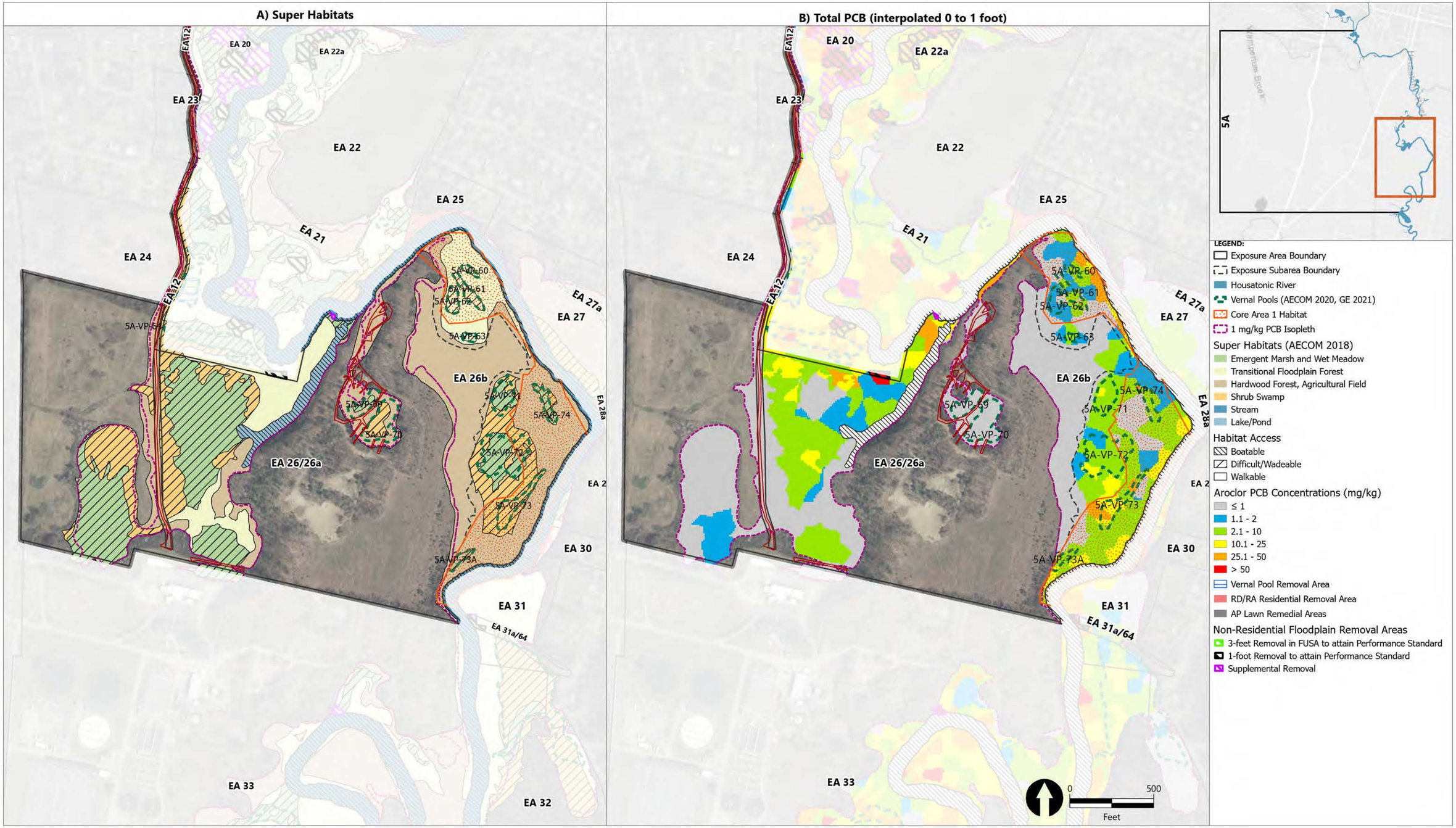

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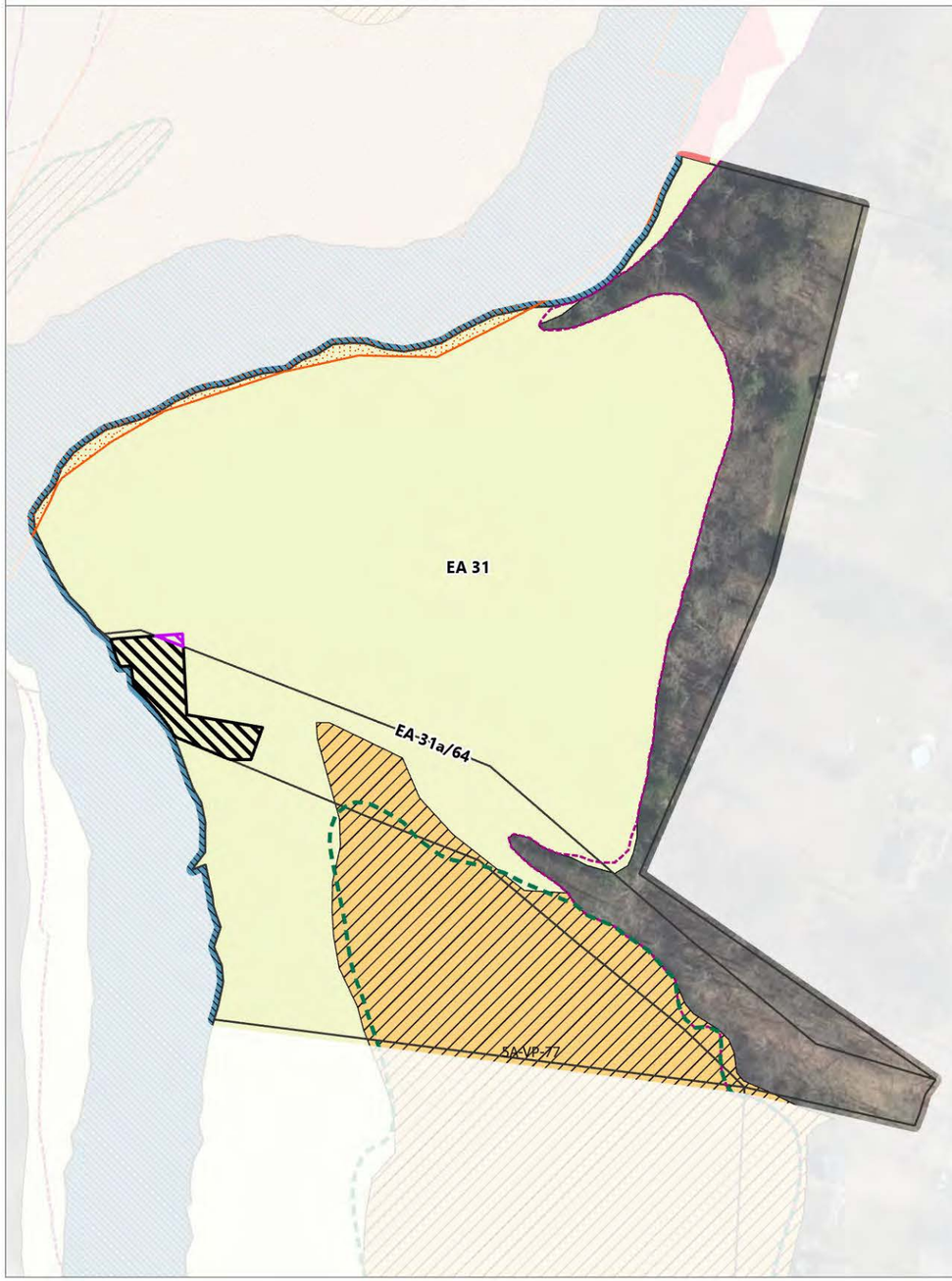
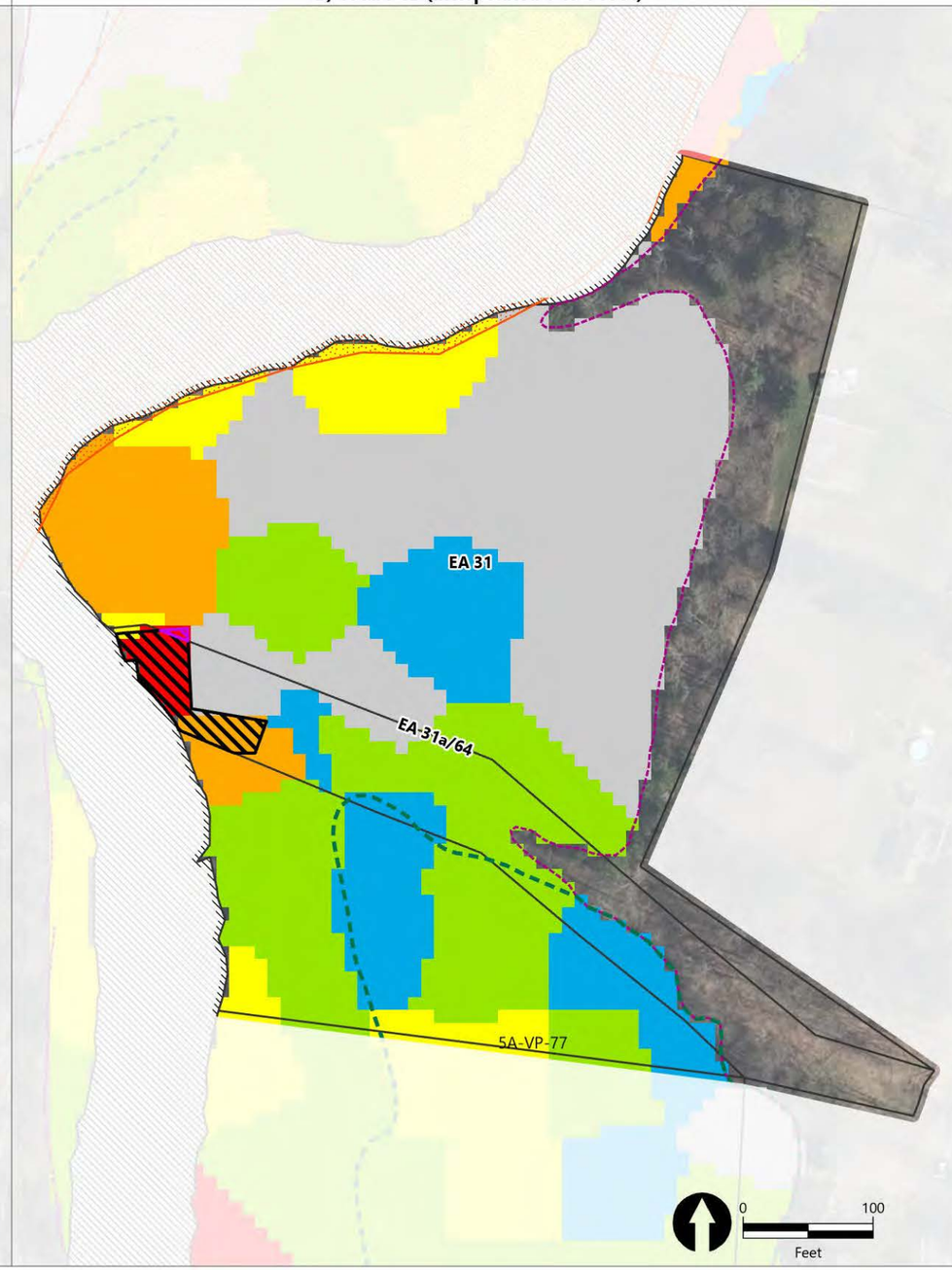
Figure 10-2o
Non-Residential Floodplain Remediation Areas (Exposure Area 26)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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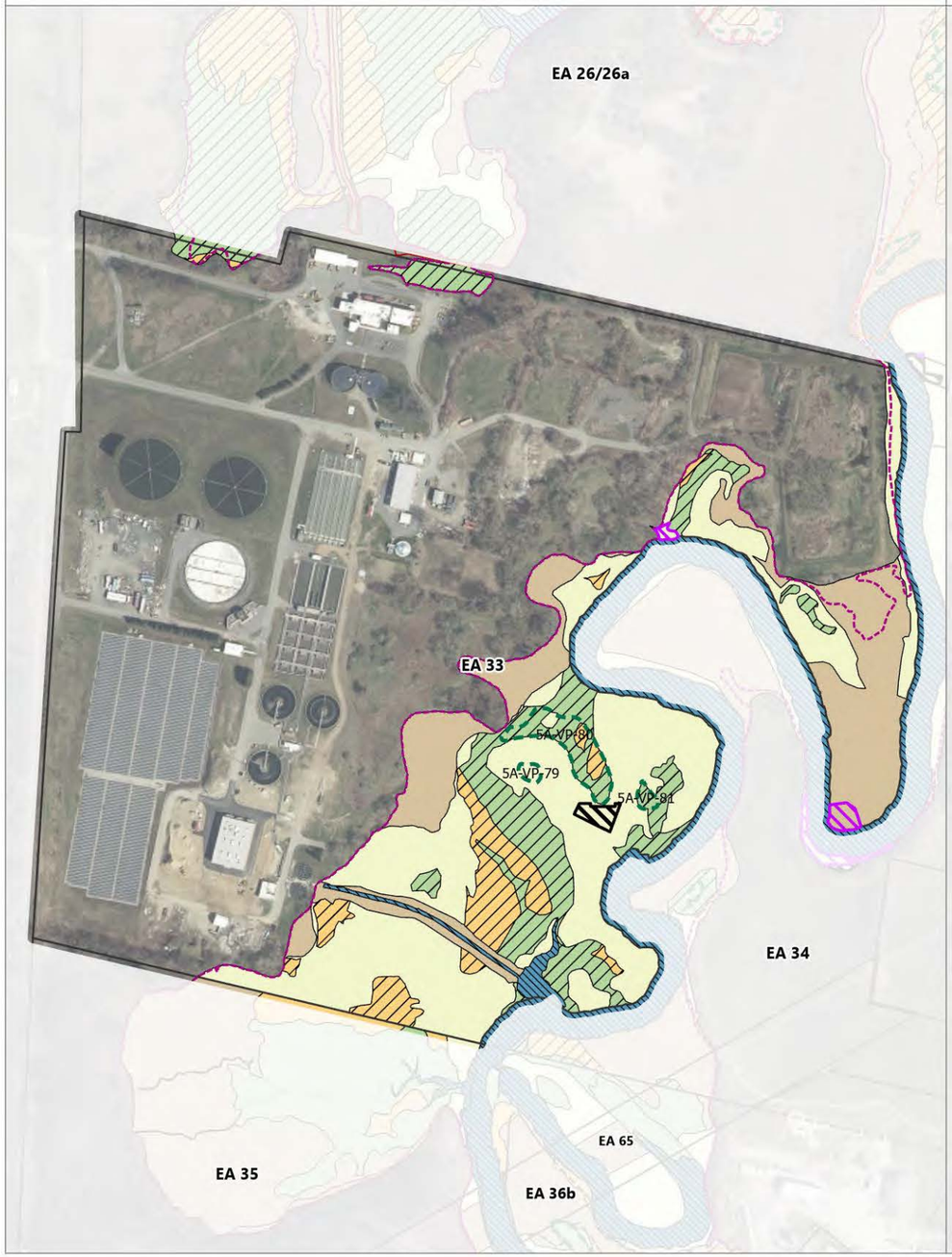
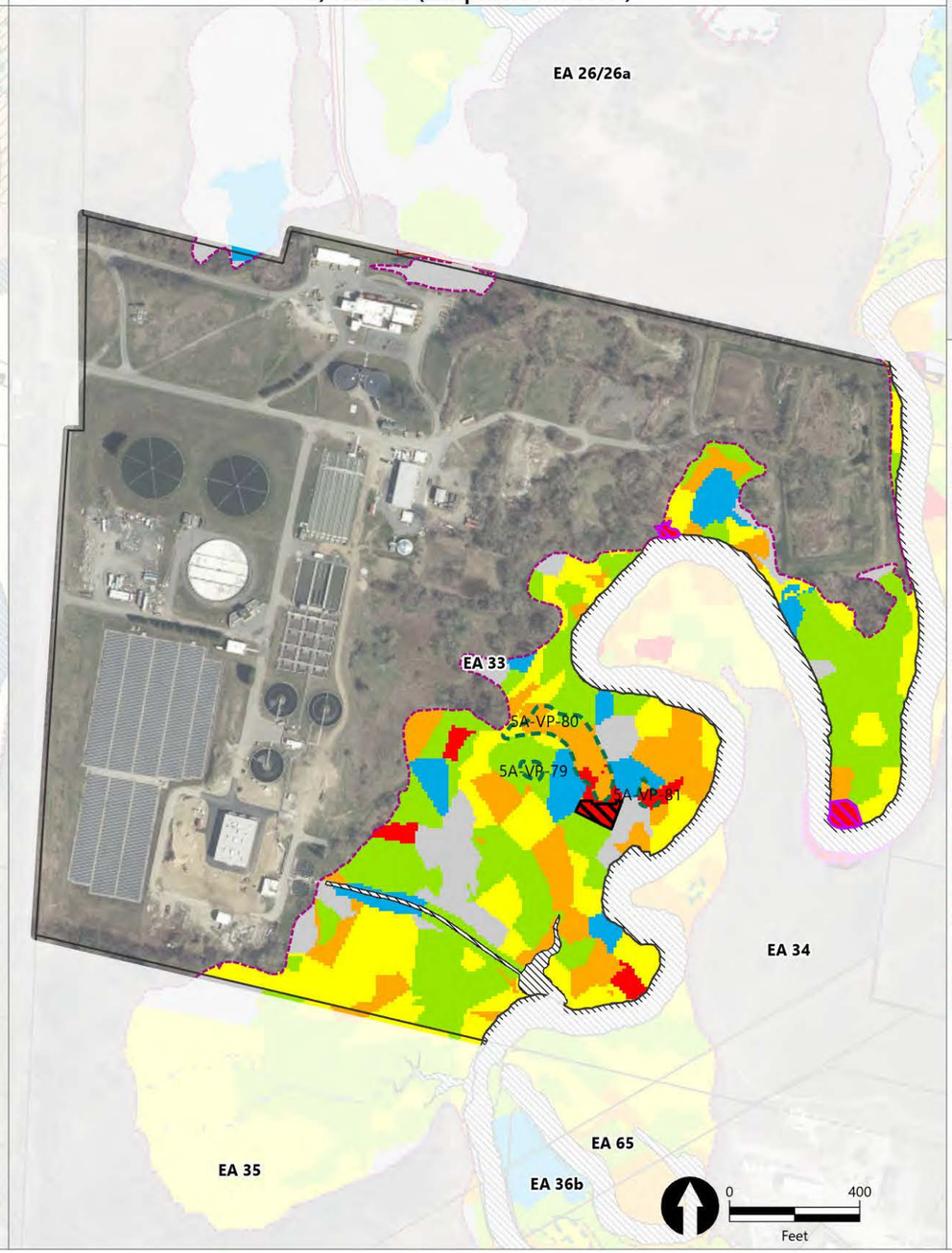
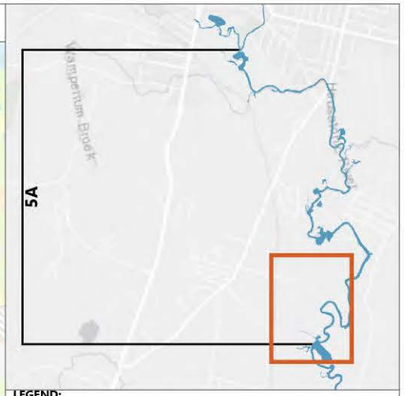
Figure 10-2p
Non-Residential Floodplain Remediation Areas (Exposure Area 31)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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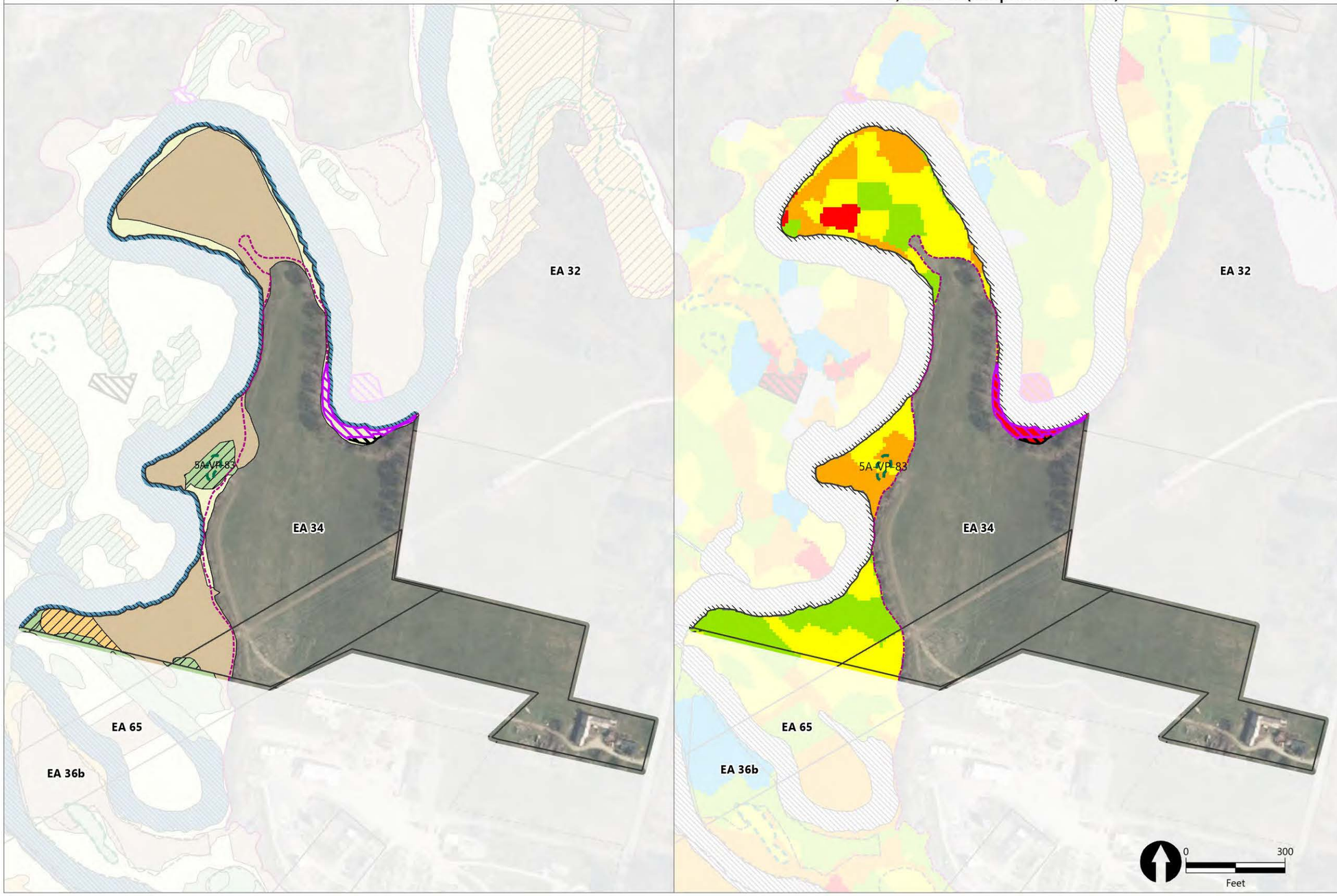
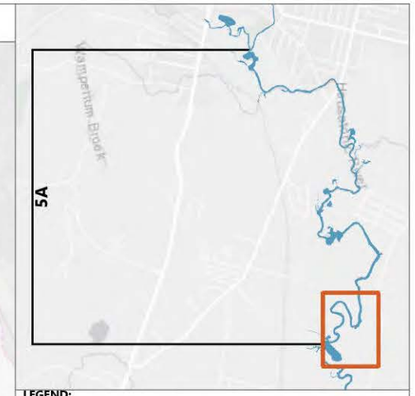
Figure 10-2q
Non-Residential Floodplain Remediation Areas (Exposure Area 33)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)





LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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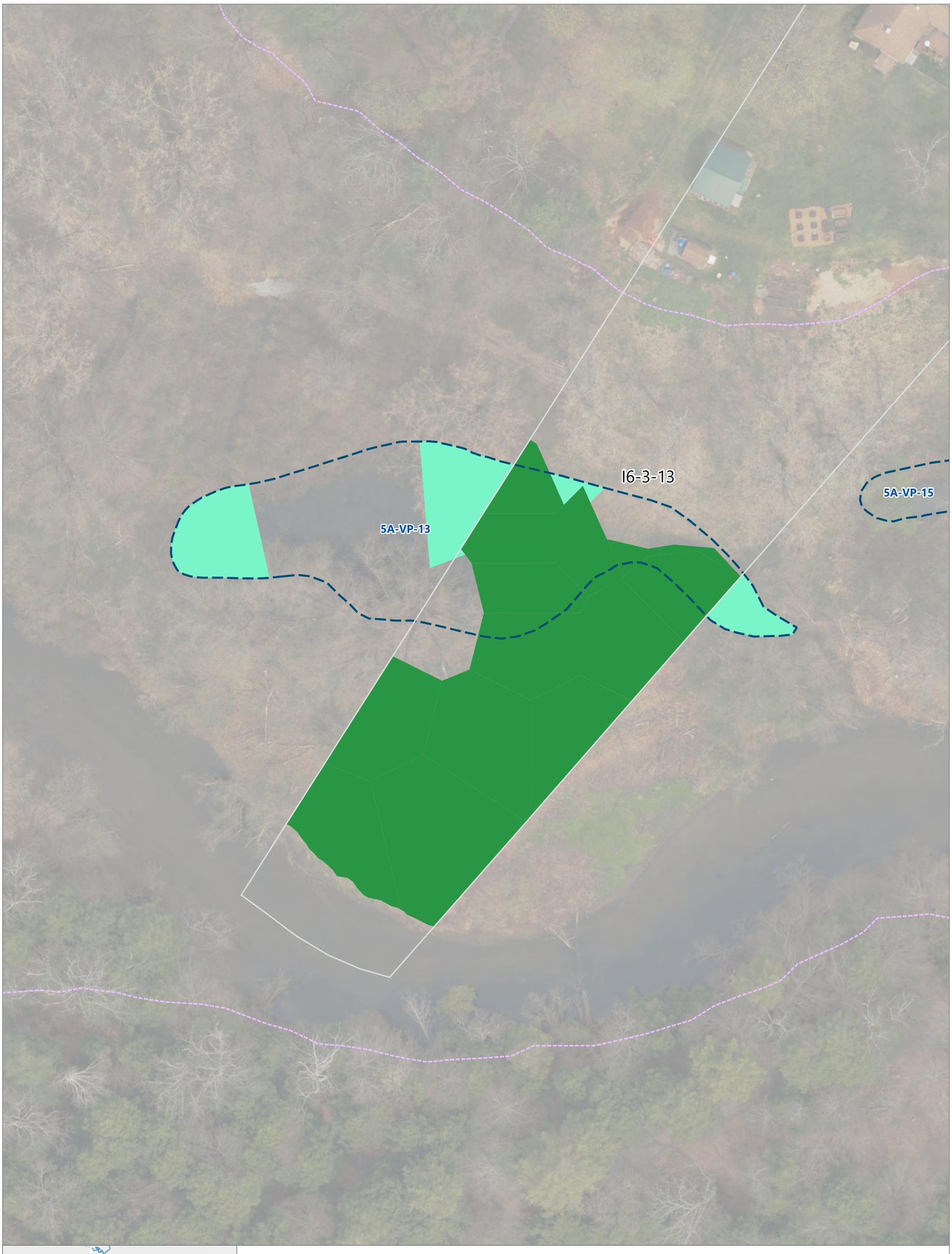
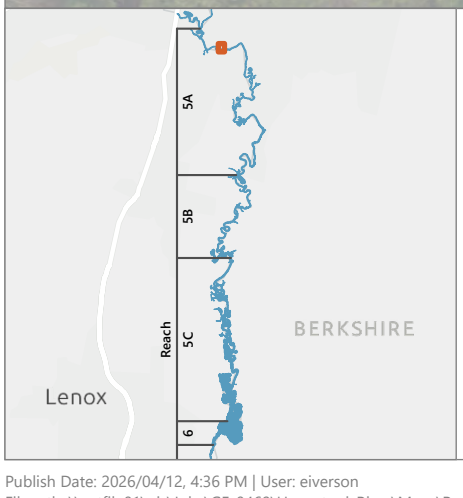
Figure 10-2r
Non-Residential Floodplain Remediation Areas (Exposure Area 34)
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River





LEGEND:

- 1 mg/kg PCB Isopleth
- Residential Properties
- Vernal Pool
- Vernal Pool Soil Removal
- Residential Soil Removal

NOTE:
1. Aerial imagery collected by Bluesky Geospatial, June 2025.

0 50
Feet

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Figure 10-3
Vernal Pool Remedial Areas
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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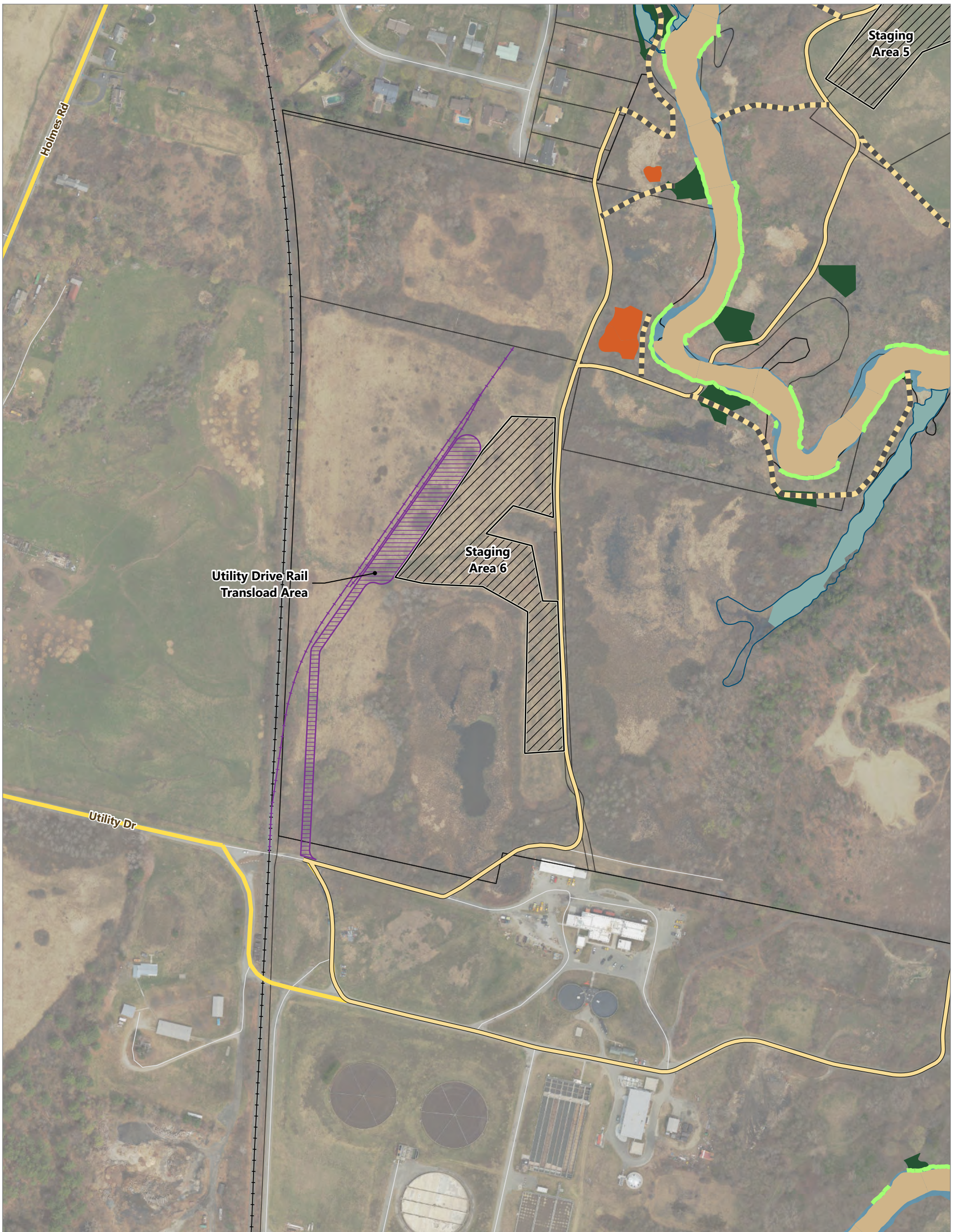
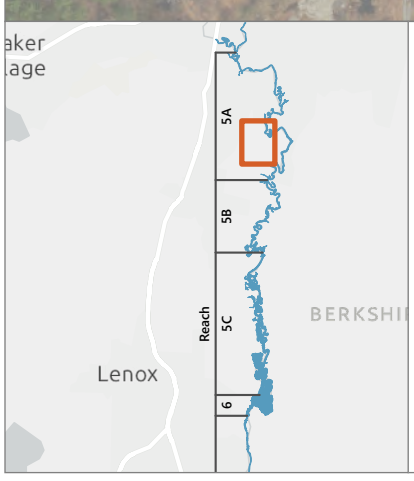
Figure 12-1
Overview of Rail Transload Areas in Reaches 5 and 6
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River





LEGEND:

- Housatonic River
- Roads
- Backwaters and Other Waterbodies
- Tax Parcel Boundaries
- Railroad
- Staging Area Final Design
- Conceptual Railroad Spur
- Conceptual Rail Transload Area
- Final Design Access Road - Primary
- Final Design Access Road - Secondary
- Primary and/or Secondary Transportation Route Associated with Material Disposal

Reach 5A Remediation Areas

- Floodplain Soil Remediation
- Riverbank Soil Remediation
- Backwater/Other Waterbody Remediation
- In-River Sediment Remediation Area

Vernal Pool Pilot Study

- Excavation Vernal Pools

NOTES:
1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. Parcel boundaries from MassGIS.

0 325
Feet

Publish Date: 2026/04/29, 11:19 AM | User: eiverson
Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section12.aprx | RDWP Fig 12-1to3

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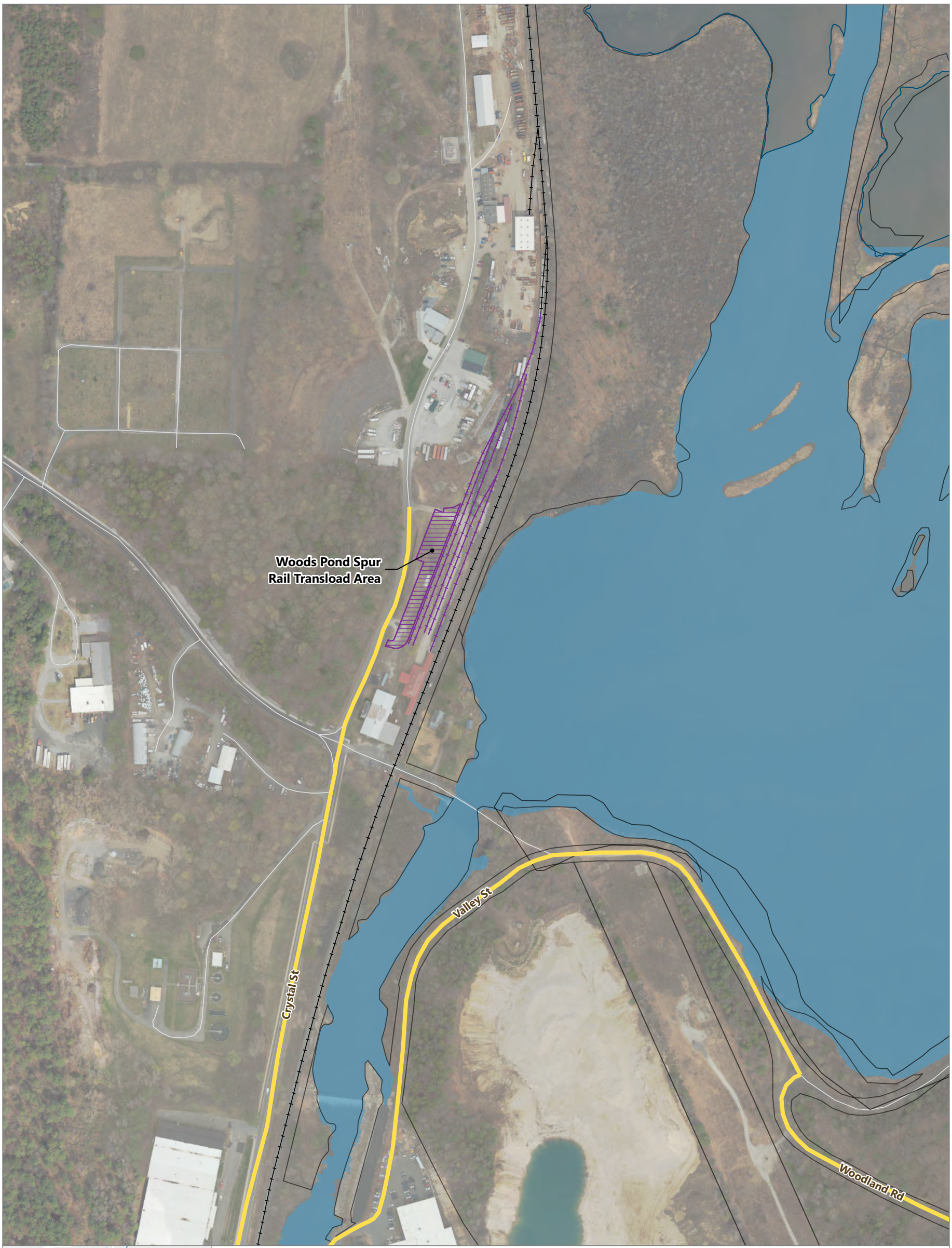
Figure 12-2
Utility Drive Rail Transload Area
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



LEGEND:

- Housatonic River
- Roads
- Backwaters and Other Waterbodies
- Tax Parcel Boundaries
- Railroad
- Conceptual Railroad Spur
- Conceptual Rail Transload Area
- Primary and/or Secondary Transportation Route Associated with Material Disposal

NOTES:

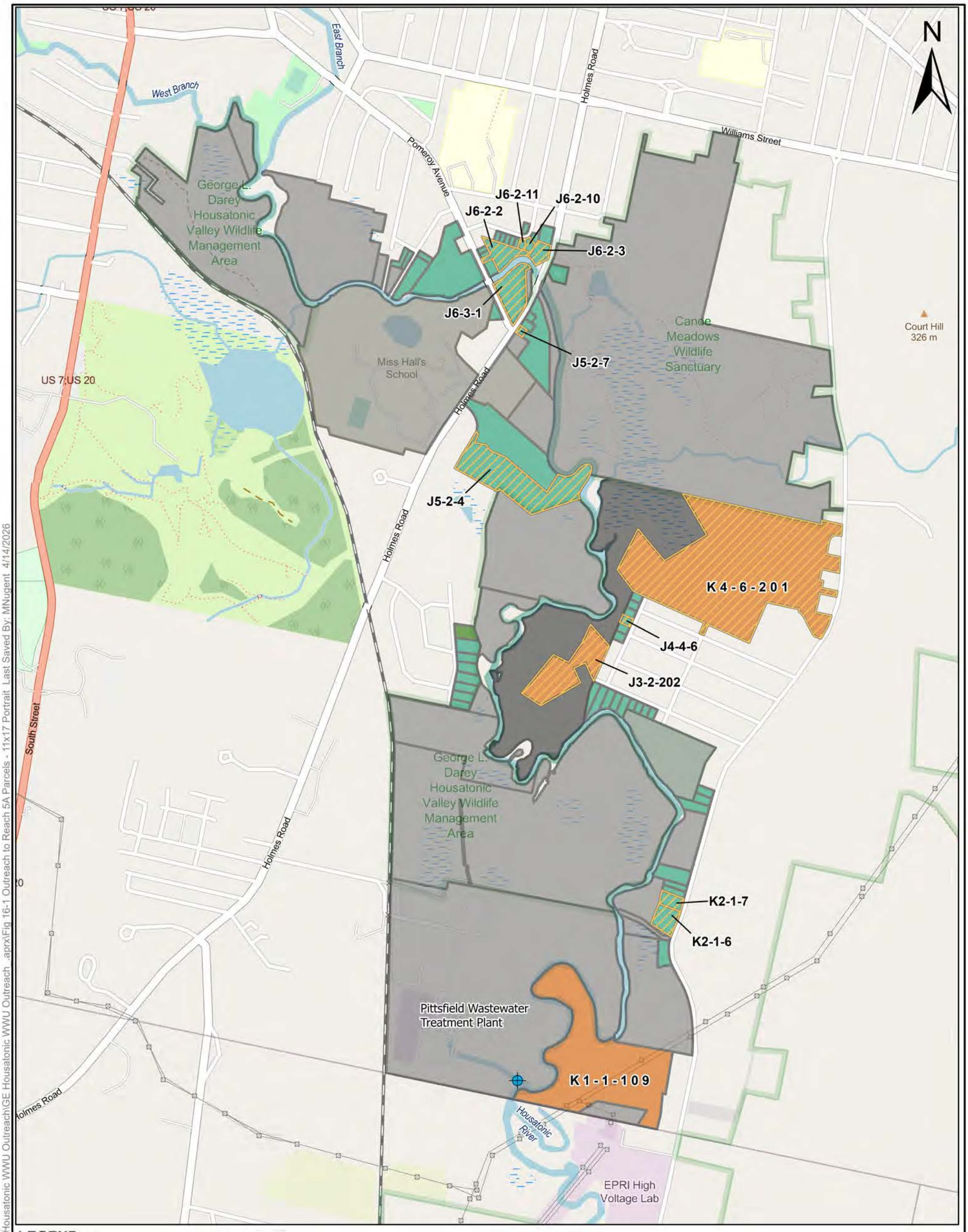
1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.
2. Parcel boundaries from MassGIS.

0 325
Feet

Publish Date: 2026/04/29, 11:19 AM | User: eiverson
Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\MainReport\Section12.aprx | RDWP Fig 12-1to3

ANCHOR QEA

Figure 12-3
Woods Pond Spur Rail Transload Area
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



LEGEND

- NPDES DISCHARGE POINT
- RESIDENTIAL
- RESIDENTIAL (DESIGNATED AS EXEMPT PROPERTY IN MASSGIS)
- AGRICULTURAL/HORTICULTURAL
- OTHER/AGRICULTURAL/ HORTICULTURAL (DESIGNATED AS RESIDENTIAL IN MASSGIS)
- OTHER
- WATER WITHDRAWAL AND USES SURVEY SENT TO PROPERTY OWNER

NOTES:

1. PROJECTION: WGS 1984 WEB MERCATOR AUXILIARY SPHERE
2. BASE MAP SOURCE: OPEN STREET MAP, ACCESSED 4/14/2026
3. STREAMS OBTAINED FROM MASSGIS AT: WWW.MASS.GOV/INFO-DETAILS/MASSGIS-DATA-MAJOR-PONDS-AND-MAJOR-STREAMS, ACCESSED 9/22/2023
4. TAX PARCEL DATASET OBTAINED FROM MASSGIS AT: WWW.MASS.GOV//INFO-DETAILS/MASSGIS-DATA-PROPERTY-TAX-PARCELS
5. MAP SCALE IS 1:18,100
6. SHADED PARCELS REPRESENT PARCELS THAT ARE LOCATED IN REACH 5A AND WITHIN 500 FEET OF THE RIVER.

0 1,500 3,000

GRAPHIC SCALE IN FEET

GENERAL ELECTRIC COMPANY
FINAL REMEDIAL DESIGN / REMEDIAL ACTION WORK PLAN FOR REACH 5A

OUTREACH TO REACH 5A PARCELS WITHIN 500 FEET OF RIVER

ARCADIS

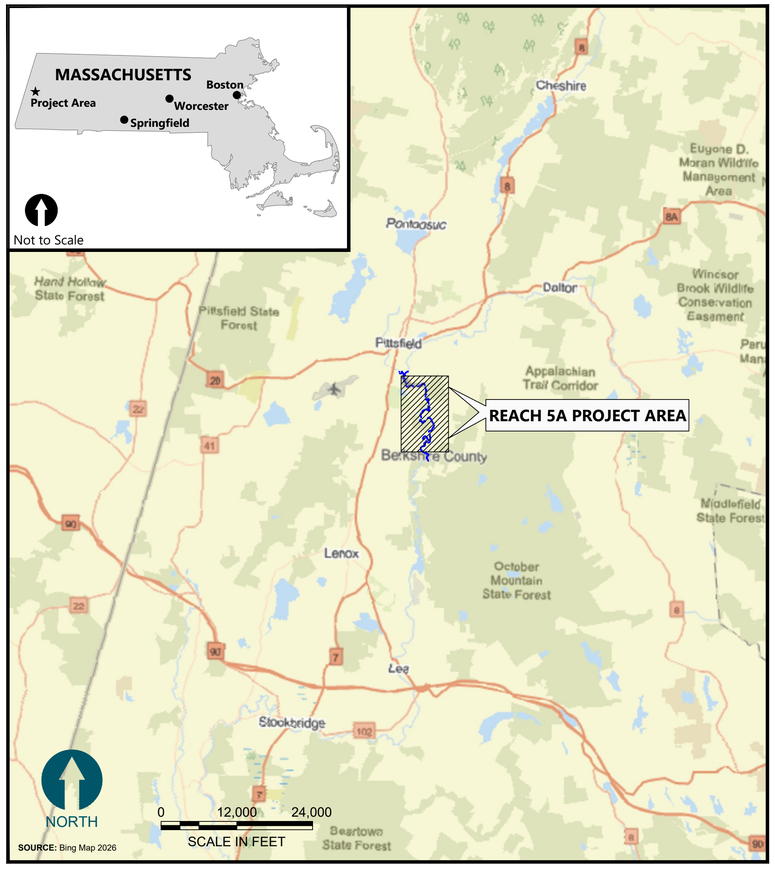
FIGURE
16-1

Path: T:_ENVIRONMENTAL_Housatonic\ArcPro Projects\GE Housatonic WWU Outreach\GE Housatonic WWU Outreach_aprx\Fig 16-1 Outreach to Reach 5A Parcels - 11x17 Portrait Last Saved By: MNugent 4/14/2026

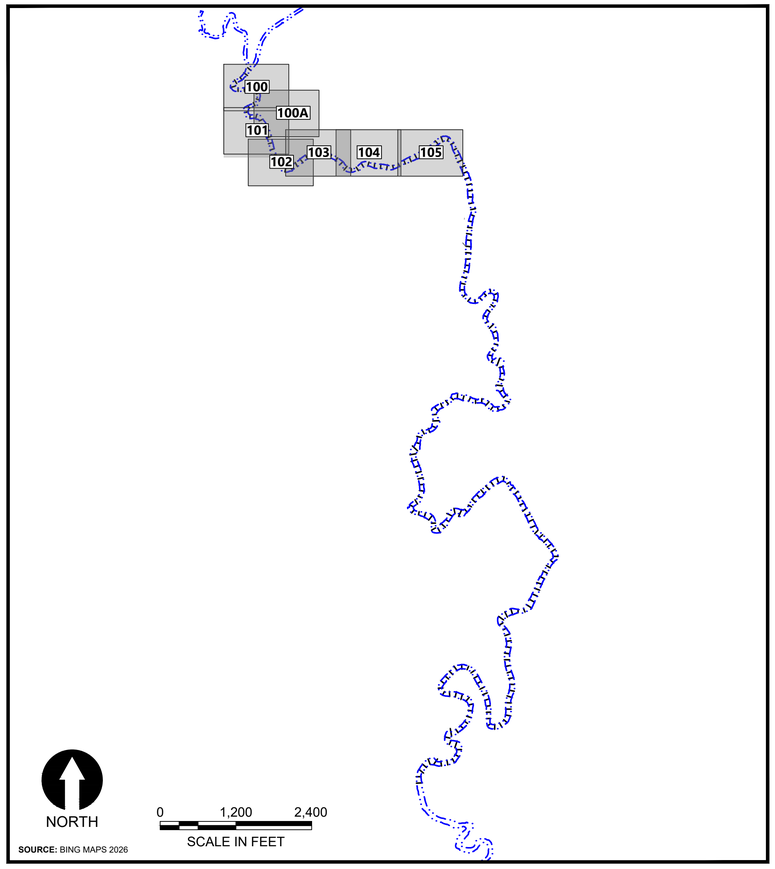
Appendix A
Design Drawings

HOUSATONIC RIVER - REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

VICINITY MAP



LOCATION MAP



PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

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ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

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DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

TITLE SHEET

T0001

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SHEET ID	SHEET TITLE

T-SERIES: TITLE SERIES

T0001	TITLE SHEET
T0002	DRAWING INDEX

G-SERIES: GENERAL

G0001	ABBREVIATIONS AND LEGEND
G0002	GENERAL NOTES
G0010	OVERALL SITE PLAN
G0100	REACH 5A SITE PLAN STA. 0+00 TO STA. 48+00

E-SERIES: EXISTING CONDITIONS

E1100	EXISTING CONDITIONS STA. 0+00 TO STA. 12+50 & INTERMITTENT SIDE CHANNEL (E-OWB1)
E1100A	EXISTING CONDITIONS STAGING AREA SA-1
E1101	EXISTING CONDITIONS STA. 12+50 TO STA. 21+50
E1102	EXISTING CONDITIONS STA. 19+50 TO STA. 30+00
E1103	EXISTING CONDITIONS STA. 25+50 TO STA. 36+50
E1104	EXISTING CONDITIONS STA. 34+50 TO STA. 45+00
E1105	EXISTING CONDITIONS STA. 45+00 TO STA. 48+00

S-SERIES: TEMPORARY ACCESS ROADS AND STAGING AREAS SITE PREPARATION

S1100	TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 1
S1100A	TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 2
S1101	TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 3
S1102	TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 4
S1103	TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 5
S1104	TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 6
S1105	TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 7
S2000	TRANSPORT ROUTE TO UTILITY DRIVE TRANSLOAD AREA
S2001	UTILITY DRIVE TRANSLOAD AREA SITE PLAN
S2002	WOODS POND TRANSLOAD AREA SITE PLAN
S6000	STAGING ENTRANCE CONSTRUCTION DETAILS
S6001	ACCESS ROADS AND ENTRANCE DETAILS
S6002	CULVERT EXTENSION DETAILS

D-SERIES: DREDGING

D1100	DREDGE PLAN STA. 0+00 TO STA. 12+50
D1101	DREDGE PLAN STA. 12+50 TO STA. 21+50
D1102	DREDGE PLAN STA. 19+50 TO STA. 30+00
D1103	DREDGE PLAN STA. 25+50 TO STA. 36+50
D1104	DREDGE PLAN STA. 34+50 TO STA. 45+00
D1105	DREDGE PLAN STA. 45+00 TO STA. 48+00
D6000	TYPICAL OFFSET DETAILS
D7000	TEMPORARY WATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM
D7001	TEMPORARY WATER TREATMENT SYSTEM LEGEND AND TABLES

C-SERIES: CAPPING

C1100	CAPPING PLAN STA. 0+00 TO STA. 12+50
C1101	CAPPING PLAN STA. 12+50 TO STA. 21+50
C1102	CAPPING PLAN STA. 19+50 TO STA. 30+00
C1103	CAPPING PLAN STA. 25+50 TO STA. 36+50
C1104	CAPPING PLAN STA. 34+50 TO STA. 45+00
C1105	CAPPING PLAN STA. 45+00 TO STA. 48+00
C5000	REMEDIATION CROSS SECTIONS
C5001	REMEDIATION CROSS SECTIONS
C5002	REMEDIATION CROSS SECTIONS
C6000	CAPPING DETAILS

SHEET ID	SHEET TITLE

FP-SERIES: FLOODPLAINS

FP2100	FLOODPLAIN SITE PREPARATION PLAN
FP2101	FLOODPLAIN SITE PREPARATION PLAN
FP2102	FLOODPLAIN SITE PREPARATION PLAN
FP2103	FLOODPLAIN SITE PREPARATION PLAN
FP2104	FLOODPLAIN SITE PREPARATION PLAN
FP2105	FLOODPLAIN SITE PREPARATION PLAN
FP3100	FLOODPLAIN SOIL REMOVAL LIMITS AND DISPOSAL LOCATION IDENTIFICATION
FP3101	FLOODPLAIN SOIL REMOVAL LIMITS AND DISPOSAL LOCATION IDENTIFICATION
FP3102	FLOODPLAIN SOIL REMOVAL LIMITS AND DISPOSAL LOCATION IDENTIFICATION
FP3103	FLOODPLAIN SOIL REMOVAL LIMITS AND DISPOSAL LOCATION IDENTIFICATION
FP3104	FLOODPLAIN SOIL REMOVAL LIMITS AND DISPOSAL LOCATION IDENTIFICATION
FP3105	FLOODPLAIN SOIL REMOVAL LIMITS AND DISPOSAL LOCATION IDENTIFICATION
FP6000	MISCELLANEOUS DETAILS
FP6001	VERNAL POOL BACKFILL DETAILS

OWB-SERIES: OTHER WATER BODIES AND BACKWATERS

OWB1100	REMEDIAL ACTION PLAN INTERMEDIATE SIDE CHANNEL (E-OWB1)
OWB5000	INTERMITTENT SIDE CHANNEL (E-OWB1) CROSS SECTIONS
OWB6000	INTERMITTENT SIDE CHANNEL (E-OWB1) DETAIL

SR-SERIES: GEOMORPHIC DESIGN

SR1100	GEOMORPHIC DESIGN PLAN STA. 0+00 TO STA. 12+50 & INTERMITTENT SIDE CHANNEL (E-OWB1)
SR1101	GEOMORPHIC DESIGN PLAN STA. 12+50 TO STA. 21+50
SR1102	GEOMORPHIC DESIGN PLAN STA. 21+50 TO STA. 30+00
SR1103	GEOMORPHIC DESIGN PLAN STA. 30+00 TO STA. 36+50
SR1104	GEOMORPHIC DESIGN PLAN STA. 36+50 TO STA. 45+00
SR1105	GEOMORPHIC DESIGN PLAN STA. 45+00 TO STA. 48+00
SR5000	GEOMORPHIC PROFILE VIEW STA. PR 0+00 TO STA. PR 22+00
SR5001	GEOMORPHIC PROFILE VIEW STA. PR 22+00 TO STA. PR 45+50
SR5002	GEOMORPHIC PROFILE VIEW STA. PR 45+50 TO STA. PR 48+00
SR6000	GEOMORPHIC SECTION VIEWS STA. PR 0+10 TO STA. PR 15+00
SR6001	GEOMORPHIC SECTION VIEWS STA. PR 16+00 TO STA. PR 30+00
SR6002	GEOMORPHIC SECTION VIEWS STA. PR 31+00 TO STA. PR 45+00
SR6003	GEOMORPHIC SECTION VIEWS STA. PR 46+00 TO STA. PR 48+00
SR7000	GEOMORPHIC DETAILS - TYPICAL CROSS SECTIONS
SR7001	GEOMORPHIC DETAILS - TYPICAL CROSS SECTIONS
SR7002	GEOMORPHIC DETAILS - SINGLE ARM BOULDER VANE
SR7003	GEOMORPHIC DETAILS - SINGLE ARM LOG VANE
SR7004	GEOMORPHIC DETAILS - BOULDER J HOOK
SR7005	GEOMORPHIC DETAILS - LOG J HOOK
SR7006	GEOMORPHIC DETAILS - BOULDER CROSS VANE
SR7007	GEOMORPHIC DETAILS - LOG CROSS VANE
SR7008	GEOMORPHIC DETAILS - BOULDER SILL
SR7009	GEOMORPHIC DETAILS - LOG SILL
SR7010	GEOMORPHIC DETAILS - COIR MATTING
SR7011	GEOMORPHIC DETAILS - TOEWOOD
SR7012	GEOMORPHIC DETAILS - BRUSH MATTRESS
SR7013	GEOMORPHIC DETAILS - RIPRAP BANK PROTECTION

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

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HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

DRAWING INDEX

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GENERAL LEGEND:

- VEGETATION TREE/SHRUB LINE
- S — S — SEWER LINE
- SEWER MANHOLE
- SEWER SIPHON
- SD — STORM LINE
- SD — STORM CULVERT
- STORM OUTFALL
- STORM CATCH BASIN
- STORM STRUCTURE
- STORM CHANNEL
- STORM CHANNEL STRUCTURE
- W — W — WATER LINE
- WATER LATERAL
- WATER HYDRANT
- OHE — OVERHEAD ELECTRIC LINE
- GE R5A 39 ACIR ● SURVEY CONTROL POINT

ABBREVIATIONS:

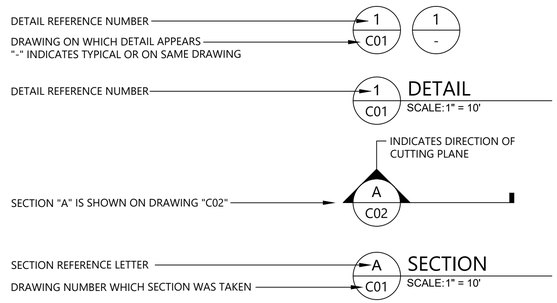
°	DEGREES
ø	DIAMETER
#	NUMBER
APPROX	APPROXIMATE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
BM	BENCHMARK
BMP	BEST MANAGEMENT PRACTICE
CCU	CAP CERTIFICATION UNIT
CFS	CUBIC FEET PER SECOND
CL	CENTERLINE
CP	CONTROL POINT
CY	CUBIC YARDS
DBH	DIAMETER AT BREAST HEIGHT
DCP	DYNAMIC CONE PENETROMETER
DI	DUCTILE IRON
DWG	DRAWING
E	EAST, EASTING
EG	EXISTING GRADE
ELEV	ELEVATION
ESC	EROSION AND SEDIMENT CONTROL
EX.	EXISTING
FT.	FOOT
GE	GENERAL ELECTRIC
GIS	GEOGRAPHIC INFORMATION SYSTEM
HDPE	HIGH-DENSITY POLYETHYLENE
H, HOR	HORIZONTAL
HL	HABITAT LAYER
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
L	LENGTH
LIDAR	LIGHT DIRECTION AND RANGING
LF	LINEAR FOOT
MASSDEP	MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
MASSGIS	MASSACHUSETTS BUREAU OF GEOGRAPHIC INFORMATION
MAX	MAXIMUM
MIN	MINIMUM
MLW	MEAN LOW WATER
N	NORTH, NORTHING
NAD83	NORTH AMERICAN DATUM OF 1983
NAVD88	NORTH AMERICAN VERTICAL DATUM OF 1988
NCD	NATURAL CHANNEL DESIGN
N/F	NOW OF FORMERLY (PROPERTY DEED INFORMATION)
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
PAC	POWER ACTIVATED CARBON
PE	PROFESSIONAL ENGINEER
RCP	REINFORCED CONCRETE PIPE
RCU	RIVERBANK CERTIFICATION UNIT
ROW	RIGHT-OF-WAY
S	SOUTH
SS	SANITARY SEWER
ST	STORM
STA.	STATION
SF	SQUARE FOOT
T	TELEPHONE
TBD	TO BE DETERMINED
TOB	TOP OF BANK
TSCA	TOXIC SUBSTANCES CONTROL ACT
TYP	TYPICAL
VP	VERNAL POOL(S)
WSE	WATER SURFACE ELEVATION

PROJECT DATUM:

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. SURVEY FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. SURVEY FEET

DETAIL AND SECTION REFERENCING



BENCHMARK SURVEY CONTROL POINTS

UNITS - US SURVEY FOOT, NAD83 MASS. STATE PLANE COORDINATES, NAVD88 ELEVATIONS				
MONUMENT	EASTING	NORTHING	ELEVATION (NAVD88) U.S. SURVEY FEET	APPROXIMATE STATION AND OFFSET
GE R5A 34-SPIKE NAIL	186169.86	2986494.81	973.64	48+36.7, 20.1' RIGHT
GE R5A 35-ALUMINUM CAP ROD	185734.09	2986385.05	961.74	43+84, 62.9' LEFT
GE R5A 36-MAG NAIL	186795.45	2986553.16	976.56	56+73.1, 20.8' LEFT
GE R5A 37-SPIKE NAIL	186957.21	2986849.47	984.83	54+96.5, 294.7' LEFT
GE R5A 38-ALUMINUM CAP ROD	183654.05	2988036.27	966.77	-2+28, 38' LEFT
GE R5A 39-ALUMINUM CAP ROD	183301.97	2987645.68	964.88	2+96, 48.7' LEFT

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HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

ABBREVIATIONS AND LEGENDS

G0001

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Apr 28, 2026 2:10pm cyard2

SOURCES:

1. RIVER CENTERLINE, ROADWAYS, TOWNSHIP PARCELS, PROPERTY BOUNDARIES ACQUIRED FROM MASSGIS (2023).
2. AERIAL IMAGERY FROM BING MAPS (2026).
3. PRELIMINARY REACH 5A TOPO-BATHYMETRIC SURVEY BY SPICER GROUP INC., (SPICER) (2023).
4. VERNAL POOL TOPOGRAPHIC SURVEYS PERFORMED BY FORESIGHT LAND SERVICES, INC. (APRIL TO DECEMBER 2024). TOPOGRAPHIC SURVEYS COVERED THE VERNAL POOLS AND A 50-FOOT BUFFER AREA SURROUNDING THE POOLS.
5. UPLAND TOPOGRAPHIC LIDAR AERIAL SURVEYS (OUTSIDE OF THE VERNAL POOLS - REFER TO NOTE 5) BY BLUESKY GEOSPATIAL, LTD. (APRIL 29, 2025).
6. IN-RIVER TOPO-BATHYMETRIC LIDAR AERIAL SURVEYS BY WHITEOUT SOLUTIONS, INC. (MAY 1, 2025 AND DECEMBER 1, 2025).
7. AERIAL LIDAR SURVEY GROUND CONTROL SURVEYS BY C.T. MALE ASSOCIATES, ENGINEERING, SURVEYING, ARCHITECTURE, LANDSCAPE ARCHITECTURE & GEOLOGY, D.P.C. (C.T. MALE) (2025).
8. BATHYMETRY AND TOPOGRAPHY DEPICTED AROUND THE POMEROY AVENUE AND HOLMES ROAD BRIDGES BASED ON DATA PROVIDED BY SPICER (2022).
9. ALIGNMENT AND LOCATIONS OF SANITARY SEWER UTILITIES BY C.T. MALE (2025-2026). SUPPLEMENTED WITH GIS SHAPEFILE DATA PROVIDED BY THE CITY OF PITTSFIELD (2025).
10. APPROXIMATE ALIGNMENT AND LOCATIONS OF STORMWATER UTILITIES PROVIDED BY THE CITY OF PITTSFIELD (2025).
11. APPROXIMATE ALIGNMENT AND LOCATIONS OF POTABLE WATER UTILITIES PROVIDED BY THE CITY OF PITTSFIELD (2025).
12. SURVEY OF OVERHEAD UTILITY POLES AND LINES IN THE HOLMES ROAD-POMEROY AVENUE AREA BY C.T. MALE (2025).
13. TOP OF RIVERBANK SURVEY BY FORESIGHT LAND SERVICES (2024) AND C.T. MALE (2025).
14. EXISTING SHORELINE BOUNDARY DEVELOPED BY ANCHOR QEA BASED ON FIELD REVIEWS BY REPRESENTATIVES OF GE AND EPA IN NOVEMBER 2025 AND BASED ON FIELD SURVEYS BY C.T. MALE IN OCTOBER AND NOVEMBER 2025.
15. LAND SURVEY OF EXISTING RAIL LINE AND SPURS AT UTILITY DRIVE BY C.T. MALE (2025).
16. LAND SURVEY OF EXISTING PUBLIC ROADS, CONSTRUCTION SUPPORT AREAS IN THE HOLMES ROAD-POMEROY AVENUE AREA BY C.T. MALE (2025).
17. EXISTING RIFFLE EXTENTS BASED ON INTERPRETATION BY AECOM.
18. PARCEL OWNER AND EASEMENT INFORMATION PROVIDED BY C.T. MALE, FORESIGHT LAND SERVICES, INC., AND MASSGIS.
19. SURVEY CONTROL POINTS INSTALLED BY C.T. MALE (2026).

GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS WITHIN THE LIMITS OF WORK AND DETERMINE THE APPROPRIATE QUANTITIES AND MATERIALS TO COMPLETE THE WORK WITHIN ACCORDANCE OF THE DRAWINGS AND SPECIFICATIONS.
2. LOCATIONS OF UTILITIES ARE APPROXIMATE AND NOT ALL UTILITIES MAY BE SHOWN. CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL UTILITIES. CONTRACTOR SHALL VERIFY THE PRESENCE AND LOCATION OF ALL UNDERGROUND, UNDERWATER, AND OVERHEAD UTILITIES AND SHALL PROTECT EXISTING UTILITIES IN THE WORK AREA.
3. ALL BASEMAP INFORMATION CAN ONLY BE CONSIDERED AS INDICATING THE CONDITIONS EXISTING AT THE TIME OF THE SURVEYS. REUSE OF THIS INFORMATION BY CONTRACTOR OR OTHERS BEYOND THE SPECIFIC SCOPES OF WORK FOR WHICH CONTRACTOR WAS RETAINED SHALL BE AT THE SOLE RISK OF CONTRACTOR.
4. DRAWINGS INCLUDE COLOR AND SHOULD BE PRINTED ACCORDINGLY. SOME DESIGN FEATURES MAY NOT BE VISIBLE OR LEGIBLE IN GRAYSCALE OR BLACK AND WHITE IF REPRODUCED INCORRECTLY.
5. CROSS SECTIONS AND DETAILS ARE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY AND ARE PROVIDED ONLY TO ILLUSTRATE THE INTENT OF THE DESIGN. ACTUAL SITE CONDITIONS MAY VARY FROM THE INFORMATION SHOWN ON THE CROSS SECTIONS AND SHALL BE VERIFIED BY CONTRACTOR.
6. CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING AND ENSURING THE COMPLETION OF THE WORK, INCLUDING ANY WORK PERFORMED BY SUBCONTRACTORS. CONTRACTOR IS RESPONSIBLE FOR DOCUMENTING THE WORK AND AS-BUILT CONDITIONS FOLLOWING CONSTRUCTION.
7. CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF LOCAL, STATE, AND FEDERAL AGENCIES FOR IMPLEMENTATION OF THE WORK. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY ADDITIONAL PERMITS THAT ARE REQUIRED TO COMPLETE THE WORK THAT ARE NOT OBTAINED BY THE OWNER.
8. CONTRACTOR SHALL INSTALL AND MAINTAIN TEMPORARY EROSION AND SEDIMENTATION CONTROLS AS SHOWN ON THESE DRAWINGS AND IN ACCORDANCE WITH THE CONTRACTOR'S APPROVED EROSION AND SEDIMENTATION CONTROL PLAN.

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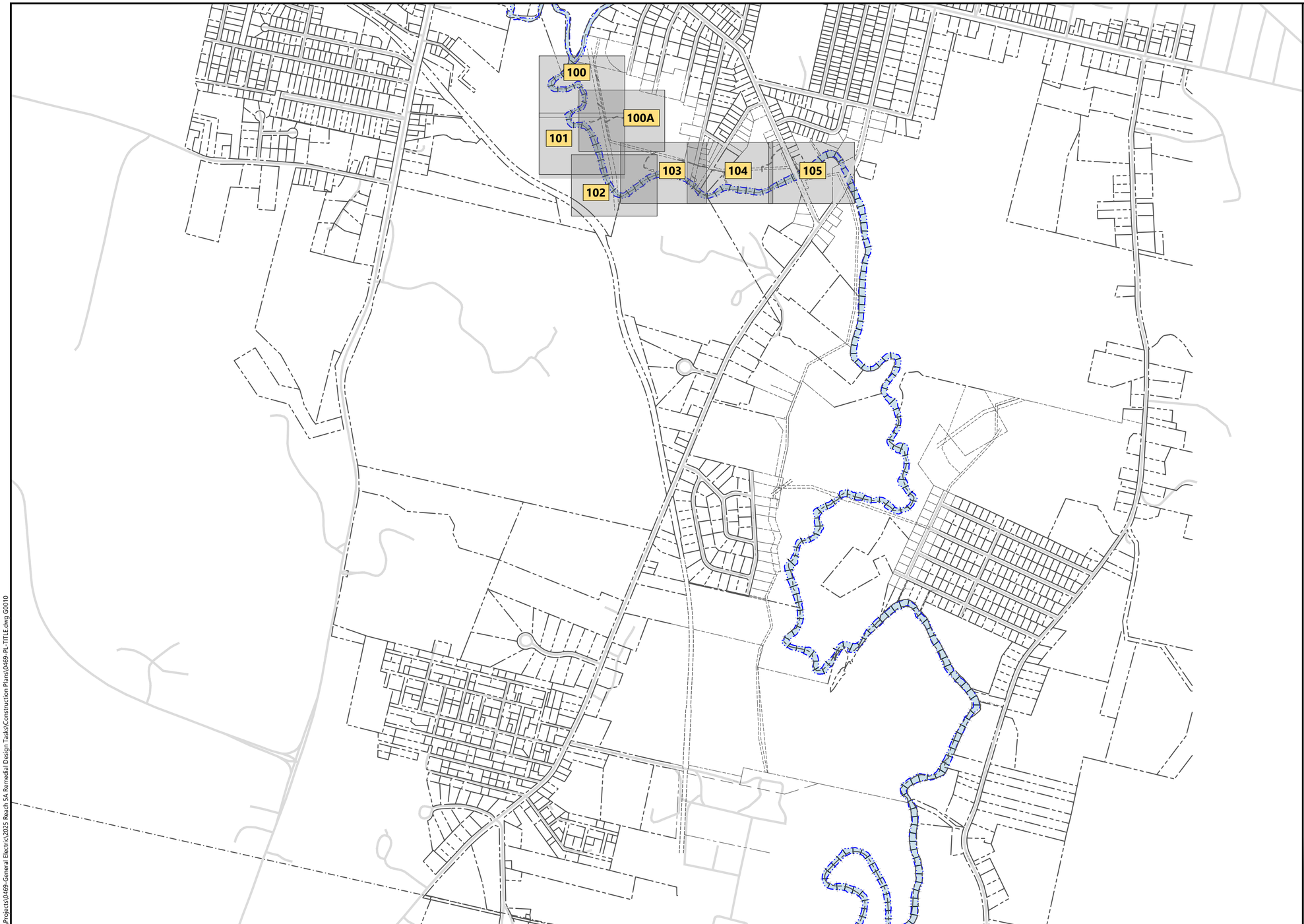
GENERAL NOTES

G0002

Apr 28, 2026 3:17pm cyard2 K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-TITLE.dwg G0002



LEGEND:

- 100 — SHEET NAME AND DESIGNATION
- PROPERTY BOUNDARY
- PUBLIC ROADWAY
- EXISTING RIVER SHORELINE
- EXISTING RIVER CENTERLINE
- 3+00 — 3+00 EXISTING RIVER STATIONING

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NORTH

0 500 1000

SCALE IN FEET

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

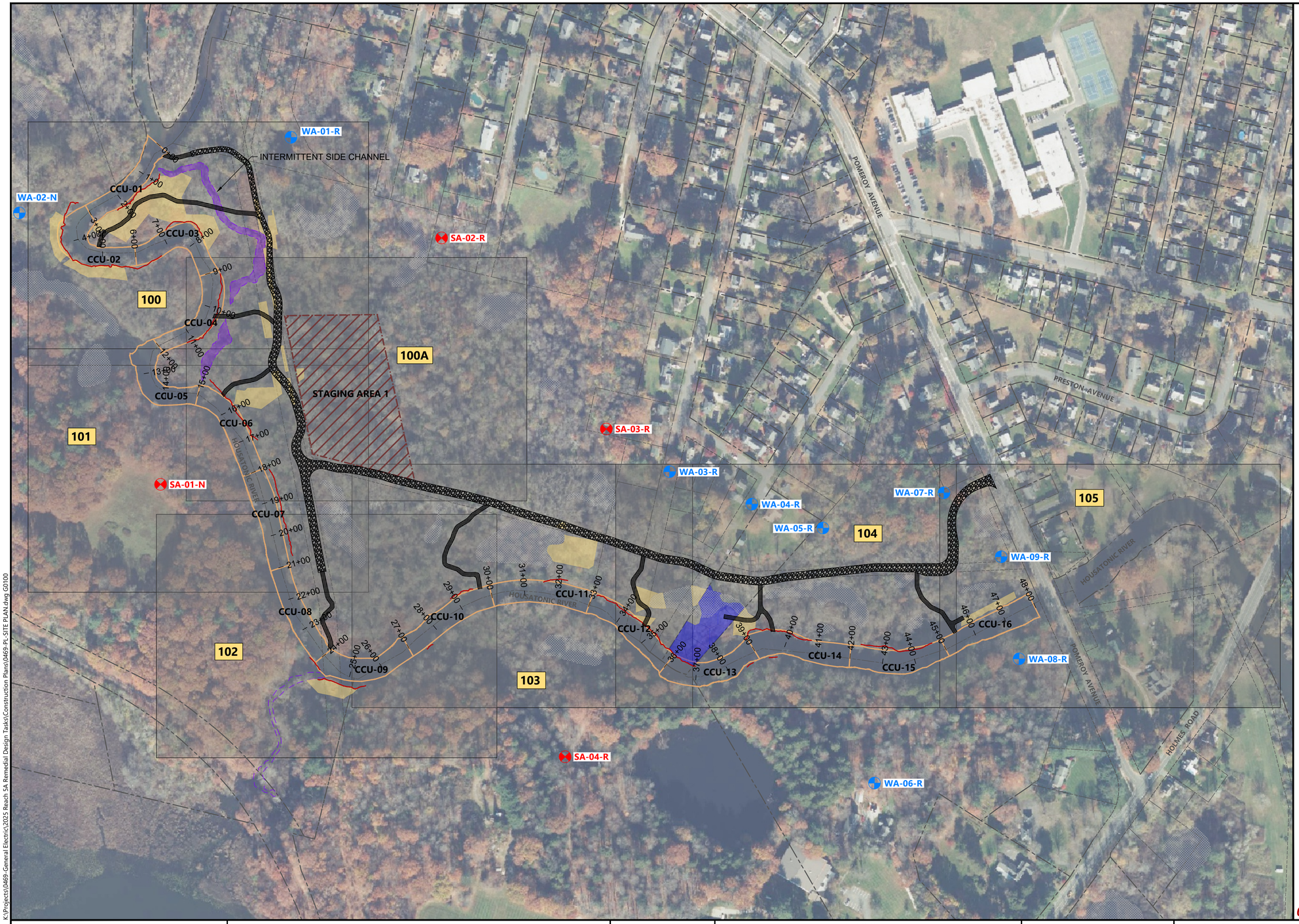
DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

OVERALL SITE PLAN

G0010

Apr 28, 2026 2:10pm cyard2 K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-TITLE.dwg G0010



S-SERIES LEGEND:

- 100 — SHEET NAME AND DESIGNATION
- PROPERTY-EASEMENT BOUNDARY
- EXISTING RIVER CENTERLINE
- 3+00 — EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- PROPOSED STAGING / LAYDOWN AREA

AIR AND POTENTIAL NOISE MONITORING LOCATIONS

- STAGING AREA MONITORING LOCATIONS
- WORK AREA MONITORING LOCATIONS

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. THE "R" SUFFIX IN THE MONITORING LOCATION ID INDICATES THAT THE MONITORING LOCATION IS CONSIDERED A RESIDENTIAL MONITORING LOCATION FOR COMPARISON WITH THE NOISE QUALITY OF LIFE STANDARDS.
2. THE "N" SUFFIX IN THE MONITORING LOCATION ID INDICATES THAT THE MONITORING LOCATION IS CONSIDERED A NON-RESIDENTIAL MONITORING LOCATION FOR COMPARISON WITH THE NOISE QUALITY OF LIFE STANDARDS.

NORTH

0 200 400

SCALE IN FEET

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-SITE PLAN.dwg G0100

Apr 29, 2026 12:27pm cyard2

ANCHOR QEA

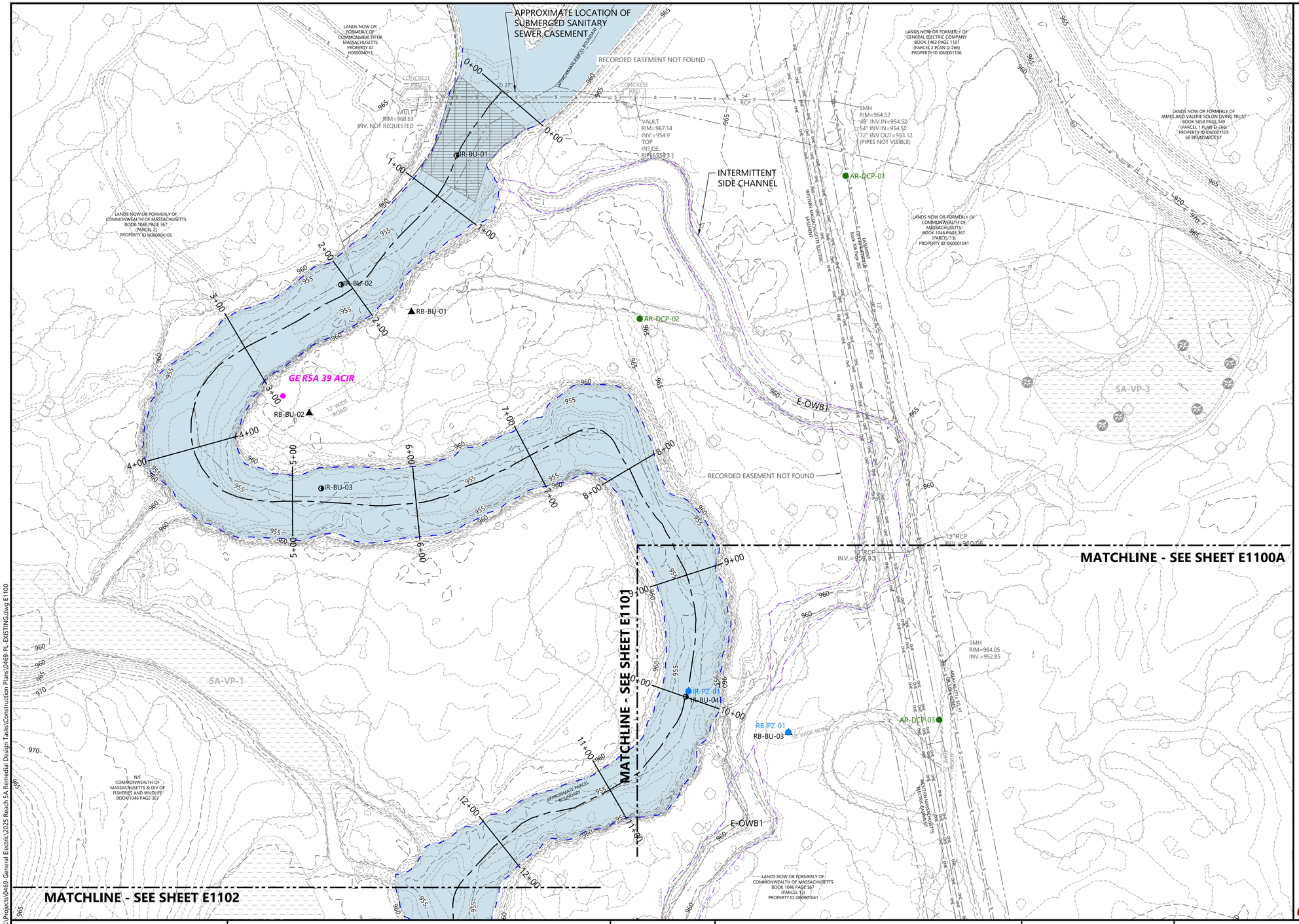
REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

REACH 5A SITE PLAN
STA. 0+00 TO STA. 48+00

G0100





E-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY/RIGHT OF WAY/EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- EXISTING RIFFLE BOUNDARY
- 2024 GEOTECHNICAL LOCATION (BORING)
- 2024 GEOTECHNICAL LOCATION (DCP)
- 2024 GEOTECHNICAL LOCATION (PIEZOMETER)
- 2025 IN-RIVER GEOTECHNICAL LOCATION (BORING)

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH

0 40 80

SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

EXISTING CONDITIONS
STA. 0+00 TO STA. 12+50 &
INTERMITTENT SIDE CHANNEL (E-OWB1)

E1100

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-EXISTING.dwg E1100

Apr 28, 2026 2:41pm cyard

MATCHLINE - SEE SHEET E1100

MATCHLINE - SEE SHEET E1101

MATCHLINE - SEE SHEET E1103

INTERMITTENT SIDE CHANNEL

E-OWB1

AR-PZ-01
AR-BU-04

RB-PZ-01
RB-BU-03

AR-DCP-03

SMH
RIM=964.05
INV.=952.85

12"RCP
INV.=960.06

12"RCP
INV.=959.93

5A-VP-4

5A-VP-5

NOBLEHURST AVE
COMMONWEALTH OF MASSACHUSETTS
BOOK
PAGE

WESTERN MASSACHUSETTS ELECTRIC CO. (WMECO)

LANDS NOW OR FORMERLY OF COMMONWEALTH OF MASSACHUSETTS
BOOK 1046 PAGE 367
(PARCEL E)
PROPERTY ID I060001041

SA-B-01

RB-BU-04

IR-BU-05

SA-DCP-01

AR-DCP-04

AR-B-01

Lands Now or Formerly of COMMONWEALTH OF MASSACHUSETTS
Book 1046 Page 367
(Parcel 13)
Property ID I060001041

SMH
RIM=962.75
UNABLE TO OPEN
(APPROX. INV.=952.75)

12"RCP

12"RCP INV.=959.81

LANDS NOW OR FORMERLY OF COMMONWEALTH OF MASSACHUSETTS
BOOK 1046 PAGE 367
(PARCEL B)
(PLAN D162-5)
PROPERTY ID H060004105

RR RIGHT OF WAY
MASSACHUSETTS DEPARTMENT OF
BOOK 5495
PAGE 47

9+00
10+00
11+00
15+00
16+00
17+00
18+00
19+00



E-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY/RIGHT OF WAY/EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- EXISTING RIFFLE BOUNDARY
- 2024 GEOTECHNICAL LOCATION (BORING)
- 2024 GEOTECHNICAL LOCATION (DCP)
- 2024 GEOTECHNICAL LOCATION (PIEZOMETER)
- 2025 IN-RIVER GEOTECHNICAL LOCATION (BORING)

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

NORTH

0 40 80

SCALE IN FEET

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

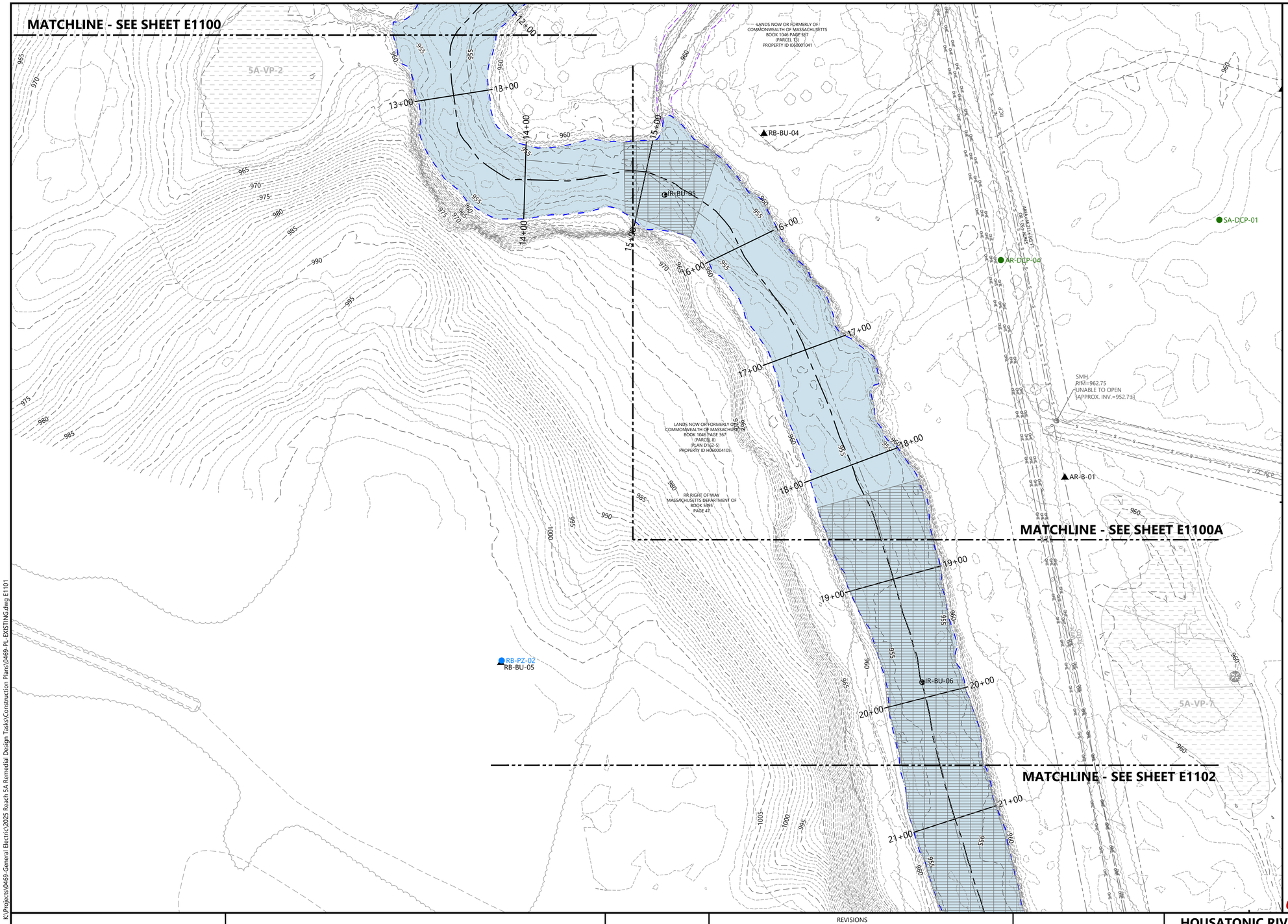
HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

EXISTING CONDITIONS
STAGING AREA SA-1

E1100A

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-EXISTING.dwg E1100A

Apr 28, 2026 2:43pm cyard





E-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY/RIGHT OF WAY/EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- EXISTING RIFFLE BOUNDARY
- 2024 GEOTECHNICAL LOCATION (BORING)
- 2024 GEOTECHNICAL LOCATION (DCP)
- 2024 GEOTECHNICAL LOCATION (PIEZOMETER)
- 2025 IN-RIVER GEOTECHNICAL LOCATION (BORING)

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH

0 40 80

SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

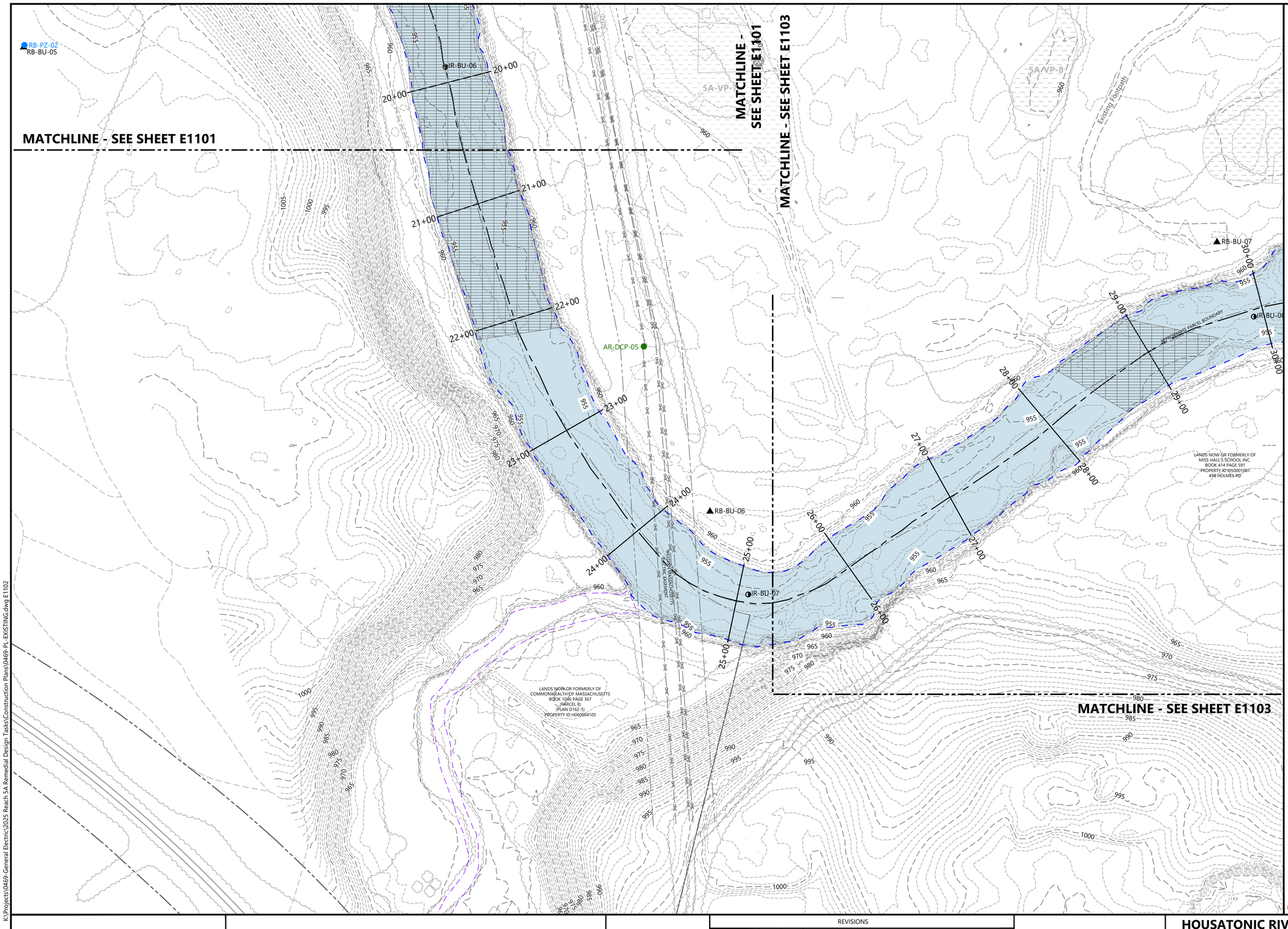
DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

EXISTING CONDITIONS
STA. 12+50 TO STA. 21+50

E1101

Apr 28, 2026 2:45pm cyard K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-EXISTING.dwg E1101





E-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY/RIGHT OF WAY/EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- EXISTING RIFFLE BOUNDARY
- 2024 GEOTECHNICAL LOCATION (BORING)
- 2024 GEOTECHNICAL LOCATION (DCP)
- 2024 GEOTECHNICAL LOCATION (PIEZOMETER)
- 2025 IN-RIVER GEOTECHNICAL LOCATION (BORING)

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH

0 40 80

SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

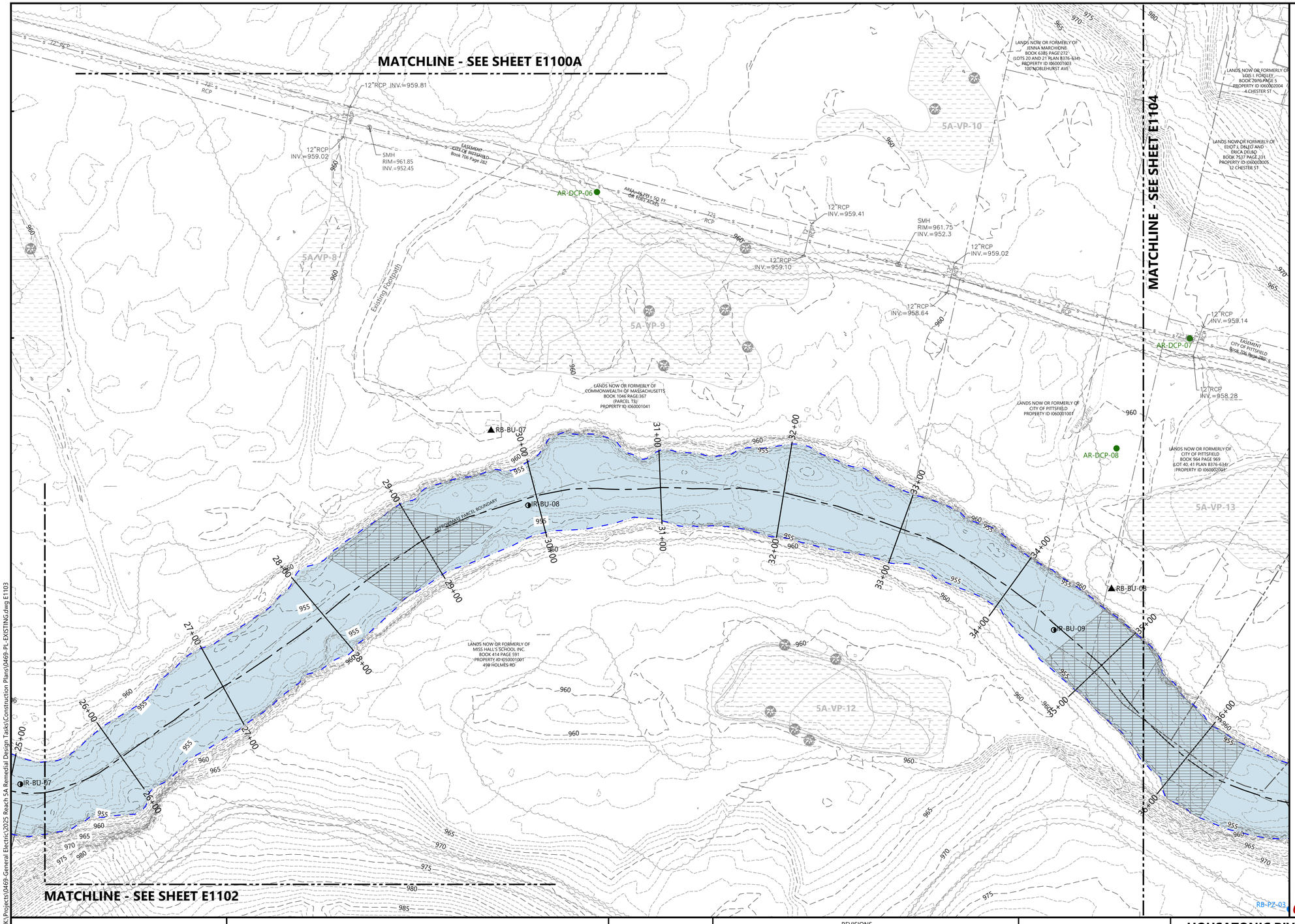
DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

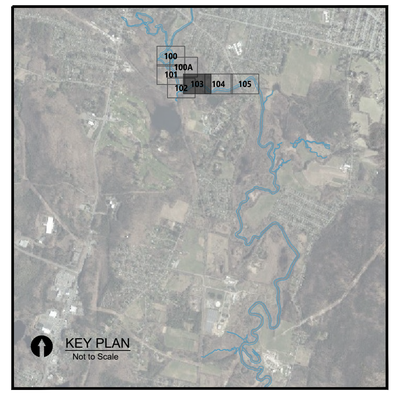
HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

EXISTING CONDITIONS
STA. 19+50 TO STA. 30+00

E1102

Apr 28, 2026 2:46pm cyard K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-EXISTING.dwg E1102





E-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY/RIGHT OF WAY/EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- EXISTING RIFFLE BOUNDARY
- 2024 GEOTECHNICAL LOCATION (BORING)
- 2024 GEOTECHNICAL LOCATION (DCP)
- 2024 GEOTECHNICAL LOCATION (PIEZOMETER)
- 2025 IN-RIVER GEOTECHNICAL LOCATION (BORING)

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

NORTH

0 40 80

SCALE IN FEET

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

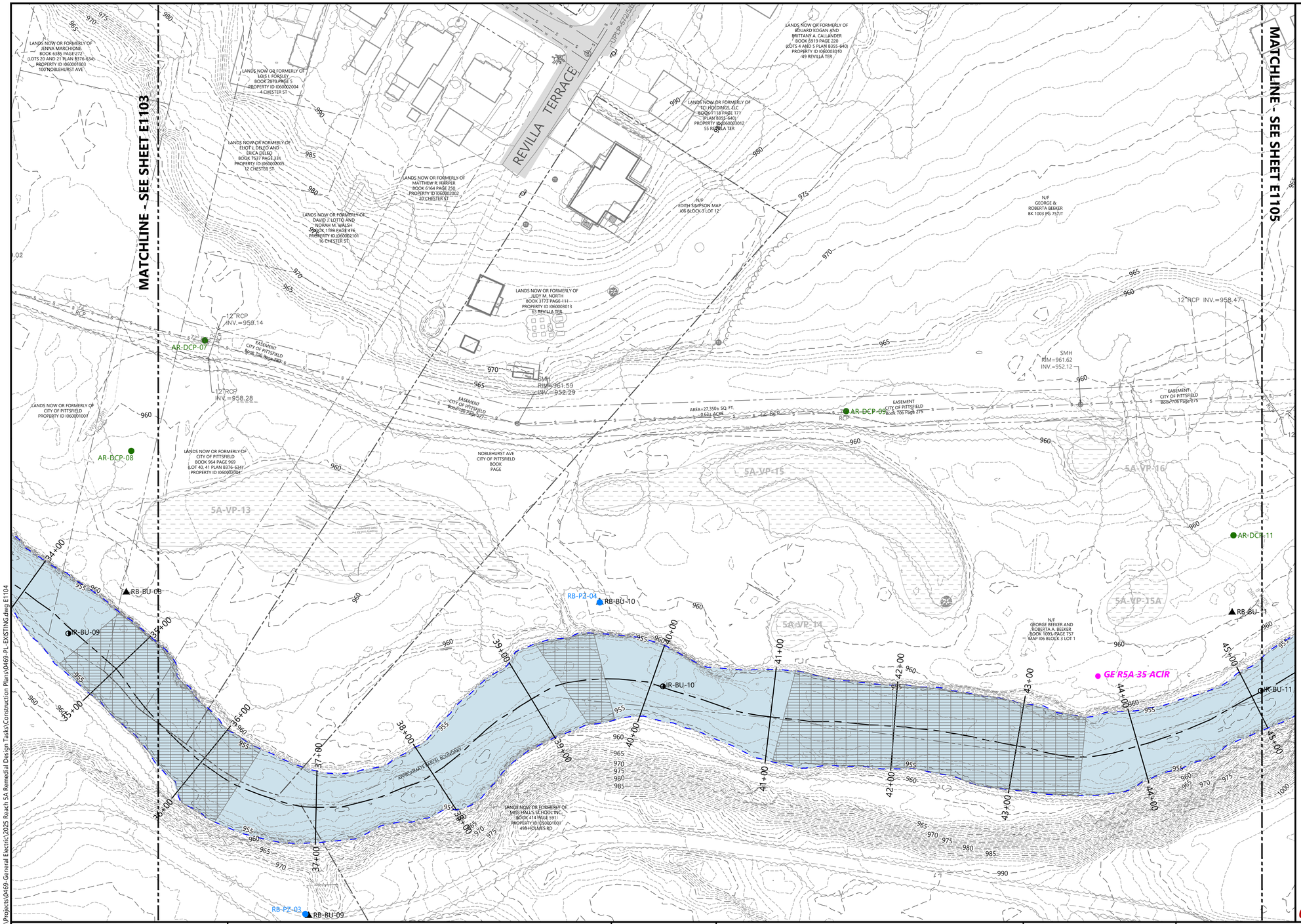
HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

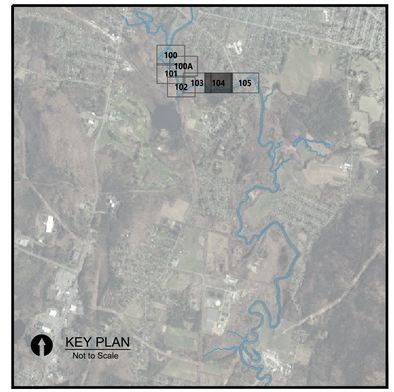
EXISTING CONDITIONS
STA. 25+50 TO STA. 36+50

E1103

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-EXISTING.dwg E1103

Apr 28, 2026 2:48pm cyard





E-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY/RIGHT OF WAY/EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- EXISTING RIFFLE BOUNDARY
- 2024 GEOTECHNICAL LOCATION (BORING)
- 2024 GEOTECHNICAL LOCATION (DCP)
- 2024 GEOTECHNICAL LOCATION (PIEZOMETER)
- 2025 IN-RIVER GEOTECHNICAL LOCATION (BORING)

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH

0 40 80

SCALE IN FEET

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

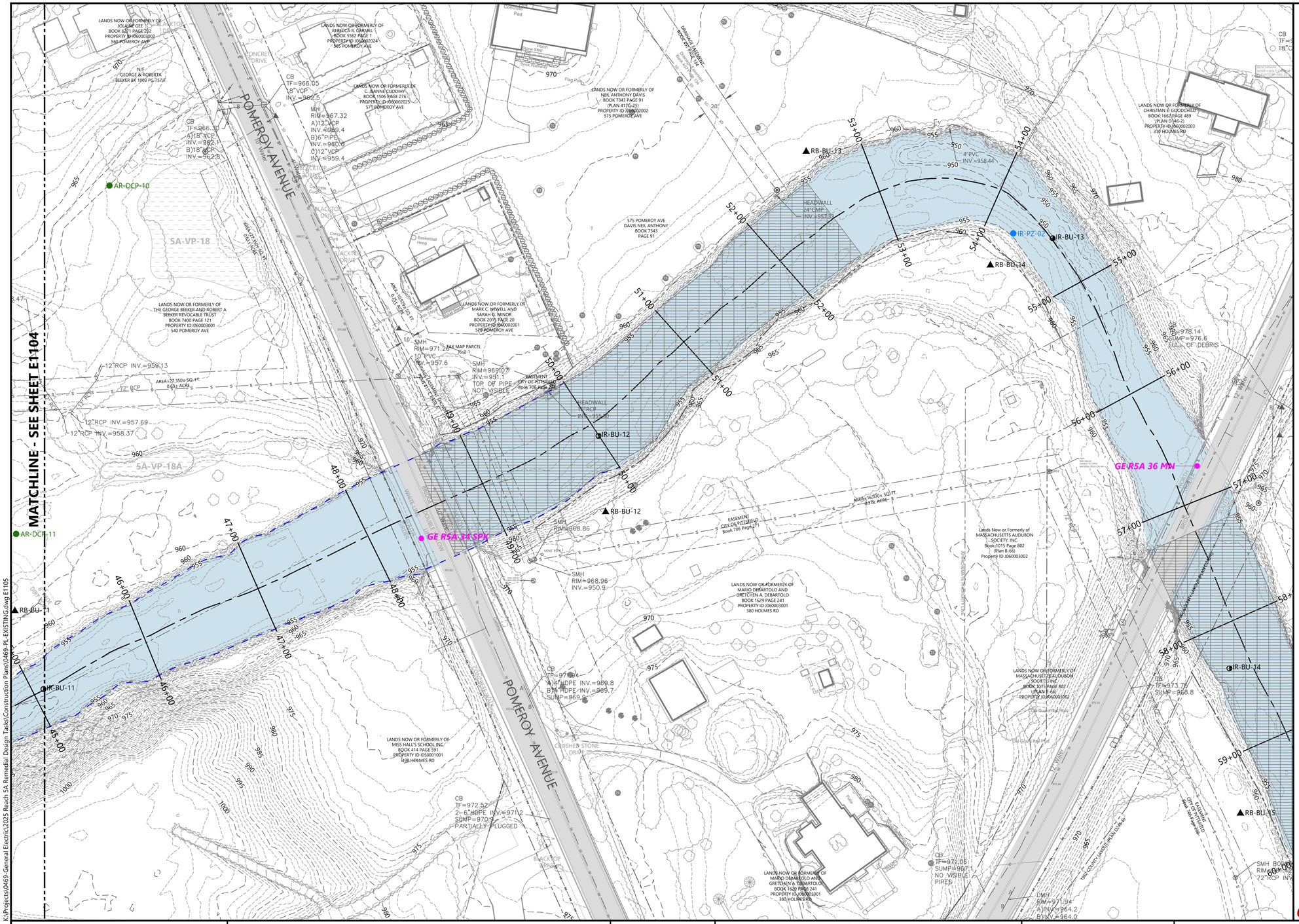
EXISTING CONDITIONS
STA. 34+50 TO STA. 45+00

E1104

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-EXISTING.dwg E1104

Apr 28, 2026 2:50pm cyard

MATCHLINE - SEE SHEET E1104





E-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY/RIGHT OF WAY/EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- EXISTING RIFFLE BOUNDARY
- 2024 GEOTECHNICAL LOCATION (BORING)
- 2024 GEOTECHNICAL LOCATION (DCP)
- 2024 GEOTECHNICAL LOCATION (PIEZOMETER)
- 2025 IN-RIVER GEOTECHNICAL LOCATION (BORING)

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH

0 40 80

SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-EXISTING.dwg E1105

Apr 29, 2026 10:08am cyard2

ANCHOR QEA

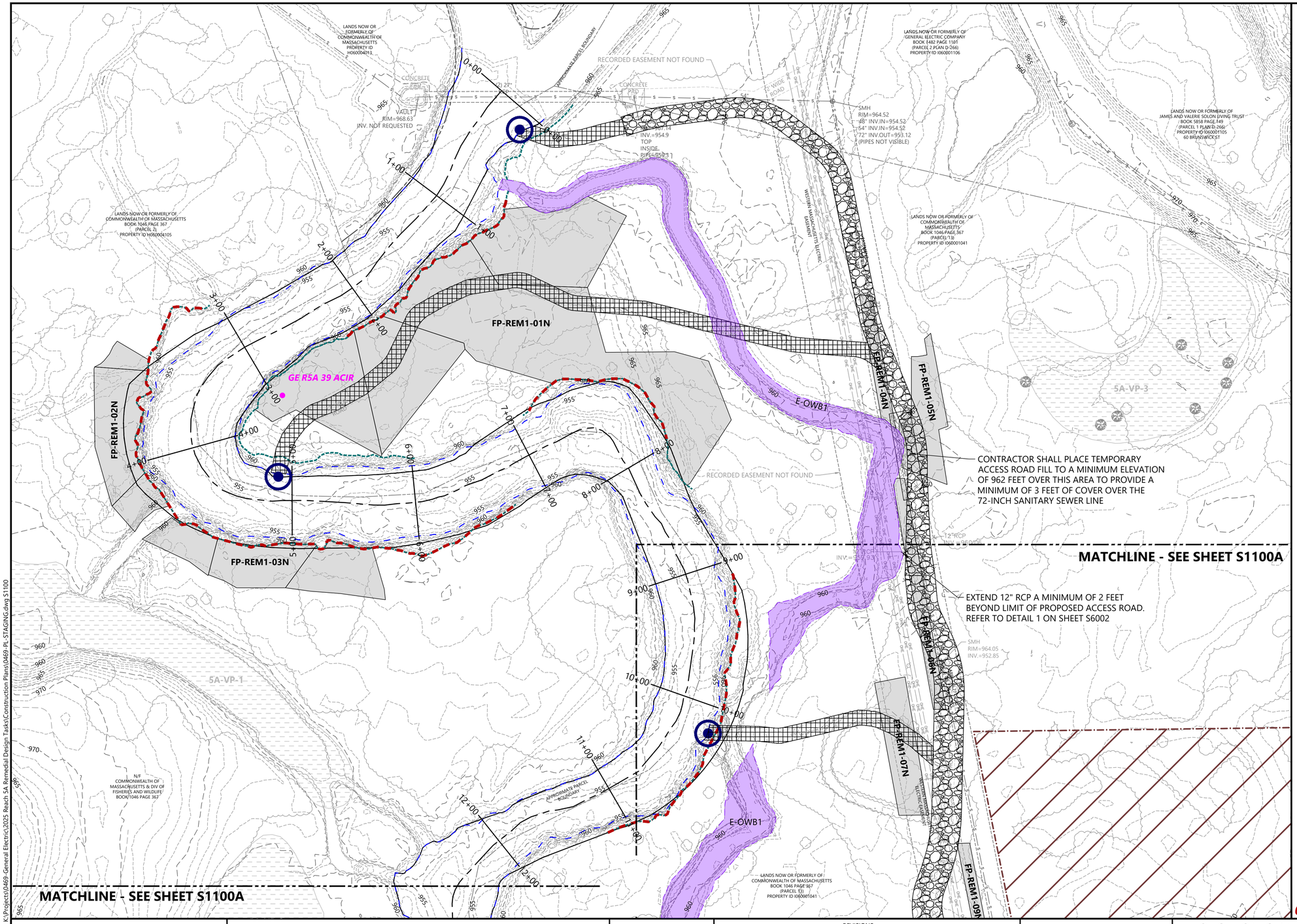
REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

EXISTING CONDITIONS
STA. 45+00 TO STA. 48+00

E1105



S-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.
3. THE LOCATIONS OF TEMPORARY ACCESS ROADS, STAGING AREAS, RIVER ACCESS LOCATIONS, AND BRIDGE CROSSINGS SHOWN ON THE DRAWINGS ARE APPROXIMATE AND MAY BE SUBJECT TO CHANGE BASED ON INPUT BY THE CONTRACTOR. THE FINAL LOCATIONS OF THESE FEATURES WILL BE PRESENTED IN A SUPPLEMENTAL INFORMATION PACKAGE.

NORTH

0 40 80

SCALE IN FEET

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION GENERAL ELECTRIC COMPANY PITTSFIELD, MASSACHUSETTS

TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 1

S1100

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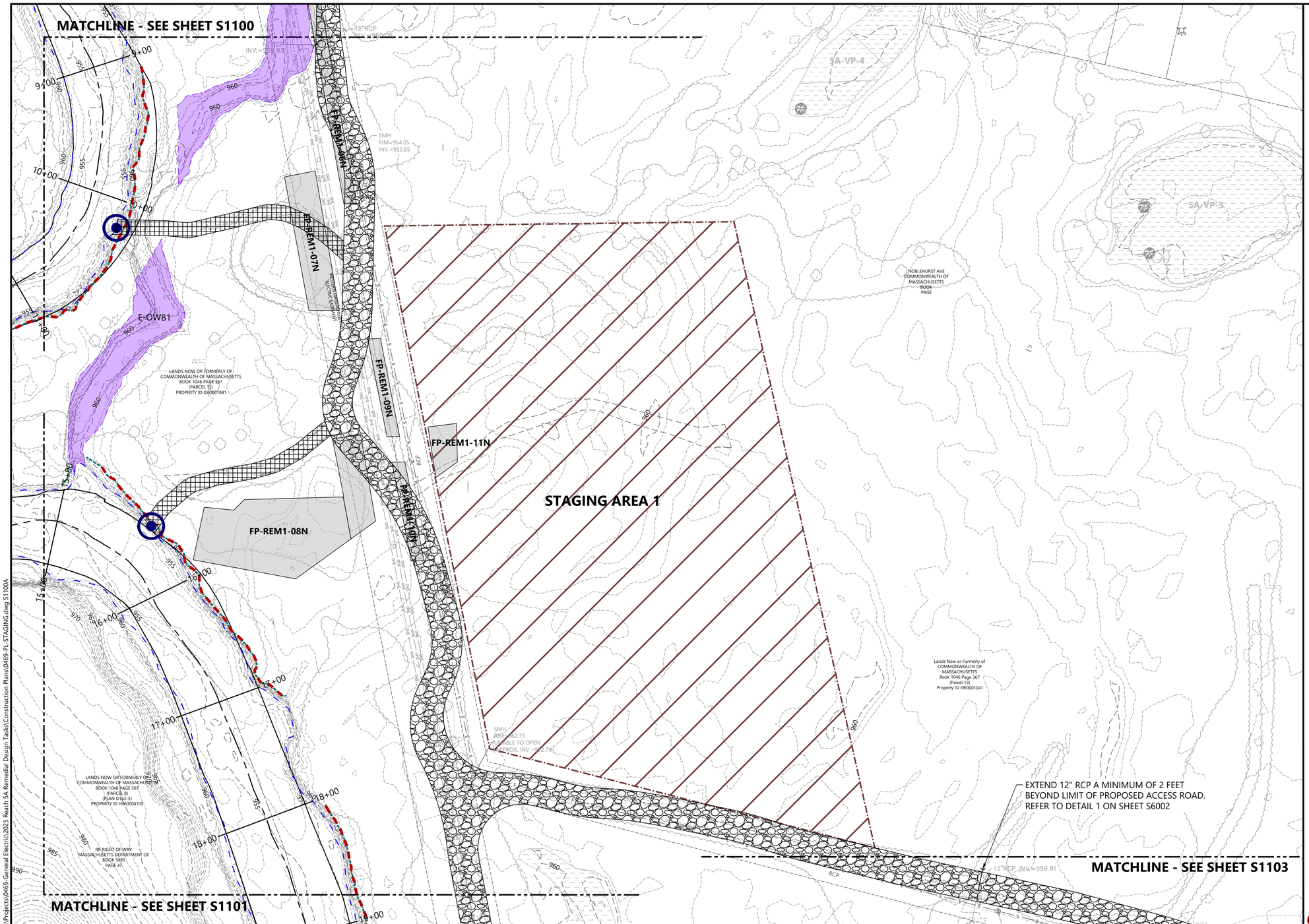



S-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.
3. THE LOCATIONS OF TEMPORARY ACCESS ROADS, STAGING AREAS, RIVER ACCESS LOCATIONS, AND BRIDGE CROSSINGS SHOWN ON THE DRAWINGS ARE APPROXIMATE AND MAY BE SUBJECT TO CHANGE BASED ON INPUT BY THE CONTRACTOR. THE FINAL LOCATIONS OF THESE FEATURES WILL BE PRESENTED IN A SUPPLEMENTAL INFORMATION PACKAGE.

NORTH

0 40 80

SCALE IN FEET

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ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 2

S1100A

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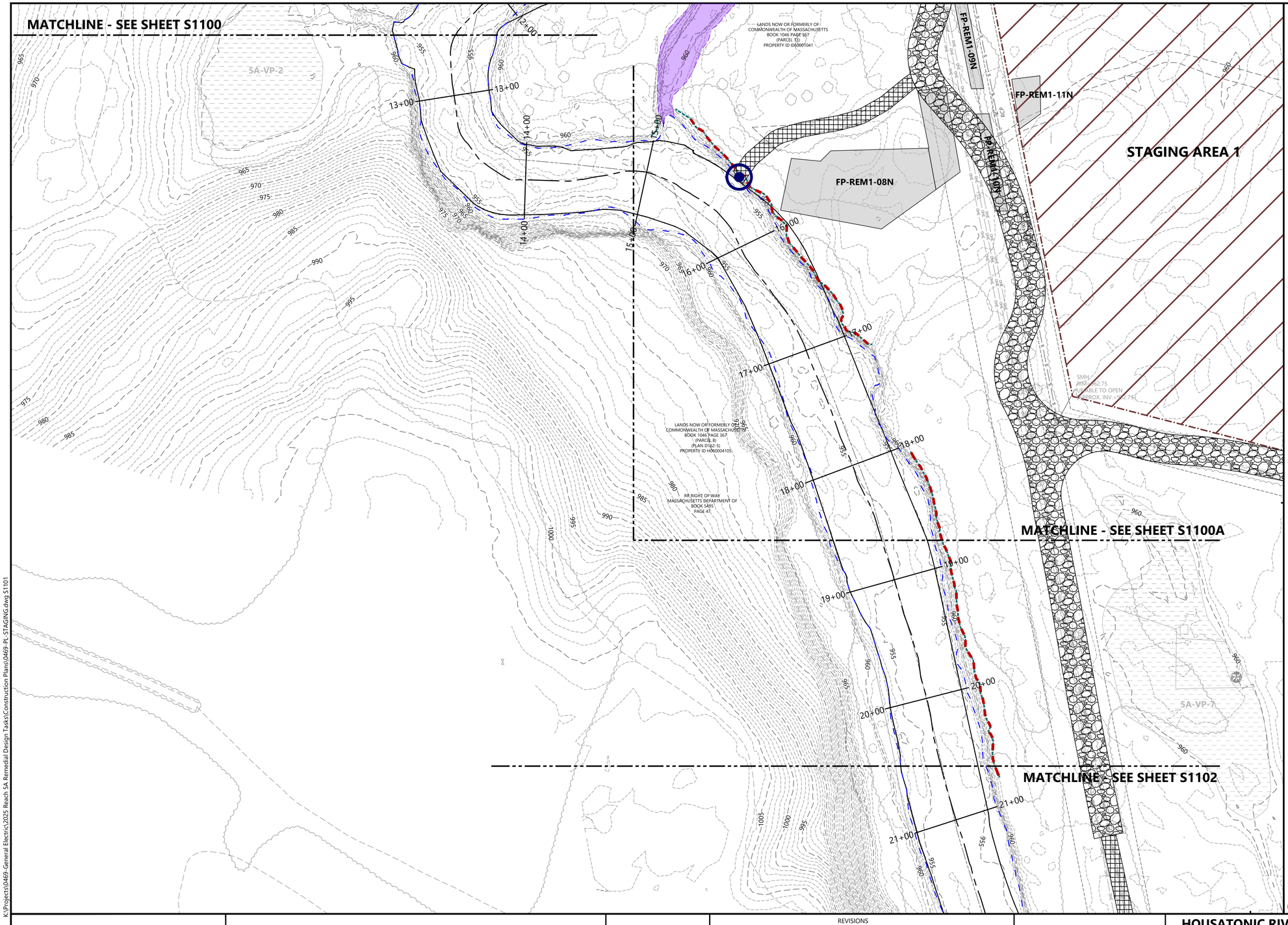
Apr 29, 2026 11:08am cyard2





S-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

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PLAN INTENDED TO BE VIEWED IN "COLOR" ADJACENT BLOCK IS "BLUE"

NORTH

0 40 80

SCALE IN FEET

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
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DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 3

S1101

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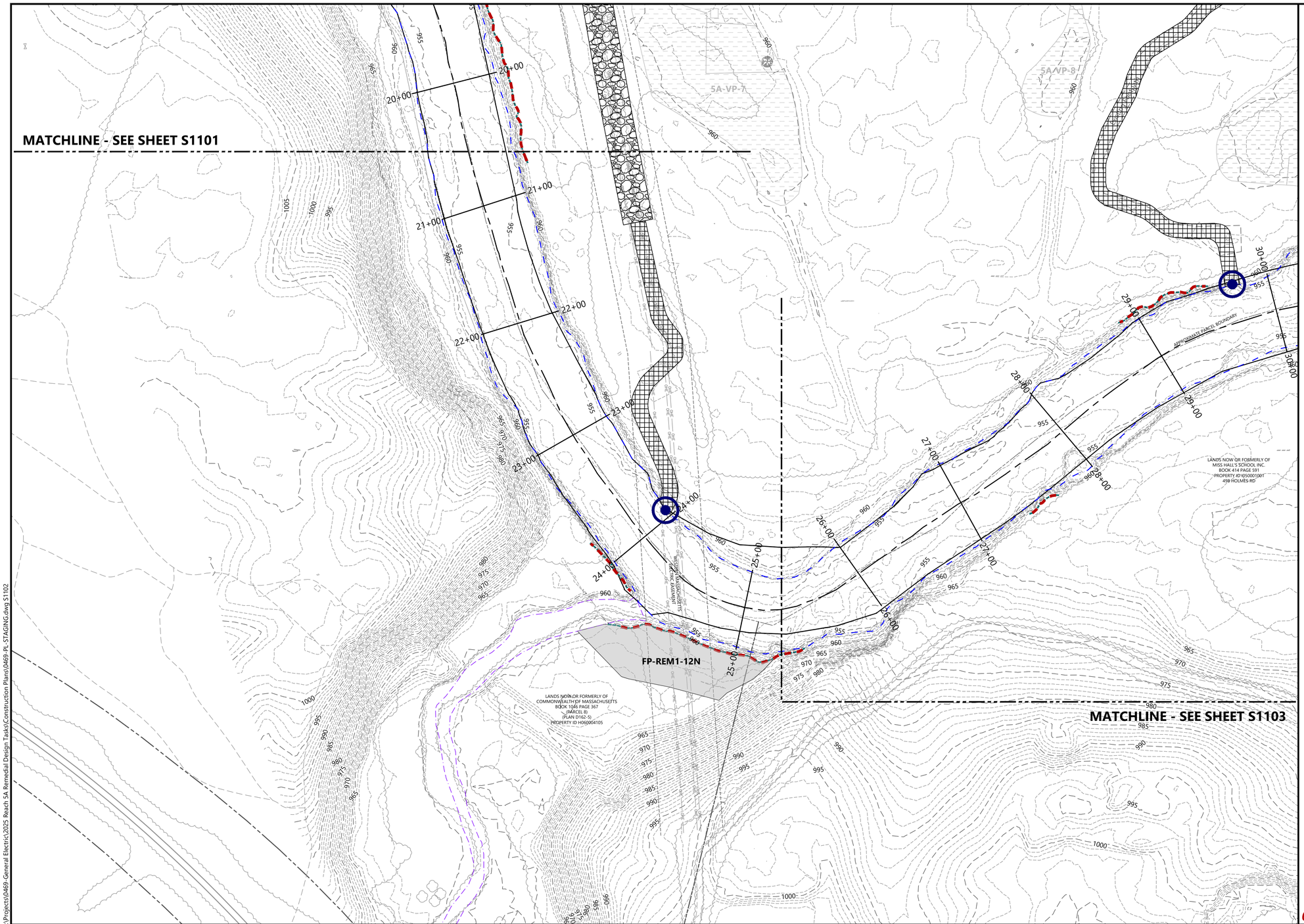
Apr 29, 2026 12:42pm cyard





S-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- 3+00 3+00 EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

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NORTH

0 40 80

SCALE IN FEET

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04-29-2026 DRAFT-NOT FOR CONSTRUCTION

K:\Projects\0469 General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-STAGING.dwg S1102

Apr 29, 2026 12:45pm cyard

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 4

S1102

MATCHLINE - SEE SHEET S1101

MATCHLINE - SEE SHEET S1104

MATCHLINE - SEE SHEET S1102

FP-REM1-13N

FP-REM1-14N

FP-REM1-15N

FP-REM1-16N

5A-VP-8

5A-VP-9

5A-VP-10

5A-VP-12

5A-VP-13

CONTRACTOR TO INSTALL AND MAINTAIN ROAD WIDTH TO PROVIDE MINIMUM 5' OFFSET FROM EDGE OF VERNAL POOL (TYP)

EXTEND 12" RCP A MINIMUM OF 2 FEET BEYOND LIMIT OF PROPOSED ACCESS ROAD. REFER TO DETAIL 1 ON SHEET S6002

EXTEND 12" RCP A MINIMUM OF 2 FEET BEYOND LIMIT OF PROPOSED ACCESS ROAD. REFER TO DETAIL 1 ON SHEET S6002

12"RCP INV.=959.81

12"RCP INV.=959.02

SMH RIM=961.85 INV.=952.45

12"RCP INV.=959.41

SMH RIM=961.75 INV.=952.3

12"RCP INV.=959.02

12"RCP INV.=959.10

12"RCP INV.=958.6

12"RCP INV.=958.14

12"RCP INV.=958.28

EASEMENT CITY OF PITTSFIELD BOOK 706 PAGE 283

EASEMENT CITY OF PITTSFIELD BOOK 706 PAGE 283

LANDS NOW OR FORMERLY OF JENNA MARCHIONE BOOK 6385 PAGE 272 (LOTS 20 AND 21 PLAN B376-634) PROPERTY ID I060001803 100 NOBLEHURST AVE

LANDS NOW OR FORMERLY OF LOIS I. FORSLEY BOOK 2970 PAGE 5 PROPERTY ID I060002004 4 CHESTER ST

LANDS NOW OR FORMERLY OF ELIOT J. DILLO AND ERICA DELEO BOOK 7537 PAGE 231 PROPERTY ID I060002005 12 CHESTER ST

LANDS NOW OR FORMERLY OF COMMONWEALTH OF MASSACHUSETTS BOOK 1046 PAGE/367 (PARCEL T3) PROPERTY ID I060001041

LANDS NOW OR FORMERLY OF CITY OF PITTSFIELD PROPERTY ID I060001100

LANDS NOW OR FORMERLY OF CITY OF PITTSFIELD BOOK 964 PAGE 969 (LOT 40, 41 PLAN B376-634) PROPERTY ID I060002004

LANDS NOW OR FORMERLY OF MISS HALL'S SCHOOL INC. BOOK 414 PAGE 591 PROPERTY ID I050001001 498 HOLMES RD

APPROXIMATE PARCEL BOUNDARY

25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00

955 960 965 970 975 980 985

KEY PLAN
Not to Scale

100 100A 101 102 103 104 105

S-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- 3+00 EXISTING RIVER STATIONING 3+00
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
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- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
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- RIVER ACCESS POINT

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

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NOTES:

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NORTH

0 40 80

SCALE IN FEET

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04-29-2026 DRAFT-NOT FOR CONSTRUCTION

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-STAGING.dwg S1103

Apr 29, 2026 12:48pm cyard

ANCHOR QEA

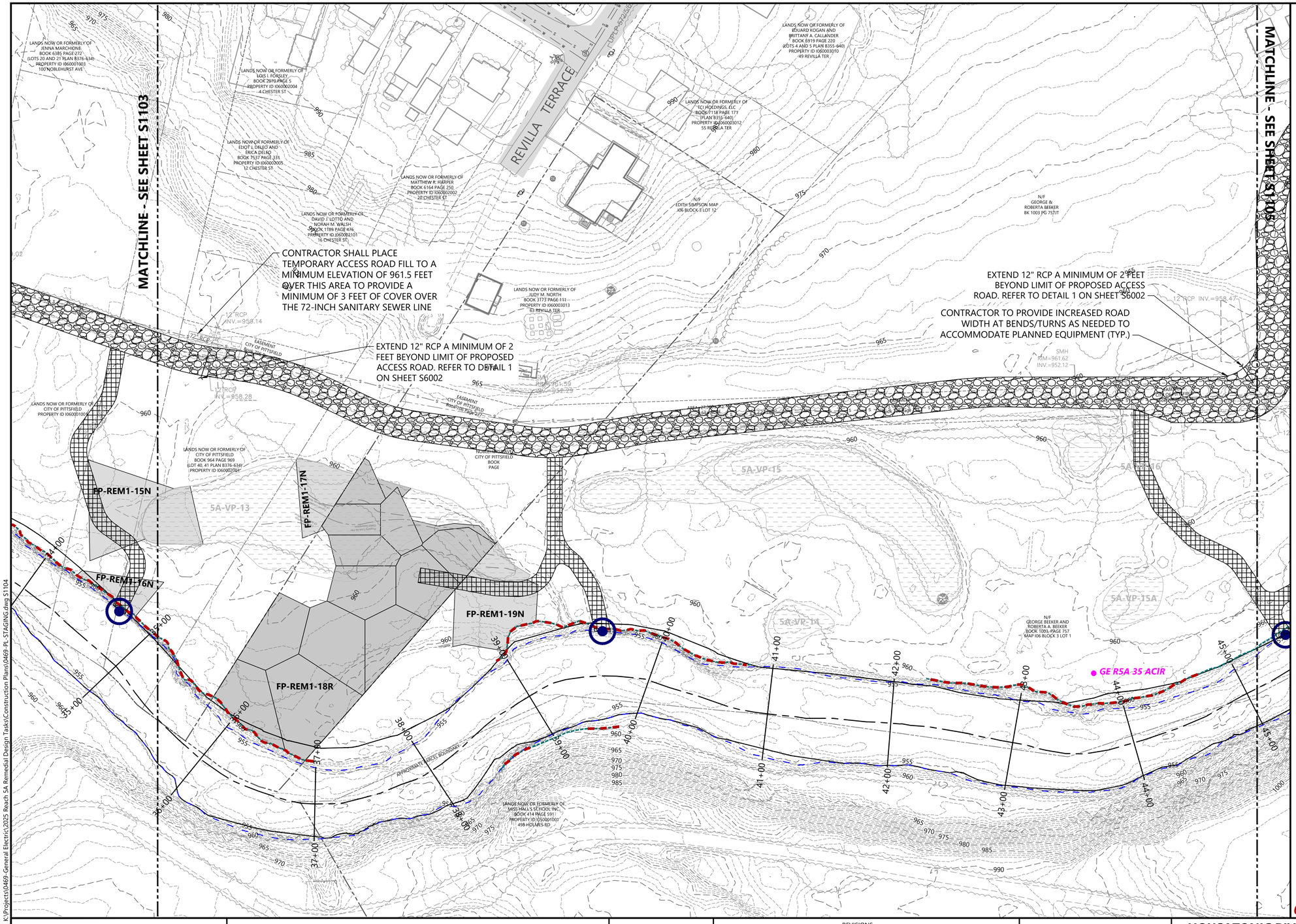
REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

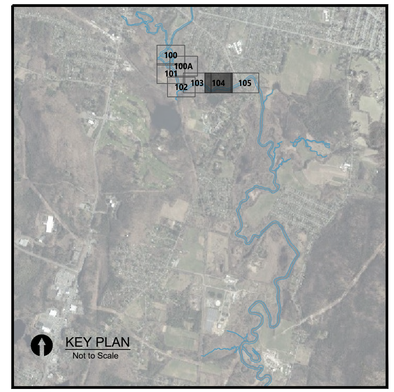
DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 5

S1103





S-SERIES LEGEND:

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- PROPERTY-EASEMENT BOUNDARY
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HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

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NORTH

0 40 80

SCALE IN FEET

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ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 6

S1104

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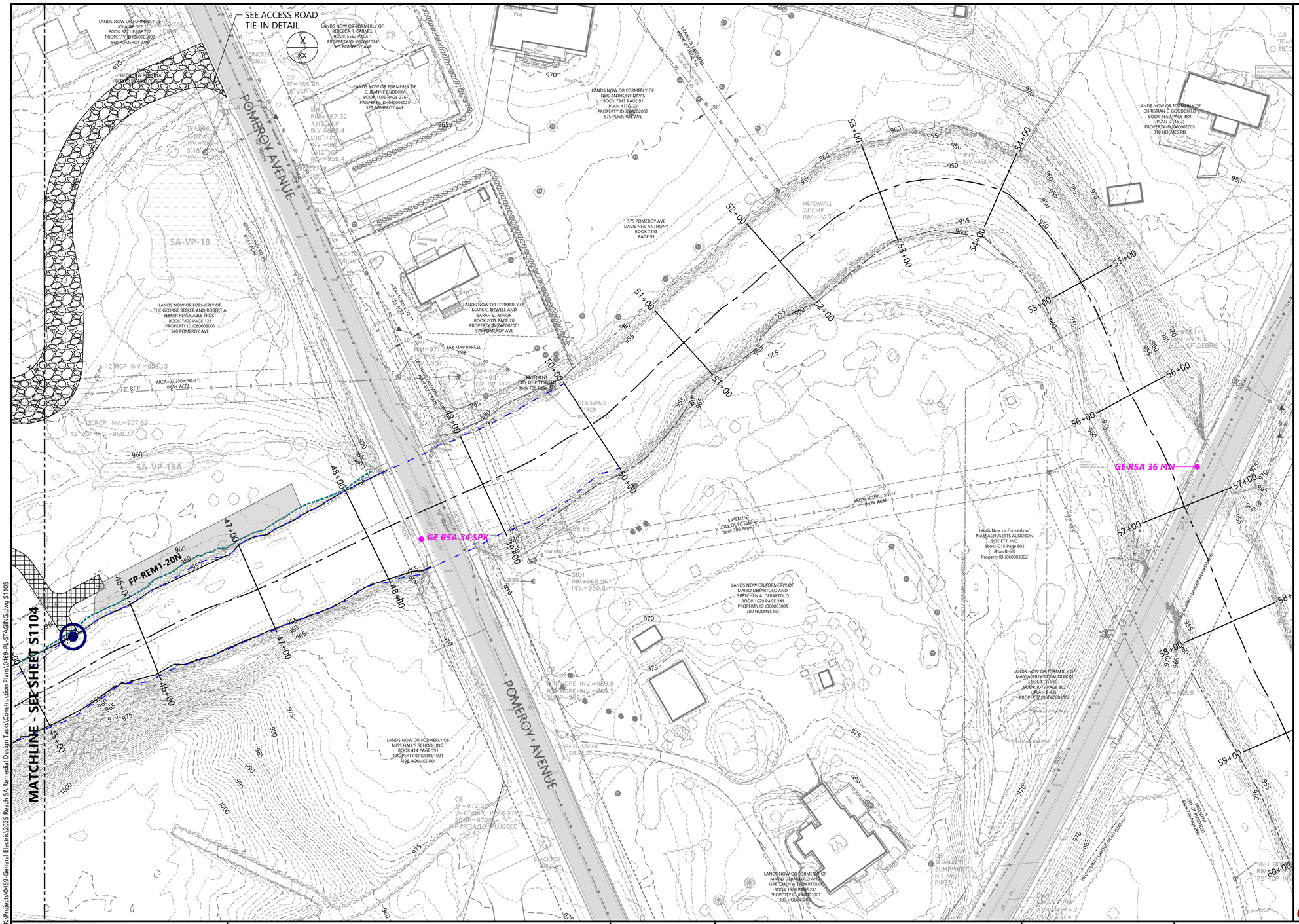
Apr 29, 2026 12:50pm cyard





S-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
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NORTH

0 40 80

SCALE IN FEET

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04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

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APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

TEMPORARY ACCESS ROAD AND STAGING AREA LAYOUT, SHEET 7

S1105

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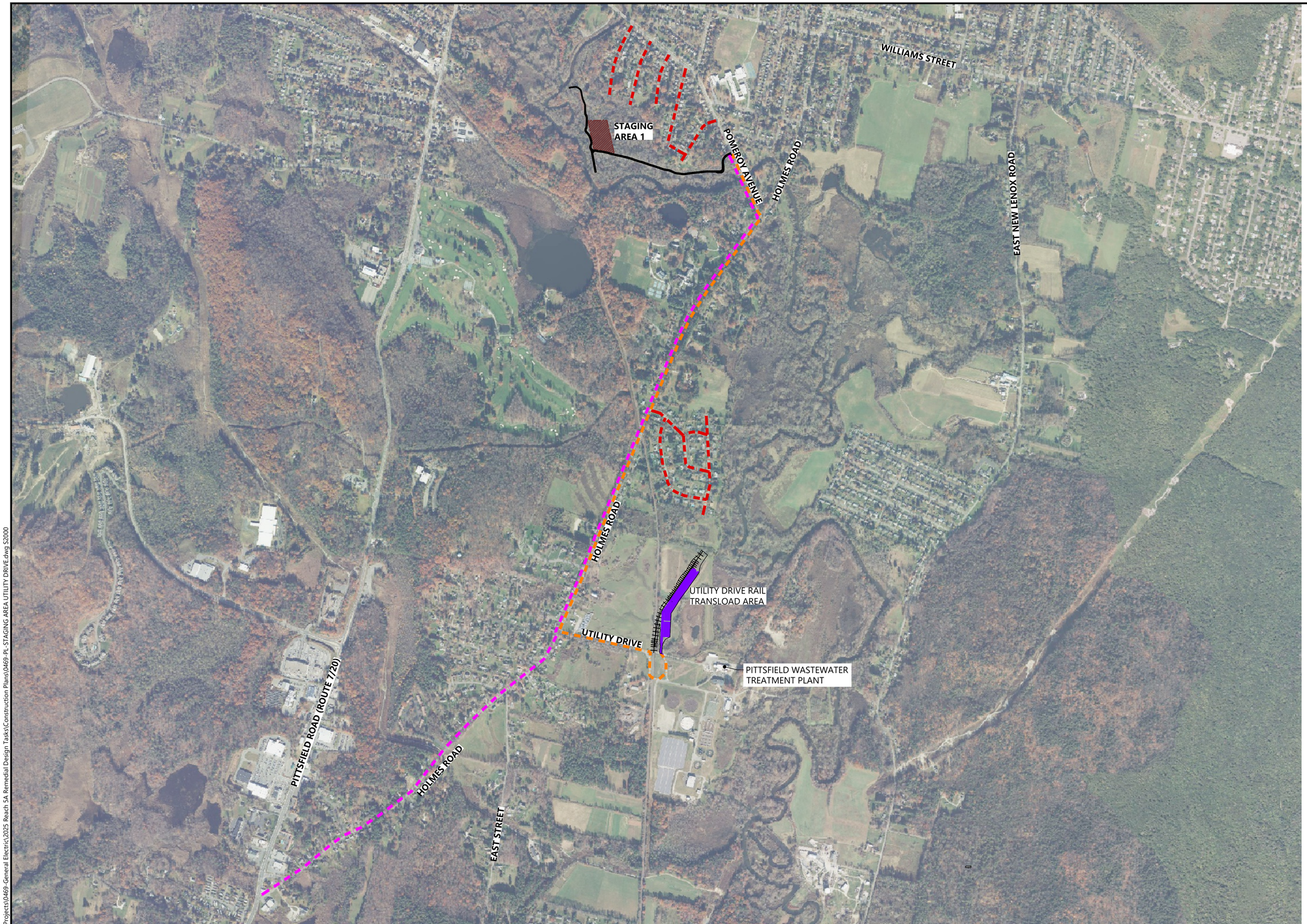

LEGEND:

- ROAD USE RESTRICTED
- TRUCK ROUTE TO UTILITY DRIVE RAIL TRANSLOAD AREA
- IMPORTED FILL MATERIAL HAUL ROUTE
- PRIMARY TEMPORARY ACCESS ROAD

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. SURVEY FEET

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. SURVEY FEET

NORTH

0 750 1500

SCALE IN FEET

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HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

TRANSPORT ROUTE TO UTILITY DRIVE TRANSLOAD AREA

S2000

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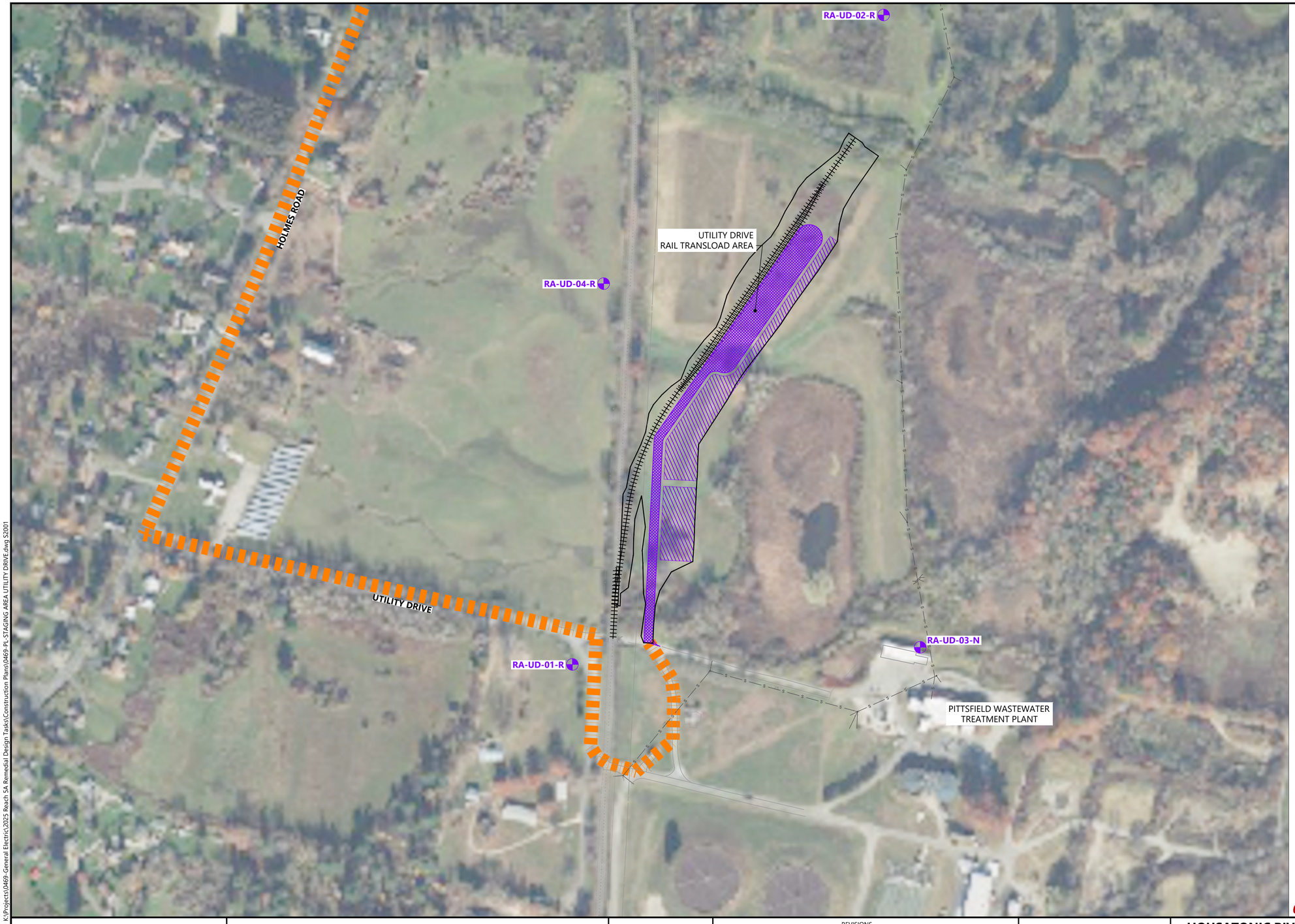
Apr 28, 2026 1:46pm cyard2



LEGEND:

TRUCK ROUTE TO UTILITY DRIVE RAIL TRANSLOAD AREA

AIR AND POTENTIAL NOISE MONITORING LOCATIONS

RAIL AREA MONITORING LOCATION

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. SURVEY FEET

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. SURVEY FEET

NOTES:

1. THE "R" SUFFIX IN THE MONITORING LOCATION ID INDICATES THAT THE MONITORING LOCATION IS CONSIDERED A RESIDENTIAL MONITORING LOCATION FOR COMPARISON WITH THE NOISE QUALITY OF LIFE STANDARDS.
2. THE "N" SUFFIX IN THE MONITORING LOCATION ID INDICATES THAT THE MONITORING LOCATION IS CONSIDERED A NON-RESIDENTIAL MONITORING LOCATION FOR COMPARISON WITH THE NOISE QUALITY OF LIFE STANDARDS.

NORTH

0 150 300

SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

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HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

UTILITY DRIVE TRANSLOAD AREA SITE PLAN

S2001

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-STAGING AREA UTILITY DRIVE.dwg S2001

Apr 29, 2026 9:30am cyard2



LEGEND:

AIR AND POTENTIAL NOISE MONITORING LOCATIONS

RAIL AREA MONITORING LOCATION

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. SURVEY FEET

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NORTH

0 150 300

SCALE IN FEET

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GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

WOODS POND RAIL TRANSLOAD AREA SITE PLAN

S2002

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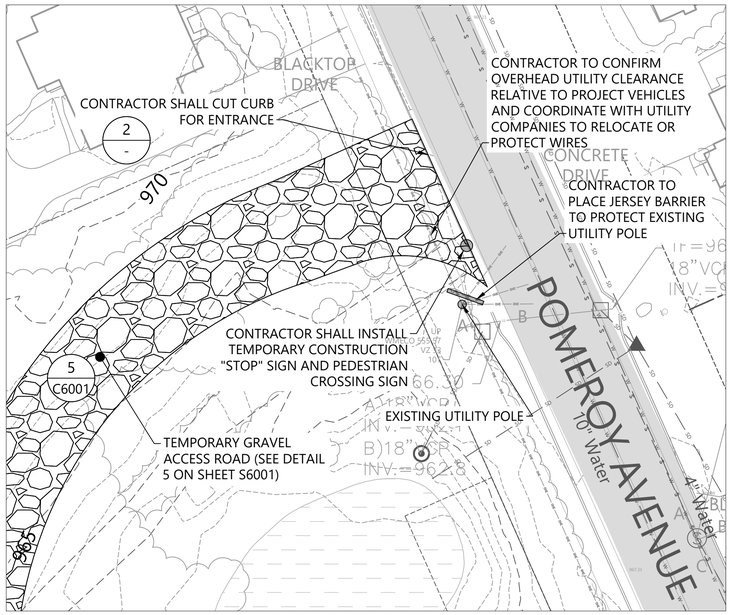
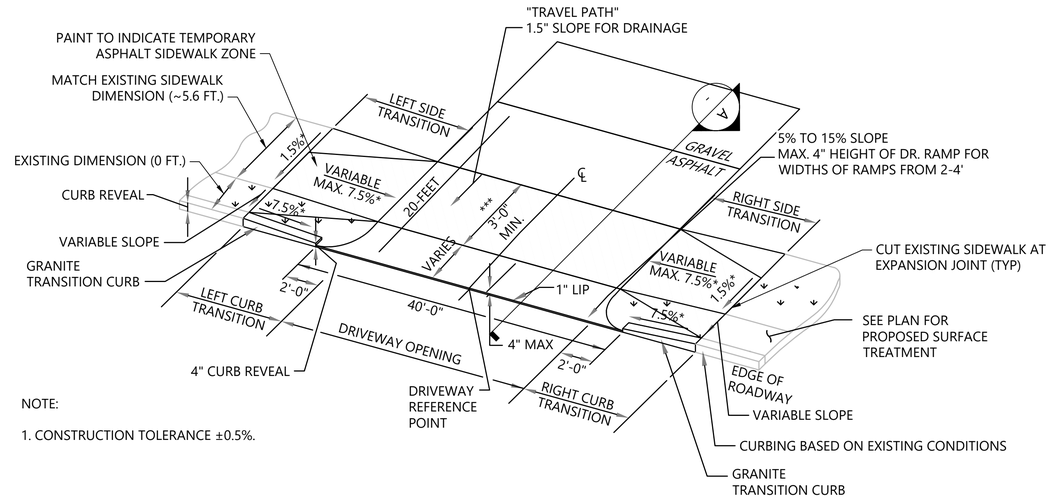


1 / S1105 POMEROY AVENUE INTERSECTION DETAIL
SCALE: 1" = 20'

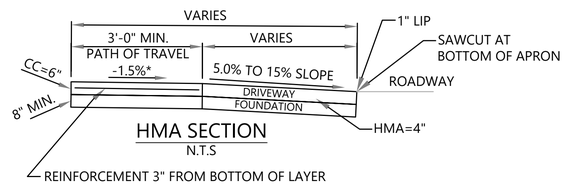
NOTES:

1. CONTRACTOR TO INSTALL ADDITIONAL SIGNAGE, INCLUDING: "CONSTRUCTION ACCESS ONLY. NOT A PUBLIC ROAD", AND "CONSTRUCTION ENTRANCE 500 FEET AHEAD, TRUCKS TURNING". CONTRACTOR SHALL INSTALL SIGNAGE WHERE APPLICABLE.

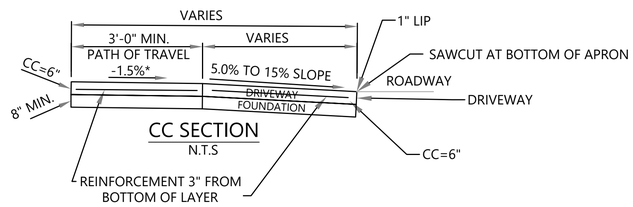


NOTE:

1. CONSTRUCTION TOLERANCE ±0.5%.

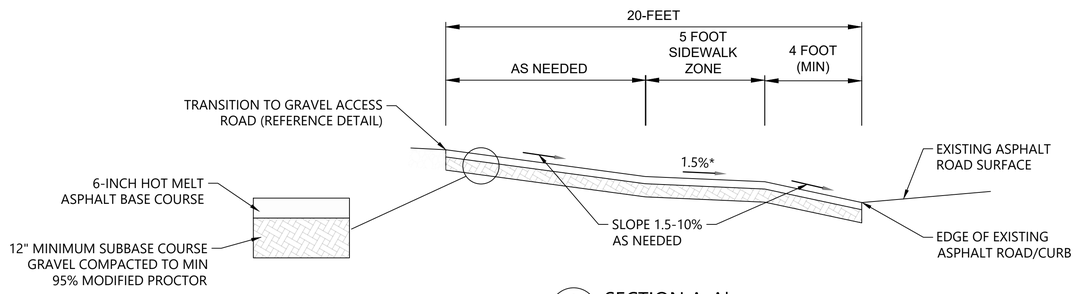


HMA SECTION
N.T.S



CC SECTION
N.T.S

2 / - ACCESS ROAD INTERSECTION AT POMEROY AVENUE
SCALE: NOT TO SCALE



A / - SECTION A-A'
SCALE: NOT TO SCALE

NOTES:

1. ACCESS ROAD INTERSECTION AT POMEROY AVE. TO BE PARTIALLY OR FULLY CONSTRUCTED AS PART OF THE VERNAL POOL PILOT STUDY.
2. CONTRACTOR SHALL PLACE SIGNS AT DISTANCES OF 200 FEET AND 500 FEET IN BOTH DIRECTIONS INDICATING "CONSTRUCTION AHEAD - TRUCKS ENTERING" OR APPROVED EQUAL, OR AS OTHERWISE DIRECTED BY THE CITY OF PITTSFIELD.
3. CONTRACTOR SHALL MAINTAIN A FLAGGER DURING ACTIVE WORK HOURS TO FACILITATE VEHICLES ENTERING AND EXITING POMEROY AVE.
4. CONTRACTOR TO PROVIDE POLICE DETAIL FOR TRAFFIC ALONG POMEROY AVE. DURING ACTIVE WORK HOURS.
5. UPON COMPLETION OF THE WORK UPSTREAM/WEST OF POMEROY AVE., THE CONTRACTOR SHALL REMOVE AND DISPOSE ASPHALT, RESTORE CURB TO ORIGINAL WIDTH AND CONDITION, CONSTRUCT A REPLACEMENT REINFORCED CONCRETE SIDEWALK, AND GENERALLY RESTORE THE ACCESS POINT TO PRE-EXISTING CONDITION. SEE DETAILS 1, 2, AND 3 ON SHEET S6001.

NORTH
0 20 40
SCALE IN FEET

PLAN INTENDED TO BE VIEWED IN 'COLOR' ADJACENT BLOCK IS 'BLUE'

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

STAGING ENTRANCE CONSTRUCTION DETAILS

S6000

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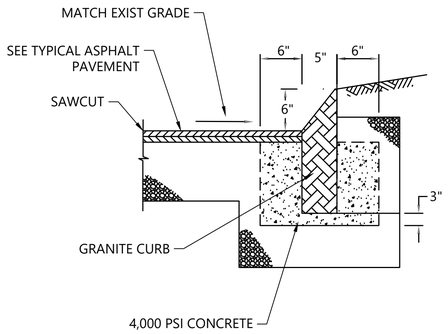
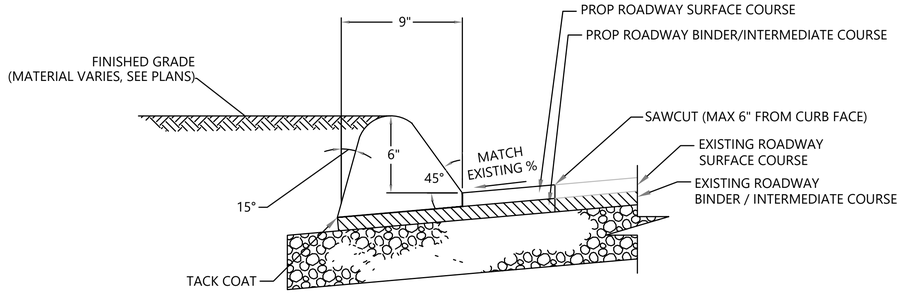


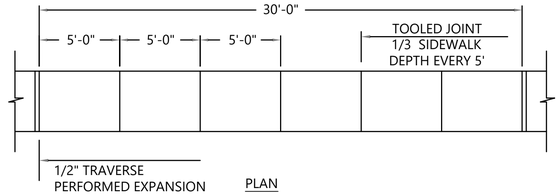
NOTES:

1. LENGTH OF CURB VARIES TO FIT RADIUS 2 FT. MIN.
2. ENDS SHALL BE SQUARE TO TOP AND RADIAL TO FACE.
3. BUTT ENDS TOGETHER AS CLOSE AS POSSIBLE. MAXIMUM SPACE OF 1/2" ALLOWED. 8" DOWN FROM TOP. JOINT SHALL BE MORTARED FULL DEPTH.
4. 1/2" EXPANSION JOINT EVERY 100 50± FT.
5. CURBS TO BE SET ON A RADIUS OF 100 FEET OR LESS SHALL BE CUT TO THE CURVE REQUIRED, AND THEIR ENDS CUT ON RADIAL LINES.
6. 1 2" EXPANSION JOINT AND FILLER WHEN CURB IS ADJACENT TO CONCRETE SIDEWALK.
7. CUT NEAT LINE 6" FROM CURB LINE AND REMOVE BASE AND GRAVEL. REPLACE WITH CEMENT CONCRETE.
8. ANY DESIGNATED CEMENT CONCRETE THAT IS ACCEPTABLE UNDER SECTION M4 OF THE STANDARD SPECIFICATIONS MAY BE USED; ALL TEST REQUIREMENTS ARE WAIVED. HOT MIX ASPHALT SHALL NOT BE USED AS A SUBSTITUTE.
9. REPLACEMENT CURB SHALL BE INSTALLED TO MATCH ADJACENT CONFIGURATION.

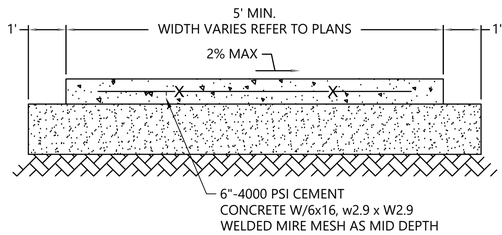
1 / - GRANITE CURB TYPE VB 6" REVEAL
SCALE: NOT TO SCALE



2 / - HMA CURB TYPE II 6" REVEAL
SCALE: NOT TO SCALE



PLAN

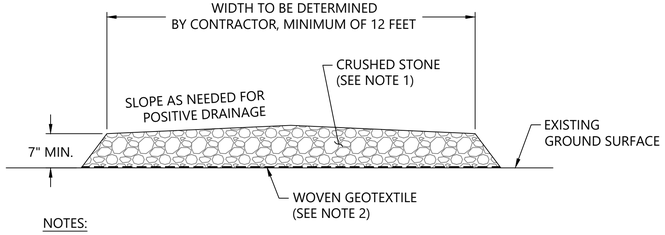


SECTION

NOTES:

1. PROVIDE DEEP TOOL JOINT EVERY 5 FT. (1/3 DEPTH OF SLAB).
2. REPLACE EXPANSION JOINT IF EXISTING JOINT FALLS WITH RECONSTRUCTION.
3. SAWCUT CONTROL JOINTS WITH 24 HOURS.
4. SMOOTH TROWEL EDGE, MARGINS, JOINTS TYP.
5. MEDIUM BROOM FINISH TO BE PERPENDICULAR TO THE LONGITUDINAL DIRECTION OF PAVEMENT: UNLESS, OTHERWISE NOTED ON PLANS. REFLECTANCE RATING OF 0.3 MINIMUM.
6. WET CURE MINIMUM IS 7 DAYS.
7. TO BE USED AT ALL PEDESTRIAN CURB RAMPS AND SIDEWALKS THROUGH DRIVEWAYS.

3 / - CONCRETE SIDEWALK - REINFORCED
SCALE: NOT TO SCALE



NOTES:

1. CRUSHED STONE SHALL BE M2.01.7 1" DENSE GRADED CRUSHED IN ACCORDANCE WITH MASSACHUSETTS DEPARTMENT OF HIGHWAYS.
2. WOVEN GEOTEXTILE SHALL MEET AASHTO MS288-05 CLASS I SURVIVABILITY REQUIREMENTS FOR SEPARATION GEOTEXTILES.

4 / - TEMPORARY GRAVEL ACCESS ROAD
SCALE: NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

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HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

ACCESS ROADS AND ENTRANCE DETAILS

S6001

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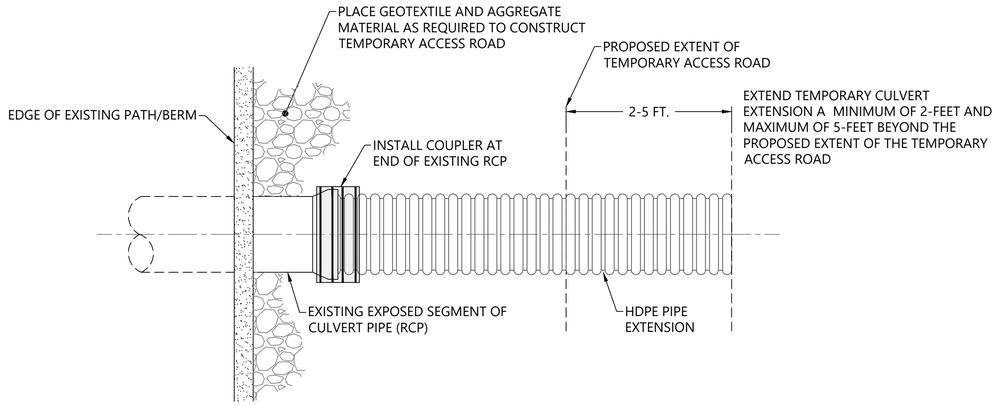

NOTES:

1. CULVERT PIPE EXTENSIONS SHALL BE HDPE, CORRUGATED METAL PIPE, OR OTHER APPROVED MATERIAL CAPABLE OF TRAFFIC LOADING.
2. INSTALL CULVERT PIPE EXTENSION TO ABUT EXISTING CULVERT. EXTENSION SHALL BE OF SUFFICIENT LENGTH TO EXTEND A MINIMUM OF 2 FEET AND MAXIMUM OF 5 FEET BEYOND THE PROPOSED EXTENT OF THE TEMPORARY ACCESS ROAD.
3. CONNECT EXTENSION TO EXISTING CULVERT PIPE USING A COUPLER (MARMAC CONSTRUCTION PRODUCTS DISSIMILAR PIPE COUPLER, OR APPROVED EQUAL). INSTALL PER MANUFACTURER'S DIRECTIONS.
4. INSTALL GEOTEXTILE TO COVER HDPE PIPE PRIOR TO PLACING AGGREGATE MATERIAL.
5. PIPE EXTENSION SHALL BE INSTALLED TO MATCH EXISTING GRADE/SLOPE OF RCP SO THAT WATER FLOW IS UNIMPEDED.
6. CONTRACTOR SHALL REMOVE CULVERT EXTENSIONS AND RESTORE DRAINAGE CHANNELS WHEN TEMPORARY ACCESS ROADS ARE REMOVED, UNLESS OTHERWISE APPROVED.

1 / - TEMPORARY CULVERT EXTENSION PLAN
SCALE: NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

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HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

CULVERT EXTENSION DETAILS

S6002

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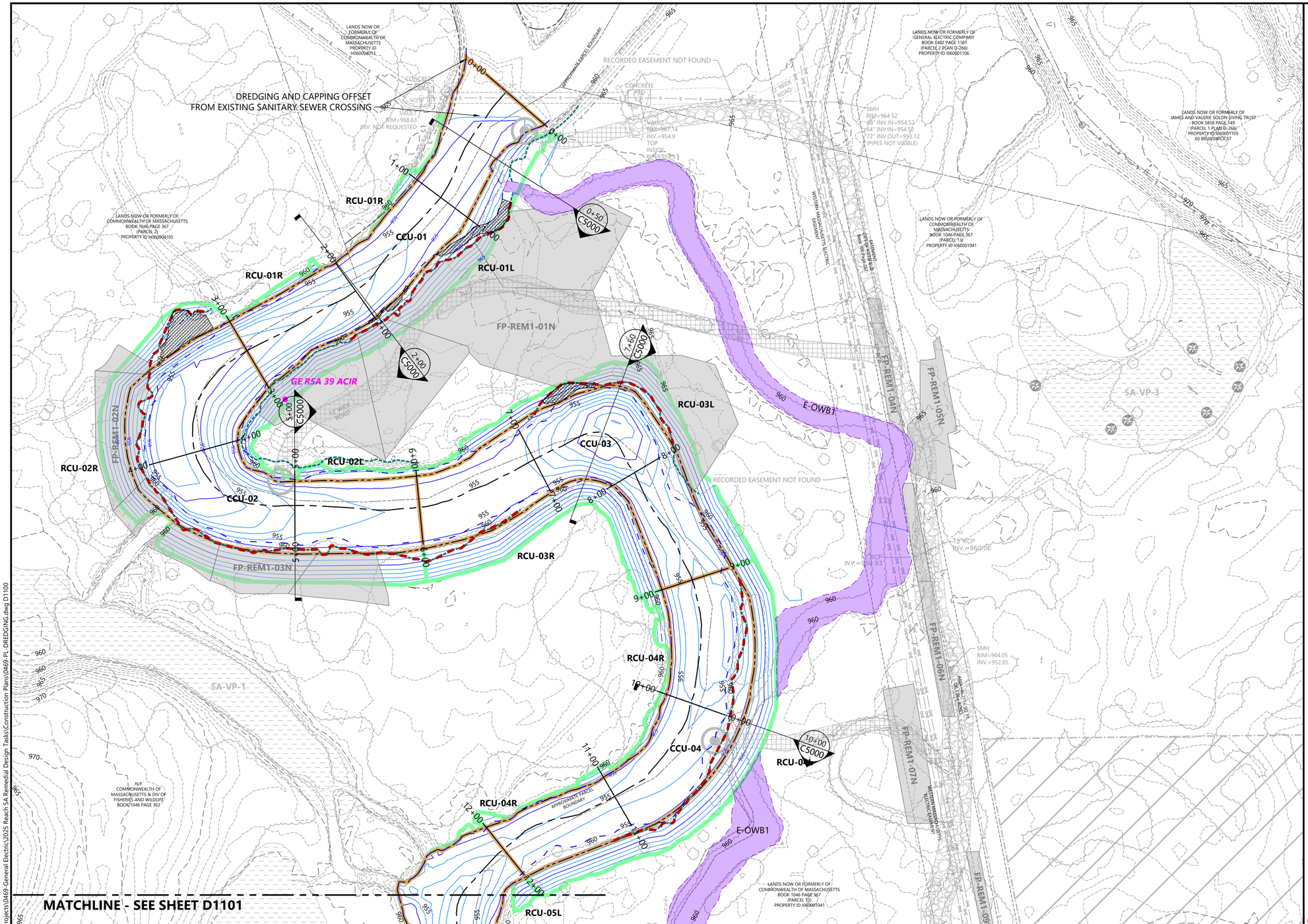



D-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT
- CROSS SECTION LOCATION
- DREDGE PRISM POST-DREDGE CONTOURS (1-FOOT INTERVAL)
- CCU-03 — CAP CERTIFICATION UNIT AND NAME DESIGNATION
- RCU-03L — RIVERBANK CERTIFICATION UNIT AND NAME DESIGNATION
- RIVERBANK ADDITIONAL REMOVAL AREA (SEE NOTE 6)
- DREDGED MATERIAL DESIGNATED FOR OFF-SITE DISPOSAL

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.
3. REQUIRED ELEVATIONS FOR DREDGING ARE SHOWN ON THE ELECTRONIC DREDGE PRISM XYZ FILES. DREDGING SHALL BE CONDUCTED IN ACCORDANCE WITH REQUIREMENTS OUTLINED IN SPECIFICATION 35 24 00 SEDIMENT AND RIVERBANK SOIL REMOVAL. RIVERBANK/UPLAND SOIL REMOVAL ABOVE THE EXISTING SHORELINE IS SHOWN ALSO SHOWN IN THE DREDGE PRISM XYZ FILE.
4. DEPICTED IN-RIVER AND RIVERBANK DREDGING CONTOURS ARE BASED ON THE DREDGE PRISM DESIGN SURFACE, AND DO NOT INCLUDE ALLOWABLE OVERDREDGE.
5. DREDGE PRISMS FOOTPRINTS AND ELEVATIONS ARE SUBJECT TO CHANGE BASED ON ADDITIONAL DATA COLLECTION OR DESIGN REFINEMENT FOLLOWING THE SELECTION OF A REMEDIAL CONTRACTOR.
6. ADDITIONAL REMOVAL IS REQUIRED TO ACHIEVE A 1-FOOT REMOVAL DEPTH WITHIN PORTIONS OF THE RIVERBANK WHERE REMEDIATION IS REQUIRED BUT THE DREDGE PRISM TARGET DEPTH IS LESS THAN 1 FOOT.

NORTH

0 40 80
SCALE IN FEET

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04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST / D. BINKNEY
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: M. WERTH
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

DREDGE PLAN STA. 0+00 TO STA. 12+50

D1100

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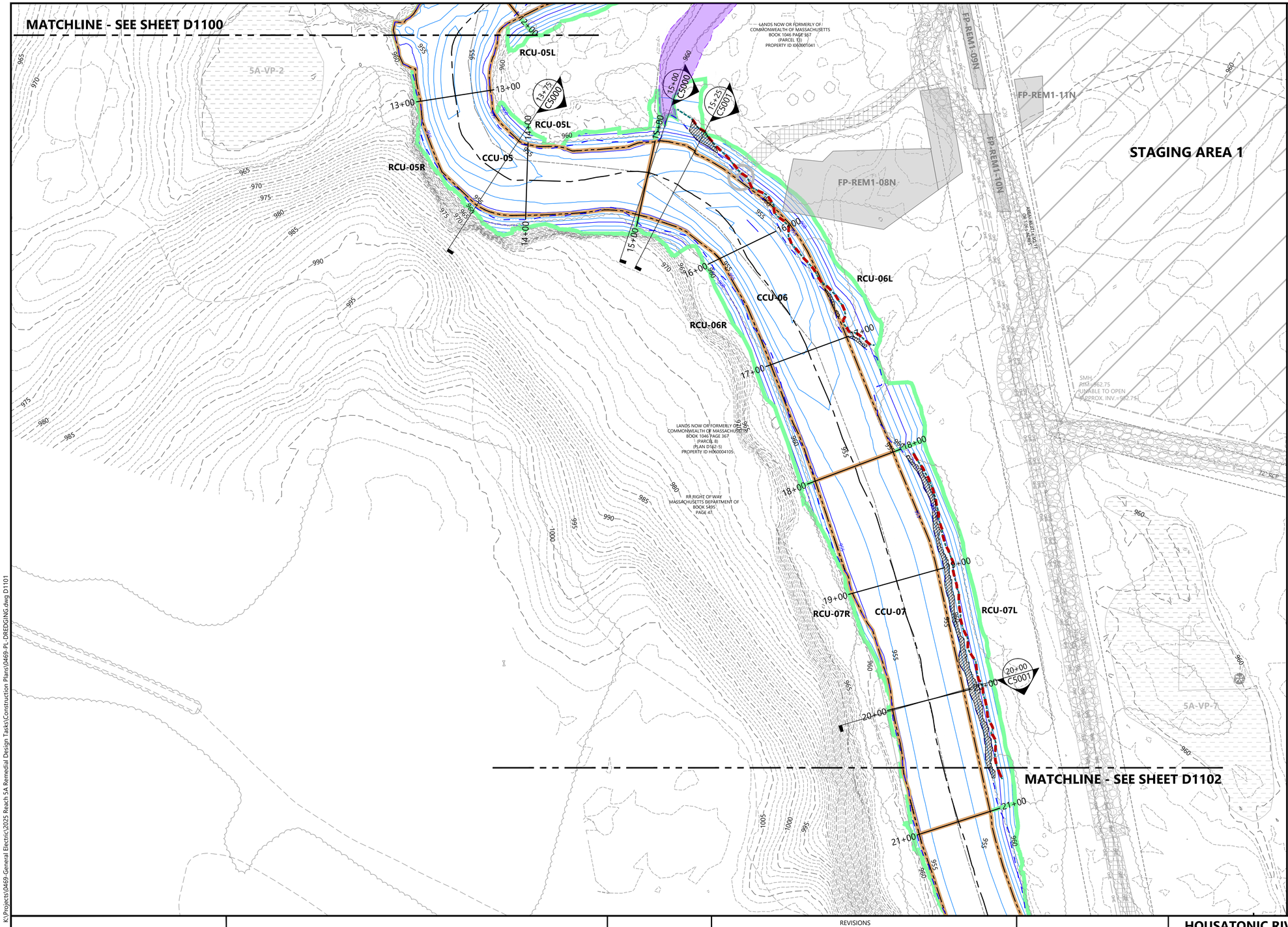



D-SERIES LEGEND:

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- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- 3+00 — 3+00 EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT
- 5+00 / C100 CROSS SECTION LOCATION
- 950 DREDGE PRISM POST-DREDGE CONTOURS (1-FOOT INTERVAL)
- CCU-03 CAP CERTIFICATION UNIT AND NAME DESIGNATION
- RCU-03L RIVERBANK CERTIFICATION UNIT AND NAME DESIGNATION
- RIVERBANK ADDITIONAL REMOVAL AREA (SEE NOTE 6)
- DREDGED MATERIAL DESIGNATED FOR OFF-SITE DISPOSAL

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

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NORTH

0 40 80
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HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

DREDGE PLAN STA. 12+50 TO STA. 21+50

D1101

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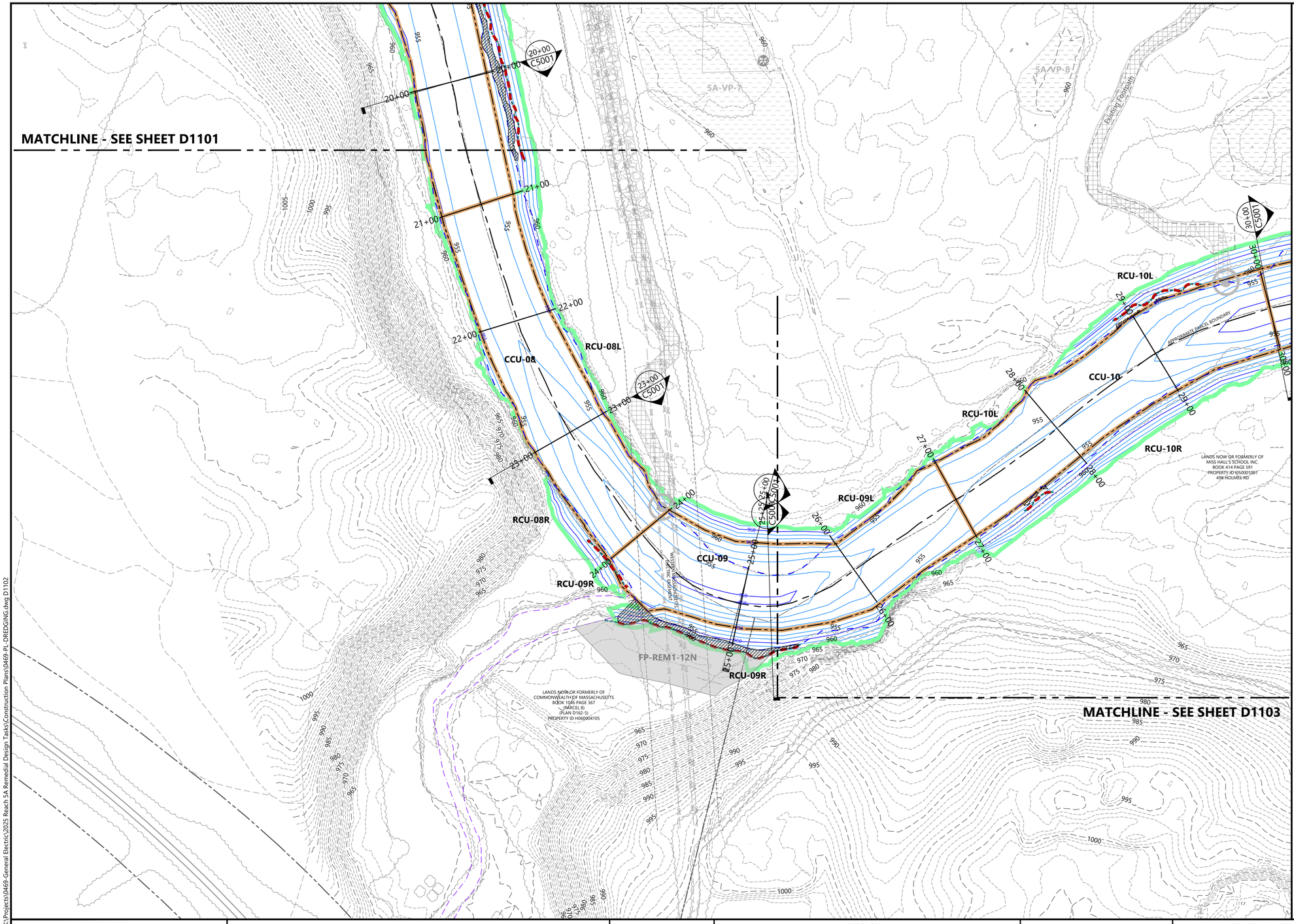



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HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

DREDGE PLAN STA. 19+50 TO STA. 30+00

D1102

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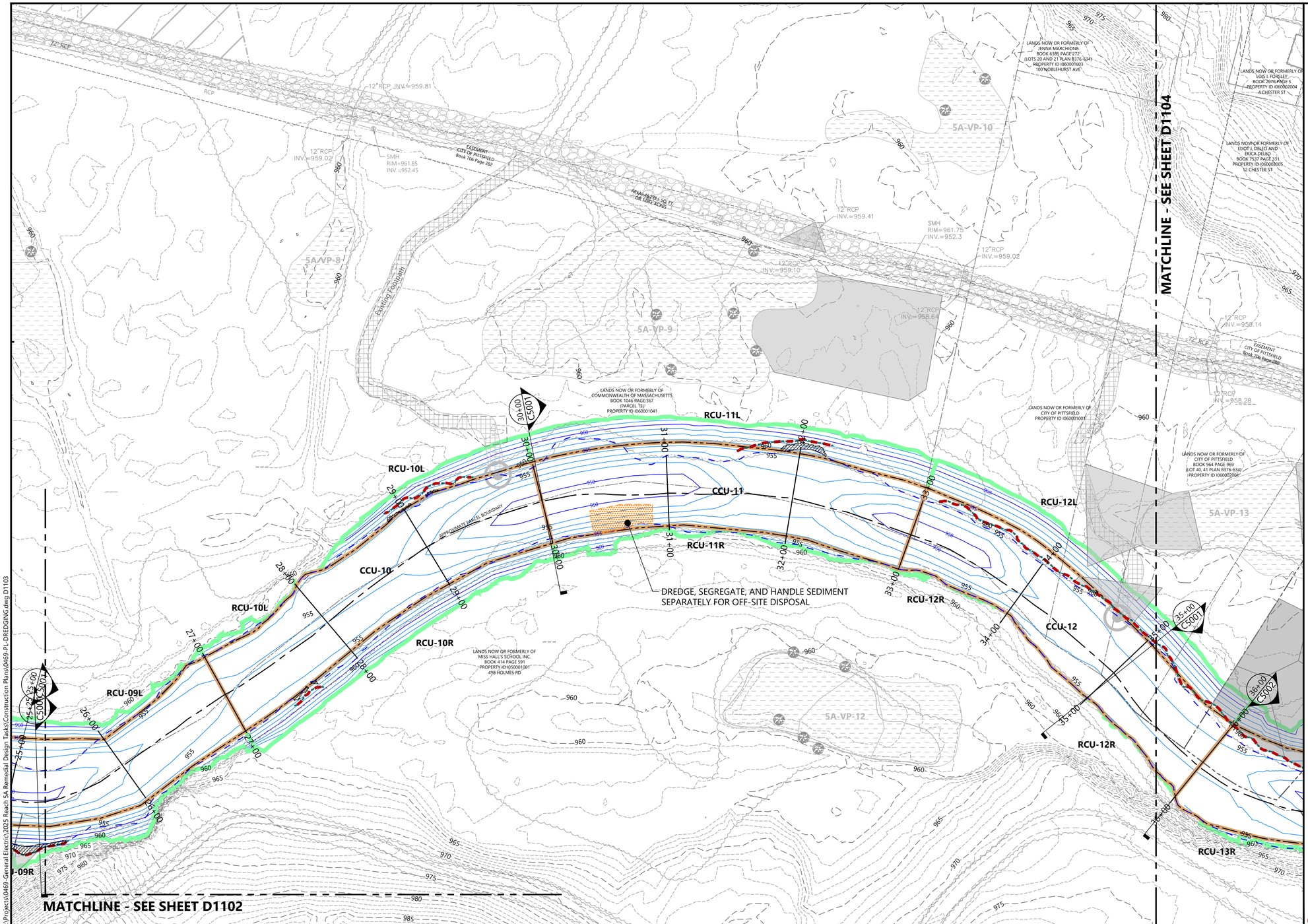



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- 3+00 (C1100) CROSS SECTION LOCATION
- DREDGE PRISM POST-DREDGE CONTOURS (1-FOOT INTERVAL)
- CCU-03 CAP CERTIFICATION UNIT AND NAME DESIGNATION
- RCU-03L RIVERBANK CERTIFICATION UNIT AND NAME DESIGNATION
- RIVERBANK ADDITIONAL REMOVAL AREA (SEE NOTE 6)
- DREDGED MATERIAL DESIGNATED FOR OFF-SITE DISPOSAL

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.
3. REQUIRED ELEVATIONS FOR DREDGING ARE SHOWN ON THE ELECTRONIC DREDGE PRISM XYZ FILES. DREDGING SHALL BE CONDUCTED IN ACCORDANCE WITH REQUIREMENTS OUTLINED IN SPECIFICATION 35 24 00 SEDIMENT AND RIVERBANK SOIL REMOVAL. RIVERBANK/UPLAND SOIL REMOVAL ABOVE THE EXISTING SHORELINE IS SHOWN ALSO SHOWN IN THE DREDGE PRISM XYZ FILE.
4. DEPICTED IN-RIVER AND RIVERBANK DREDGING CONTOURS ARE BASED ON THE DREDGE PRISM DESIGN SURFACE, AND DO NOT INCLUDE ALLOWABLE OVERDREDGE.
5. DREDGE PRISMS FOOTPRINTS AND ELEVATIONS ARE SUBJECT TO CHANGE BASED ON ADDITIONAL DATA COLLECTION OR DESIGN REFINEMENT FOLLOWING THE SELECTION OF A REMEDIAL CONTRACTOR.
6. ADDITIONAL REMOVAL IS REQUIRED TO ACHIEVE A 1-FOOT REMOVAL DEPTH WITHIN PORTIONS OF THE RIVERBANK WHERE REMEDIATION IS REQUIRED BUT THE DREDGE PRISM TARGET DEPTH IS LESS THAN 1 FOOT.

NORTH

0 40 80
SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

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Apr 29, 2026 12:40pm cyard2

ANCHOR QEA

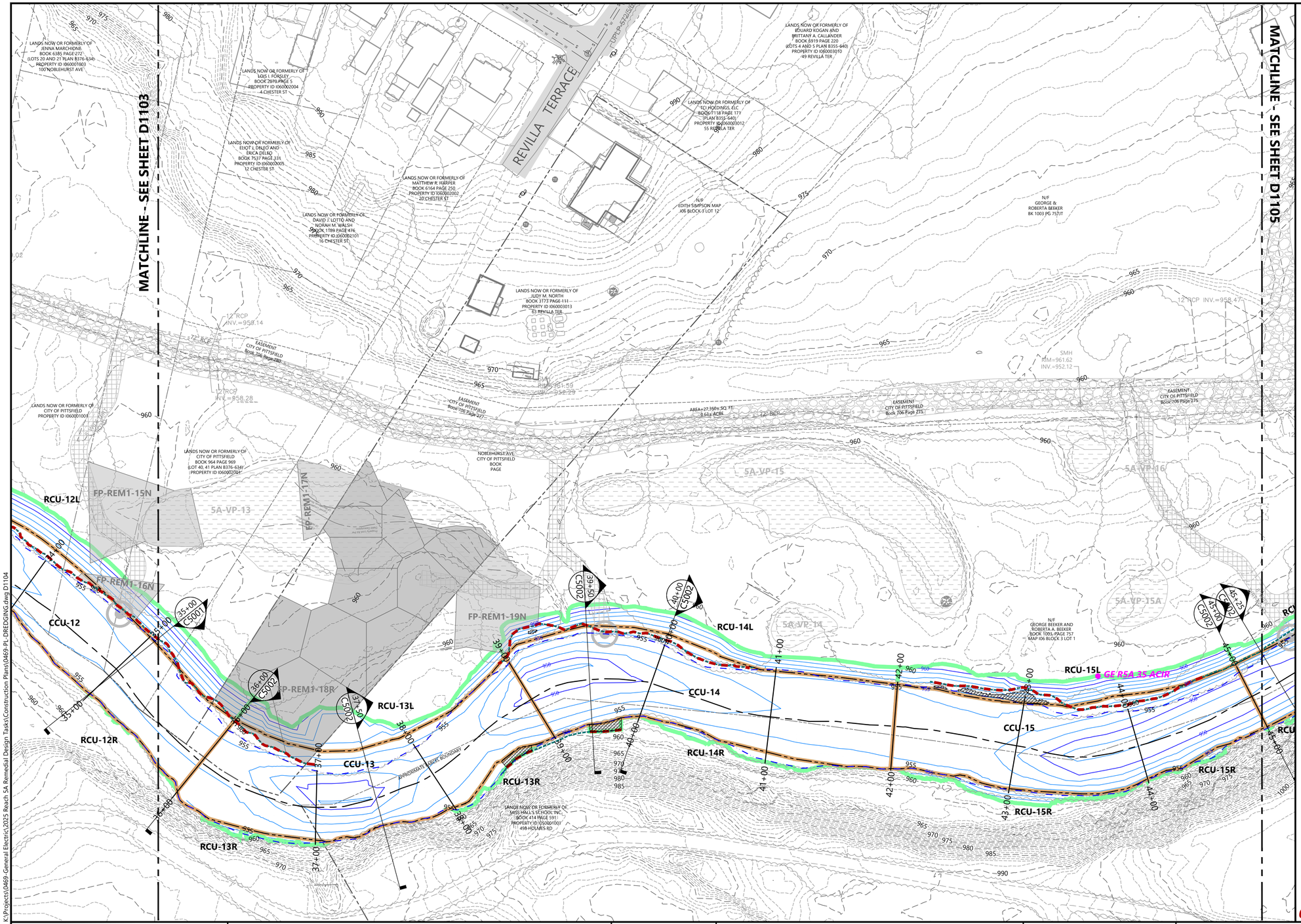
REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

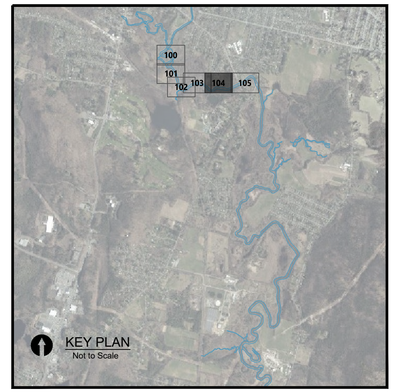
DESIGNED BY: C. GUEST / D. BINKNEY
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: M. WERTH
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION GENERAL ELECTRIC COMPANY PITTSFIELD, MASSACHUSETTS

DREDGE PLAN STA. 25+50 TO STA. 36+50

D1103





D-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT
- CROSS SECTION LOCATION
- DREDGE PRISM POST-DREDGE CONTOURS (1-FOOT INTERVAL)
- CCU-03 — CAP CERTIFICATION UNIT AND NAME DESIGNATION
- RCU-03L — RIVERBANK CERTIFICATION UNIT AND NAME DESIGNATION
- RIVERBANK ADDITIONAL REMOVAL AREA (SEE NOTE 6)
- DREDGED MATERIAL DESIGNATED FOR OFF-SITE DISPOSAL

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
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NORTH

0 40 80
SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS 'BLUE'

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

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Apr 29, 2026 12:42pm cyard2

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST / D. BINKNEY
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: M. WERTH
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

DREDGE PLAN STA. 34+50 TO STA. 45+00

D1104

MATCHLINE - SEE SHEET D1104

MATCHLINE - SEE SHEET D1106



D-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
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- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
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NORTH

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SCALE IN FEET

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ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST / D. BINKNEY
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: M. WERTH
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

DREDGE PLAN STA. 45+00 TO STA. 48+00

D1105

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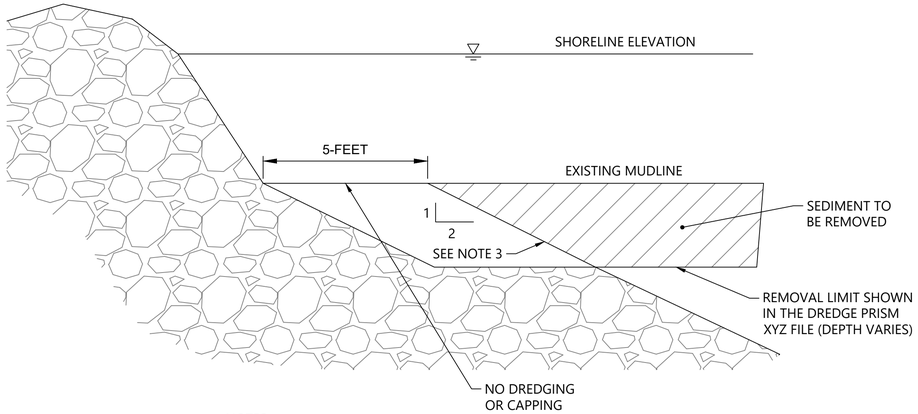
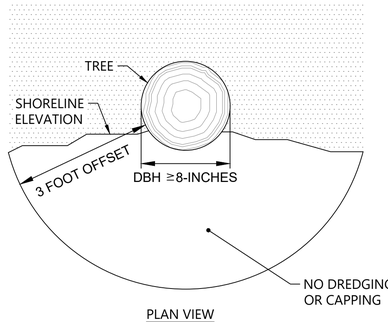


NOTES:

1. THIS DETAIL SHALL APPLY TO LOCATIONS WITH RIP RAP AT THE SHORELINE, EXCEPT IN AREAS WHERE THE DREDGE PRISM FILES SPECIFY SOIL REMOVAL AND GRADING OF RIVERBANK AREAS.
2. EXISTING RIP RAP SHALL NOT BE DISTURBED
3. IF RIP RAP IS ENCOUNTERED DURING DREDGING ACTIVITIES, PROBE TO FIND THE INTERFACE OF THE MUDLINE AND THE RIP RAP. AT THE INTERFACE, MOVE 5 FEET INTO THE RIVER AND CUT ON A 2:1 (HORIZONTAL:VERTICAL) SLOPE TO THE DEPTH OF THE CONTAMINATION. THE CONSTRUCTION MANAGER WILL ISSUE A REVISED DREDGE PRISM AFTER THE LOCATION OF RIP RAP IS DETERMINED IN THE FIELD IN ACCORDANCE WITH SPECIFICATION SECTION 35 24 00. INFORM THE CONSTRUCTION MANAGER IF RIP RAP IS ENCOUNTERED.

1 / - RIP RAP OFFSET DETAIL
SCALE:NOT TO SCALE

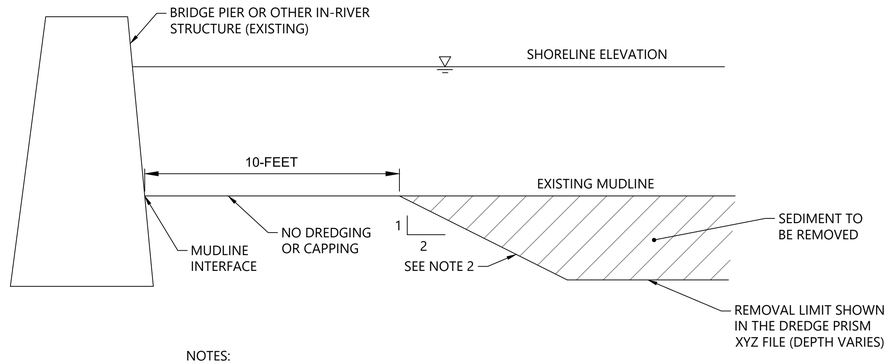


PLAN VIEW

NOTES:

1. THIS DETAIL SHALL APPLY TO LOCATIONS WHERE TREES WITH A DBH GREATER THAN OR EQUAL TO 8 INCHES ARE PRESENT AT THE SHORELINE, EXCEPT IN AREAS WHERE THE DREDGE PRISM FILES SPECIFY SOIL REMOVAL AND GRADING OF RIVERBANK AREAS.
2. ALL TREES/ROOTBALLS PRESENT AT OR BELOW THE SHORELINE WITH DIAMETER AT BREAST HEIGHT (DBH) GREATER THAN OR EQUAL TO 8 INCHES SHALL NOT BE REMOVED UNLESS APPROVED BY THE CONSTRUCTION MANAGER.
3. AT THE INTERFACE OF THE TREE/ROOTBALL AND THE MUDLINE, MOVE 3 FEET INTO THE RIVER AND CUT ON A 45 DEGREE ANGLE UNTIL INTERSECTION WITH THE REMOVAL LIMIT SHOWN IN THE DREDGE PRISM XYZ FILE.

2 / - TREE/ROOTBALL OFFSET DETAIL
SCALE:NOT TO SCALE



NOTES:

1. THIS DETAIL SHALL APPLY TO LOCATIONS WHERE BRIDGE PIERS AND OTHER PERMANENT IN-RIVER STRUCTURES ARE PRESENT.
2. AT BRIDGE PIERS AND OTHER IN-RIVER STRUCTURES, MOVE 10 FEET INTO RIVER FROM THE MUDLINE INTERFACE AND CUT ON A STABLE SLOPE TO REMOVAL LIMIT SHOWN IN THE DREDGE PRISM XYZ FILE, BUT NO STEEPER THAN 2:1 (HORIZONTAL:VERTICAL).
3. EXISTING RIP RAP AND SCOUR PROTECTION SHALL NOT BE DISTURBED.
4. IF RIP RAP AND/OR SCOUR PROTECTION ARE LOCATED OUTSIDE OF 1 FEET FROM THE BRIDGE PIER OR IN-RIVER STRUCTURE, IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER AND IMPLEMENT PROBING ACTIVITIES DESCRIBED IN SPECIFICATION SECTION 35 24 00

3 / - IN-RIVER STRUCTURE OFFSET DETAIL
SCALE:NOT TO SCALE

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ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

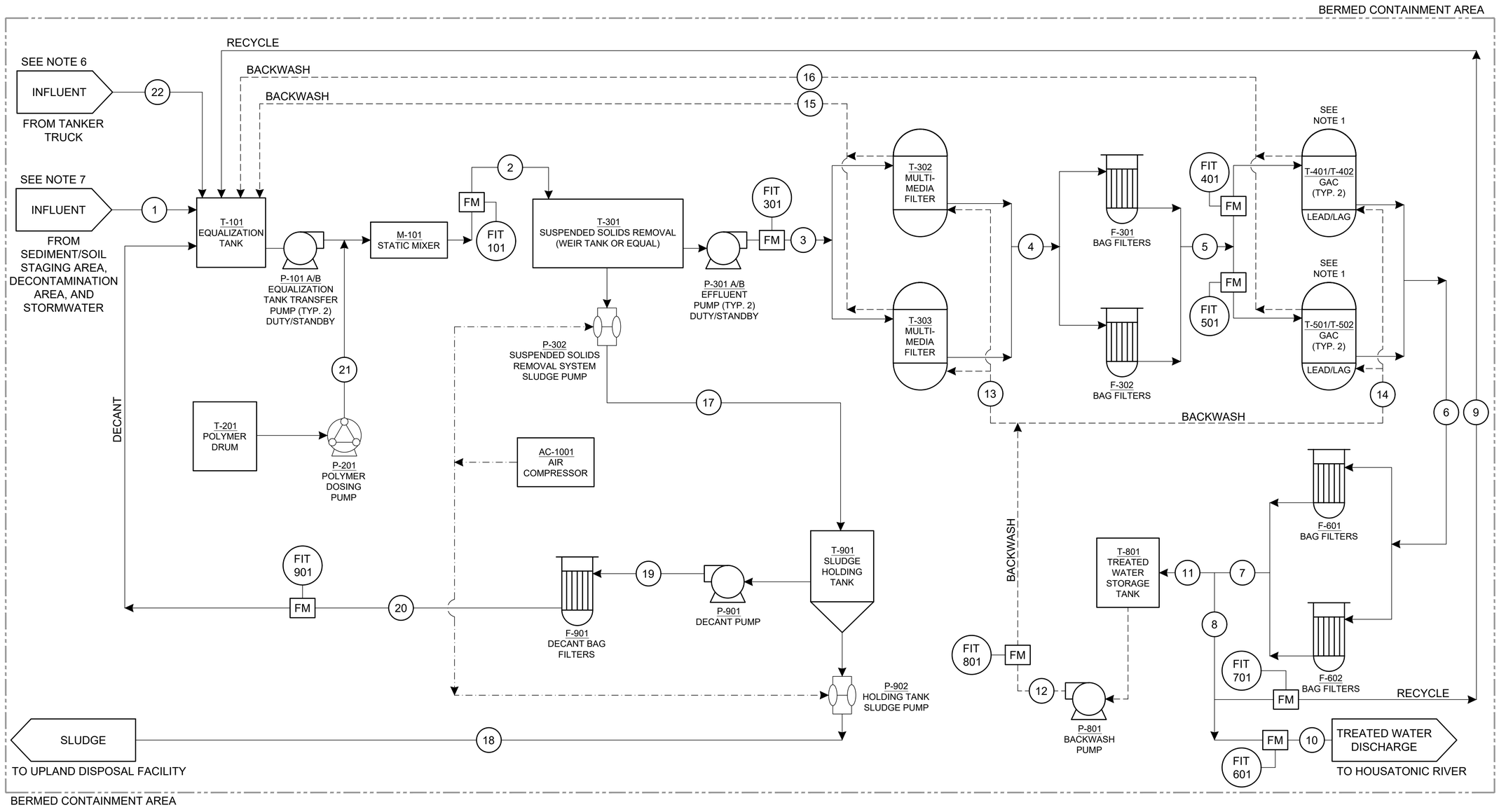
DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

TYPICAL OFFSET DETAILS

D6000

Apr 28, 2026 2:17pm cyard K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-DETAILS.dwg D6000



NOTES:

A. SEE DESIGN DRAWING D7001 FOR NOTES REFERENCED HEREIN.

NOT TO SCALE

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

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Professional Engineer's Name: **MARK O. GRAVELDING**

Professional Engineer's No.: .

State	Date Signed	Project Mgr.
MA		.

Designed by	Drawn by	Checked by
JAY	EAK	MOG

DRAFT FOR DISCUSSION PURPOSES ONLY

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • PITTSFIELD, MASSACHUSETTS

HOUSATONIC RIVER REACH 5A REMEDIATION

TEMPORARY WATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM

ARCADIS Project No. 30223149.3000

Date APRIL 2026

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

D7000

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FLOW TABLE

Flow #	Description	Flow Rate (gpm)	Notes
1	Equalization Tank Influent	100	--
2	Suspended Solids Removal Tank Influer	100	--
3	MMF Influent	100	--
4	Bag Filter (F-301/F-401) Influent	100	--
5	GAC Influent	100	--
6	Bag Filter (F-601/F-602) Influent	100	--
7	Bag Filter (F-601/F-602) Effluent	100	--
8	Bag Filter (F-601/F-602) Effluent	100	--
9	Recycle	--	Operated as needed.
10	Treated Water Discharge	100	--
11	Backwash Source Water	--	Operated as needed.
12	MMF/GAC Backwash	--	Operated as needed. Flow rate per MMF and GAC media manufacturer specifications.
13	MMF Backwash Influent	--	Operated as needed. Flow rate per MMF media manufacturer specifications.
14	GAC Backwash Influent	--	Operated as needed. Flow rate per GAC media manufacturer specifications.
15	MMF Backwash Effluent	--	Operated as needed. Flow rate per MMF media manufacturer specifications.
16	GAC Backwash Effluent	--	Operated as needed. Flow rate per GAC media manufacturer specifications.
17	Sludge Holding Tank Influent	--	Operated as needed.
18	Sludge to UDF	--	Operated as needed.
19	Sludge Holding Tank Decant	--	Operated as needed.
20	Sludge Holding Tank Decant (Filtered)	--	Operated as needed.
21	Polymer Dosing	--	Operated as needed.
22	Tanker Truck Offloading	--	Operated as needed.

INTERLOCK TABLE

Interlock #	Title	Initiated By	Description	Interlock Reset
1	System E-Stop	1. E-Stop button	1. Disable all equipment	1. Reset E-Stop
2	TWTS Influent	1. Equalization Tank high-high level	1. Shut down TWTS influent pumps	1. High-high level alarms reset when the corresponding low level condition is met
3	Equalization Tank Transfer Pumps and Polymer Dosing Pump	1. Equalization Tank low-low level 2. Suspended Solids Removal System high-high level 3. FIT-101 low flow rate	1. Shut down Equalization Tank Transfer Pumps 2. Shut down polymer dosing pump	1. Low-low level alarms reset when the corresponding high level condition is met 2. High-high level alarms reset when the corresponding low level condition is met 3. Low flow rate alarms reset upon acknowledgement by the operator
4	Effluent Pumps	1. Suspended Solids Removal System low-low level 2. Treated Water Storage Tank high-high level 3. Equalization Tank high-high level 4. High differential pressure across multi-media filters, bag filters, or LGAC 5. FIT-301 low flow rate	1. Shut down Effluent Pumps	1. Low-low level alarms reset when the corresponding high level condition is met 2. High-high level alarms reset when the corresponding low level condition is met 3. High differential pressure alarms reset upon acknowledgement by the operator 4. Low flow rate alarms reset upon acknowledgement by the operator
5	Backwash Pump	1. Treated Water Storage Tank low-low level 2. Equalization Tank high-high level 3. High differential pressure across multi-media filters or LGAC 4. FIT-801 low flow rate	1. Shut down Backwash Pump	1. Low-low level alarms reset when the corresponding high level condition is met 2. High-high level alarms reset when the corresponding low level condition is met 3. High differential pressure alarms reset upon acknowledgement by the operator 4. Low flow rate alarms reset upon acknowledgement by the operator
6	Decant Pump	1. Sludge Holding Tank low-low level 2. Equalization Tank high-high level 3. High differential pressure across Decant Bag Filters 4. FIT-901 low flow rate	1. Shut down Decant Pump	1. Low-low level alarms reset when the corresponding high level condition is met 2. High-high level alarms reset when the corresponding low level condition is met 3. High differential pressure alarms reset upon acknowledgement by the operator 4. Low flow rate alarms reset upon acknowledgement by the operator
7	Suspended Solids Removal System Sludge Pump	1. Suspended Solids Removal System low-low level 2. Sludge Holding Tank high-high level 3. Suspended Solids Removal System Sludge Pump discharge high pressure	1. Stop Suspended Solids Removal System Sludge Pump	1. Low-low level alarms reset when the corresponding high level condition is met 2. High-high level alarms reset when the corresponding low level condition is met 3. High pressure alarms reset upon acknowledgement by the operator
8	Sludge Holding Tank Sludge Pump	1. Sludge Holding Tank low-low level 2.Sludge Holding Tank Sludge Pump discharge high pressure	1. Stop Sludge Holding Tank Sludge Pump	1. Low-low level alarms reset when the corresponding high level condition is met 2. High-high level alarms reset when the corresponding low level condition is met 3. High pressure alarms reset upon acknowledgement by the operator

LEGEND:

CENTRIFUGAL PUMP

AIR OPERATED DOUBLE DIAPHRAGM PUMP

PERISTALTIC PUMP

FM — FLOW METER

FIT 501 — FLOW INDICATING TRANSFER

LINE TYPES:

MAIN PROCESS

BACKWASH

PNEUMATIC

ABBREVIATIONS:

GAC	LIQUID PHASE GRANULAR ACTIVATED CARBON
GPM	GALLONS PER MINUTE
MMF	MULTI-MEDIA FILTER
TWTS	TEMPORARY WATER TREATMENT SYSTEM
UDF	UPLAND DISPOSAL FACILITY

NOTES:

1. MINIMUM GAC EMPTY BED CONTACT TIME = 10 MINUTES PER VESSEL.
2. ALL EQUIPMENT SHALL BE SKID-MOUNTED.
3. CONTRACTOR SHALL INSTALL A BERMED CONTAINMENT AREA AROUND TWTS.
4. CONTRACTOR SHALL INSTALL ALL TWTS EQUIPMENT ON AN AGGREGATE GRAVEL PAD.
5. INSTALL, OPERATE, AND MAINTAIN TWTS IN COMPLIANCE WITH THE DISCHARGE PERMIT AND IN ACCORDANCE WITH SPECIFICATION SECTION 02 72 00 - WATER MANAGEMENT AND TREATMENT.
6. CONTRACTOR SHALL CONFIGURE THE EQUALIZATION TANK INFLUENT TO ALLOW OFFLOADING OF LIQUIDS FROM A TANKER TRUCK.
7. CONTRACTOR SHALL INTERLOCK ALL AUTOMATED TWTS INFLUENT PUMPS TO THE EQUALIZATION TANK HIGH - HIGH LEVEL ALARM TO PREVENT OVERFILLING.

NOT TO SCALE

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: _____ USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

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Professional Engineer's Name: MARK O. GRAVELDING

Professional Engineer's No.:

State	Date Signed	Project Mgr.
MA		.
Designed by	Drawn by	Checked by
JAY	EAK	MOG

DRAFT FOR DISCUSSION PURPOSES ONLY

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • PITTSFIELD, MASSACHUSETTS

HOUSATONIC RIVER REACH 5A REMEDIATION

TEMPORARY WATER TREATMENT SYSTEM LEGEND AND TABLES

ARCADIS Project No. 30223149.3000

Date APRIL 2026

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

D7001

DREDGING AND CAPPING OFFSET
FROM EXISTING SANITARY SEWER CROSSING

CCU-01
CCU-02
CCU-03
CCU-04

FP-REM1-01N
FP-REM1-02N
FP-REM1-03N
FP-REM1-04N
FP-REM1-05N
FP-REM1-06N
FP-REM1-07N
FP-REM1-09N

GE RSA 39 ACIR

E-OWB1

5A-VP-1
5A-VP-3

RECORDED EASEMENT NOT FOUND

LANDS NOW OR FORMERLY OF COMMONWEALTH OF MASSACHUSETTS PROPERTY ID H06004213

LANDS NOW OR FORMERLY OF COMMONWEALTH OF MASSACHUSETTS BOOK 1046 PAGE 367 (PARCEL 2) PROPERTY ID H06004105

LANDS NOW OR FORMERLY OF GENERAL ELECTRIC COMPANY BOOK 1482 PAGE 1101 (PARCEL 2 PLAN D-266) PROPERTY ID I06001106

LANDS NOW OR FORMERLY OF JAMES AND VALERIE SOLON LIVING TRUST BOOK 5858 PAGE 149 (PARCEL 1 PLAN D-266) PROPERTY ID I06000T105 60 BRUNSWICK ST

LANDS NOW OR FORMERLY OF COMMONWEALTH OF MASSACHUSETTS BOOK 1046 PAGE 367 (PARCEL T3) PROPERTY ID I06000T041

N/F COMMONWEALTH OF MASSACHUSETTS & DIV OF FISHERIES AND WILDLIFE BOOK/1046 PAGE 367

LANDS NOW OR FORMERLY OF COMMONWEALTH OF MASSACHUSETTS BOOK 1046 PAGE 367 (PARCEL T3) PROPERTY ID I06000T041

APPROXIMATE PARCEL BOUNDARY

WESTERN MASSACHUSETTS ELECTRIC EASEMENT

EASEMENT CITY OF PITTSFIELD BOOK 1046 PAGE 420

SMH RIM=964.52 18" INV.IN=954.52 24" INV.IN=954.52 72" INV.OUT=953.12 (PIPES NOT VISIBLE)

SMH RIM=964.05 INV.=952.85

12" RCP INV.=960.06

INV.=959.93

VAULT RIM=968.63 INV. NOT REQUESTED

VAULT RIM=967.14 INV.=954.9 TOP INSIDE

MATCHLINE - SEE SHEET C1101



C-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
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- MODIFIED RIVER SHORELINE
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- RIVER ACCESS POINT
- CAP TYPE A
- CAP TYPE B
- GRAVEL HABITAT LAYER
- SAND HABITAT LAYER
- CAP DETAIL INDICATOR
- CCU-03 — CAP CERTIFICATION UNIT AND NAME DESIGNATION
- POST-CAP NCD GRADING ELEVATIONS

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH
0 40 80
SCALE IN FEET

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. HENDERSON
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / M. WERTH
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

CAPPING PLAN STA. 0+00 TO STA. 12+50

C1100

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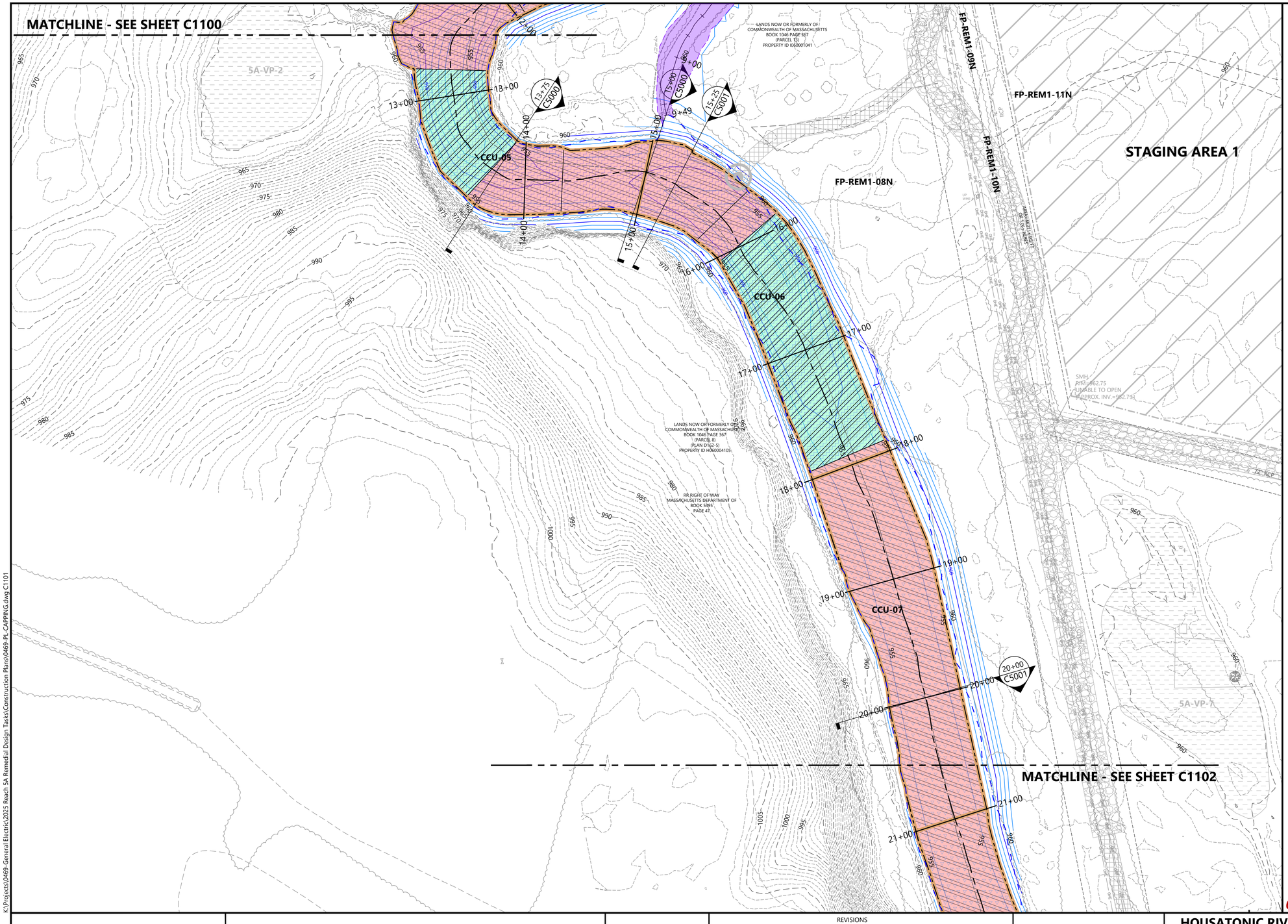
Apr 28, 2026 1:56pm cyard



C-SERIES LEGEND:

- 950 — EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING RIVER CENTERLINE
- 3+00 — 3+00 EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- RIVER ACCESS POINT
- CAP TYPE A
- CAP TYPE B
- GRAVEL HABITAT LAYER
- SAND HABITAT LAYER
- C1100 CAP DETAIL INDICATOR
- CCU-03 CAP CERTIFICATION UNIT AND NAME DESIGNATION
- 950 POST-CAP NCD GRADING ELEVATIONS

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH

0 40 80

SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. HENDERSON
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / M. WERTH
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

CAPPING PLAN STA. 12+50 TO STA. 21+50

C1101

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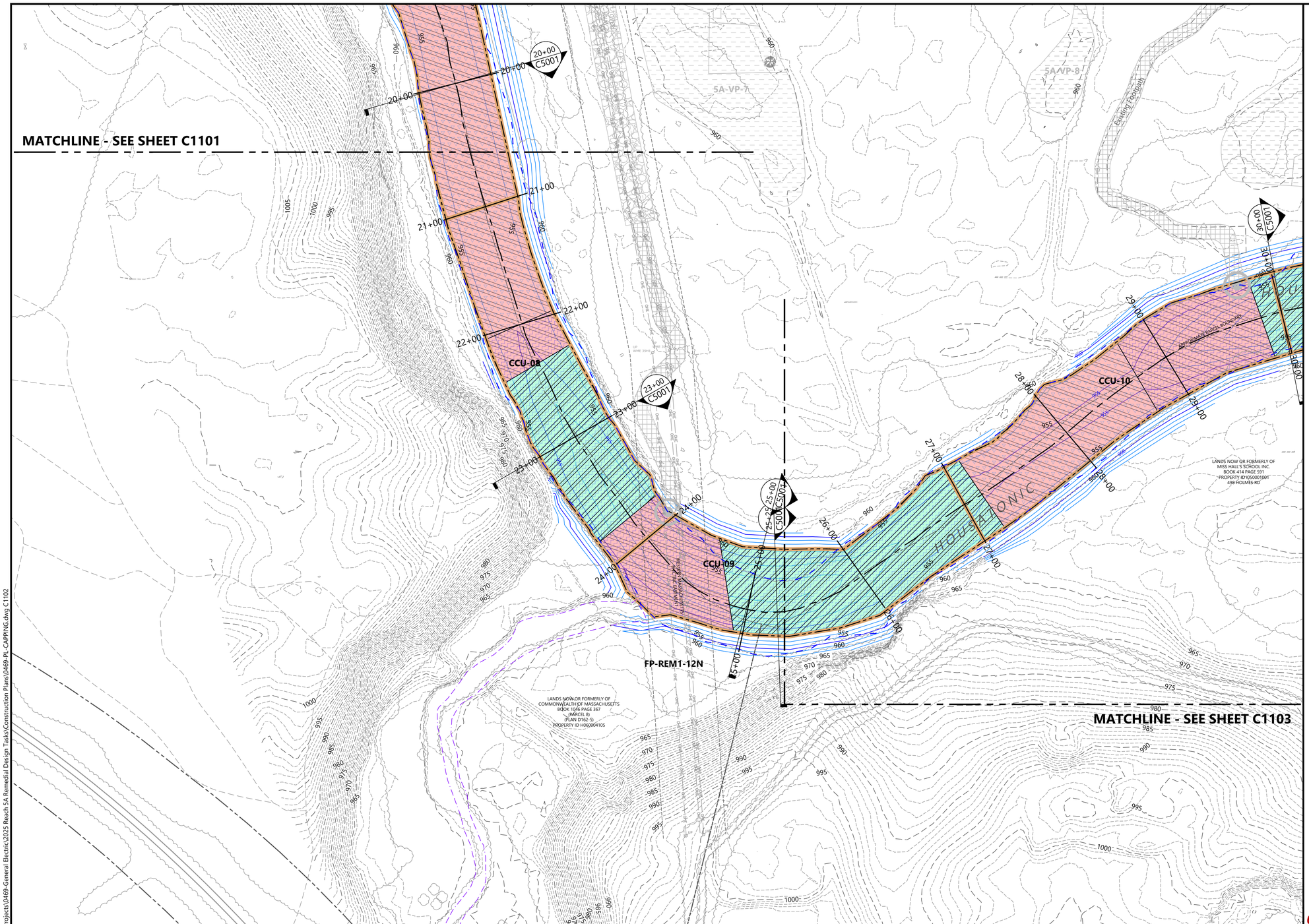



C-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- RIVER ACCESS POINT
- CAP TYPE A
- CAP TYPE B
- GRAVEL HABITAT LAYER
- SAND HABITAT LAYER
- CAP DETAIL INDICATOR
- CCU-03 — CAP CERTIFICATION UNIT AND NAME DESIGNATION
- POST-CAP NCD GRADING ELEVATIONS

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH

0 40 80

SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. HENDERSON
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / M. WERTH
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

CAPPING PLAN STA. 19+50 TO STA. 30+00

C1102

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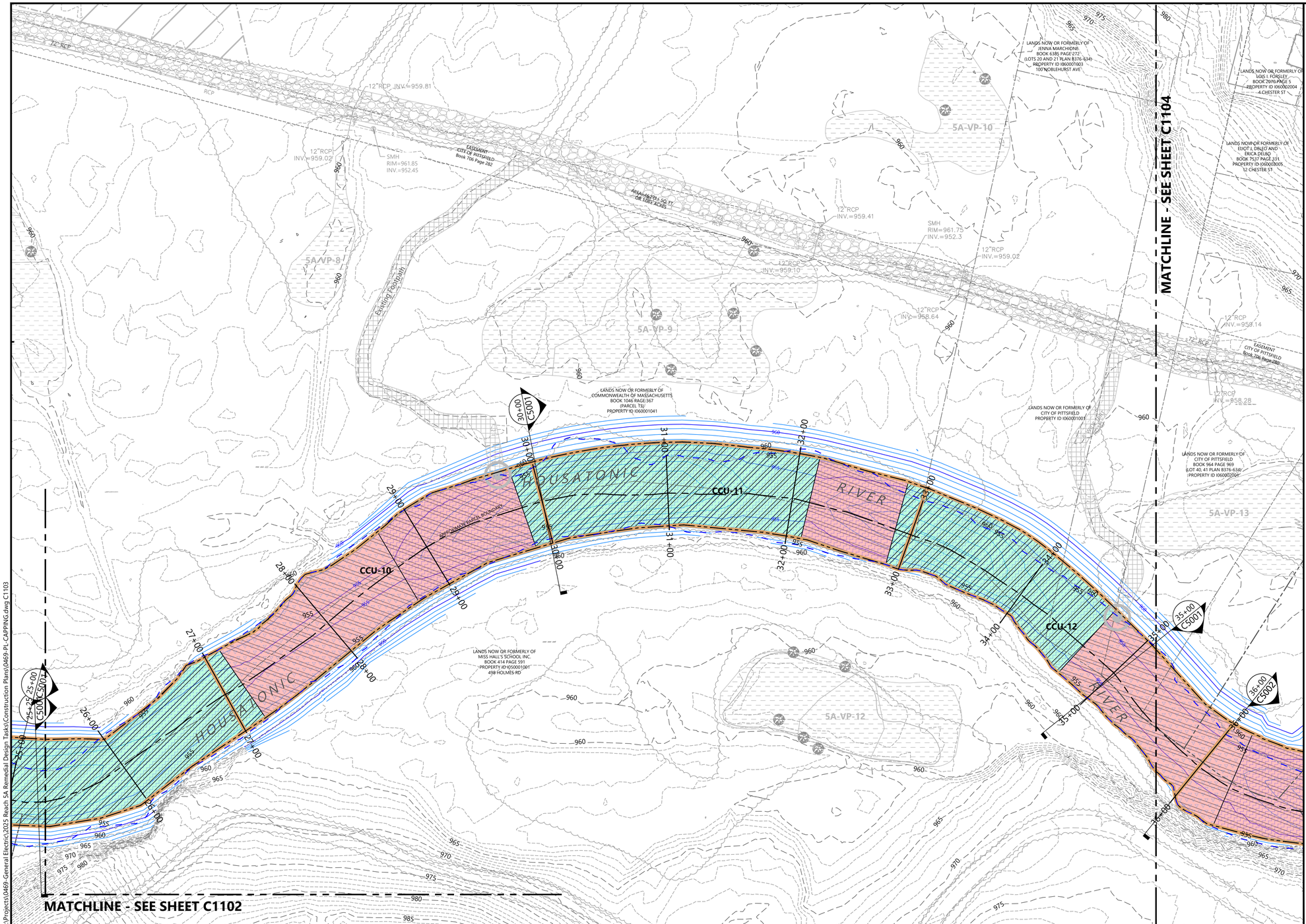



C-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
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- CAP CERTIFICATION UNIT AND NAME DESIGNATION
- POST-CAP NCD GRADING ELEVATIONS

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

NORTH

0 40 80

SCALE IN FEET

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

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Apr 29, 2026 12:52pm cyard2

ANCHOR QEA

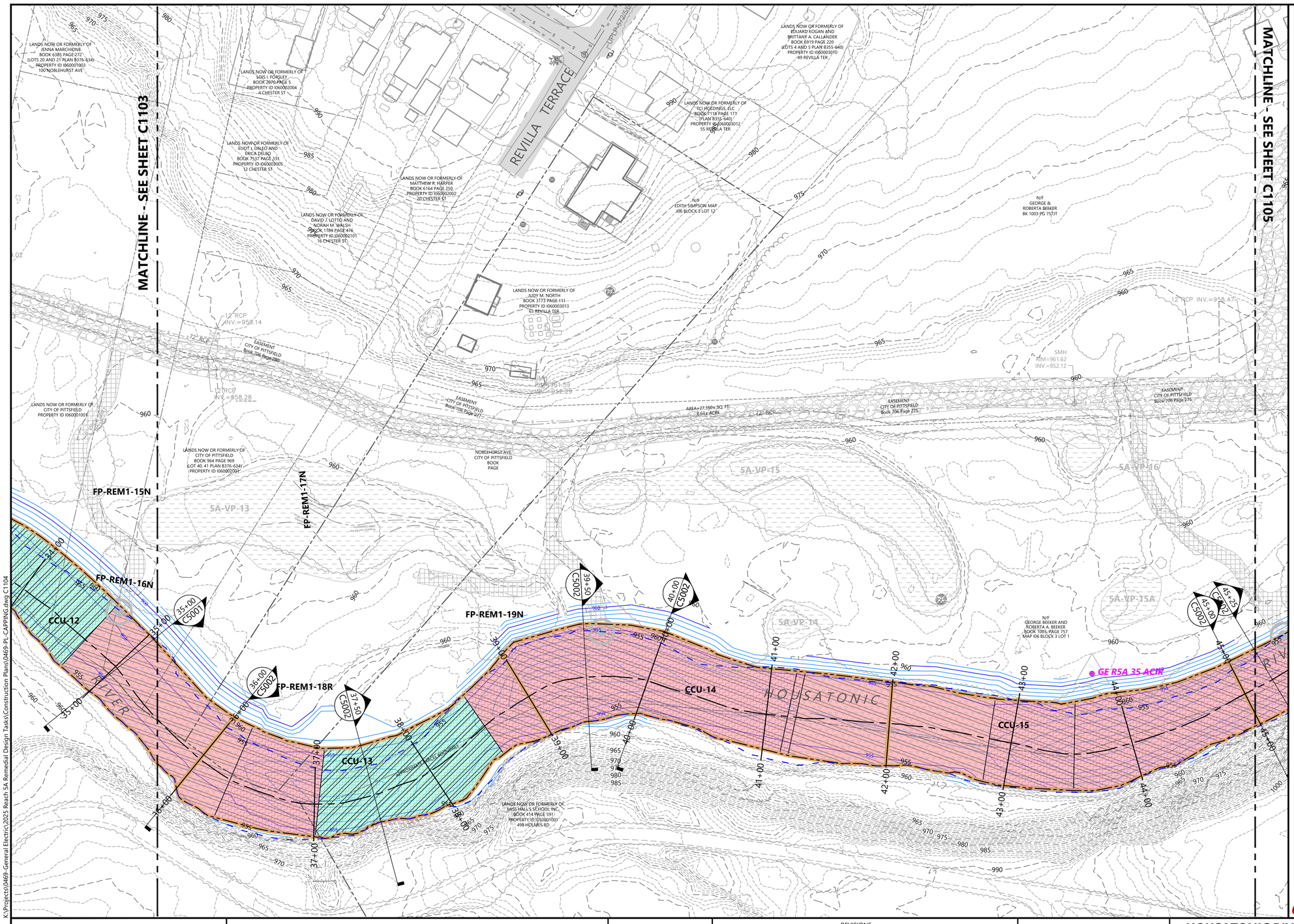
REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. HENDERSON
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / M. WERTH
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

CAPPING PLAN STA. 25+50 TO STA. 36+50

C1103



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Apr 29, 2026 12:56pm cyard2

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. HENDERSON
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / M. WERTH
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

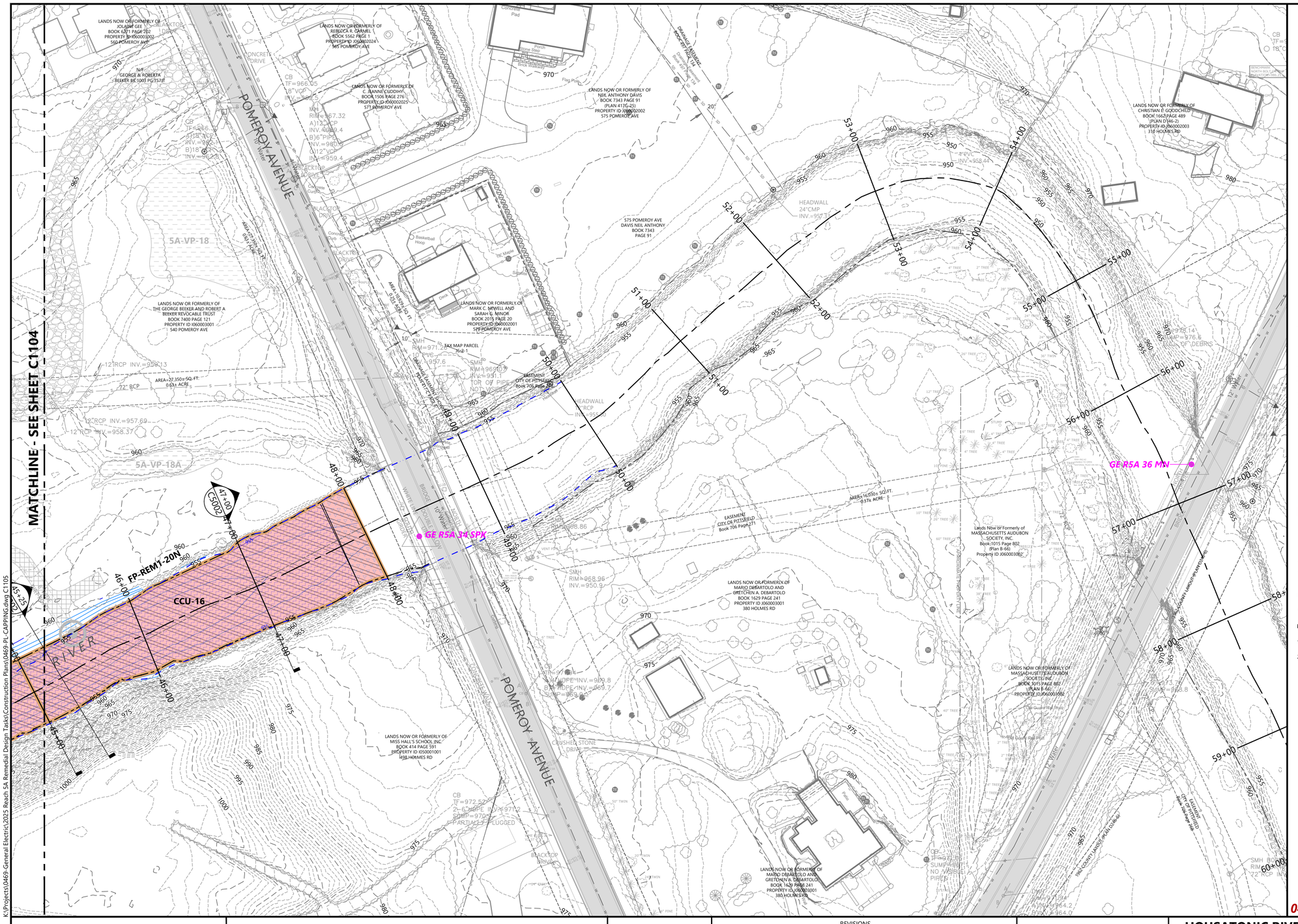
HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

CAPPING PLAN STA. 34+50 TO 45+00

C1104

MATCHLINE - SEE SHEET C1104

MATCHLINE - SEE SHEET C1106


POMEROY AVENUE
WATER
SEWER
DRAINAGE
OVERHEAD WIRES
BRIDGE
STONE WALL
CONCRETE DRIVE
BLACKTOP DRIVE
CRUSHED STONE DRIVE
LANDS NOW OR FORMERLY OF JOSAINE GEE BOOK 6371 PAGE 202 PROPERTY ID 1060003002 560 POMEROY AVE
N/F GEORGE & ROBERTA BEEKER BK 1003 PG 757FF
LANDS NOW OR FORMERLY OF REBECCA R. CARMEL \ BOOK 5562 PAGE 1 PROPERTY ID 1060002024 565 POMEROY AVE
LANDS NOW OR FORMERLY OF C. JEANNE CUDDIHY BOOK 1506 PAGE 276 PROPERTY ID 1060002025 571 POMEROY AVE
LANDS NOW OR FORMERLY OF NEIL ANTHONY DAVIS BOOK 7343 PAGE 91 (PLAN 417G-25) PROPERTY ID 1060002002 575 POMEROY AVE
575 POMEROY AVE DAVIS NEIL ANTHONY BOOK 7343 PAGE 91
LANDS NOW OR FORMERLY OF CHRISTIAN D GODCHILD BOOK 1662 PAGE 489 (PLAN D146-2) PROPERTY ID 1060002003 316 HOLMES RD
LANDS NOW OR FORMERLY OF THE GEORGE BEEKER AND ROBERT A BEEKER REVOCABLE TRUST BOOK 7400 PAGE 121 PROPERTY ID 1060003001 540 POMEROY AVE
LANDS NOW OR FORMERLY OF MARK C. MEWELL AND SARAH G. MINOR BOOK 2015 PAGE 20 PROPERTY ID 1060002001 569 POMEROY AVE
LANDS NOW OR FORMERLY OF MARIO DEBARTOLO AND GRETCHEN A. DEBARTOLO BOOK 1629 PAGE 241 PROPERTY ID 1060003001 380 HOLMES RD
LANDS NOW OR FORMERLY OF MISS HALL'S SCHOOL INC. BOOK 414 PAGE 591 PROPERTY ID 1050001001 498 HOLMES RD
Lands Now or Formerly of MASSACHUSETTS AUDUBON SOCIETY, INC. Book:1015 Page 802 (Plan B-66) Property ID 1060003002
LANDS NOW OR FORMERLY OF MASSACHUSETTS AUDUBON SOCIETY, INC. BOOK 1015 PAGE 801 (PLAN B-66) PROPERTY ID 1060001002
TAX MAP PARCEL 76-2-1
EASEMENT CITY OF PITTSFIELD Book 706 Page 271
DRAINAGE EASEMENT BOOK 2015 PAGE 20
HEADWALL 24"CMP INV.=957.3
HEADWALL 12"RCP INV.=955.0
5A-VP-18
5A-VP-18A
FP-REM1-20N
CCU-16
GE RSA 34 SPX
GE RSA 36 MN
AREA=27,350± SQ. FT. 0.63± ACRE
AREA=16,050± SQ.FT. 0.37± ACRE
12"RCP INV.=959.13
72" RCP
12"RCP INV.=957.69
12"RCP INV.=958.37
12"RCP INV.=957.6
SMH RIM=971.2 12" PVC INV.=957.6
SMH RIM=969.07 INV.=951.1 TOP OF PIPE NOT VISIBLE
SMH RIM=968.86
SMH RIM=968.96 INV.=950.9
CB TF=972.52 2-6"HDPE INV.=971.2 SUMP=970.7 PARTIALLY PLUGGED
CB TF=970.7 SUMP=967.0 NO VISIBLE PIPES
CB TF=973.7 18"HDPE INV.=969.8 8"HDPE INV.=969.7 SUMP=969.2
SMH RIM=973.14 SUMP=976.6 PILE OF DEBRIS
SMH RIM=963.8 12"RCP INV.=960.7
SMH RIM=964.2 INV.=964.0
CB TF=966.05 8"VCP INV.=960.5
MH RIM=967.32 A)12"CMP INV.=959.4 B)6"PIPE INV.=960.0 C)12"VCP INV.=959.4
CB TF=966.6 8"CMP INV.=960.2 B)18" INV.=959.2
CB TF=966.6 8"CMP INV.=960.2 B)18" INV.=959.2
Basketball Hoop
Flag Pole
Porch
Concrete Pad
Shed
Deck
Gazebo
Picnic Table
Fire Pit
Swing Set
Utility Pole
Guide Rail
Fence
Tree Line
Vent Pipe
Sign
Culvert
Manhole
Catch Basin
Hydrant
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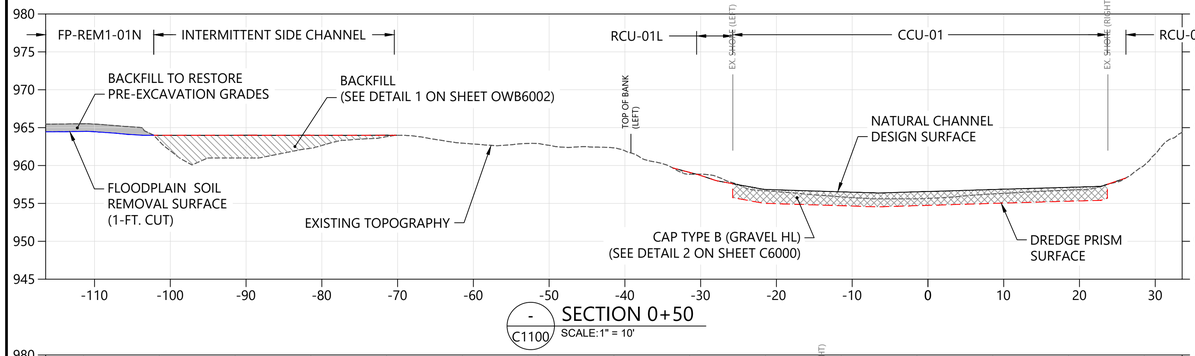

- / C1100 SECTION 0+50
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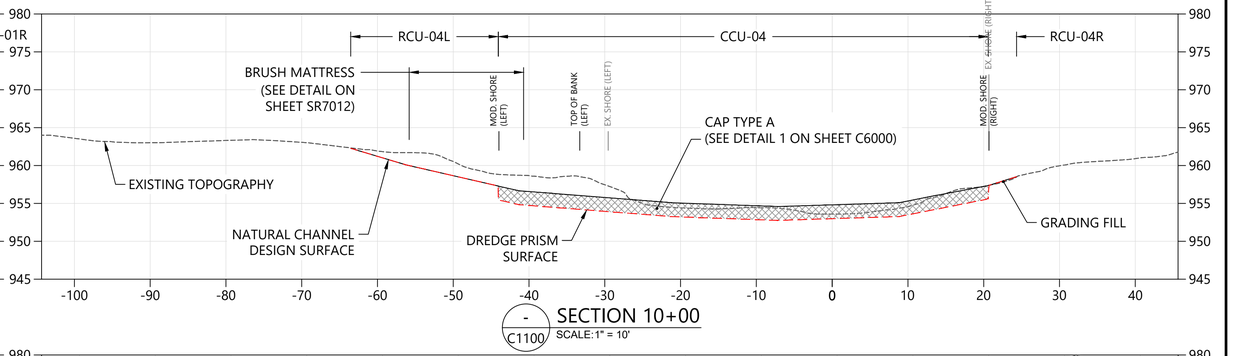

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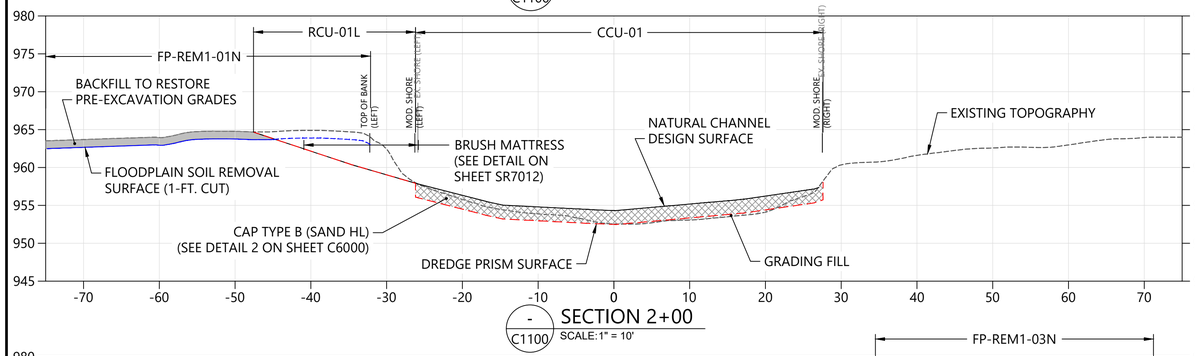

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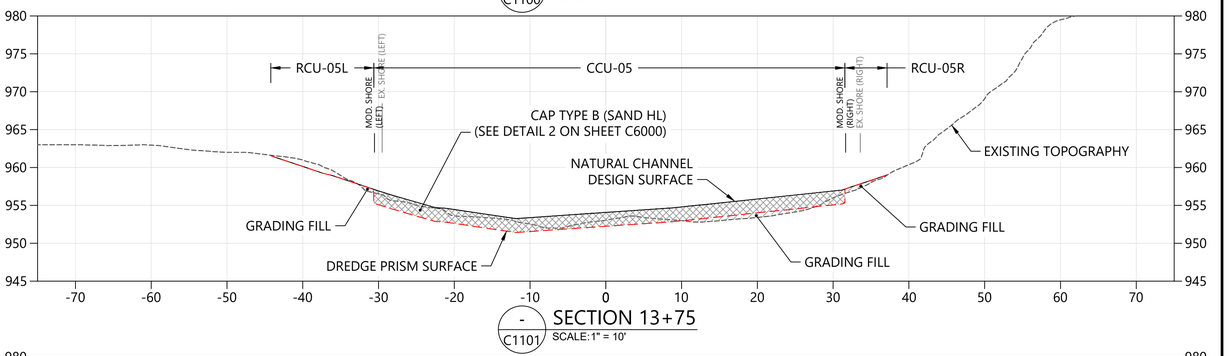

- / C1101 SECTION 13+75
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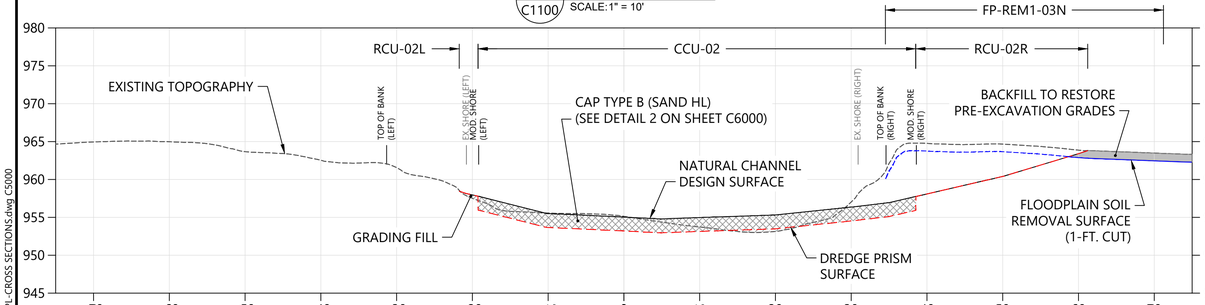

- / C1100 SECTION 5+00
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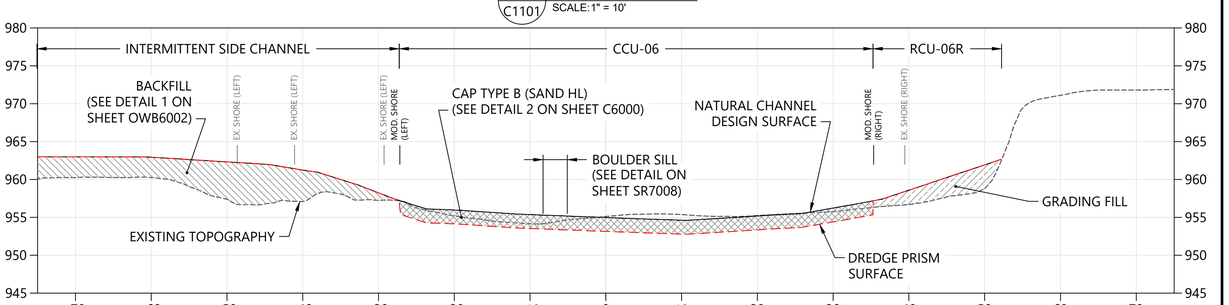
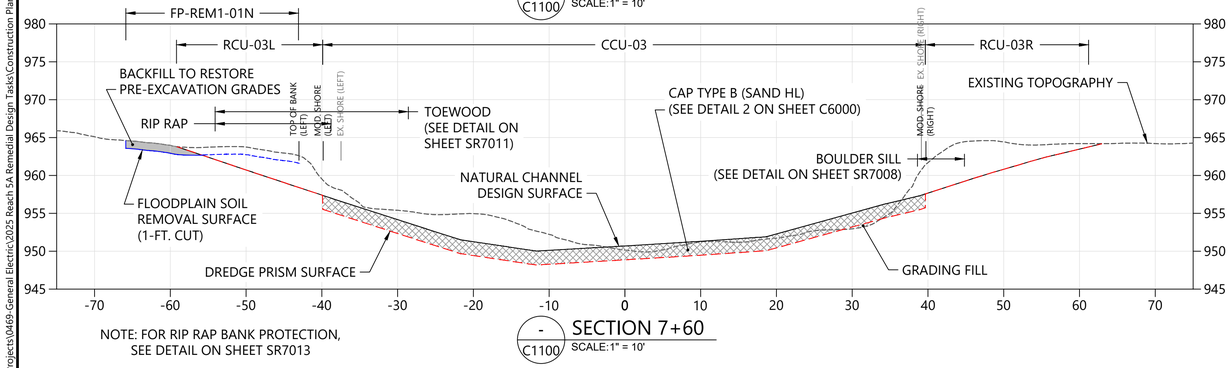


- / C1101 SECTION 15+00
SCALE:1" = 10'



NOTE: FOR RIP RAP BANK PROTECTION, SEE DETAIL ON SHEET SR7013

- / C1100 SECTION 7+60
SCALE:1" = 10'

LEGEND:

- EXISTING TOPOGRAPHY / BATHYMETRY (BLUESKY/WHITEOUT 2025)
- NATURAL CHANNEL DESIGN SURFACE (AECOM)
- DREDGE PRISM SURFACE
- FLOODPLAIN SOIL REMOVAL SURFACE
- ENGINEERED CAP
- GRADING FILL
- INTERMITTENT SIDE CHANNEL BACKFILL
- FLOODPLAIN REMOVAL AREA BACKFILL

NOTES:
1. CROSS SECTIONS ARE ORIENTATED FACING DOWNSTREAM.
2. ELEVATIONS ARE IN FEET (NAVD88).

0 10 20
SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST / D. BINKNEY
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

REMEDIATION CROSS SECTIONS

C5000

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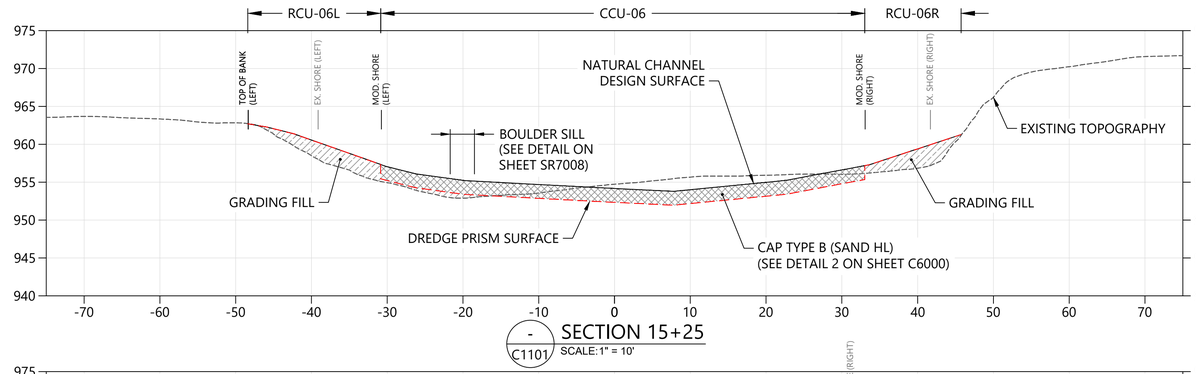
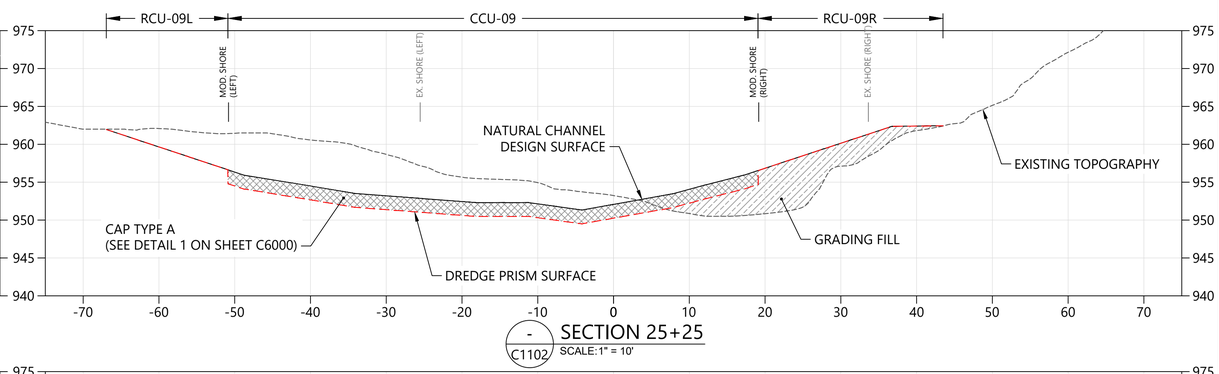
Apr 28, 2026 2:14pm cyard



- C1101 SECTION 15+25
SCALE:1" = 10'



- C1102 SECTION 25+25
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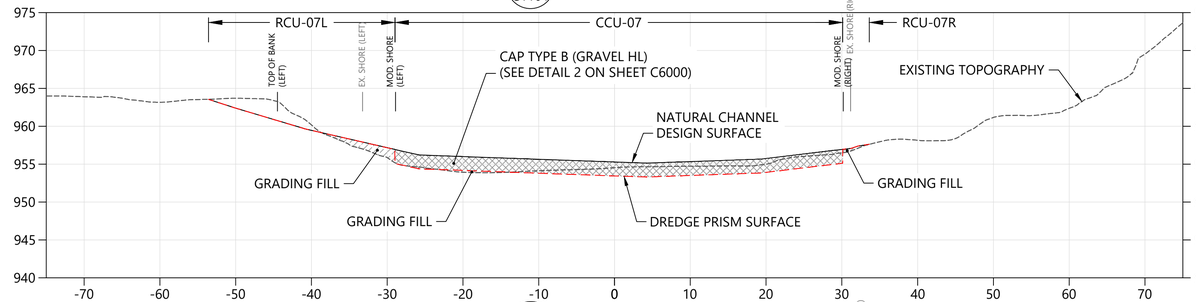
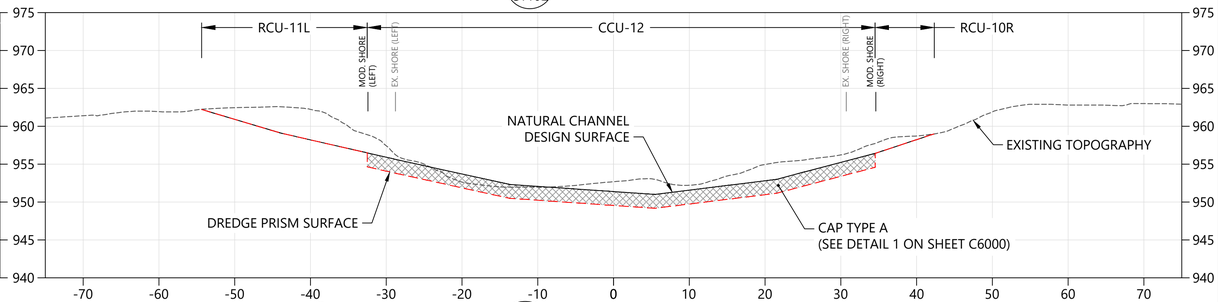


- C1101 SECTION 20+00
SCALE:1" = 10'



- C1103 SECTION 30+00
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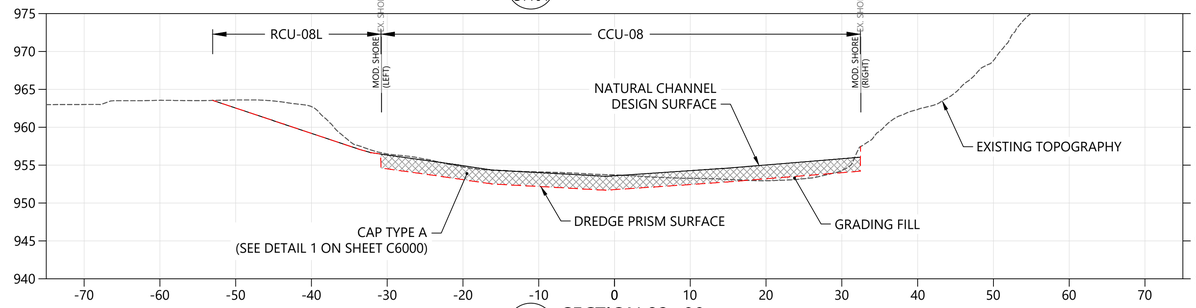
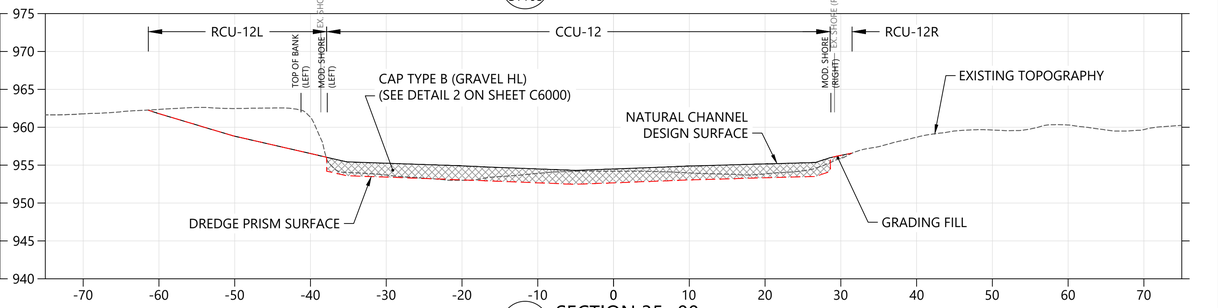
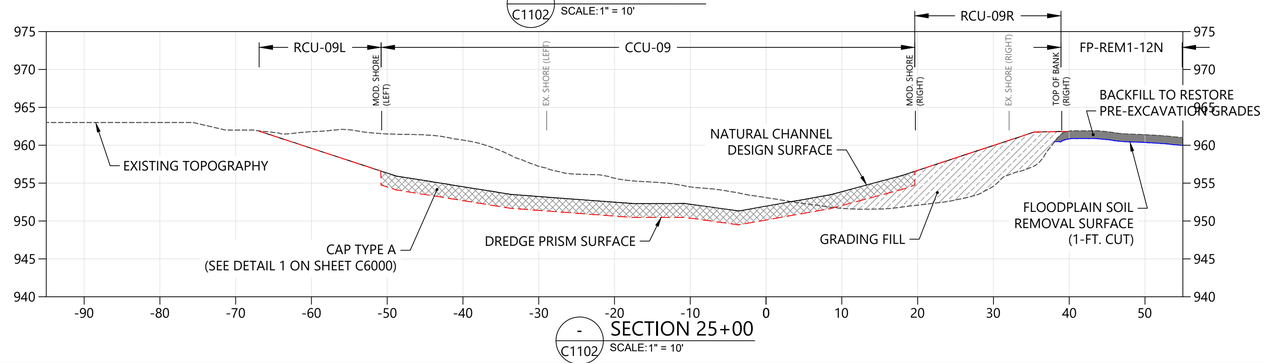


- C1102 SECTION 23+00
SCALE:1" = 10'



- C1103 SECTION 35+00
SCALE:1" = 10'



- C1102 SECTION 25+00
SCALE:1" = 10'

LEGEND:

- EXISTING TOPOGRAPHY / BATHYMETRY (BLUESKY/WHITEOUT 2025)
- NATURAL CHANNEL DESIGN SURFACE (AECOM)
- DREDGE PRISM SURFACE
- FLOODPLAIN SOIL REMOVAL SURFACE
- ENGINEERED CAP
- GRADING FILL
- INTERMITTENT SIDE CHANNEL BACKFILL
- FLOODPLAIN REMOVAL AREA BACKFILL

NOTES:
1. CROSS SECTIONS ARE ORIENTATED FACING DOWNSTREAM.
2. ELEVATIONS ARE IN FEET (NAVD88).

0 10 20
SCALE IN FEET

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST / D. BINKNEY
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

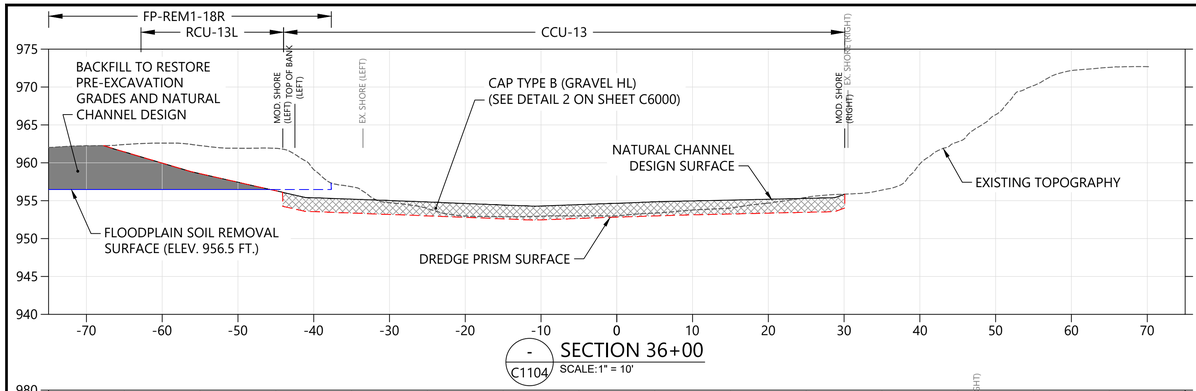
HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

REMEDIATION CROSS SECTIONS

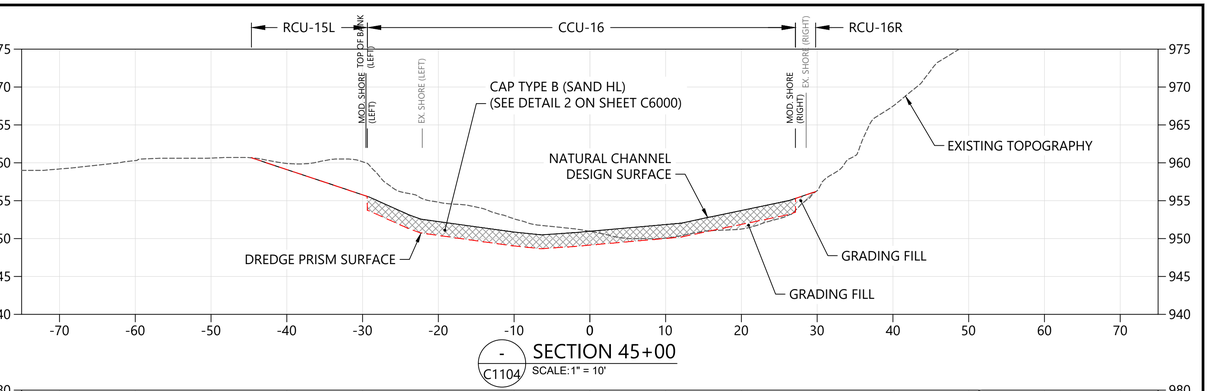
C5001

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-CROSS SECTIONS.dwg C5001

Apr 29, 2026 11:27am cyard2



- C1104 SECTION 36+00
SCALE:1" = 10'



- C1104 SECTION 45+00
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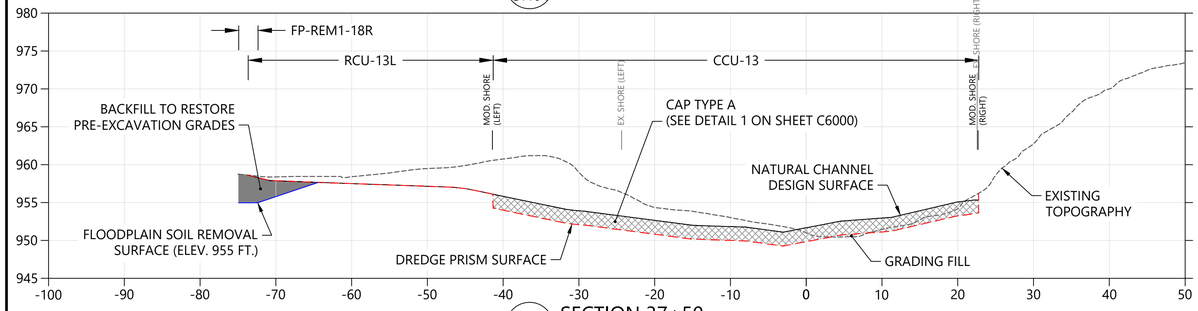

- C1104 SECTION 37+50
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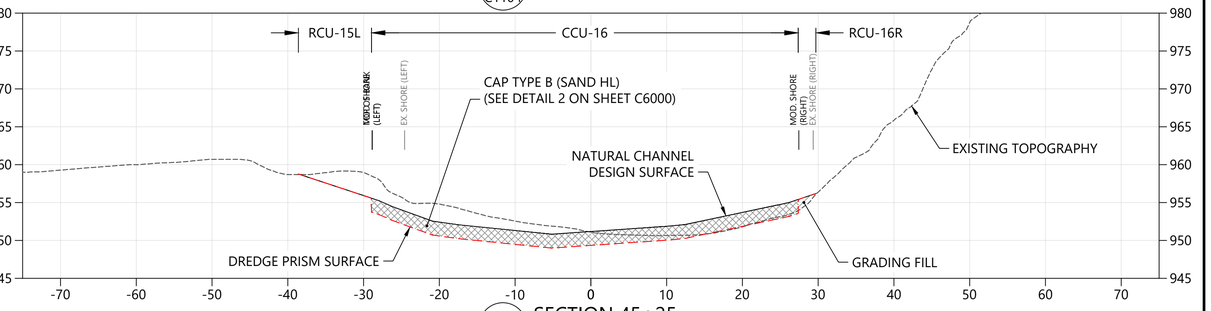

- C1105 SECTION 45+25
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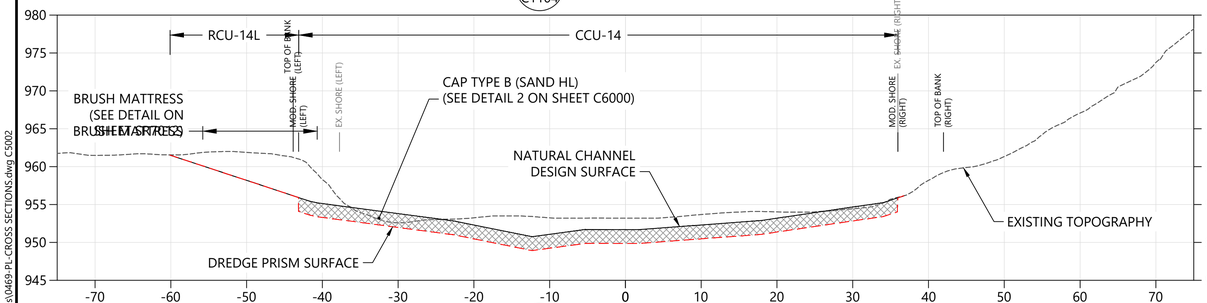
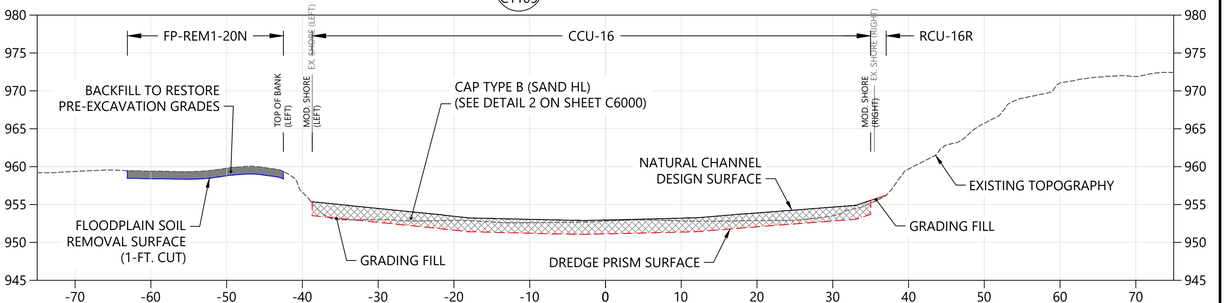
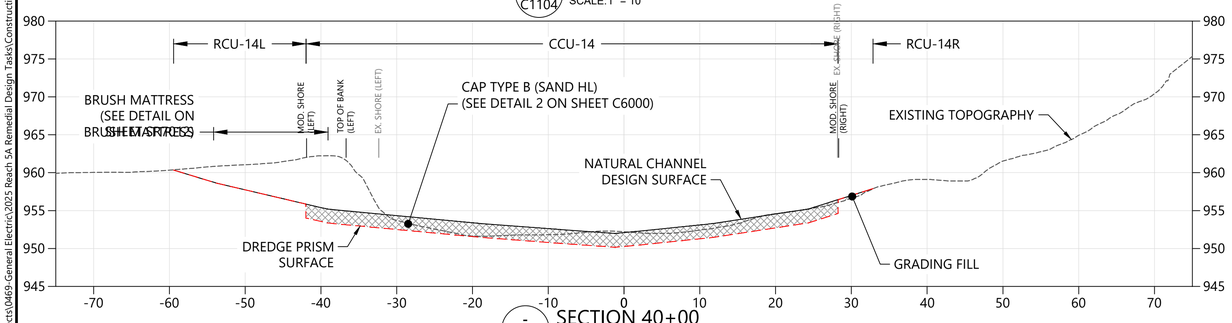


- C1104 SECTION 39+50
SCALE:1" = 10'



- C1105 SECTION 47+00
SCALE:1" = 10'



- C1104 SECTION 40+00
SCALE:1" = 10'

LEGEND:

- EXISTING TOPOGRAPHY / BATHYMETRY (BLUESKY/WHITEOUT 2025)
- NATURAL CHANNEL DESIGN SURFACE (AECOM)
- DREDGE PRISM SURFACE
- FLOODPLAIN SOIL REMOVAL SURFACE
- ENGINEERED CAP
- GRADING FILL
- INTERMITTENT SIDE CHANNEL BACKFILL
- FLOODPLAIN REMOVAL AREA BACKFILL

NOTES:
1. CROSS SECTIONS ARE ORIENTATED FACING DOWNSTREAM.
2. ELEVATIONS ARE IN FEET (NAVD88).

0 10 20
SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST / D. BINKNEY
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

REMEDIATION CROSS SECTIONS

C5002

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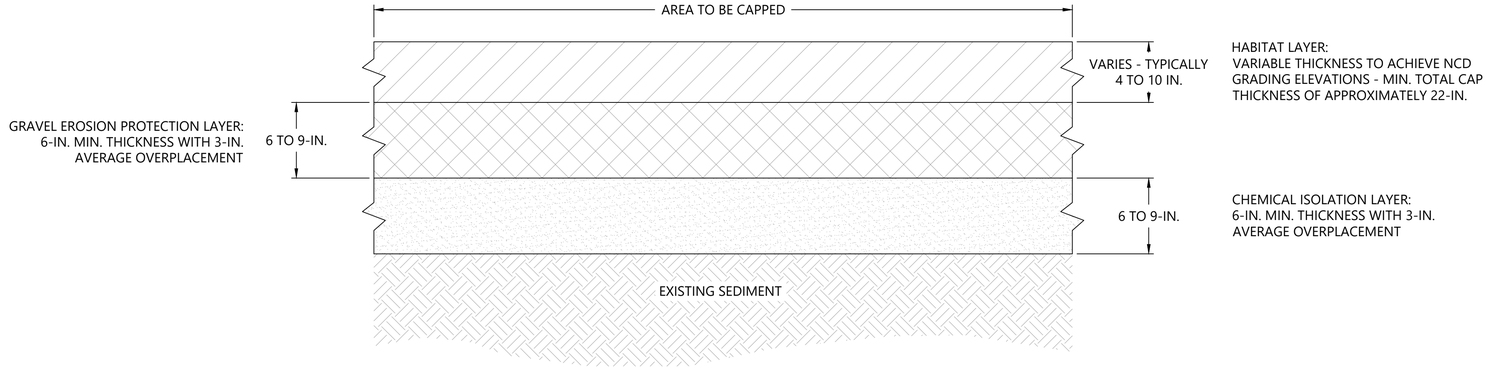
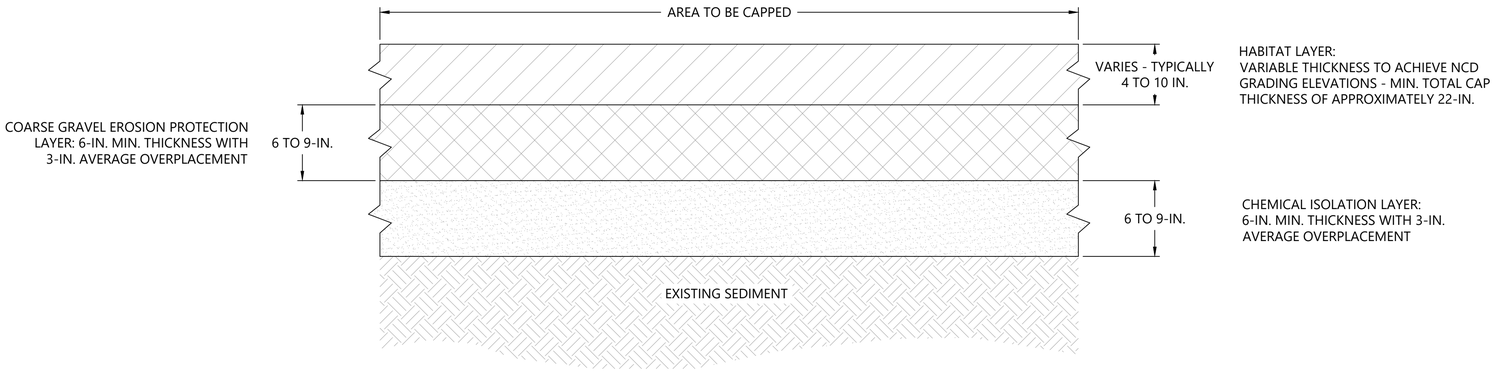
Apr 29, 2026 11:27am cyard2



NOTES:

1. FOR CAP LAYER MATERIAL GRADATIONS REFER TO TECHNICAL SPECIFICATION SECTION 31 05 13 - SOILS AND AGGREGATES.
2. HABITAT LAYER MATERIAL SHALL BE PLACED AS SAND OR COARSE GRAVEL AS SHOWN ON THE PLAN VIEW DRAWINGS.

1 / - CAP TYPE A
SCALE:NOT TO SCALE



NOTES:

1. FOR CAP LAYER MATERIAL GRADATIONS REFER TO TECHNICAL SPECIFICATION SECTION 31 05 13 - SOILS AND AGGREGATES.
2. HABITAT LAYER MATERIAL SHALL BE PLACED AS SAND OR COARSE GRAVEL AS SHOWN ON THE PLAN VIEW DRAWINGS.

2 / - CAP TYPE B
SCALE:NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

CAPPING DETAILS

C6000

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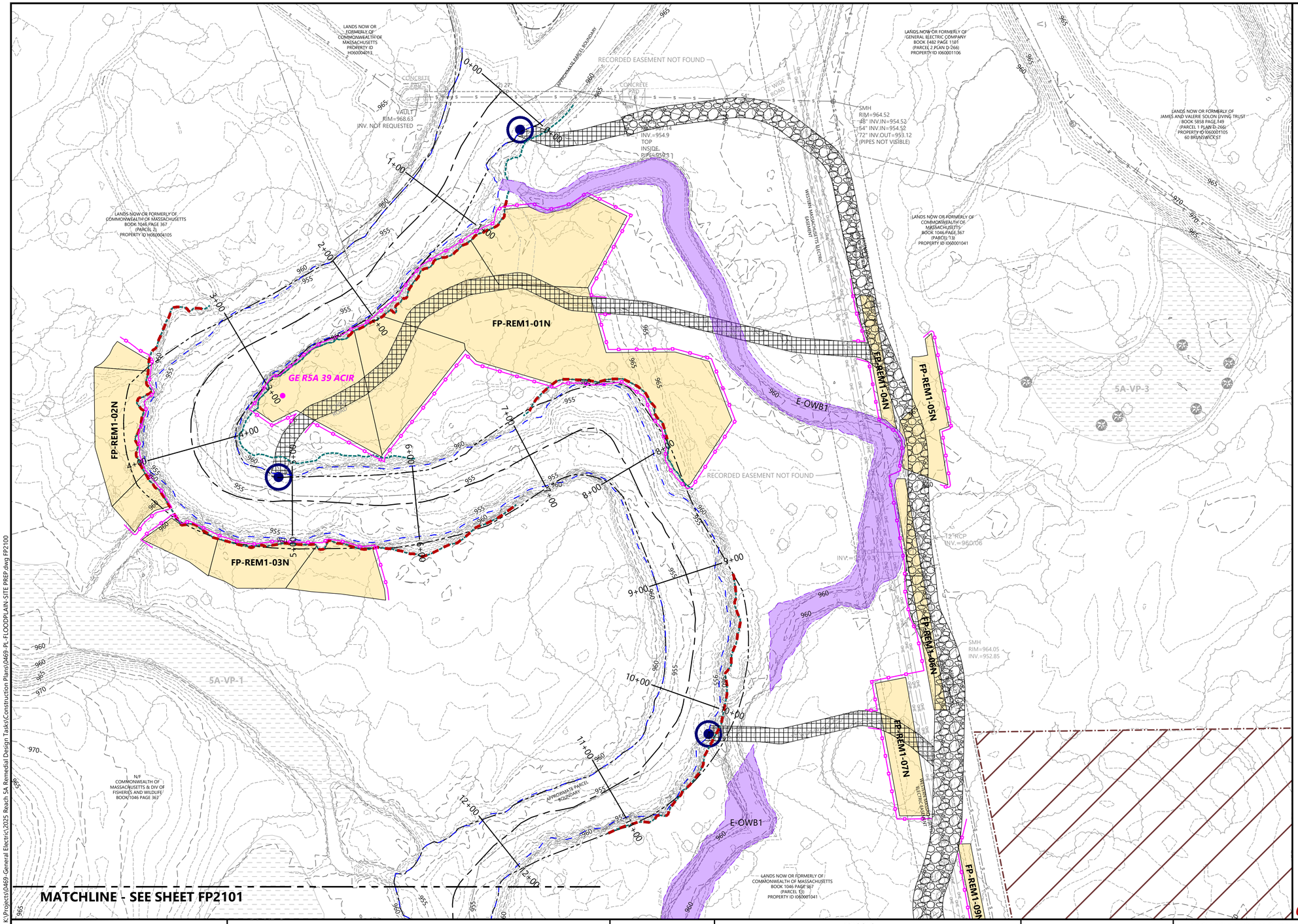



FP-SERIES SITE PREPARATION LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT
- LOCATION OF TREES GREATER THAN 8- TO 10-INCHES BASED ON PRELIMINARY TREE SURVEY (CONTRACTOR TO IDENTIFY AND PRESERVE TREES WITH A DIAMETER GREATER THAN 8-INCHES TO THE EXTENT PRACTICABLE)
- EROSION CONTROL (SILT FENCE)

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

NORTH

0 40 80

SCALE IN FEET

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: A. CORBIN / J. DREHS
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / C. GUEST
APPROVED BY: A. CORBIN
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

FLOODPLAIN SITE PREPARATION PLAN

FP2100

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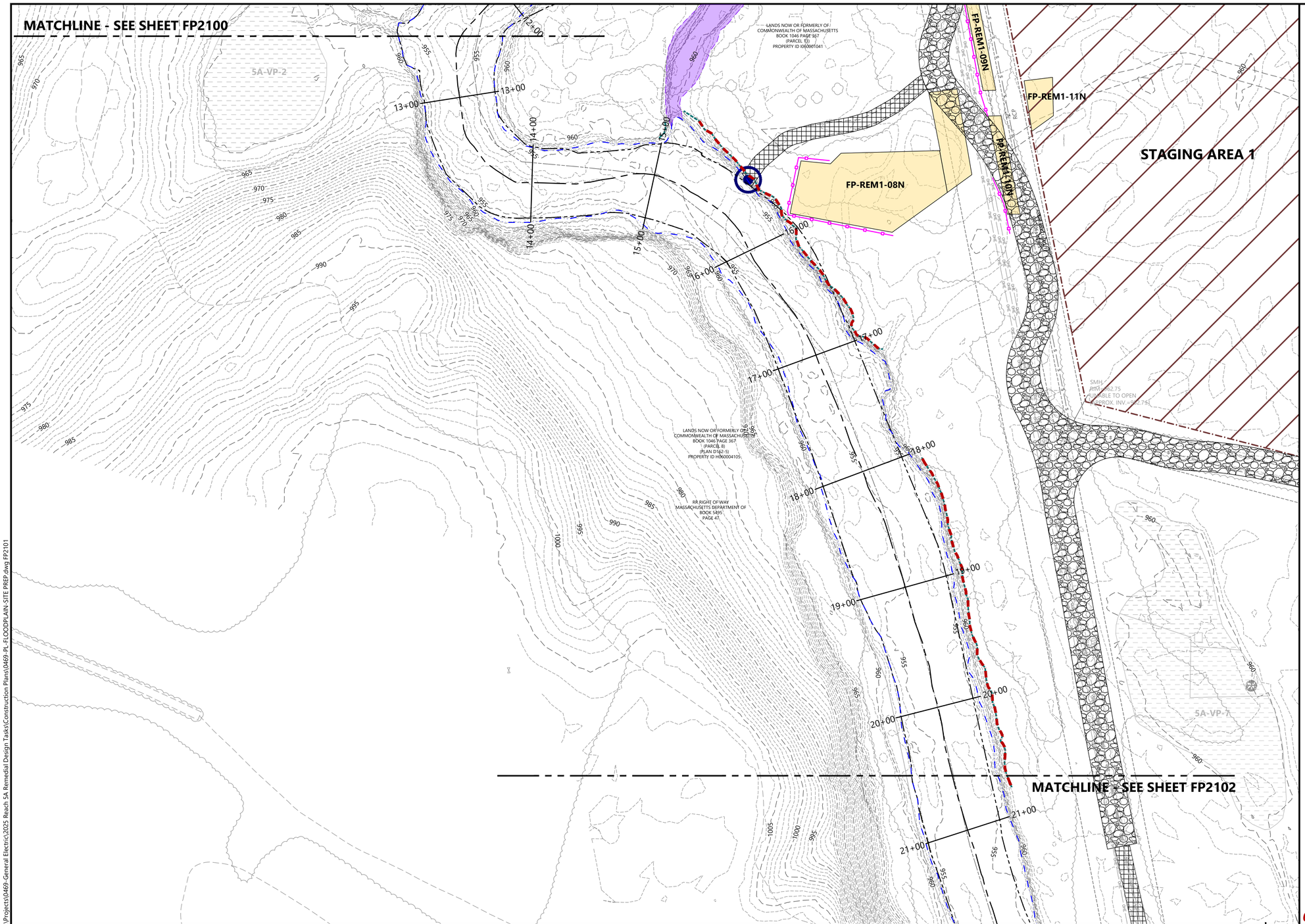
Apr 28, 2026 2:31pm cyard2





FP-SERIES SITE PREPARATION LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT
- LOCATION OF TREES GREATER THAN 8- TO 10-INCHES BASED ON PRELIMINARY TREE SURVEY (CONTRACTOR TO IDENTIFY AND PRESERVE TREES WITH A DIAMETER GREATER THAN 8-INCHES TO THE EXTENT PRACTICABLE)
- EROSION CONTROL (SILT FENCE)

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH

0 40 80

SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: A. CORBIN / J. DREHS
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / C. GUEST
APPROVED BY: A. CORBIN
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

FLOODPLAIN SITE PREPARATION PLAN

FP2101

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Apr 28, 2026 2:32pm cyard2

MATCHLINE - SEE SHEET FP2101

MATCHLINE - SEE SHEET FP2103

FP-REM1-12N

5A-VP-7

5A-VP-8

LANDS NOW OR FORMERLY OF
COMMONWEALTH OF MASSACHUSETTS
BOOK 1046 PAGE 367
(PARCEL B)
(PLAN D162-5)
PROPERTY ID M060004105

LANDS NOW OR FORMERLY OF
MISS HALL'S SCHOOL INC.
BOOK 414 PAGE 591
PROPERTY ID I050001201
498 HOLMES RD

APPROXIMATE PARCEL BOUNDARY

WESTERN MASSACHUSETTS ELECTRIC CO.



FP-SERIES SITE PREPARATION LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
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- SECONDARY TEMPORARY ACCESS ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT
- LOCATION OF TREES GREATER THAN 8- TO 10-INCHES BASED ON PRELIMINARY TREE SURVEY (CONTRACTOR TO IDENTIFY AND PRESERVE TREES WITH A DIAMETER GREATER THAN 8-INCHES TO THE EXTENT PRACTICABLE)
- EROSION CONTROL (SILT FENCE)

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

NORTH

0 40 80

SCALE IN FEET

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: A. CORBIN / J. DREHS
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / C. GUEST
APPROVED BY: A. CORBIN
SCALE: AS NOTED
DATE: APRIL 2026

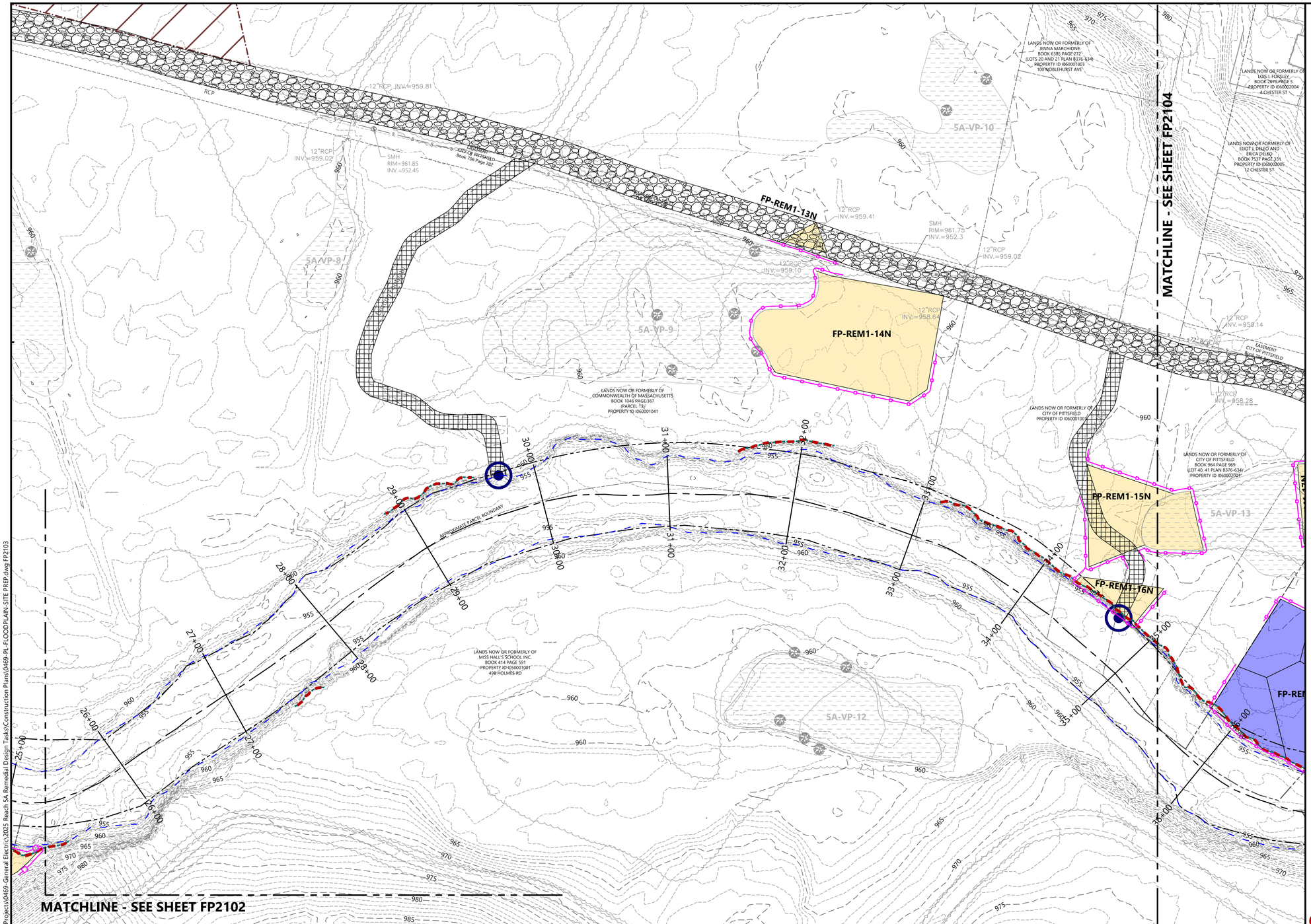
HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

FLOODPLAIN SITE PREPARATION PLAN

FP2102

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-FLOODPLAIN-SITE PREP.dwg FP2102

Apr 28, 2026 2:34pm cyard2





FP-SERIES SITE PREPARATION LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ACCESS ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT
- LOCATION OF TREES GREATER THAN 8- TO 10-INCHES BASED ON PRELIMINARY TREE SURVEY (CONTRACTOR TO IDENTIFY AND PRESERVE TREES WITH A DIAMETER GREATER THAN 8-INCHES TO THE EXTENT PRACTICABLE)
- EROSION CONTROL (SILT FENCE)

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH

0 40 80

SCALE IN FEET

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: A. CORBIN / J. DREHS
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / C. GUEST
APPROVED BY: A. CORBIN
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

FLOODPLAIN SITE PREPARATION PLAN

FP2103

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-FLOODPLAIN-SITE PREP.dwg FP2103

Apr 28, 2026 2:35pm cyard2

MATCHLINE - SEE SHEET FP2103

MATCHLINE - SEE SHEET FP2105

REVILLA TERRACE

LANDS NOW OR FORMERLY OF
JONNA MARCHIONE
BOOK 6385 PAGE 272
(LOTS 20 AND 21 PLAN B376-634)
PROPERTY ID I06000700
100 NOBLEHURST AVE

LANDS NOW OR FORMERLY OF
LOIS I. FORSLEY
BOOK 2975 PAGE 5
PROPERTY ID I06002004
4 CHESTER ST

LANDS NOW OR FORMERLY OF
ELIOT I. DELEO AND
ERICA DELEO
BOOK 7527 PAGE 331
PROPERTY ID I06000300S
12 CHESTER ST

LANDS NOW OR FORMERLY OF
MATTHEW P. HARPER
BOOK 6164 PAGE 250
PROPERTY ID I06000200Z
20 CHESTER ST

LANDS NOW OR FORMERLY OF
DAVID J. LOTTO AND
NORAH M. WALSH
BOOK 1789 PAGE 476
PROPERTY ID I06000210I
16 CHESTER ST

LANDS NOW OR FORMERLY OF
JUDY M. NORTH
BOOK 3173 PAGE 111
PROPERTY ID I06000301J
15 REVILLA TER

LANDS NOW OR FORMERLY OF
TCI HOLDINGS, LLC
BOOK 7118 PAGE 171
PLAN B355-640)
PROPERTY ID I06000301Z
55 REVILLA TER

LANDS NOW OR FORMERLY OF
EDUARD KOGAN AND
BRITTANY A. CALLANDER
BOOK 6919 PAGE 220
(LOTS 4 AND 5 PLAN B355-640)
PROPERTY ID I06000301O
49 REVILLA TER

N/F
EDITH SIMPSON MAP
106 BLOCK 3 LOT 12

N/F
GEORGE &
ROBERTA BEEKER
BK 1003 PG 757JT

N/F
GEORGE BEEKER AND
ROBERTA A. BEEKER
BOOK 1005, PAGE 757
MAP 106 BLOCK 3 LOT 1

LANDS NOW OR FORMERLY OF
CITY OF PITTSFIELD
PROPERTY ID I06000100

LANDS NOW OR FORMERLY OF
CITY OF PITTSFIELD
BOOK 964 PAGE 969
(LOT 40, 41 PLAN B376-634)
PROPERTY ID I06000200T

LANDS NOW OR FORMERLY OF
MISS HALL'S SCHOOL INC.
BOOK 414 PAGE 591
PROPERTY ID I05000100J
498 HOLMES RD

12 RCP
INV.=958.14

12 RCP
INV.=958.28

12 RCP
INV.=958.47

SMH
RIM=961.59
INV.=952.29

SMH
RIM=961.62
INV.=952.12

EASEMENT
CITY OF PITTSFIELD
BOOK 964 PAGE 969

EASEMENT
CITY OF PITTSFIELD
BOOK 1705 PAGE 247

EASEMENT
CITY OF PITTSFIELD
BOOK
PAGE

EASEMENT
CITY OF PITTSFIELD
BOOK 1705 PAGE 247

NORTH EASEMENT
CITY OF PITTSFIELD
BOOK
PAGE

FP-REM1-15N

FP-REM1-16N

FP-REM1-17N

FP-REM1-18R

FP-REM1-19N

5A-VP-13

5A-VP-14

5A-VP-15

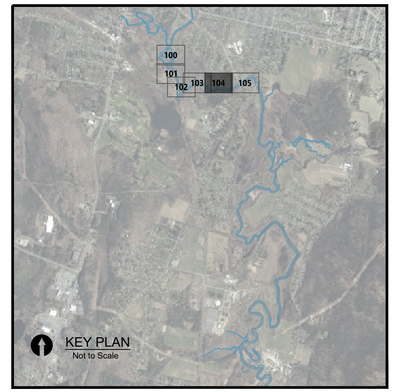
5A-VP-15A

5A-VP-16

GE R5A-35 ACIR

APPROXIMATE PROJECT BOUNDARY

34+00
35+00
36+00
37+00
38+00
39+00
40+00
41+00
42+00
43+00
44+00
45+00



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NOTES:

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NORTH

0 40 80

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K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-FLOODPLAIN-SITE PREP.dwg FP2104

Apr 28, 2026 2:37pm cyard2

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

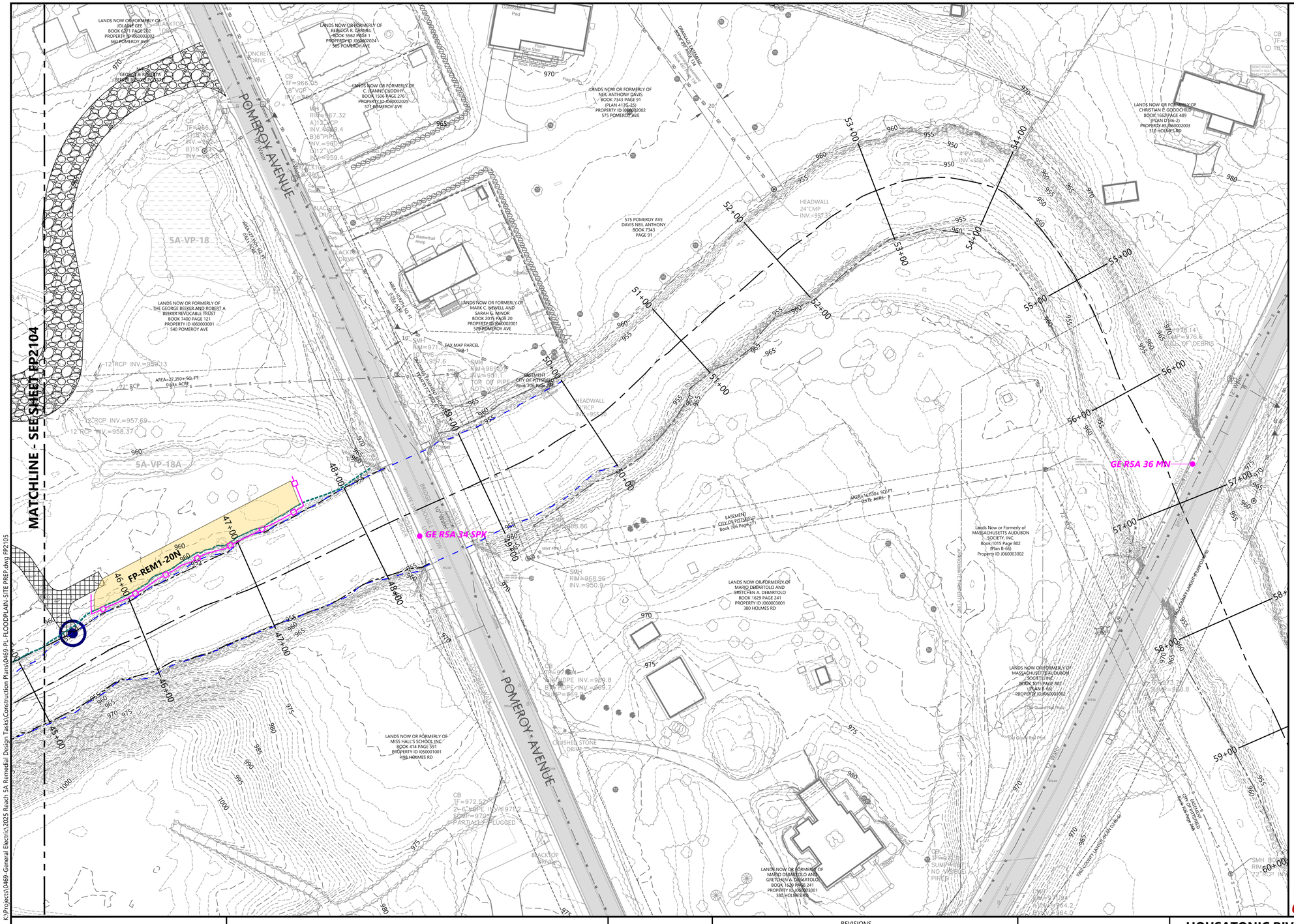
DESIGNED BY: A. CORBIN / J. DREHS
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / C. GUEST
APPROVED BY: A. CORBIN
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

FLOODPLAIN SITE PREPARATION PLAN

FP2104

MATCHLINE - SEE SHEET FP2104


POMEROY AVENUE
LANDS NOW OR FORMERLY OF JOSAINE GEE BOOK 6371 PAGE 202 PROPERTY ID 1060003002 560 POMEROY AVE
LANDS NOW OR FORMERLY OF REBECCA R. CARMEL I BOOK 5562 PAGE 1 PROPERTY ID 1060002024 565 POMEROY AVE
LANDS NOW OR FORMERLY OF C. JEANNE CUDDIHY BOOK 1506 PAGE 276 PROPERTY ID 1060002025 571 POMEROY AVE
LANDS NOW OR FORMERLY OF NEIL ANTHONY DAVIS BOOK 7343 PAGE 91 (PLAN 417G-25) PROPERTY ID 1060003002 575 POMEROY AVE
LANDS NOW OR FORMERLY OF CHRISTIAN D GOOCHILD BOOK 1662, PAGE 489 (PLAN D146-2) PROPERTY ID 1060002003 316 HOLMES RD
LANDS NOW OR FORMERLY OF THE GEORGE BEEKER AND ROBERT A BEEKER REVOCABLE TRUST BOOK 7400 PAGE 121 PROPERTY ID 1060003001 540 POMEROY AVE
LANDS NOW OR FORMERLY OF MARK C. MEWELL AND SARAH E. MINOR BOOK 2015 PAGE 20 PROPERTY ID 1060002001 549 POMEROY AVE
575 POMEROY AVE DAVIS NEIL ANTHONY BOOK 7343 PAGE 91
HEADWALL 24"CMP INV.=957.3
HEADWALL 24"CMP INV.=958.47
HEADWALL 12"RCP INV.=957.0
TAX MAP PARCEL 7068-1
EASEMENT CITY OF PITTSFIELD Book 706 Page 71
AREA=16,030± SQ.FT. 0.37± ACRE
AREA=27,350± SQ. FT. 0.63± ACRE
AREA=21,900± SQ. FT. 0.50± ACRE
5A-VP-18
5A-VP-18A
FP-REM1-20N
GE RSA 1N SPX
GE RSA 36 MN
LANDS NOW OR FORMERLY OF MISS HALL'S SCHOOL INC. BOOK 414 PAGE 591 PROPERTY ID 1050001001 498 HOLMES RD
LANDS NOW OR FORMERLY OF MARIO DEBARTOLO AND GRETCHEN A. DEBARTOLO BOOK 1629 PAGE 241 PROPERTY ID 1060003001 380 HOLMES RD
Lands Now or Formerly of MASSACHUSETTS AUDUBON SOCIETY, INC. Book:1015 Page 802 (Plan B-66) Property ID 1060003002
LANDS NOW OR FORMERLY OF MASSACHUSETTS AUDUBON SOCIETY, INC. BOOK 1015 PAGE 802 (PLAN B-66) PROPERTY ID 1060003002
EASEMENT CITY OF PITTSFIELD Book 1004 Page 158
SEE COUNTY MAP(S) #CAN 0104&0
CRUSHED STONE DRIVE
BLACKTOP DRIVE
CONCRETE DRIVE
WHITE LINE DOUBLE SOLID
10" WARNING TAPE
Basketball Hoop
Deck
Concrete Pad
Porch
Flag Pole
Shed
TK Meter
Gas Gate
Gas Guard Rail Post
Gas Line Marker
Gas Valve
Gas Vent
Gas Vent Pipe
Gas Vent Riser
Gas Vent Riser Pipe
Gas Vent Riser Pipe Cap
Gas Vent Riser Pipe Cap Vent
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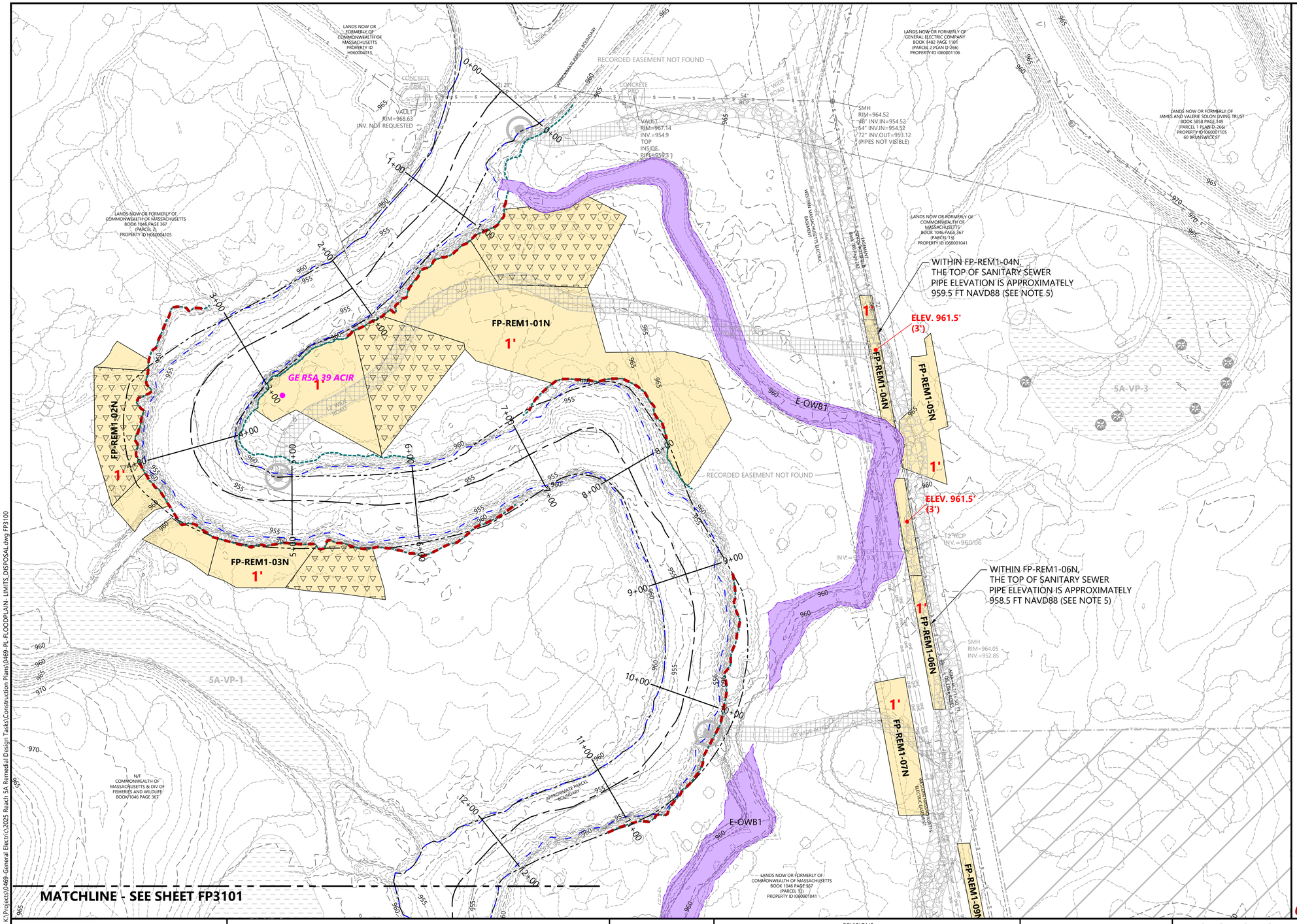



FP-SERIES SITE DISPOSAL LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- 1' DEPTH OF SURFACE REMOVAL AREAS
- 961.5' (3') REQUIRED ELEVATION FOR SUBSURFACE REMOVAL AREAS
- ON-SITE DISPOSAL (ALL FLOODPLAIN REMEDIATION AREAS UNLESS OTHERWISE NOTED)
- OFF-SITE DISPOSAL
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT
- LOCATION OF TREES GREATER THAN 8- TO 10-INCHES BASED ON PRELIMINARY TREE SURVEY (CONTRACTOR TO IDENTIFY AND PRESERVE TREES WITH A DIAMETER GREATER THAN 8-INCHES TO THE EXTENT PRACTICABLE)

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

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NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.
3. BASED UPON A PRELIMINARY EVALUATION, ASSUMING A LOW FLOW SURFACE ELEVATION OF 955.67 FT NAVD88 ON 8/10/21 ADJACENT TO PARCEL I6-3-13, THE CONTRACTOR MAY ENCOUNTER GROUND WATER AT REMOVAL POLYGONS CALLED OUT WITHIN THESE TECHNICAL DRAWINGS. THE CONTRACTOR SHALL NOTE THAT THEY MAY ENCOUNTER GROUND WATER AT OTHER POLYGONS AND SHOULD BE PREPARED TO HANDLE ACCORDINGLY.
4. FOR EXCAVATIONS GREATER THAN 1 FOOT, THE ELEVATION WHICH THE CONTRACTOR SHALL DIG TO IS CALLED OUT ADJACENT TO THE EXCAVATION POLYGON WITH THE RELATIVE DEPTH LISTED IN PARENTHESES.
5. THE CONTRACTOR SHALL CONFIRM ALL INFORMATION ASSOCIATED WITH UTILITIES AND TAKE MEASURES TO PROTECT THEM AS STATED IN SPECIFICATION SECTION 31 23 00 - SOIL EXCAVATION AND FILL.

NORTH

0 40 80
SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS 'BLUE'

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: A. CORBIN / J. DREHS
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / C. GUEST
APPROVED BY: A. CORBIN
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

FLOODPLAIN SOIL REMOVAL LIMITS AND DISPOSAL LOCATION IDENTIFICATION

FP3100

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-FLOODPLAIN- LIMITS_DISPOSAL.dwg FP3100
Apr 28, 2026 2:52pm cyard2

MATCHLINE - SEE SHEET FP3101

LANDS NOW OR FORMERLY OF COMMONWEALTH OF MASSACHUSETTS BOOK 1046 PAGE 367 (PARCEL E) PROPERTY ID I060001041

LANDS NOW OR FORMERLY OF COMMONWEALTH OF MASSACHUSETTS BOOK 1046 PAGE 367 (PARCEL B) (PLAN D182-5) PROPERTY ID H060004105

RR RIGHT-OF-WAY MASSACHUSETTS DEPARTMENT OF BOOK 5495 PAGE 47

5A-VP-2

5A-VP-7

FP-REM1-09N
1'

FP-REM1-10N

FP-REM1-11N
1'

FP-REM1-08N
1'

WITHIN FP-REM1-09N, THE TOP OF SANITARY SEWER PIPE ELEVATION IS APPROXIMATELY 958.0 FT NAVD88 (SEE NOTE 5)

WITHIN FP-REM1-10N, THE TOP OF SANITARY SEWER PIPE ELEVATION IS APPROXIMATELY 958.0 FT NAVD88 (SEE NOTE 5)

STAGING AREA 1

ELEV. 958.0'
(3')

ABOVE GRADE LAY DOWN AREA (0.5 ACRES)

SMH
RIM=962.75
UNABLE TO OPEN
APPROX. INV.=952.75'

MATCHLINE - SEE SHEET FP3102



FP-SERIES SITE DISPOSAL LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- 3+00 — 3+00 EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- 1' — 1' DEPTH OF SURFACE REMOVAL AREAS
- 961.5' (3') — REQUIRED ELEVATION FOR SUBSURFACE REMOVAL AREAS
- ON-SITE DISPOSAL (ALL FLOODPLAIN REMEDIATION AREAS UNLESS OTHERWISE NOTED)
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NORTH

0 40 80
SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS 'BLUE'

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ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

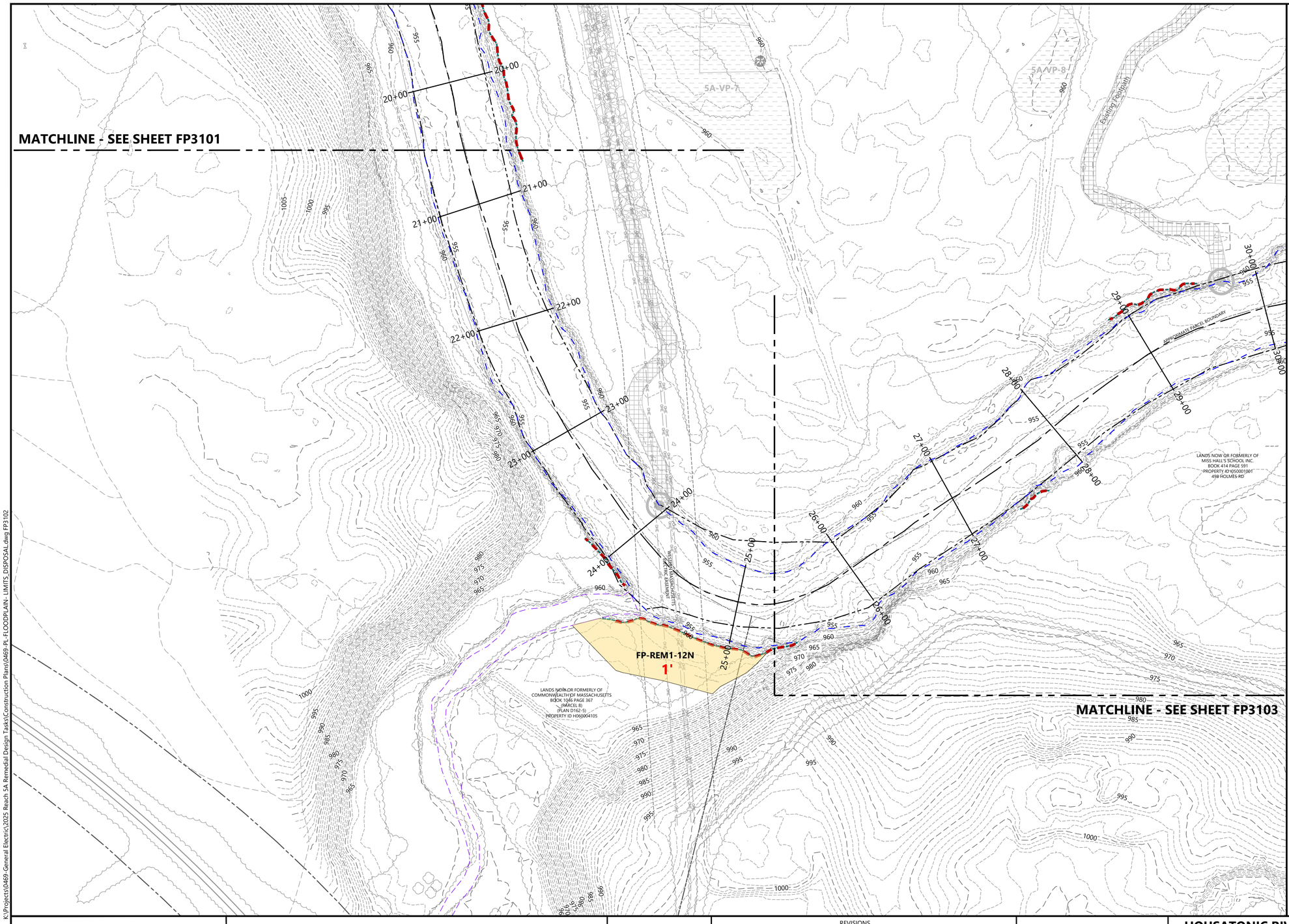
DESIGNED BY: A. CORBIN / J. DREHS
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / C. GUEST
APPROVED BY: A. CORBIN
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

FLOODPLAIN SOIL REMOVAL LIMITS AND DISPOSAL LOCATION IDENTIFICATION

FP3101

Apr 28, 2026 2:54pm cyard2 K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-FLOODPLAIN- LIMITS_DISPOSAL.dwg FP3101





FP-SERIES SITE DISPOSAL LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- 1' DEPTH OF SURFACE REMOVAL AREAS
- REQUIRED ELEVATION FOR SUBSURFACE REMOVAL AREAS
- ON-SITE DISPOSAL (ALL FLOODPLAIN REMEDIATION AREAS UNLESS OTHERWISE NOTED)
- OFF-SITE DISPOSAL
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY TEMPORARY ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT
- LOCATION OF TREES GREATER THAN 8- TO 10-INCHES BASED ON PRELIMINARY TREE SURVEY (CONTRACTOR TO IDENTIFY AND PRESERVE TREES WITH A DIAMETER GREATER THAN 8-INCHES TO THE EXTENT PRACTICABLE)

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.
3. BASED UPON A PRELIMINARY EVALUATION, ASSUMING A LOW FLOW SURFACE ELEVATION OF 955.67 FT NAVD88 ON 8/10/21 ADJACENT TO PARCEL I6-3-13, THE CONTRACTOR MAY ENCOUNTER GROUND WATER AT REMOVAL POLYGONS CALLED OUT WITHIN THESE TECHNICAL DRAWINGS. THE CONTRACTOR SHALL NOTE THAT THEY MAY ENCOUNTER GROUND WATER AT OTHER POLYGONS AND SHOULD BE PREPARED TO HANDLE ACCORDINGLY.
4. FOR EXCAVATIONS GREATER THAN 1 FOOT, THE ELEVATION WHICH THE CONTRACTOR SHALL DIG TO IS CALLED OUT ADJACENT TO THE EXCAVATION POLYGON WITH THE RELATIVE DEPTH LISTED IN PARENTHESES.
5. THE CONTRACTOR SHALL CONFIRM ALL INFORMATION ASSOCIATED WITH UTILITIES AND TAKE MEASURES TO PROTECT THEM AS STATED IN SPECIFICATION SECTION 31 23 00 - SOIL EXCAVATION AND FILL.

NORTH

0 40 80
SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: A. CORBIN / J. DREHS
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / C. GUEST
APPROVED BY: A. CORBIN
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

FLOODPLAIN SOIL REMOVAL LIMITS AND DISPOSAL LOCATION IDENTIFICATION

FP3102

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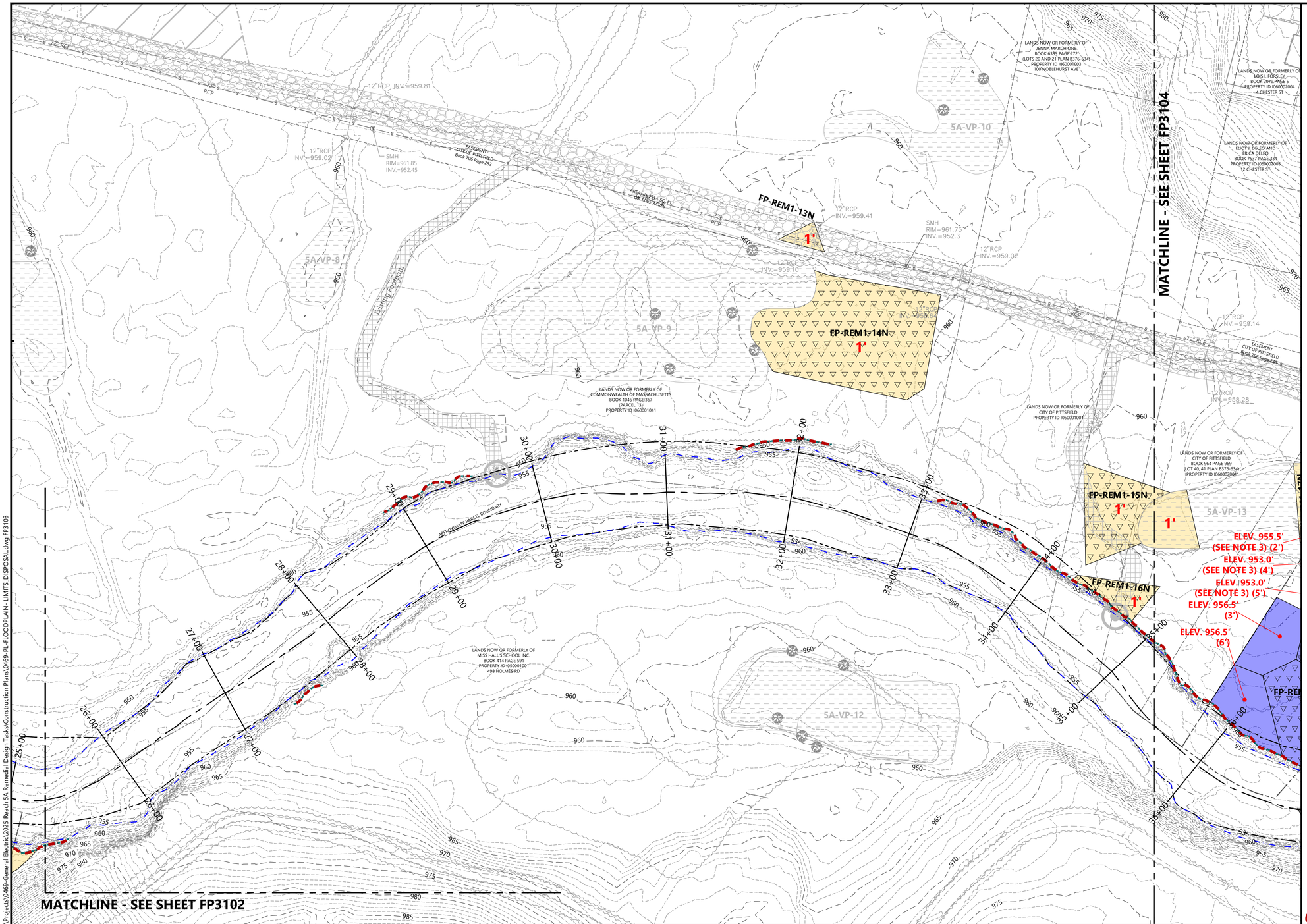
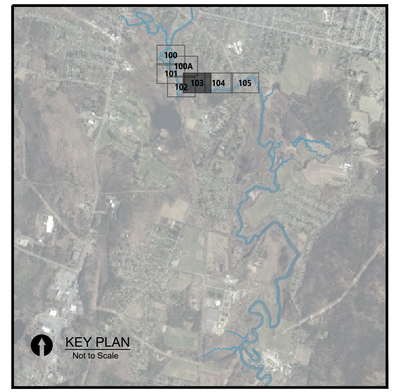
Apr 28, 2026 2:56pm cyard2





FP-SERIES SITE DISPOSAL LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- 3+00 — 3+00 EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- 1' — 1' DEPTH OF SURFACE REMOVAL AREAS
- 961.5' (3') — REQUIRED ELEVATION FOR SUBSURFACE REMOVAL AREAS
- ON-SITE DISPOSAL (ALL FLOODPLAIN REMEDIATION AREAS UNLESS OTHERWISE NOTED)
- OFF-SITE DISPOSAL
- PRIMARY TEMPORARY ACCESS ROAD
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HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

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NOTES:

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NORTH

0 40 80
SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

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ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: A. CORBIN / J. DREHS
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / C. GUEST
APPROVED BY: A. CORBIN
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

FLOODPLAIN SOIL REMOVAL LIMITS AND DISPOSAL LOCATION IDENTIFICATION

FP3103

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-FLOODPLAIN- LIMITS_DISPOSAL.dwg FP3103
Apr 28, 2026 2:57pm cyard2

MATCHLINE - SEE SHEET FP3103

MATCHLINE - SEE SHEET FP3105

REVILLA TERRACE

LANDS NOW OR FORMERLY OF
JENNA MARCHIONE
BOOK 6385 PAGE 272
(LOTS 20 AND 21 PLAN B376-634)
PROPERTY ID I060001003
100 NOBLEHURST AVE

LANDS NOW OR FORMERLY OF
LOIS I. FORSLEY
BOOK 2975 PAGE 5
PROPERTY ID I060002004
4 CHESTER ST

LANDS NOW OR FORMERLY OF
ELIOT I. DELEO AND
ERICA DELEO
BOOK 7527 PAGE 331
PROPERTY ID I060003005
12 CHESTER ST

LANDS NOW OR FORMERLY OF
MATTHEW P. HARPER
BOOK 6164 PAGE 250
PROPERTY ID I060002002
20 CHESTER ST

LANDS NOW OR FORMERLY OF
DAVID J. LOTTO AND
NORAH M. WALSH
BOOK 1789 PAGE 476
PROPERTY ID I060002101
16 CHESTER ST

LANDS NOW OR FORMERLY OF
CITY OF PITTSFIELD
PROPERTY ID I060001001

LANDS NOW OR FORMERLY OF
CITY OF PITTSFIELD
BOOK 964 PAGE 969
(LOT 40, 41 PLAN B376-634)
PROPERTY ID I060002004

LANDS NOW OR FORMERLY OF
"EC1 HOLDINGS, LLC
BOOK 7118 PAGE 171
PLAN B355-640)
PROPERTY ID I060003012
55 REVILLA TER

LANDS NOW OR FORMERLY OF
EDUARD KOGAN AND
BRITTANY A. CALLANDER
BOOK 6919 PAGE 220
(LOTS 4 AND 5 PLAN B355-640)
PROPERTY ID I060003010
49 REVILLA TER

LANDS NOW OR FORMERLY OF
JUDY M. NORTH
BOOK 3173 PAGE 111
PROPERTY ID I060003013
51 REVILLA TER

N/F
EDITH SIMPSON MAP
#26 BLOCK 3 LOT 12

N/F
GEORGE &
ROBERTA BEEKER
BK 1003 PG 757,IT

N/F
GEORGE BEEKER AND
ROBERTA A. BEEKER
BOOK 1093, PAGE 757
MAP 106 BLOCK 3 LOT 1

LANDS NOW OR FORMERLY OF
MASS HALLS SCHOOL INC
BOOK 414 PAGE 591
PROPERTY ID I050001001
498 HOLMES RD

NOBLEHURST AVE
CITY OF PITTSFIELD
BOOK
PAGE

12 RCP INV.=958.14

12 RCP INV.=958.28

12 RCP INV.=958.47

EASEMENT
CITY OF PITTSFIELD
BOOK 706 PAGE 280

EASEMENT
CITY OF PITTSFIELD
BOOK 706 PAGE 277

EASEMENT
CITY OF PITTSFIELD
BOOK 706 PAGE 275

AREA=27,350+ SQ. FT.
0.628 ACRE

SMH
RIM=961.59
INV.=952.29

SMH
RIM=961.62
INV.=952.12

5A-VP-13

5A-VP-14

5A-VP-15

5A-VP-15A

5A-VP-16

GE R5A-35 ACIR

FP-REM1-15N
1'

FP-REM1-16N
1'

FP-REM1-17N
1'

FP-REM1-18R
1'

FP-REM1-19N
1'

ELEV. 956.0'
(2') (SEE NOTE 3)

ELEV. 955.5'
(3') (SEE NOTE 3)

ELEV. 955.5'
(2') (SEE NOTE 3)

ELEV. 955.5'
(SEE NOTE 3) (2')

ELEV. 953.0'
(SEE NOTE 3) (4')

ELEV. 953.0'
(SEE NOTE 3) (5')

ELEV. 956.5'
(3')

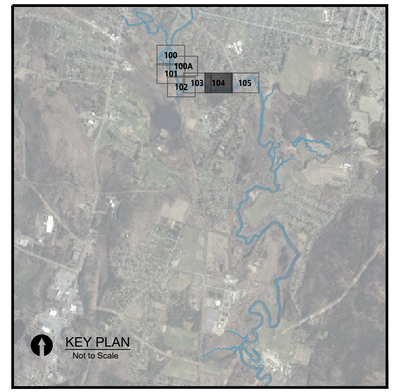
ELEV. 956.5'
(6')

ELEV. 957.5'
(3')

ELEV. 958.0'
(3')

ELEV. 955.0'
(6') (SEE NOTE 3)

APPROXIMATE RIVER BOUNDARY



FP-SERIES SITE DISPOSAL LEGEND:

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- PUBLIC ROADWAY
- EXISTING FOOTPATH
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- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- 3+00 3+00 EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
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NOTES:

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NORTH

0 40 80
SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS 'BLUE'

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-FLOODPLAIN- LIMITS_DISPOSAL.dwg FP3104

Apr 28, 2026 2:59pm cyard2

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: A. CORBIN / J. DREHS
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / C. GUEST
APPROVED BY: A. CORBIN
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

FLOODPLAIN SOIL REMOVAL LIMITS AND DISPOSAL LOCATION IDENTIFICATION

FP3104

MATCHLINE - SEE SHEET FP3104

FP-REM1-20N

1'

GE RSA 34 SPX

GE RSA 36 MN

POMEROY AVENUE

5A-VP-18

5A-VP-18A

LANDS NOW OR FORMERLY OF JOSAINE GEE BOOK 6371 PAGE 202 PROPERTY ID I060003002 560 POMEROY AVE

LANDS NOW OR FORMERLY OF REBECCA R. CARMEL \ BOOK 5562 PAGE 1 PROPERTY ID I060002024 545 POMEROY AVE

LANDS NOW OR FORMERLY OF C. JEANNE CUDDIHY BOOK 1506 PAGE 276 PROPERTY ID I060002025 571 POMEROY AVE

LANDS NOW OR FORMERLY OF NEIL ANTHONY DAVIS BOOK 7343 PAGE 91 (PLAN 417G-25) PROPERTY ID I060003002 575 POMEROY AVE

575 POMEROY AVE DAVIS NEIL ANTHONY BOOK 7343 PAGE 91

LANDS NOW OR FORMERLY OF CHRISTIAN D GOODCHILD BOOK 1662 PAGE 489 (PLAN D146-2) PROPERTY ID I060002003 316 HOLMES RD

LANDS NOW OR FORMERLY OF THE GEORGE BEEKER AND ROBERT A BEEKER REVOCABLE TRUST BOOK 7400 PAGE 121 PROPERTY ID I060003001 540 POMEROY AVE

LANDS NOW OR FORMERLY OF MARK C. MEWELL AND SARAH E. MINOR BOOK 2015 PAGE 20 PROPERTY ID I060002001 549 POMEROY AVE

LANDS NOW OR FORMERLY OF MARIO DEBARTOLO AND GRETCHEN A. DEBARTOLO BOOK 1629 PAGE 241 PROPERTY ID I060003001 380 HOLMES RD

LANDS NOW OR FORMERLY OF MISS HALL'S SCHOOL INC BOOK 414 PAGE 591 PROPERTY ID I050001001 498 HOLMES RD

Lands Now or Formerly of MASSACHUSETTS AUDUBON SOCIETY, INC. Book:1015 Page 802 (Plan B-66) Property ID I060003002

LANDS NOW OR FORMERLY OF MASSACHUSETTS AUDUBON SOCIETY, INC. BOOK 1015 PAGE 802 PLAN B-66 PROPERTY ID I060003002

TAX MAP PARCEL 76-2-1

EASEMENT CITY OF PITTSFIELD Book 705 Page 307

EASEMENT CITY OF PITTSFIELD Book 706 Page 271

DRAINAGE EASEMENT BOOK 879 PAGE 174

AREA=27,350+ SQ. FT. 0.63+ ACRE

AREA=16,030+ SQ.FT. 0.37± ACRE

AREA=4,000+ SQ FT 0.09± ACRE

HEADWALL 24"CMP INV.=957.3

HEADWALL RCP INV.=956.0

SMH RIM=971.24 INV.=957.6

SMH RIM=969.07 INV.=951.1

SMH RIM=968.86 INV.=950.9

SMH RIM=968.96 INV.=950.9

SMH RIM=976.14 INV.=963.8

SMH RIM=976.6 TOP OF DEBRIS

CB TF=966.05 8"VCP INV.=957.5

MH RIM=967.32 A)12"CMP INV.=959.4 B)6"PIPE INV.=960.0 C)12"VCP INV.=959.4

CB TF=966.6 8"CPP INV.=957.6 B)18"CMP INV.=957.3

CB TF=971.0 12"RCP INV.=959.13

12"RCP INV.=957.69

12"RCP INV.=958.37

CB TF=972.52 2-6"HDPE INV.=957.2 SUMP=970.5 PARTIALLY PLUGGED

CB TF=971.0 4"HDPE INV.=969.8 8"HDPE INV.=969.7 SUMP=969.5

CB TF=971.0 SUMP=967.0 NO PIPES PIPED

CB TF=971.0 4"HDPE INV.=964.2 8"HDPE INV.=964.0

4"PVC INV.=958.47

CONCRETE DRIVE

BLACKTOP DRIVE

CRUSHED STONE DRIVE

Basketball Hoop

Deck

Concrete Pad

Porch

Shed

Flag Pole

Gazebo

Swing Set

Sandbox

Picnic Table

Fire Pit

Pool

Pump House

Shed

Deck

Concrete Pad

Gravel Pad

Fence

Stone Wall

Wooden Fence

Chain Link Fence

Guard Rail

Utility Pole

Overhead Wires

Underground Electric

Underground Telephone

Gas Line

Water Line

Sewer Line

Storm Drain

Culvert

Bridge

Top of Bank

Edge of Pavement

Property Line

Easement

Contour

Index Contour

Intermediate Contour

Spot Elevation

Tree

Vent Pipe

Gas Valve

Gas Meter

Gas Marker

Water Valve

Water Manhole

Water Marker

Hydrant

Sewer Manhole

Sewer Cleanout

Electric Manhole

Electric Marker

Telephone Manhole

Telephone Marker

Catch Basin

Drain Manhole

Flared End Section

Headwall

Sign

Mailbox

Light Pole

Guy Wire

Guy Anchor

Transformer

Telephone Pedestal

Telephone Riser

Cable TV Riser

Cable TV Pedestal

Fiber Optic Marker

Fiber Optic Manhole

Fiber Optic Pedestal

Fiber Optic Riser

Fiber Optic Vault

Fiber Optic Handhole

Fiber Optic Cabinet

Fiber Optic Splice Box

Fiber Optic Splice Case

Fiber Optic Splice Closure

Fiber Optic Splice Enclosure

Fiber Optic Splice Tray

Fiber Optic Splice Trough

Fiber Optic Splice Organizer

Fiber Optic Splice Panel

Fiber Optic Splice Rack

Fiber Optic Splice Shelf

Fiber Optic Splice Tray Holder

Fiber Optic Splice Tray Stack

Fiber Optic Splice Tray Support

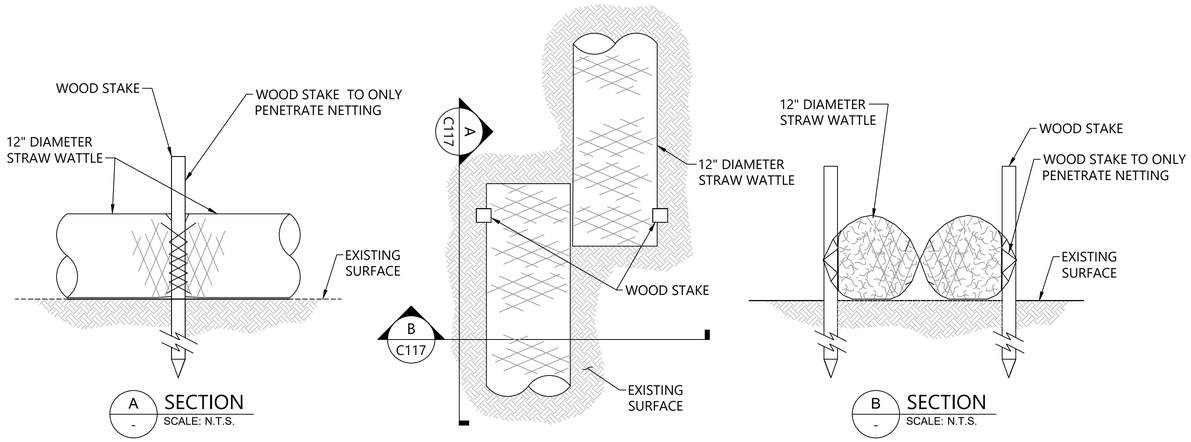
Fiber Optic Splice Tray Trough

Fiber Optic Splice Tray Organizer

Fiber Optic Splice Tray Panel

Fiber Optic Splice Tray Rack

Fiber Optic Splice Tray



A – SECTION
SCALE: N.T.S.

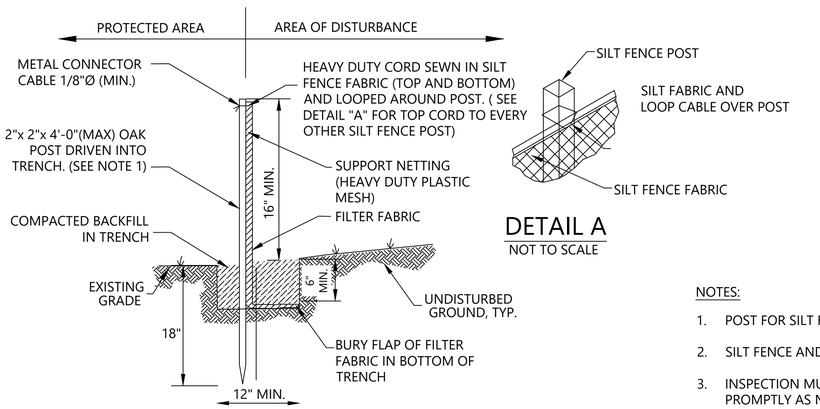
B – SECTION
SCALE: N.T.S.

STAKING DETAIL PLAN VIEW
SCALE: N.T.S

NOTES:

1. STRAW WATTLE MUST BE PLACED IN A ROW WITH A MINIMUM 1-FOOT OVERLAP AT THE ENDS.
2. STRAW WATTLE MUST BE SECURELY ANCHORED IN PLACE BY TWO STAKES DRIVEN THROUGH THE STRAW WATTLE NETTING AS SHOWN IN THE STRAW WATTLE DETAIL. STAKES MUST BE DRIVEN FLUSH WITH THE STRAW WATTLE.
3. STRAW WATTLE MUST BE REMOVED AS DIRECTED BY THE OWNER'S REPRESENTATIVE.
4. STRAW WATTLES PLACED ON SOIL MUST BE ANCHORED IN PLACE WITH STAKES DRIVEN THROUGH THE WATTLE EVERY 4 FEET AT A MINIMUM.
5. STRAW WATTLE TO BE PLACED AS NEEDED FOR EROSION AND RUNOFF CONTROL INCLUDING ALONG ROADWAYS WHERE SURFACE WATER FLOW IS EVIDENT (EG. SCOUR ZONES OR SWALES).

1 – STRAW WATTLE DETAIL
SCALE:NOT TO SCALE

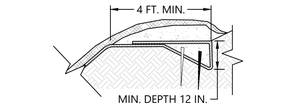


DETAIL A
NOT TO SCALE

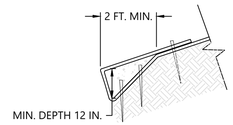
NOTES:

1. POST FOR SILT FENCE AND TURTLE FENCE MUST BE LOCATED ON 8' CENTERS.
2. SILT FENCE AND TURTLE FENCE MUST BE INSTALLED PRIOR TO CONSTRUCTION.
3. INSPECTION MUST BE DAILY AND REPAIR / REPLACEMENT MUST BE MADE PROMPTLY AS NEEDED. ACCUMULATED SEDIMENT MUST BE REMOVED AND APPROPRIATELY DISPOSED OF BY THE CONTRACTOR.
4. SILT FENCE AND TURTLE FENCE MUST BE REMOVED ONLY AS DIRECTED BY OWNER'S REPRESENTATIVE.

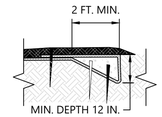
3 – SILT FENCE AND TURTLE FENCE DETAIL (UNPAVED AREAS)
SCALE:NOT TO SCALE



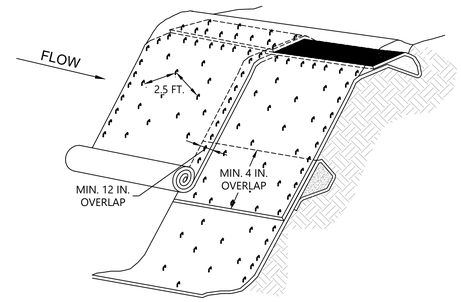
A – TOP OF SLOPE ANCHOR
SCALE:NOT TO SCALE



B – TOE OF SLOPE ANCHOR
SCALE:NOT TO SCALE



C – UPSTREAM END ANCHOR
SCALE:NOT TO SCALE

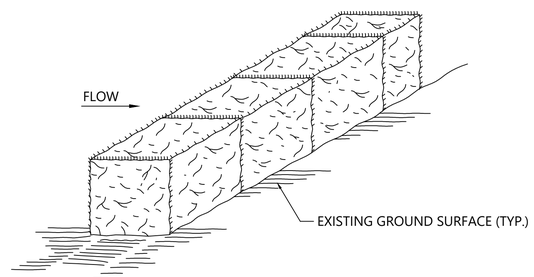


COIR FABRIC INSTALLATION, TOP OF SLOPE ISOMETRIC VIEW

NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. FABRIC SHALL HAVE GOOD SOIL CONTACT.
2. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
3. FABRIC SHOULD BE INSTALLED VERTICALLY DOWNSLOPE.
4. INSTALL COIR FABRIC OVER ENTIRE UPLAND REMOVAL AREA.
5. COIR FABRIC SHALL BE ROLLED IN A CONTROLLED FASHION. INSTALL ANCHORING AS FABRIC IS UNROLLED. FABRIC SHALL NOT BE ALLOWED TO ROLL DOWN THE SLOPE ON ITS OWN.
6. FABRIC SHALL EXTEND PAST EDGE OF TOPSOIL AND BE ANCHORED IN BACKFILL.

2 – COIR FABRIC SLOPE PROTECTION
SCALE:NOT TO SCALE



NOTES:

1. STRAW BALES MUST BE PLACED AS SHOWN IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT STRAW BALES.
2. STRAW BALES TO BE PLACED AS NEEDED FOR EROSION AND RUNOFF CONTROL.
3. INSPECTION MUST BE DAILY AND REPAIR / REPLACEMENT MUST BE MADE PROMPTLY AS NEEDED. ACCUMULATED SEDIMENT MUST BE REMOVED AND APPROPRIATELY DISPOSED BY CONTRACTOR.
4. STRAW BALES MUST BE REMOVED ONLY AS DIRECTED BY OWNER'S REPRESENTATIVE.

4 – STRAW BALE DETAIL
SCALE:NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

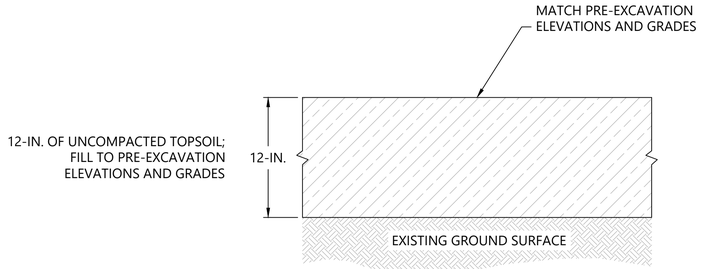
DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

MISCELLANEOUS DETAILS

FP6000

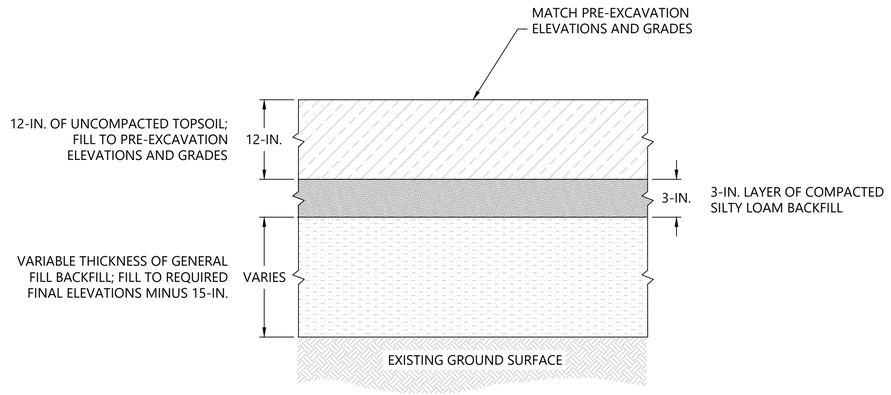
Apr 28, 2026 2:17pm cyard K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-DETAILS.dwg FP6000



NOTES:

1. PLACE 12-IN. OF UNCOMPACTED TOPSOIL TO ACHIEVE THE PRE-EXCAVATION ELEVATIONS AND GRADES.
2. TOPSOIL SHALL MEET THE REQUIREMENTS OF SPECIFICATION SECTION 31 05 13 - SOILS AND AGGREGATES.

1 - VERNAL POOL BACKFILL (1-FOOT EXCAVATIONS)
SCALE: NOT TO SCALE



NOTES:

1. PLACE AND COMPACT GENERAL FILL BACKFILL AT THE BOTTOM OF THE EXCAVATION TO 15 INCHES BELOW THE FINAL GROUND ELEVATIONS. PLACE THE GENERAL FILL BACKFILL IN LIFTS NOT GREATER THAN 8 INCHES. THE THICKNESS OF THE GENERAL FILL BACKFILL WILL VARY BY LOCATION.
2. PLACE A 3-INCH LAYER OF COMPACTED SILTY LOAM BACKFILL ABOVE THE GENERAL FILL TO ELEVATIONS 15 INCHES BELOW THE FINAL GRADE.
3. THE FINAL 12-IN. OF THE BACKFILL SHALL BE UNCOMPACTED TOPSOIL TO ACHIEVE THE PRE-EXCAVATION ELEVATIONS AND GRADES.
4. BACKFILL MATERIALS SHALL MEET THE REQUIREMENTS OF SPECIFICATION SECTION 31 05 13 - SOILS AND AGGREGATES.

2 - VERNAL POOL BACKFILL (EXCAVATIONS DEEPER THAN 1-FOOT)
SCALE: NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

VERNAL POOL BACKFILL DETAILS

FP6001

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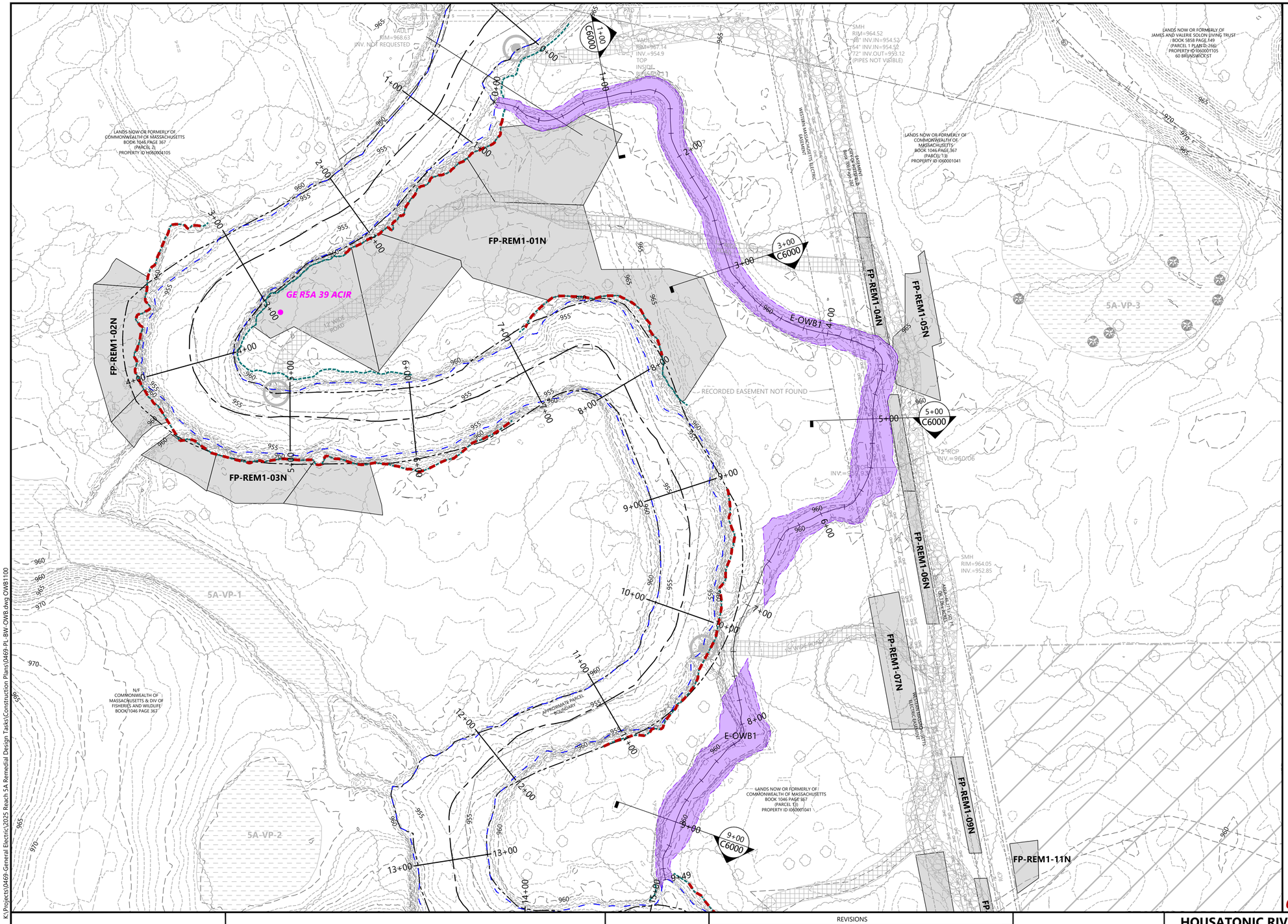



OWB-SERIES LEGEND:

- EXISTING CONTOURS (U.S. SURVEY FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY-EASEMENT BOUNDARY
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- EXISTING RIVER SHORELINE
- MODIFIED RIVER SHORELINE
- EXISTING TOP OF BANK
- EXISTING RIVER CENTERLINE
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- VERNAL POOL BOUNDARY
- RIVERBANK REMEDIATION
- NON-RESIDENTIAL FLOODPLAIN SOIL REMOVAL AREA
- PRIMARY TEMPORARY ACCESS ROAD
- SECONDARY ACCESS ROAD
- PROPOSED STAGING / LAYDOWN AREA
- RIVER ACCESS POINT

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), U.S. FEET.

NOTES:

1. SEE SHEETS G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH

0 40 80

SCALE IN FEET

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: A. CONSTANT / C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / M. WERTH
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

REMEDIAL ACTION PLAN
INTERMITTENT SIDE CHANNEL (E-OWB1)

OWB1100

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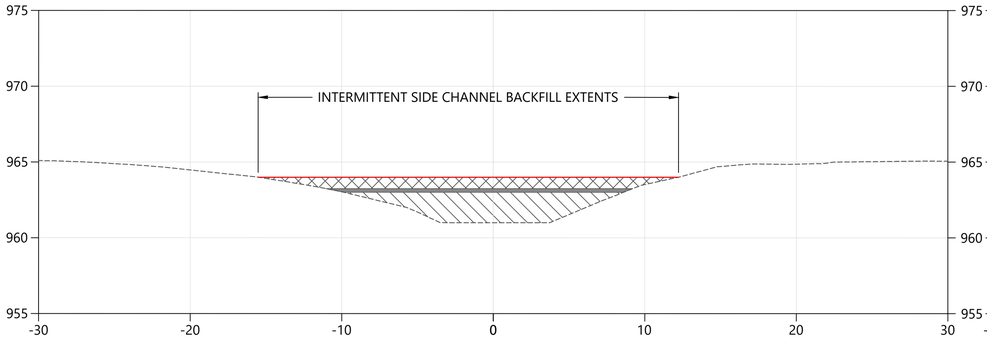
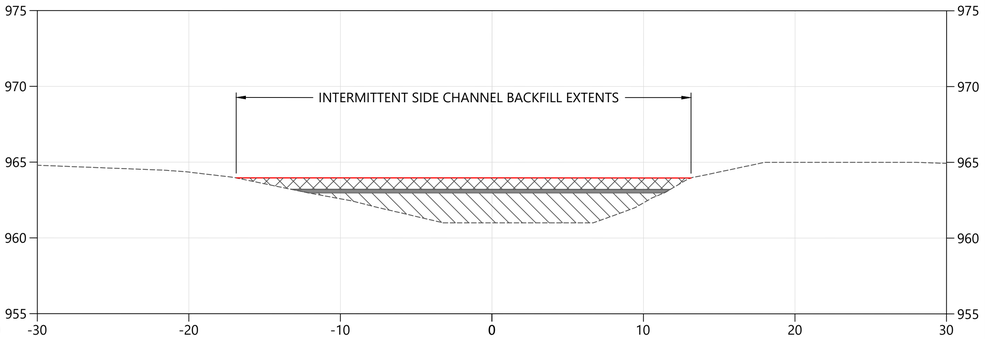
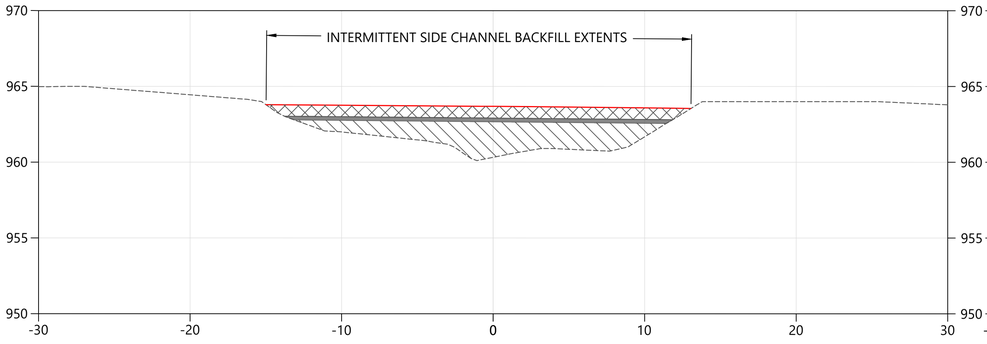
Apr 28, 2026 1:44pm cyard



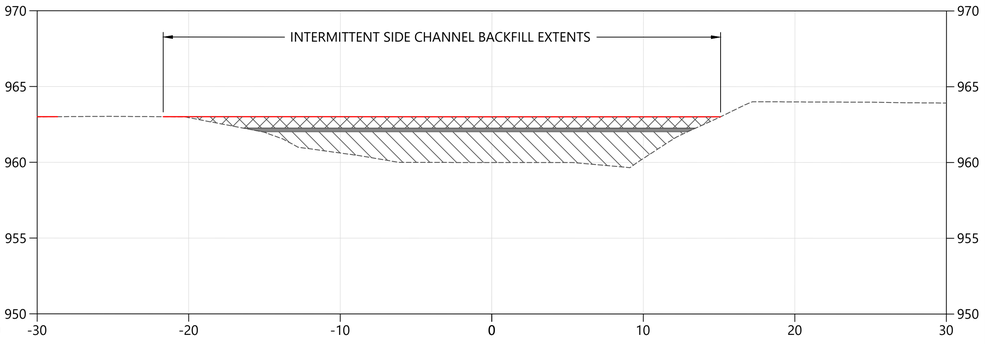
OWB 1100 SECTION 1+00
SCALE: 1" = 5'



OWB 1100 SECTION 3+00
SCALE: 1" = 5'



OWB 1100 SECTION 5+00
SCALE: 1" = 5'



OWB 1100 SECTION 9+00
SCALE: 1" = 5'

LEGEND:

- EXISTING TOPOGRAPHY GROUND SURFACE (BLUESKY/WHITEOUT 2025)
- TARGET BACKFILL SURFACE
- TOPSOIL
- GENERAL FILL BACKFILL
- SILTY LOAM BACKFILL

NOTES:

1. SEE SHEET OWB6000 FOR BACKFILL TYPE AND THICKNESS REQUIREMENTS.

0 5 10
SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

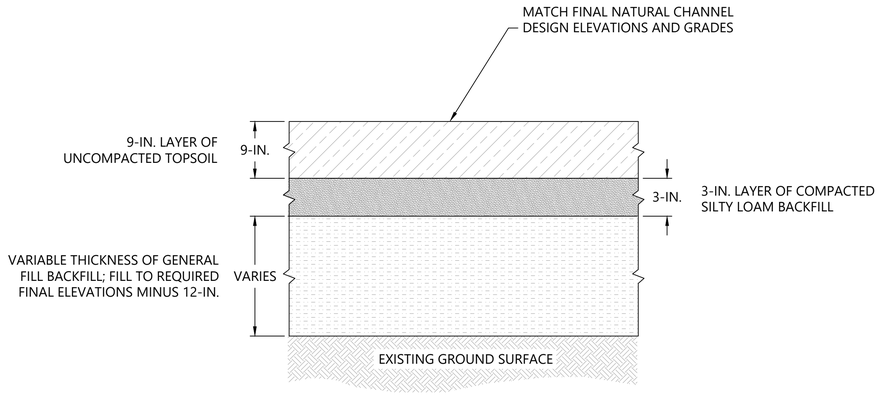
DESIGNED BY: A. CONSTANT / C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY / M. WERTH
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

INTERMITTENT SIDE CHANNEL (E-OWB1) CROSS SECTIONS

OWB5000

Apr 28, 2026 1:46pm cyard K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-BW-OWB.dwg OWB5000



NOTES:

1. PLACE AND COMPACT GENERAL FILL BACKFILL AT THE BOTTOM OF THE CHANNEL TO 12 INCHES BELOW THE FINAL GROUND ELEVATIONS. PLACE THE GENERAL FILL BACKFILL IN LIFTS NOT GREATER THAN 8 INCHES. THE THICKNESS OF THE GENERAL FILL BACKFILL WILL VARY BY LOCATION.
2. PLACE A 3-INCH LAYER OF COMPACTED SILTY LOAM BACKFILL ABOVE THE GENERAL FILL TO ELEVATIONS 9 INCHES BELOW THE FINAL GRADE.
3. THE FINAL 9-IN. OF THE BACKFILL SHALL BE UNCOMPACTED TOPSOIL TO ACHIEVE THE FINAL SPECIFIED ELEVATIONS AND GRADES.
4. BACKFILL MATERIALS SHALL MEET THE REQUIREMENTS OF SPECIFICATION SECTION 31 05 13 - SOILS AND AGGREGATES.

1 / - INTERMITTENT SIDE CHANNEL BACKFILL
SCALE:NOT TO SCALE

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04-29-2026 DRAFT-NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

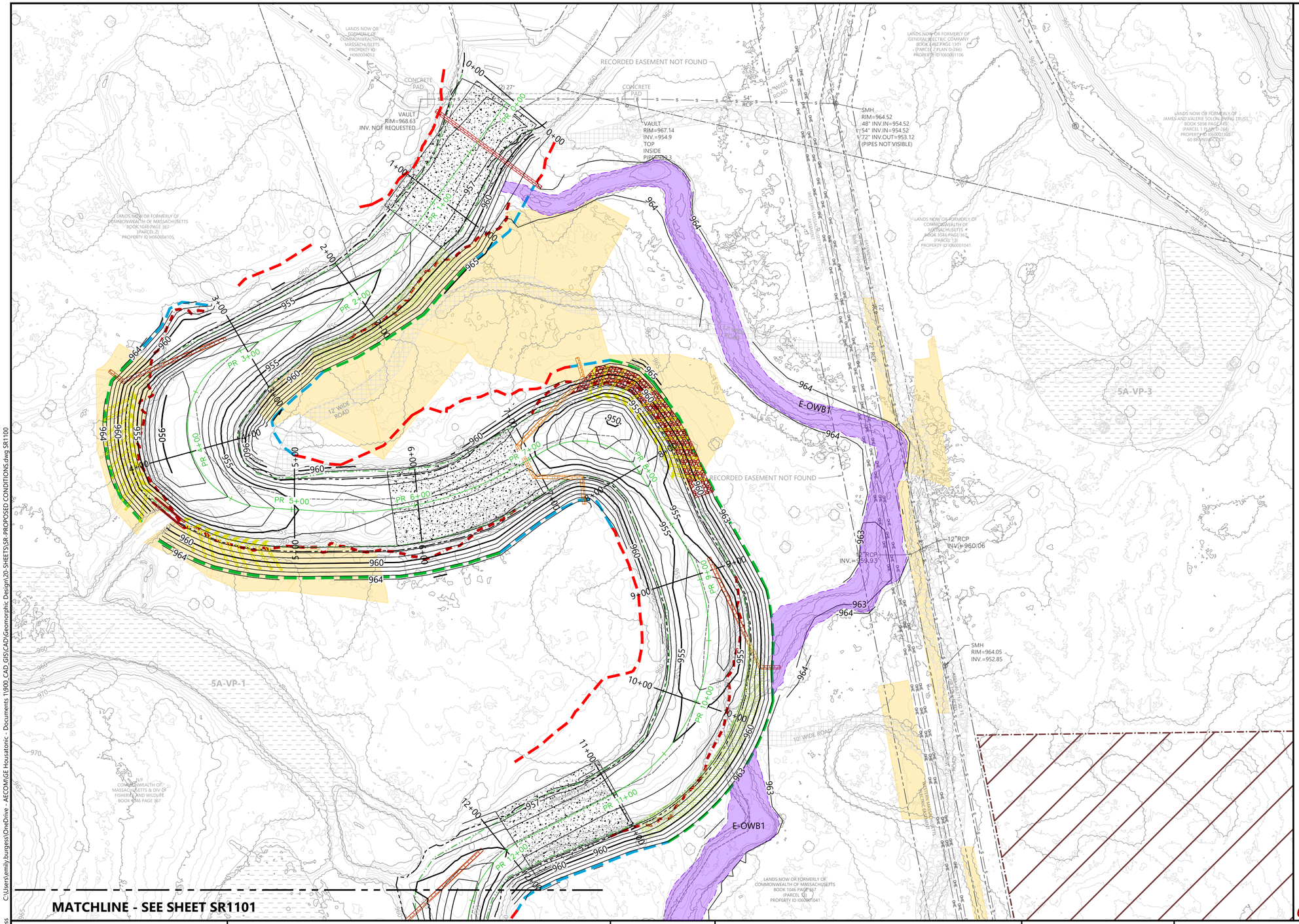
DESIGNED BY: C. GUEST
DRAWN BY: P. SCIABA / C. YARD
CHECKED BY: D. BINKNEY
APPROVED BY: C. GUEST
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

INTERMITTENT SIDE CHANNEL (E-OWB1) DETAIL

OWB6000

Apr 28, 2026 2:17pm cyard K:\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\Construction Plans\0469-PL-DETAILS.dwg OWB6000





LEGEND:

- EXISTING CONTOURS (FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY BOUNDARY MASSGIS
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- VERNAL POOL BOUNDARY
- REQUIRED RIVERBANK REMEDIATION
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- FLOODPLAIN SOIL REMOVAL AREA
- TEMPORARY ACCESS ROAD
- PROPOSED STAGING/LAYDOWN LOCATION
- PROPOSED RIVER STATIONING
- PROPOSED CONTOURS (FEET NAVD88) (1-FOOT INTERVAL)
- PROPOSED TOE OF BANK
- ESTIMATED BANKFULL EXTENTS (EXISTING, PROPOSED & TRANSITION)
- PROPOSED RIFFLE FEATURE
- PROPOSED BRUSH MATTRESS
- PROPOSED RIPRAP
- PROPOSED TOEWOOD/ ROOTWAD
- PROPOSED WOOD & ROCK J-HOOK
- PROPOSED WOOD & ROCK BENDWAY WEIR
- PROPOSED WOOD & ROCK CROSS VANE
- PROPOSED WOOD & ROCK SILL

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

NOTES:

1. SEE SHEET G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH

0 40 80

SCALE IN FEET

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: _____
DRAWN BY: _____
CHECKED BY: _____
APPROVED BY: _____
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DESIGN PLAN
STA. 00+00 TO STA. 12+50 &
INTERMITTENT SIDE CHANNEL (E-OWB1)

SR1100

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Apr 28, 2026 12:00pm emily.burgess

MATCHLINE - SEE SHEETS SR1100

STAGING AREA 1

MATCHLINE - SEE SHEET 1102



LEGEND:

- EXISTING CONTOURS (FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY BOUNDARY MASSGIS
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- VERNAL POOL BOUNDARY
- REQUIRED RIVERBANK REMEDIATION
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- FLOODPLAIN SOIL REMOVAL AREA
- TEMPORARY ACCESS ROAD
- PROPOSED STAGING/LAYDOWN LOCATION
- PROPOSED RIVER STATIONING
- PROPOSED CONTOURS (FEET NAVD88) (1-FOOT INTERVAL)
- PROPOSED TOE OF BANK
- ESTIMATED BANKFULL EXTENTS (EXISTING, PROPOSED & TRANSITION)
- PROPOSED RIFFLE FEATURE
- PROPOSED BRUSH MATTRESS
- PROPOSED RIPRAP
- PROPOSED TOEWOOD/ ROOTWAD
- PROPOSED WOOD & ROCK J-HOOK
- PROPOSED WOOD & ROCK BENDWAY WEIR
- PROPOSED WOOD & ROCK CROSS VANE
- PROPOSED WOOD & ROCK SILL

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

NOTES:

1. SEE SHEET G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH

0 40 80

SCALE IN FEET

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04-29-2026 DRAFT-NOT FOR CONSTRUCTION

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GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

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CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DESIGN PLAN
STA. 12+50 TO STA. 21+50

SR1101

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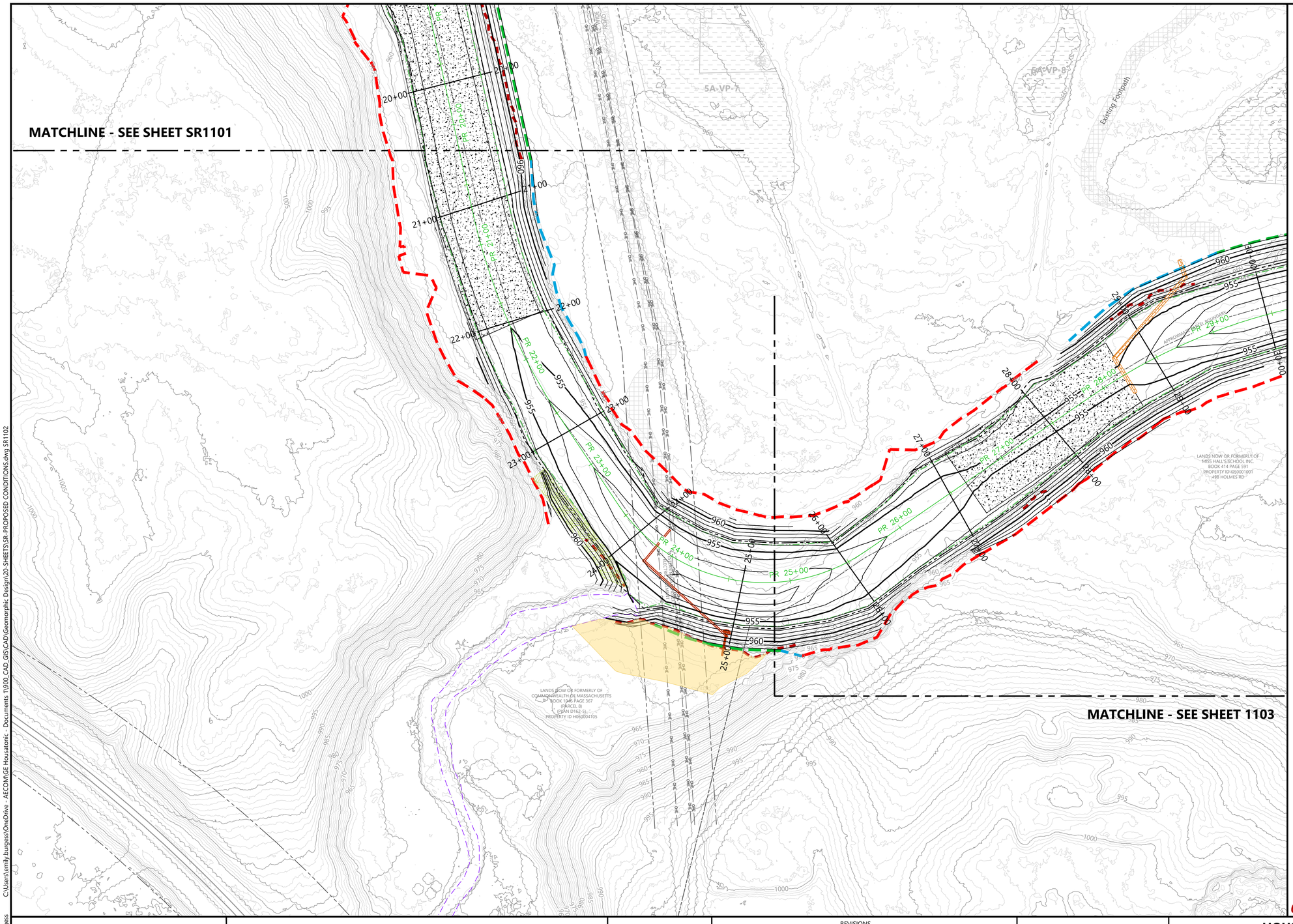



LEGEND:

- EXISTING CONTOURS (FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY BOUNDARY MASSGIS
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- VERNAL POOL BOUNDARY
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- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- FLOODPLAIN SOIL REMOVAL AREA
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- PROPOSED STAGING/LAYDOWN LOCATION
- PROPOSED RIVER STATIONING
- PROPOSED CONTOURS (FEET NAVD88) (1-FOOT INTERVAL)
- PROPOSED TOE OF BANK
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- PROPOSED RIFFLE FEATURE
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- PROPOSED WOOD & ROCK SILL

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

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NOTES:

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NORTH

0 40 80

SCALE IN FEET

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04-29-2026 DRAFT-NOT FOR CONSTRUCTION

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DESIGN PLAN
STA. 21+50 TO STA. 30+00

SR1102

Apr 28, 2026 12:16pm emily.burgess

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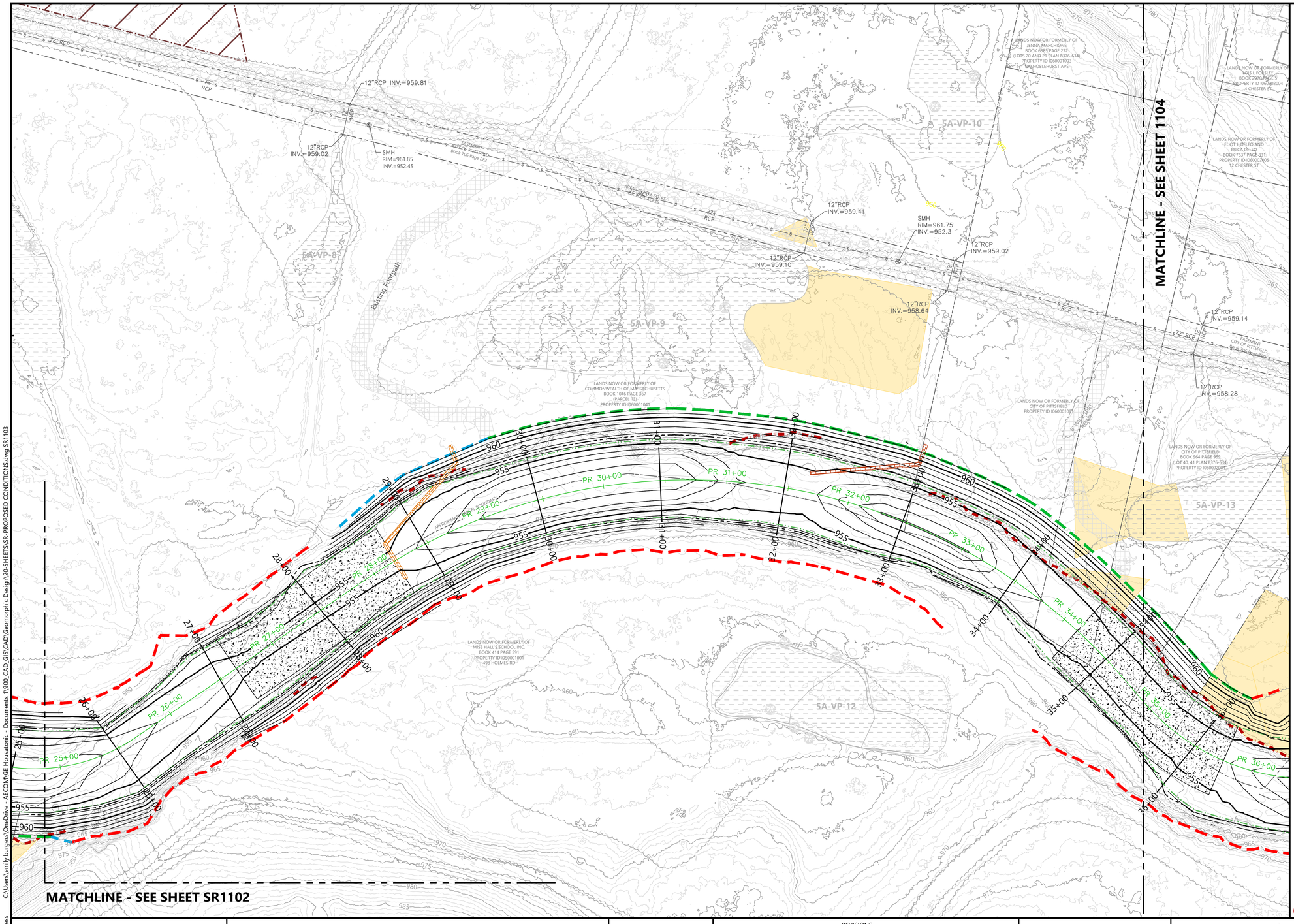



LEGEND:

- EXISTING CONTOURS (FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY BOUNDARY MASSGIS
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- VERNAL POOL BOUNDARY
- REQUIRED RIVERBANK REMEDIATION
- EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- FLOODPLAIN SOIL REMOVAL AREA
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NOTES:

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NORTH

0 40 80

SCALE IN FEET

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04-29-2026 DRAFT-NOT FOR CONSTRUCTION

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DESIGN PLAN
STA. 30+00 TO STA. 36+50

SR1103

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Apr 28, 2026 12:17pm emily.burgess

MATCHLINE - SEE SHEET SR1103

MATCHLINE - SEE SHEET SR1105

REVILLA TERRACE

LANDS NOW OR FORMERLY OF JENNA MARCHIONE BOOK 6385 PAGE 272 (LOTS 20 AND 21 PLAN B376-634) PROPERTY ID I060001003 6 NOBLEHURST AVE

LANDS NOW OR FORMERLY OF MOLLY FORSETT BOOK 7691 PAGE 5 PROPERTY ID I060002004 4 CHESTER ST

LANDS NOW OR FORMERLY OF ELIOT L. DILEO AND ERICA DILEO BOOK 7537 PAGE 331 PROPERTY ID I060002005 12 CHESTER ST

LANDS NOW OR FORMERLY OF MATTHEW R. HARPER BOOK 6164 PAGE 250 PROPERTY ID I060002002 20 CHESTER ST

LANDS NOW OR FORMERLY OF DAVID J. LOTTO AND NORAH M. WALSH BOOK 1189 PAGE 476 PROPERTY ID I060002101 15 CHESTER ST

LANDS NOW OR FORMERLY OF CITY OF PITTSFIELD PROPERTY ID I060001001

LANDS NOW OR FORMERLY OF CITY OF PITTSFIELD BOOK 964 PAGE 969 (LOT 40, 41 PLAN B376-634) PROPERTY ID I060002001

LANDS NOW OR FORMERLY OF EDUARD KOGAN AND BRITTANY A. CALLANDER BOOK 6919 PAGE 220 (LOTS 4 AND 5 PLAN B355-640) PROPERTY ID I060003010 49 REVILLA TER

LANDS NOW OR FORMERLY OF TCI HOLDINGS, LLC BOOK 7118 PAGE 171 (PLAN B355-640) PROPERTY ID I060003012 55 REVILLA TER

N/F EDITH SIMPSON MAP 106 BLOCK 3 LOT 12

N/F GEORGE & ROBERTA BEEKER BK 1003 PG 757

LANDS NOW OR FORMERLY OF JUDY M. NORTH BOOK 3173 PAGE 111 PROPERTY ID I060003013 61 REVILLA TER

N/F GEORGE BEEKER AND ROBERTA A. BEEKER BOOK 1009, PAGE 757 MAP 106 BLOCK 3 LOT 1

LANDS NOW OR FORMERLY OF MISS HALL'S SCHOOL INC BOOK 414 PAGE 591 PROPERTY ID I050001001 498 HOLMES RD

NOBLEHURST AVE CITY OF PITTSFIELD BOOK PAGE

12" RCP INV.=959.14

12" RCP INV.=958.28

12" RCP INV.=958.47

SMH RIM=961.59 INV.=952.29

SMH RIM=961.62 INV.=952.12

EASEMENT CITY OF PITTSFIELD BOOK 700 PG 173

AREA=27,350± SQ. FT. 0.63± AC.

5A-VP-13

5A-VP-14

5A-VP-15

5A-VP-15A

5A-VP-16

PR 34+00

PR 35+00

PR 36+00

PR 37+00

PR 38+00

PR 39+00

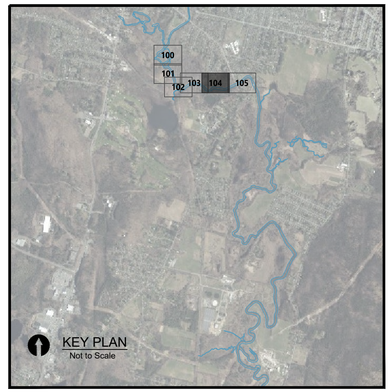
PR 40+00

PR 41+00

PR 42+00

PR 43+00

PR 44+00



LEGEND:

- 950 — EXISTING CONTOURS (FEET NAVD88) (1-FOOT INTERVAL)
- PROPERTY BOUNDARY MASSGIS
- PUBLIC ROADWAY
- EXISTING FOOTPATH
- VERNAL POOL BOUNDARY
- REQUIRED RIVERBANK REMEDIATION
- 0+00 — 0+00 EXISTING RIVER STATIONING
- OTHER WATERBODY BOUNDARY
- INTERMITTENT SIDE CHANNEL BACKFILL EXTENT
- FLOODPLAIN SOIL REMOVAL AREA
- TEMPORARY ACCESS ROAD
- PROPOSED STAGING/LAYDOWN LOCATION
- PR 3+00 PROPOSED RIVER STATIONING
- 950 PROPOSED CONTOURS (FEET NAVD88) (1-FOOT INTERVAL)
- PROPOSED TOE OF BANK
- ESTIMATED BANKFULL EXTENTS (EXISTING, PROPOSED & TRANSITION)
- PROPOSED RIFFLE FEATURE
- PROPOSED BRUSH MATTRESS
- PROPOSED RIPRAP
- PROPOSED TOEWOOD/ ROOTWAD
- PROPOSED WOOD & ROCK J-HOOK
- PROPOSED WOOD & ROCK BENDWAY WEIR
- PROPOSED WOOD & ROCK CROSS VANE
- PROPOSED WOOD & ROCK SILL

HORIZONTAL DATUM: MASSACHUSETTS STATE PLANE MAINLAND, (NAD83), U.S. FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

NOTES:

1. SEE SHEET G0001 AND G0002 FOR GENERAL NOTES AND LEGEND.
2. LOCATIONS ARE APPROXIMATE FOR ALL UTILITIES.

NORTH

0 40 80

SCALE IN FEET

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS 'BLUE'

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

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Apr 27, 2026 5:20pm emily.burgess

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

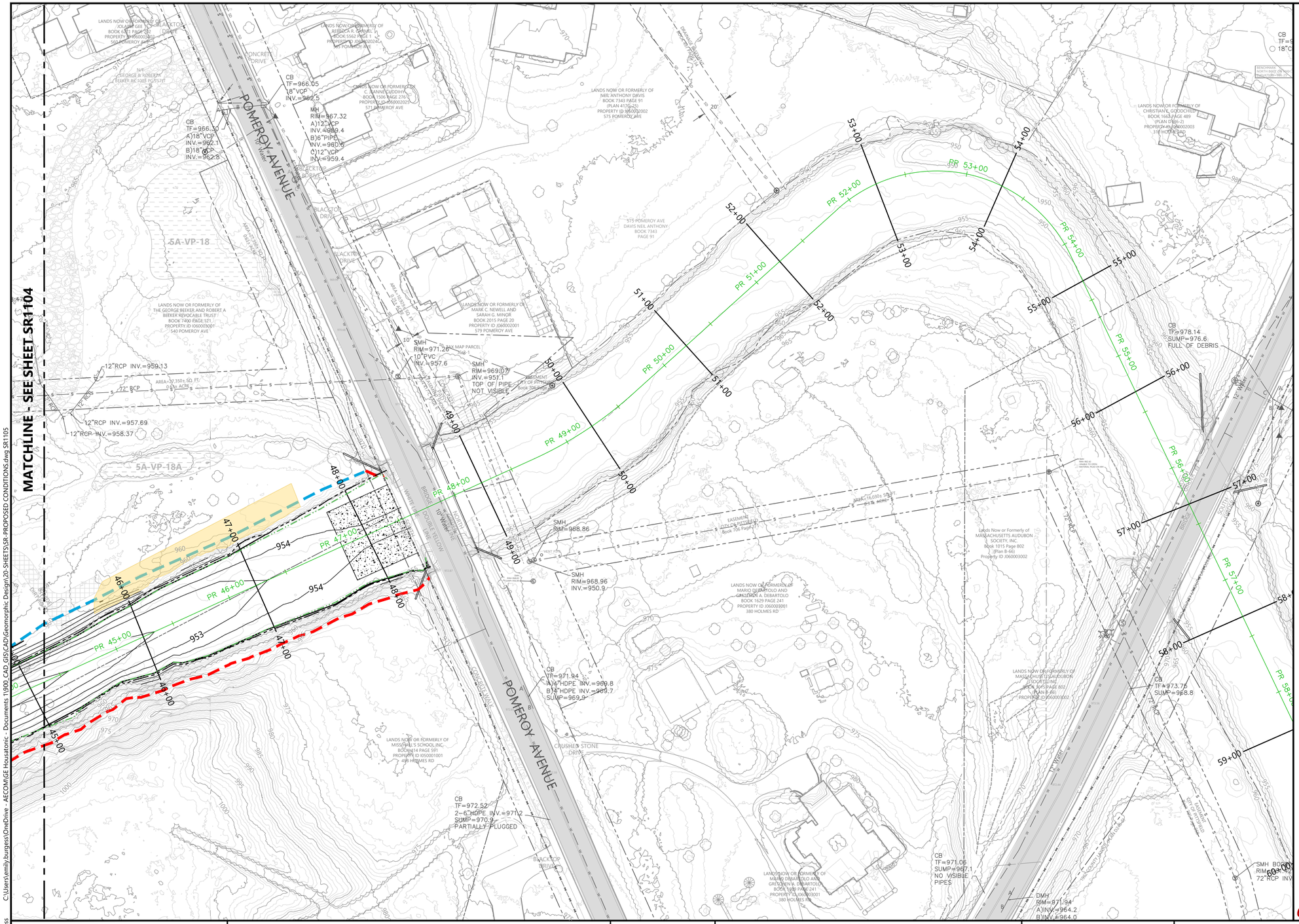
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DESIGN PLAN
STA. 36+50 TO STA. 45+00

SR1104

MATCHLINE - SEE SHEET SR1104


POMEROY AVENUE
5A-VP-18
5A-VP-18A
PR 45+00
PR 46+00
PR 47+00
PR 48+00
PR 49+00
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PR 51+00
PR 52+00
PR 53+00
PR 54+00
PR 55+00
PR 56+00
PR 57+00
PR 58+00
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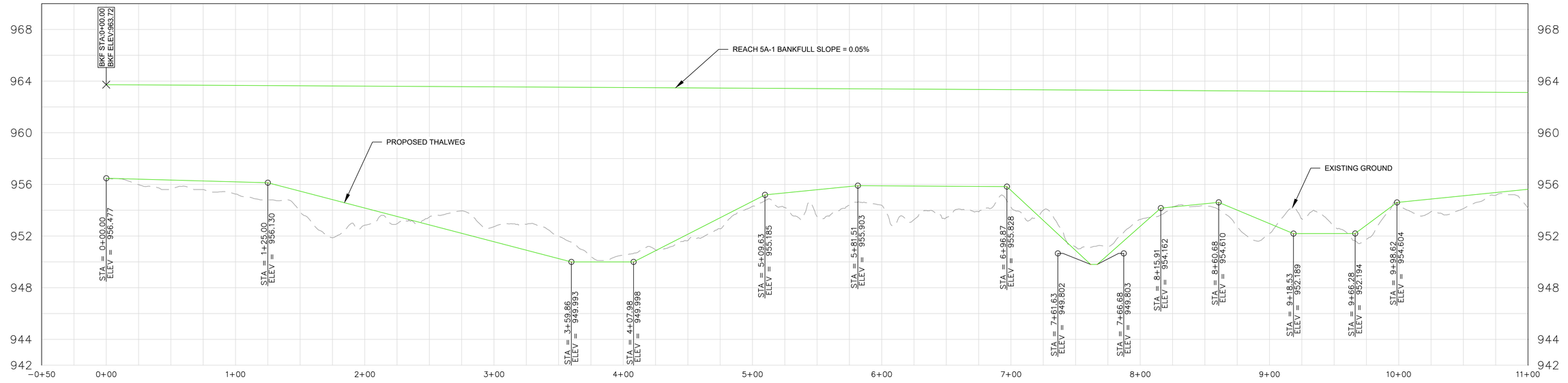
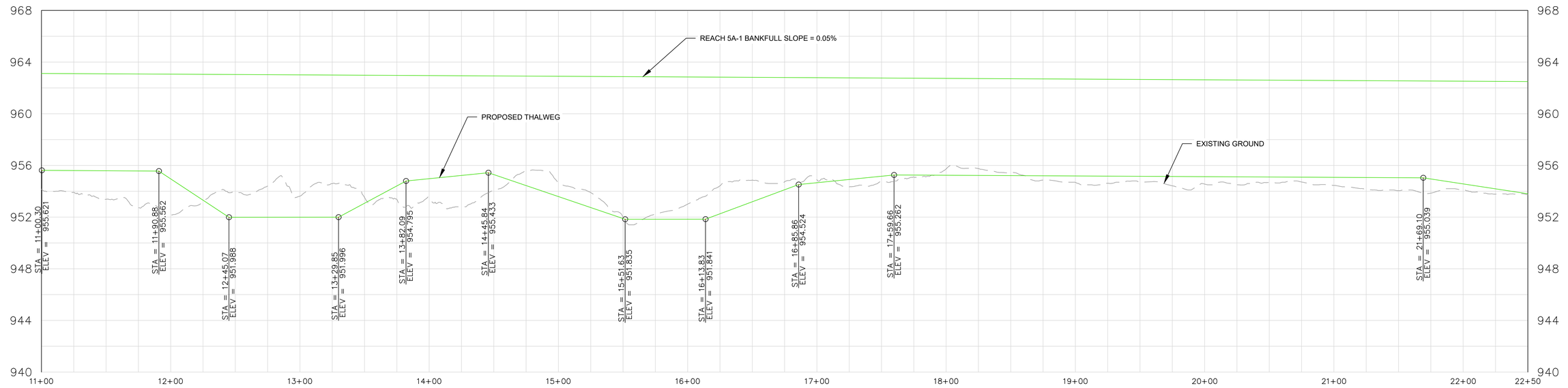
50+00
51+00
52+00
53+00
54+00
55+00
56+00
57+00
58+00
59+00
60+00
954
953
CB TF=966.05 18"VCP INV.=962.5
MH RIM=967.32 A)12"VCP INV.=959.4 B)6"PIPE INV.=960.6 C)12"VCP INV.=959.4
CB TF=966.10 A)18"VCP INV.=962.1 B)18"VCP INV.=962.8
SMH RIM=971.26 10"PVC INV.=957.6
SMH RIM=969.07 INV.=957.1 TOP OF PIPE NOT VISIBLE
SMH RIM=968.86
SMH RIM=968.96 INV.=950.9
CB TF=971.84 A)4"HDPE INV.=969.8 B)4"HDPE INV.=969.7 SUMP=969.3
CB TF=972.52 2-6"HDPE INV.=971.2 SUMP=970.9 PARTIALLY PLUGGED
CB TF=978.14 SUMP=976.6 FULL OF DEBRIS
CB TF=973.75 SUMP=968.8
CB TF=971.06 SUMP=967.1 NO VISIBLE PIPES
DMH RIM=971.94 A)INV.=964.2 B)INV.=964.0
12"RCP INV.=959.13
72" RCP
12"RCP INV.=957.69
12"RCP INV.=958.37
AREA=2,350± SQ. FT. 0.05 ACRE
AREA=10,000± SQ. FT. 0.23 ACRE
AREA=16,000± SQ. FT. 0.37 ACRE
AREA=6,000± SQ. FT. 0.14 ACRE
AREA=4,000± SQ. FT. 0.09 ACRE
AREA=3,000± SQ. FT. 0.07 ACRE
AREA=1,000± SQ. FT. 0.02 ACRE
AREA=2,000± SQ. FT. 0.05 ACRE
AREA=1,000± SQ. FT. 0.02 ACRE
AREA=1,000± SQ. FT. 0.02 ACRE
AREA=1,000± SQ. FT. 0.02



1 PROPOSED PROFILE VIEW STA. PR 0+00 - 11+00

HORIZONTAL SCALE: 1"= 40' VERTICAL SCALE: 1"=4'



2 PROPOSED PROFILE VIEW STA. PR 11+00 - 22+50

HORIZONTAL SCALE: 1"= 40' VERTICAL SCALE: 1"=4'

0 40 80
SCALE IN FEET

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

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Apr 28, 2026 2:04pm emily.burgess

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS

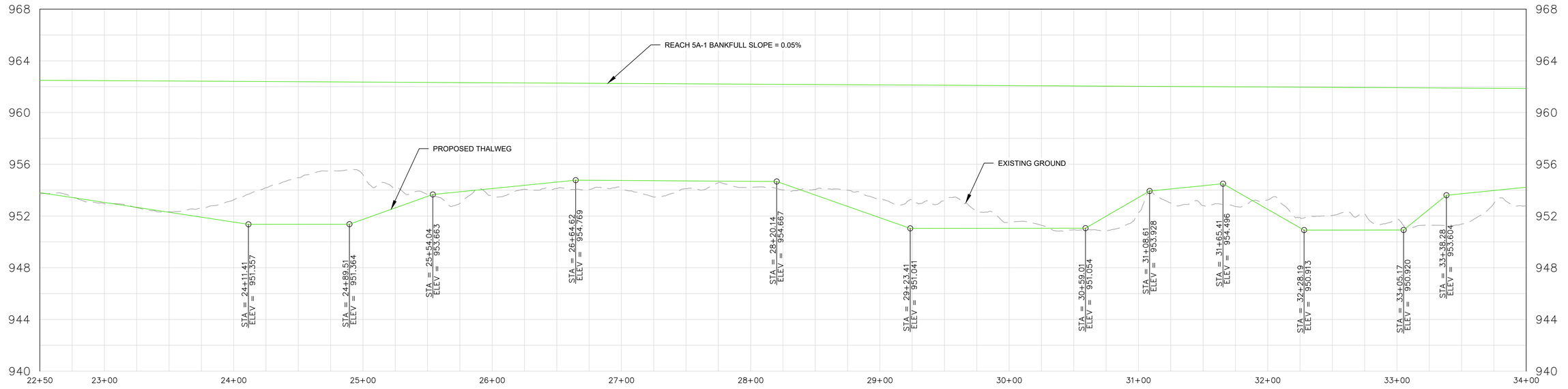
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

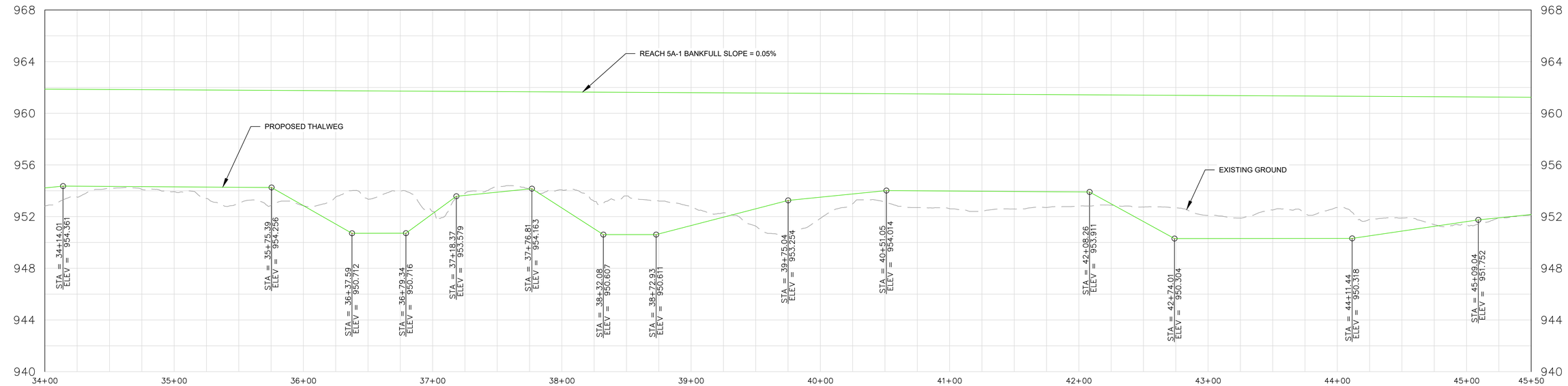
GEOMORPHIC PROFILE VIEW
STA PR 0+00 TO STA PR 22+00

SR5000



3 PROPOSED PROFILE VIEW STA. PR 22+50 - 34+00

HORIZONTAL SCALE: 1"= 40' VERTICAL SCALE: 1"=4'



4 PROPOSED PROFILE VIEW STA. PR 34+00 - 45+50

HORIZONTAL SCALE: 1"= 40' VERTICAL SCALE: 1"=4'

0 40 80

SCALE IN FEET

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

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Apr 28, 2026 2:04pm emily.burgess

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

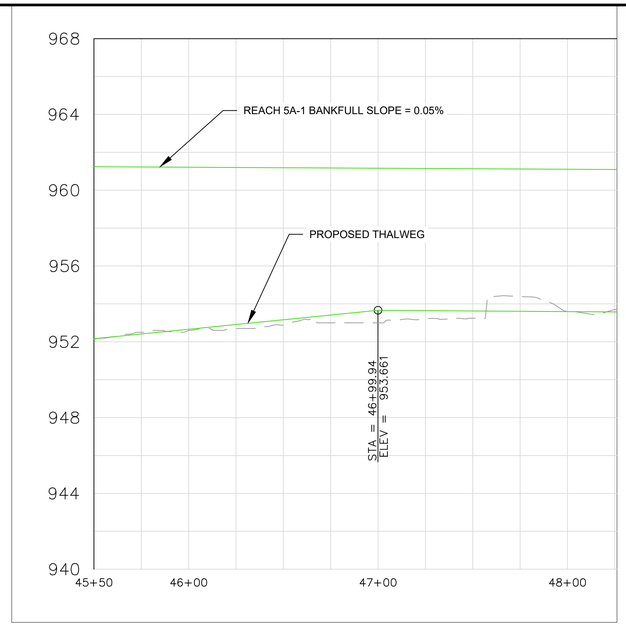
REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC PROFILE VIEW
STA PR 22+00 TO STA PR 45+50

SR5001



5 PROPOSED PROFILE VIEW STA. PR 45+50 - 48+00

HORIZONTAL SCALE: 1"= 40' VERTICAL SCALE: 1"=4'

0 40 80

SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

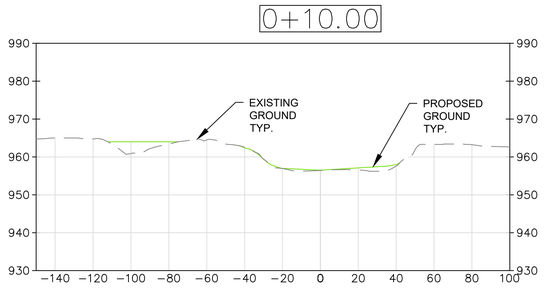
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

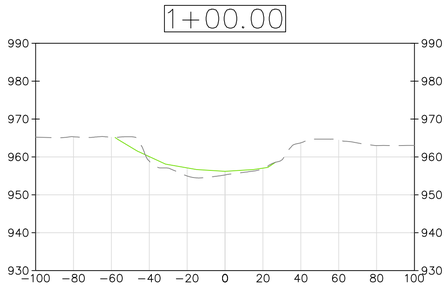
HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

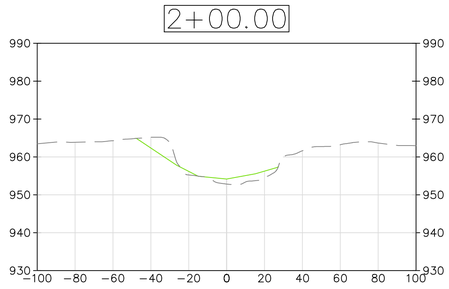
GEOMORPHIC PROFILE VIEW
STA PR 45+50 TO STA PR 48+00

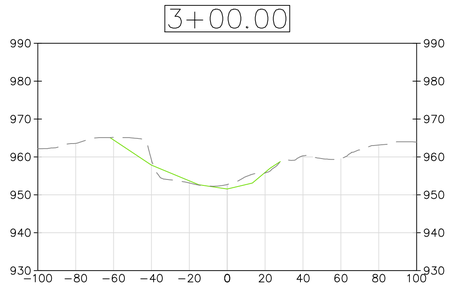
SR5002

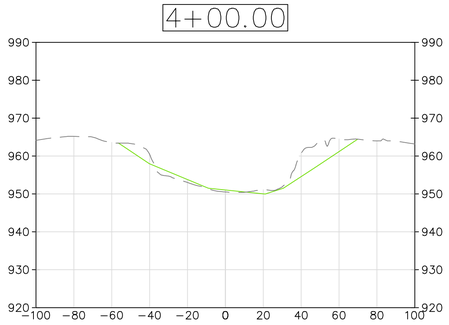
Apr 28, 2026 2:06pm emily.burgess C:\Users\emily.burgess\OneDrive - AECOM\GE Housatonic - Documents 11900_CAD_GIS\CAD\Geomorphic Design\20-SHEETS\PR-PROFILE VIEW.dwg SR5002

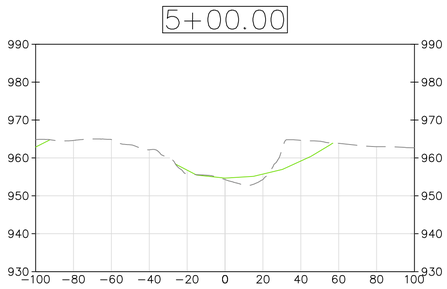


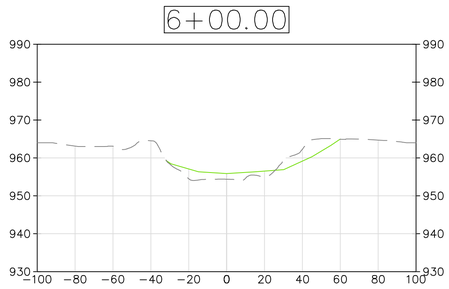


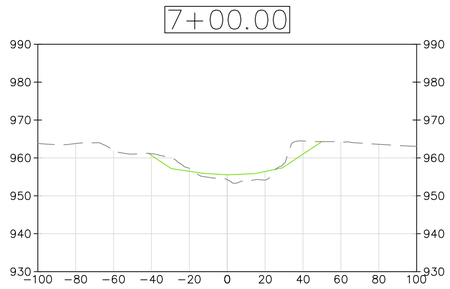


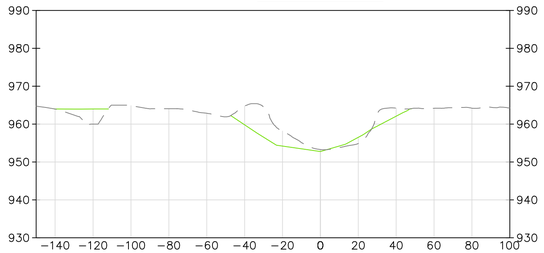


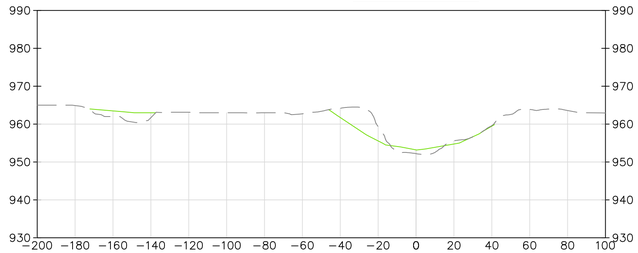


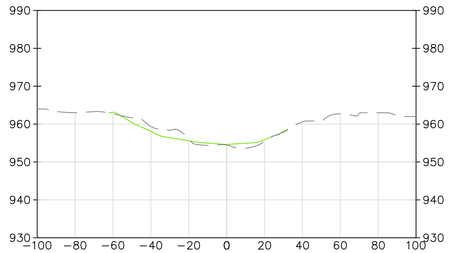


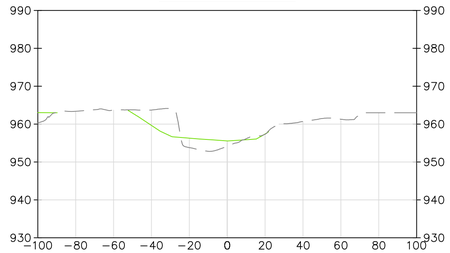


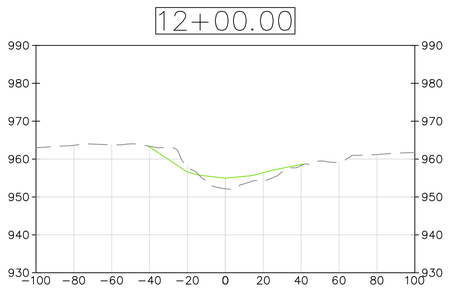


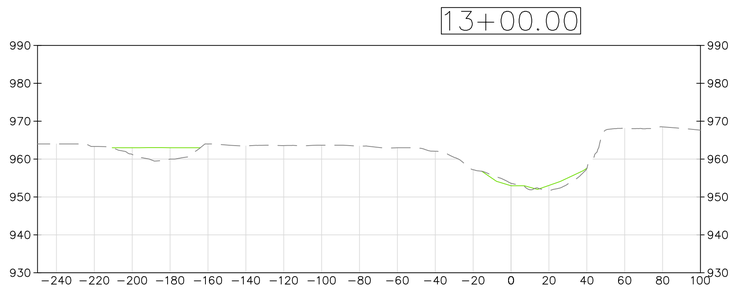


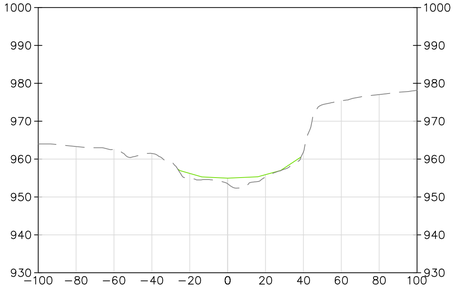


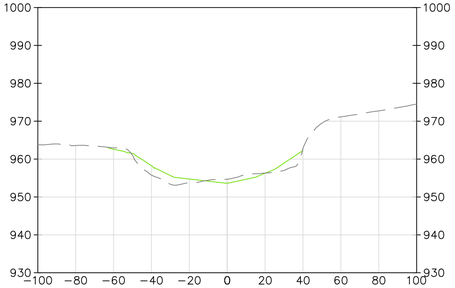












1 SECTION VIEWS STA. PR 0+10 - 15+00

HORIZONTAL SCALE: 1"= 40' VERTICAL SCALE: 1"=20'

0 40 80

SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

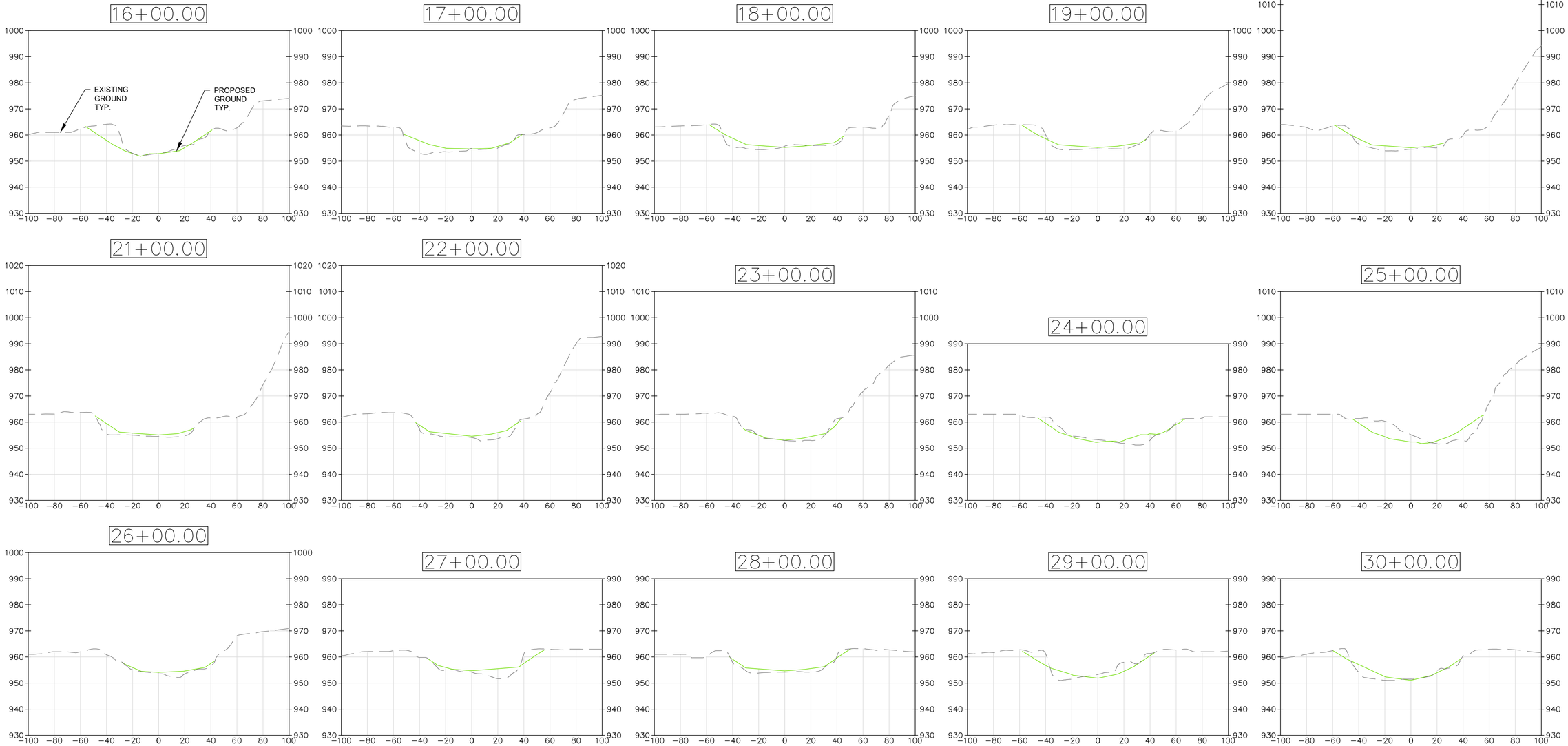
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC SECTION VIEWS
STA PR 0+10 TO STA PR 15+00

SR6000

Apr 28, 2026 12:59pm emily.burgess C:\Users\emily.burgess\OneDrive - AECOM\GE Housatonic - Documents 11900_CAD_GIS\CAD\Geomorphic Design\20-SHEETS\SE-SECTION VIEW.dwg SR6000



2 SECTION VIEWS STA. PR 16+00 - 30+00

HORIZONTAL SCALE: 1"= 40' VERTICAL SCALE: 1"=20'

0 40 80

SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC SECTION VIEWS
STA PR 16+00 TO STA PR 30+00

SR6001

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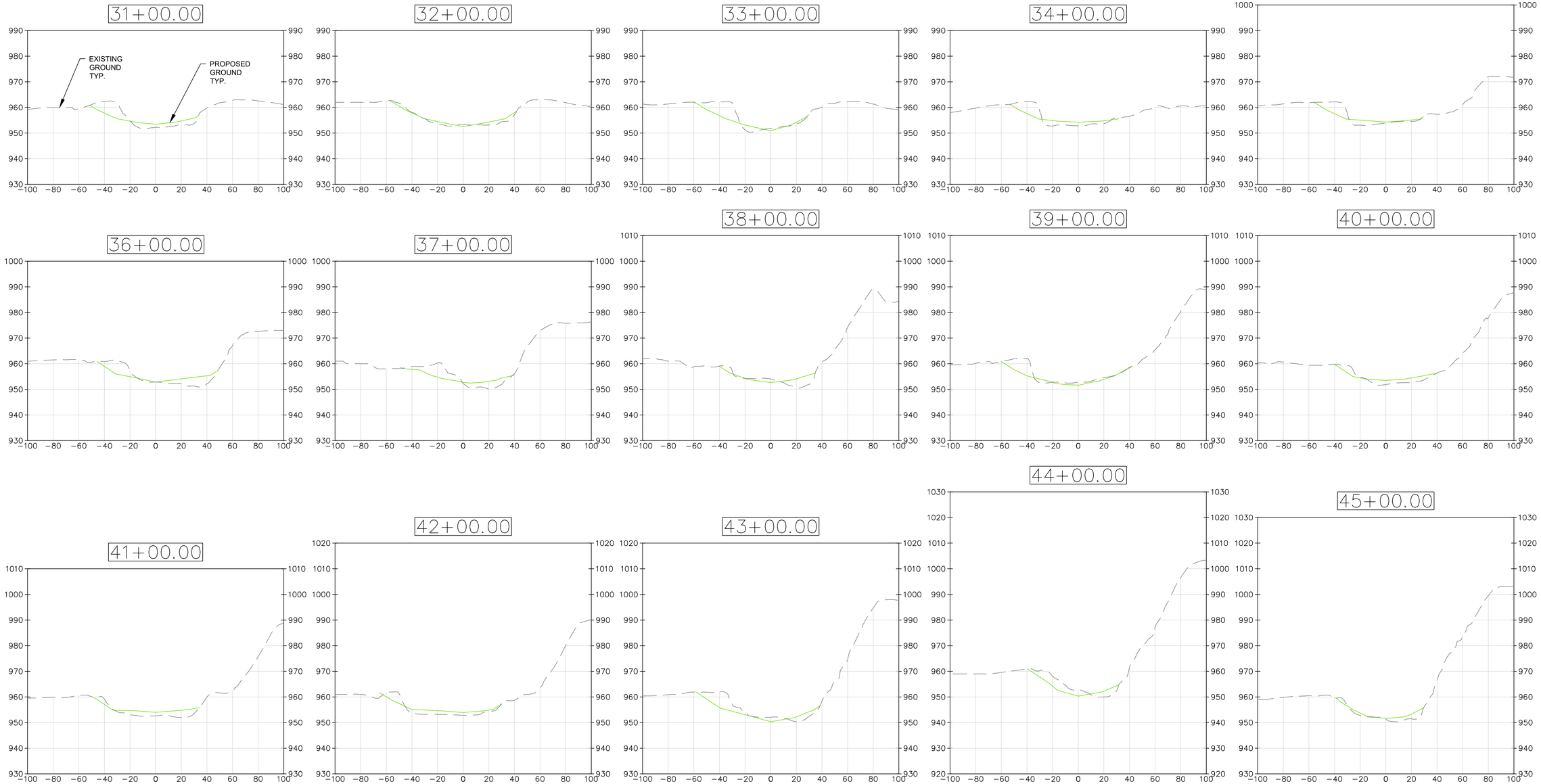

3 SECTION VIEWS STA. PR 31+00 - 45+00

HORIZONTAL SCALE: 1"= 40' VERTICAL SCALE: 1"=20'

0 40 80
SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC SECTION VIEWS
STA PR 31+00 TO STA PR 45+00

SR6002

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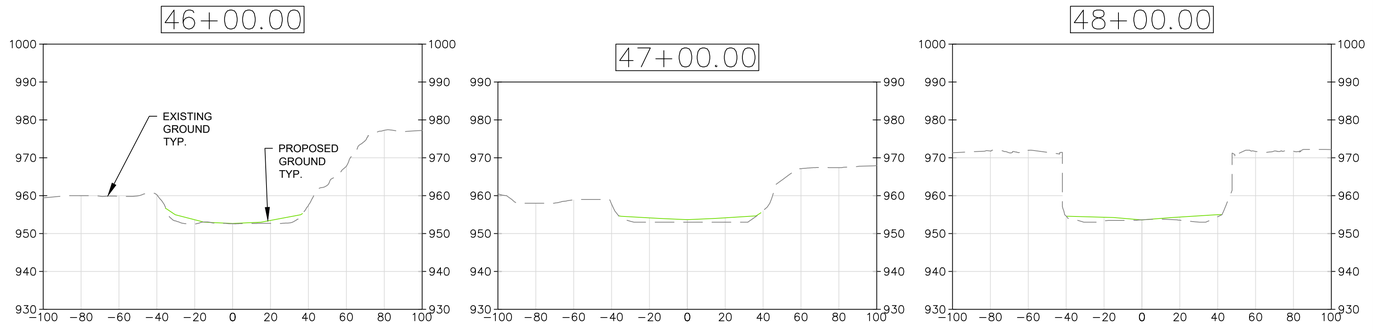
Apr 28, 2026 1:01pm emily.burges



4 SECTION VIEWS STA. PR 46+00 - 48+00

HORIZONTAL SCALE: 1"= 40' VERTICAL SCALE: 1"=20'

0 40 80

SCALE IN FEET

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

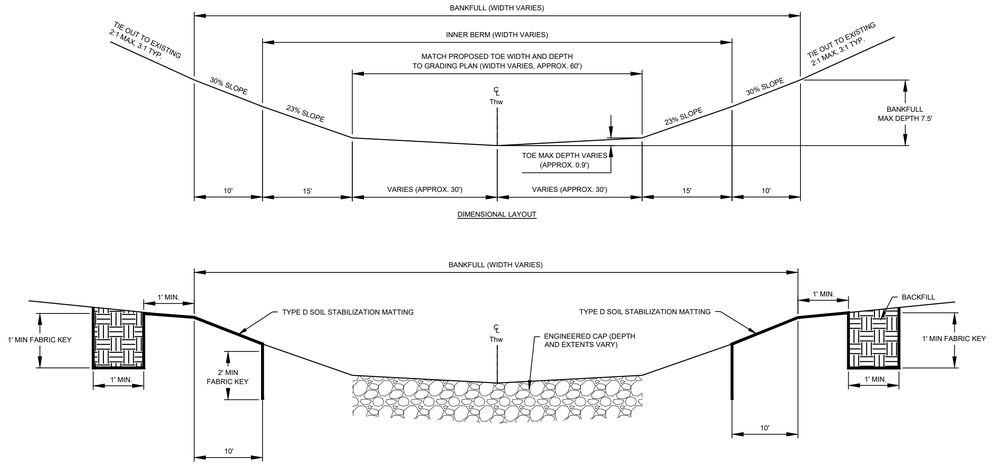
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC SECTION VIEWS
STA PR 46+00 TO STA PR 48+00

SR6003

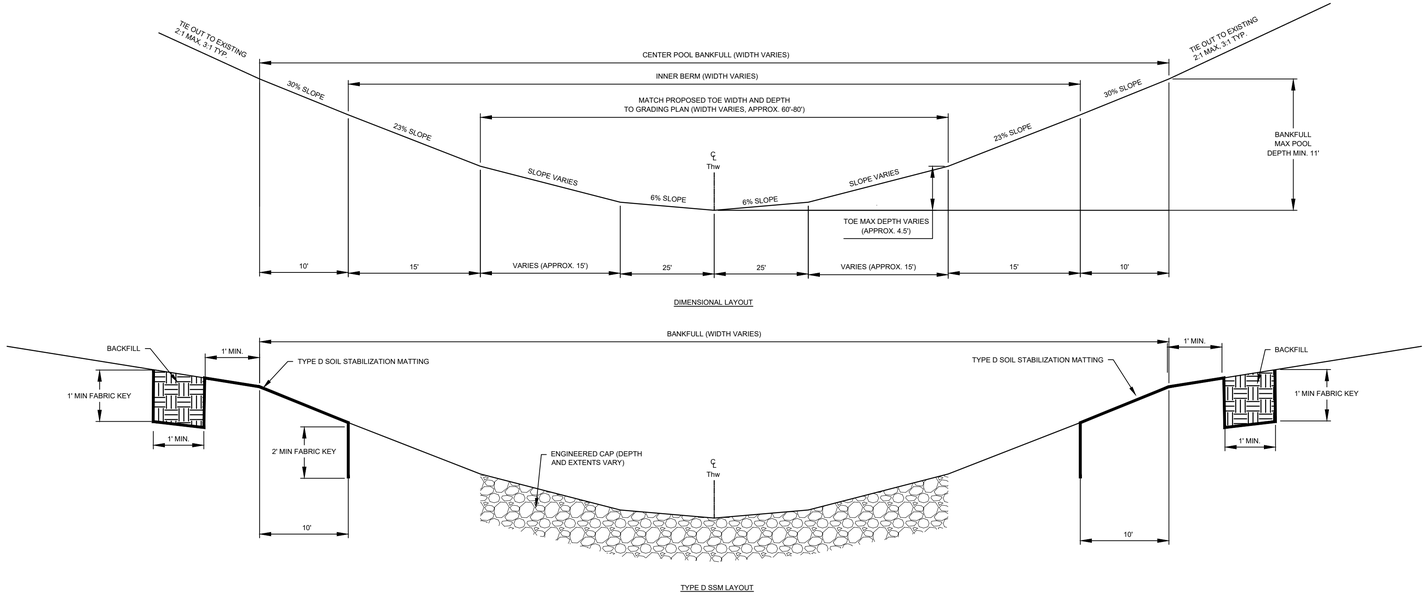
Apr 28, 2026 1:01pm emily.burgess C:\Users\emily.burgess\OneDrive - AECOM\AGE Housatonic - Documents 1\900_CAD_GIS\CAD\Geomorphic Design\20-SHEETS\SE-SECTION VIEW.dwg SR6003



1 TYPICAL REACH 5A CROSS SECTION LAYOUT - RIFFLE

NOT TO SCALE

NOTE: CROSS SECTION SHALL BE PARTIALLY APPLIED IN AREAS SHOWN ON THE PLAN VIEW TO BE GRADED. SOME AREAS SHALL ONLY BE GRADED UP TO THE PROPOSED TOE OF BANK AS SHOWN IN THE PLAN VIEW.



2 TYPICAL REACH 5A CROSS SECTION LAYOUT - CENTER POOL

NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

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CHECKED BY: _____
APPROVED BY: _____
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DETAILS - TYPICAL CROSS SECTIONS

SR7000

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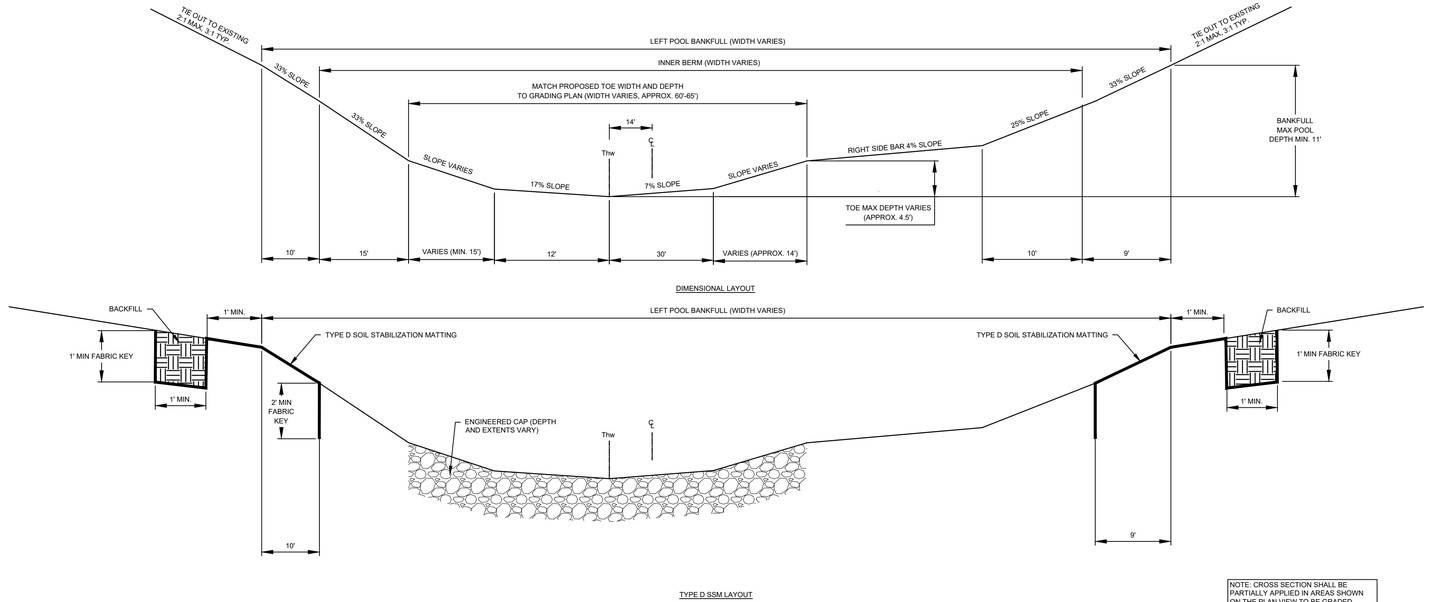
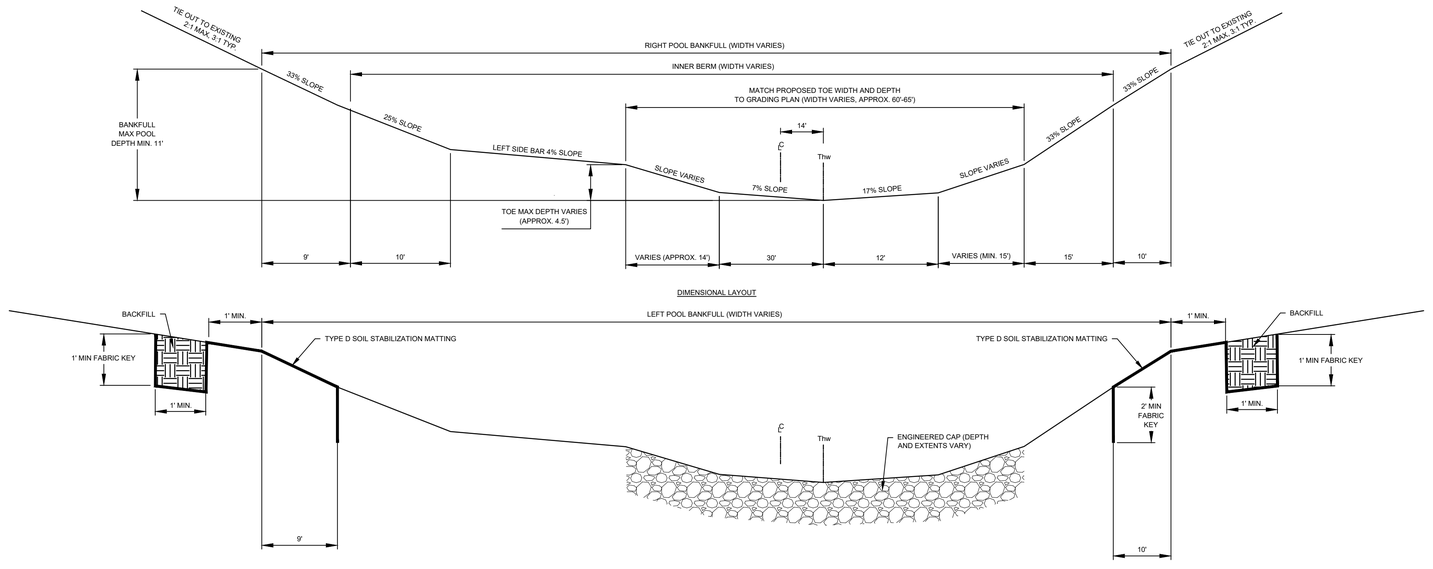


NOTE: CROSS SECTION SHALL BE PARTIALLY APPLIED IN AREAS SHOWN ON THE PLAN VIEW TO BE GRADED. SOME AREAS SHALL ONLY BE GRADED UP TO THE PROPOSED TOE OF BANK AS SHOWN IN THE PLAN VIEW.

3 TYPICAL REACH 5A CROSS SECTION LAYOUT - LEFT POOL

NOT TO SCALE



4 TYPICAL REACH 5A CROSS SECTION LAYOUT - RIGHT POOL

NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

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1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS

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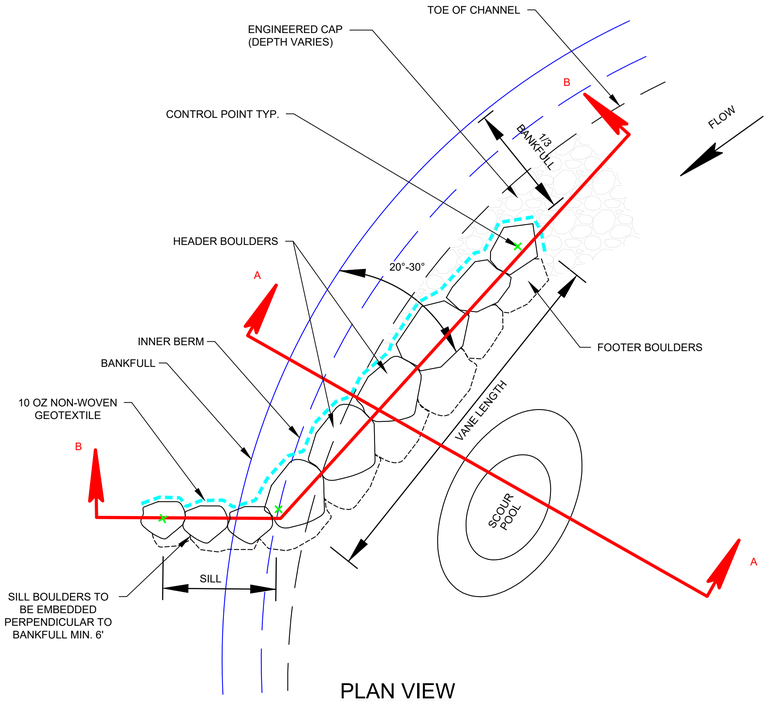
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

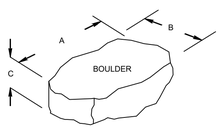
HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DETAILS - TYPICAL CROSS SECTIONS

SR7001

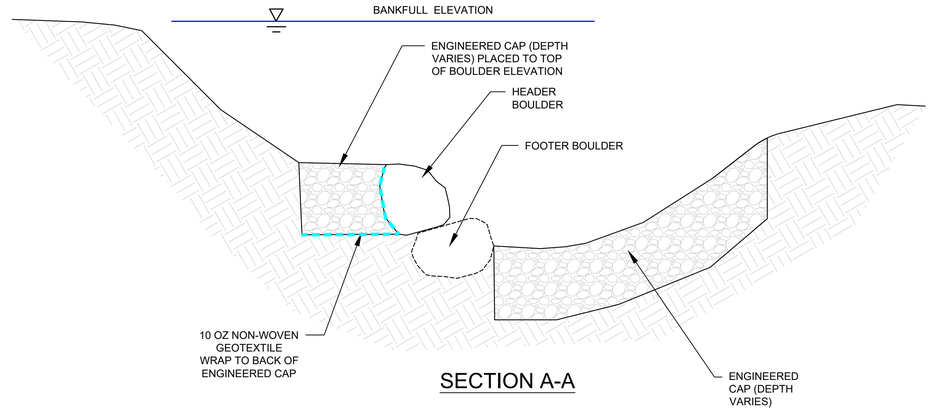


PLAN VIEW

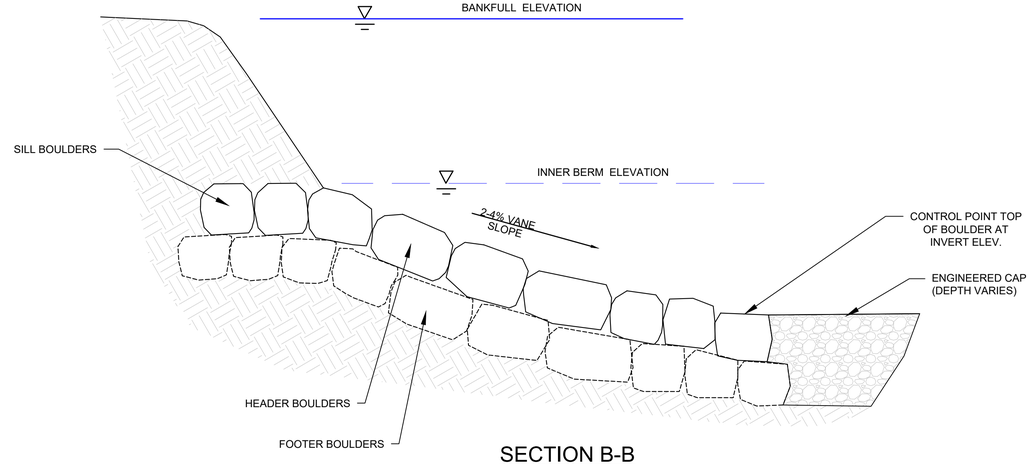


HEADER AND FOOTER BOULDER SIZES FOR SINGLE ARM VANES						
	MAX SHEAR STRESS (PSF)	MIN. DENSITY (PCF)	A-AXIS SIZE (FT)	B-AXIS SIZE (FT)	C-AXIS SIZE (FT)	MIN # OF FLAT SIDES
HEADER BOULDERS	TO BE DETERMINED					1
FOOTER BOULDERS	TO BE DETERMINED					2

NOTES:
1. BOULDER SIZING BASED ON THE MINIMUM ROCK SIZE-BANKFULL SHEAR STRESS CURVE BY ROSGEN 2001d, 2007.
2. BOULDERS WILL BE ANGULAR AND NATURAL IN COLOR (WHITE, BROWN, YELLOW, TAN, OR GRAY).
3. CONSULT THE CONSTRUCTION MANAGER OR PROJECT ENGINEER FOR USE OF BOULDERS THAT DO NOT FIT THESE SIZE SPECIFICATIONS WITHIN 6 INCHES FOR ANY PARAMETER. BOULDERS THAT MATCH THE REQUIRED MINIMUM WEIGHT MAY BE SUBSTITUTED.



SECTION A-A



SECTION B-B

STRUCTURE POINT TABLE AND ELEVATIONS TO BE PROVIDED IN NEXT SUBMISSION

1 SINGLE ARM BOULDER VANE
NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS

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APPROVED BY:
SCALE: AS NOTED
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HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DETAILS - SINGLE ARM BOULDER VANE

SR7002

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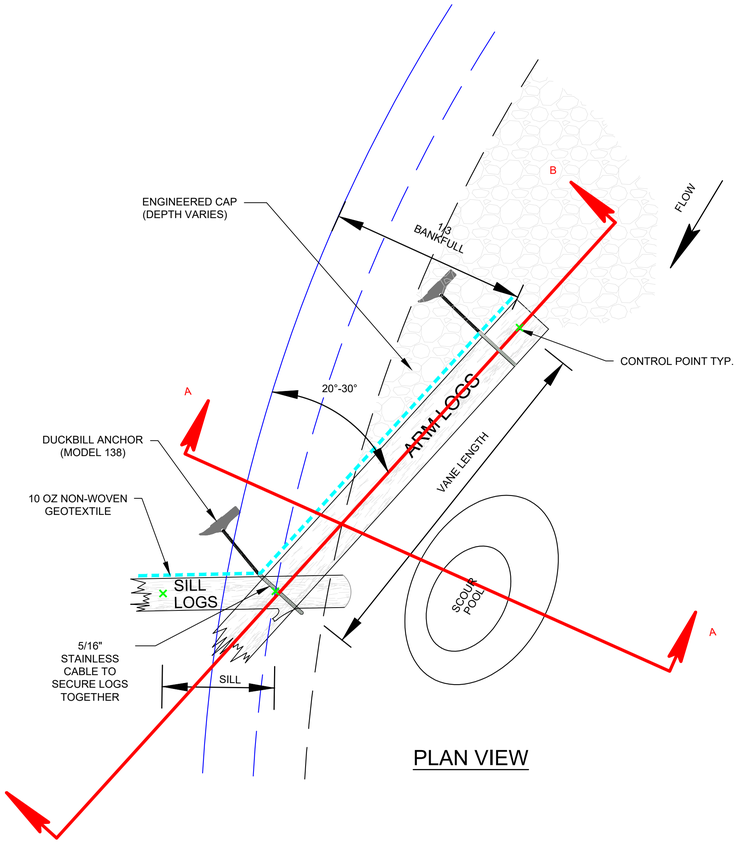
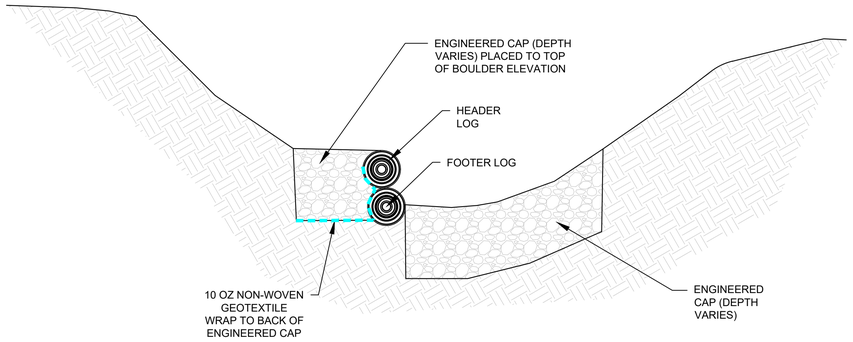
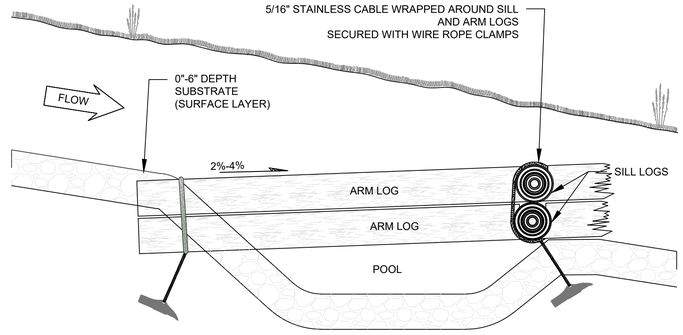


PLAN VIEW

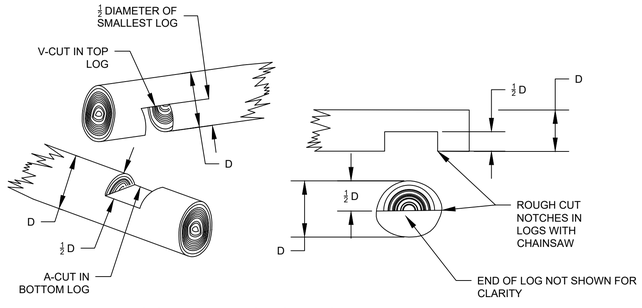


SECTION A-A

NOTES:
1. SEE SPECIFICATIONS FOR MINIMUM SIZE AND ACCEPTABLE TREE CHARACTERISTICS.
2. NOTCHES ARE CUT IN THROAT LOGS AND SILL LOGS TO ACCOMMODATE ARM ALONG AS DESCRIBED IN THE SPECIFICATIONS. CONSULT CONSTRUCTION MANAGER OR PROJECT ENGINEER IF GUIDANCE IS REQUIRED FOR PROPER LOG JOINING TECHNIQUE.
3. CONTROL POINT ELEVATIONS ARE MEASURED AT THE TOP OF LOGS. LOG CROSS VANE CONTROL POINT IDS INCREASE FROM LEFT BANK SIDE TO RIGHT BANK SIDE WHEN LOOKING DOWNSTREAM.



SECTION B-B



SQUARE NOTCH JOINT DETAIL

NOTE:
1. EACH NOTCH CUT SHOULD BE CUT TO A DEPTH OF 1/2 DIA. OF THE SMALLER OF THE TWO LOGS BEING USED FOR THE STRUCTURE. LOGS BEING USED TO FORM STRUCTURE SHOULD BE WITHIN 0.25' DIA. OF ONE ANOTHER WHEN DIAMETER ARE COMPARED.
2. LOGS SHALL BE JOINED TOGETHER AND SHOULD SIT FLUSH AGAINST ONE ANOTHER WITH NO SIGNIFICANT GAPS. GAPS MAY BE CHINKED OR CORRECTED AT THE DIRECTION OF THE CONSTRUCTION MANAGER OR ENGINEER USING WOOD BLOCKS OR ROCKS PLACED AT THE BACKSIDE OF THE LOG SO THEY MAY NOT ESCAPE THROUGH THE GAP.

2 SINGLE ARM LOG VANE
NOT TO SCALE

STRUCTURE POINT TABLE AND ELEVATIONS TO BE PROVIDED IN NEXT SUBMISSION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

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1 PLASTICS AVENUE
PITTSFIELD, MA 01201

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SCALE: AS NOTED
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HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DETAILS - SINGLE ARM LOG VANE

SR7003

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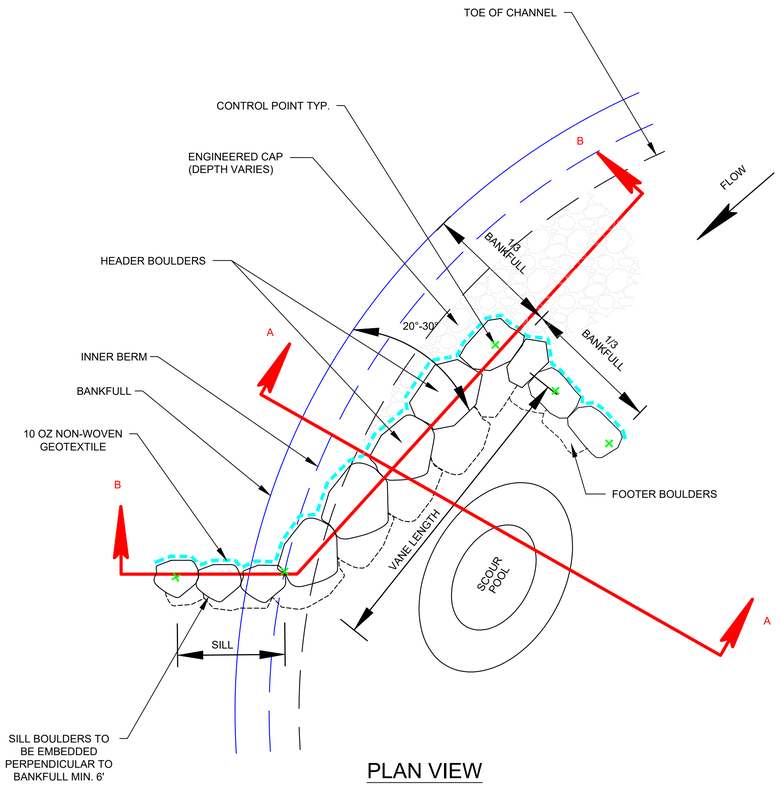
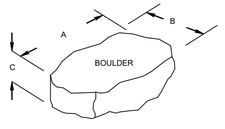


PLAN VIEW



HEADER AND FOOTER BOULDER SIZES FOR J HOOKS						
	MAX SHEAR STRESS (PSF)	MIN. DENSITY (PCF)	A-AXIS SIZE (FT)	B-AXIS SIZE (FT)	C-AXIS SIZE (FT)	MIN # OF FLAT SIDES
HEADER BOULDERS	TO BE DETERMINED					1
FOOTER BOULDERS	TO BE DETERMINED					2

NOTES:
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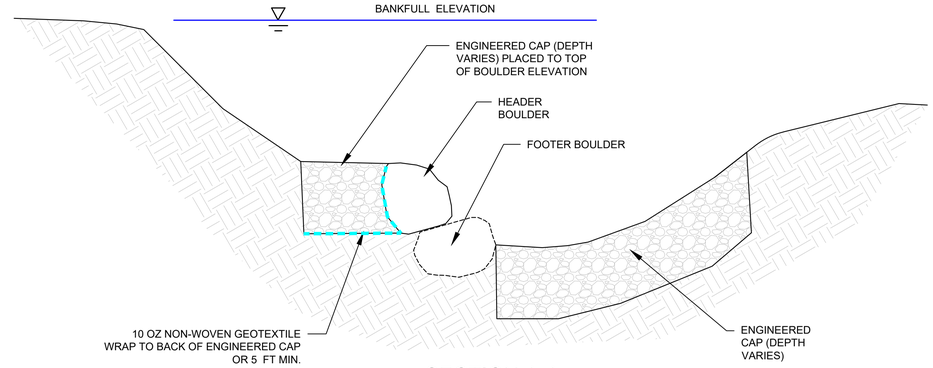
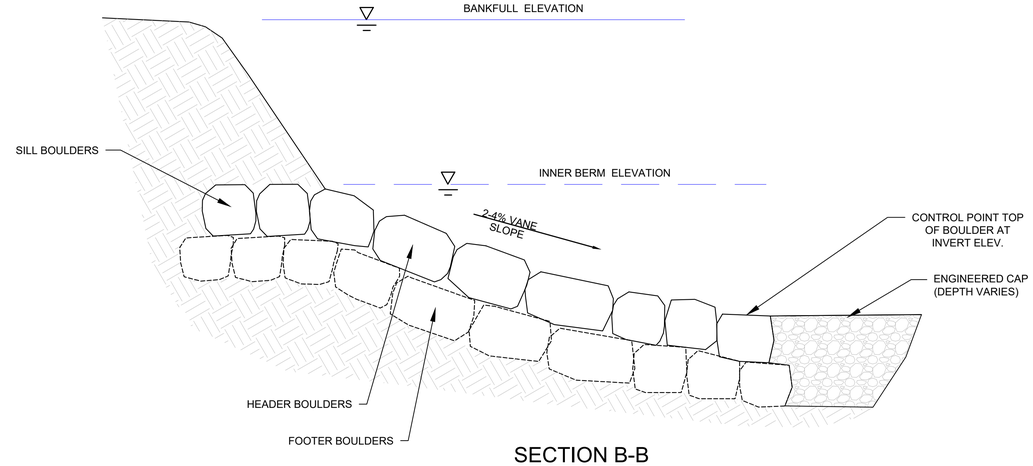


SECTION A-A



SECTION B-B

STRUCTURE POINT TABLE AND ELEVATIONS TO BE PROVIDED IN NEXT SUBMISSION

3 BOULDER J HOOK
NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS				
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SCALE: AS NOTED
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HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DETAILS - BOULDER J HOOK

SR7004

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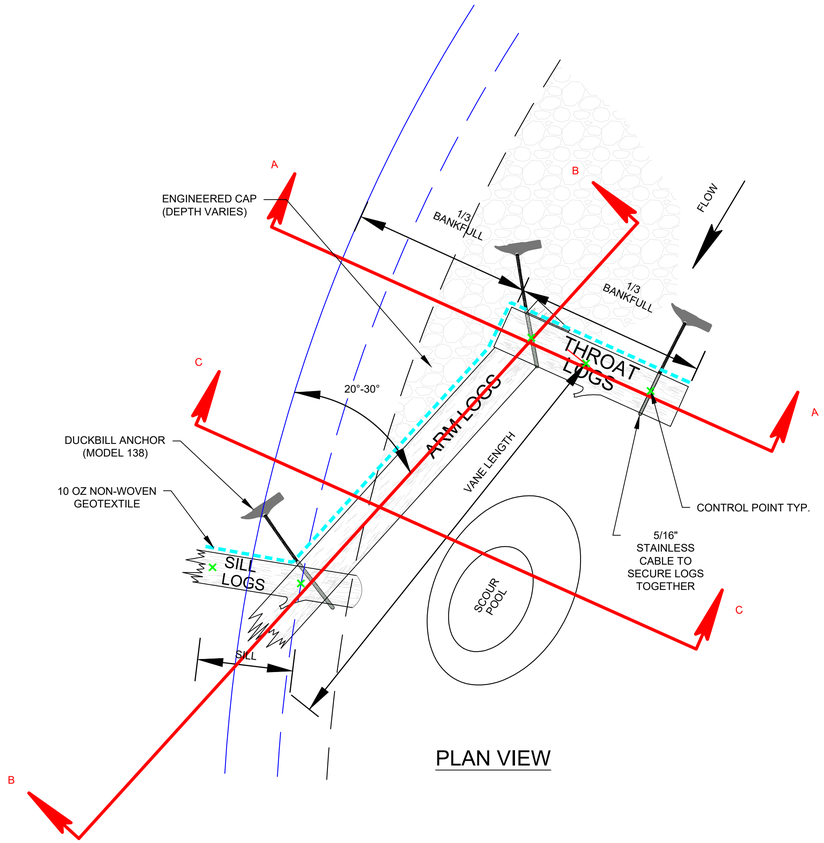
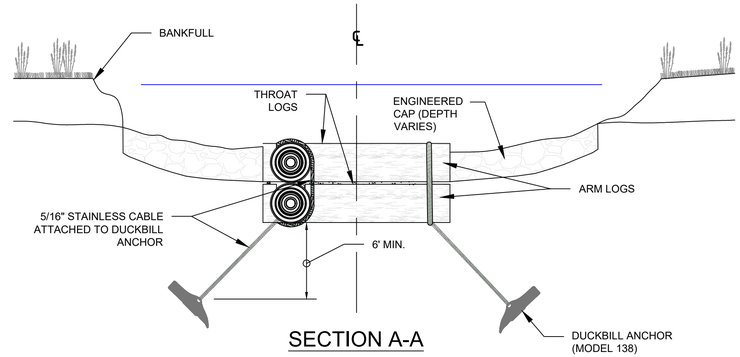


PLAN VIEW



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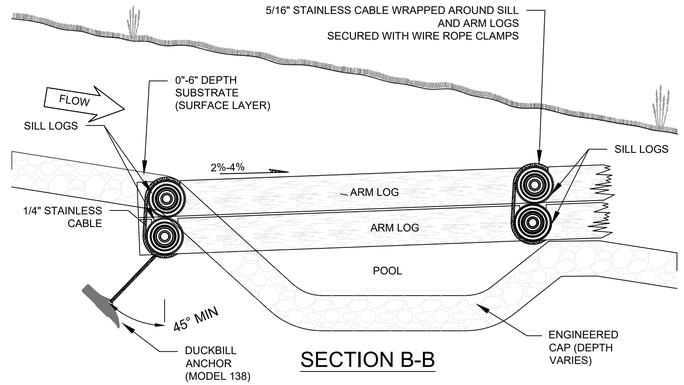

SECTION B-B

NOTES:
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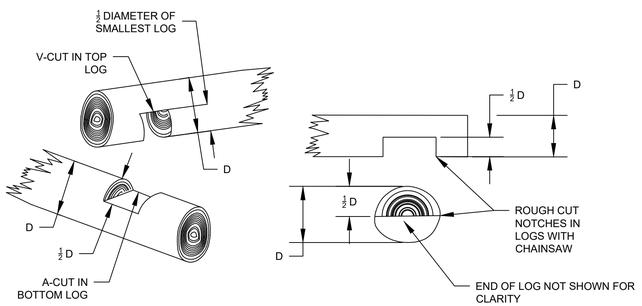
2. NOTCHES ARE CUT IN THROAT LOGS AND SILL LOGS TO ACCOMMODATE ARM ALONG AS DESCRIBED IN THE SPECIFICATIONS. CONSULT CONSTRUCTION MANAGER OR PROJECT ENGINEER IF GUIDANCE IS REQUIRED FOR PROPER LOG JOINING TECHNIQUE.
3. CONTROL POINT ELEVATIONS ARE MEASURED AT THE TOP OF LOGS. LOG CROSS VANE CONTROL POINT IDS INCREASE FROM LEFT BANK SIDE TO RIGHT BANK SIDE WHEN LOOKING DOWNSTREAM.



SQUARE NOTCH JOINT DETAIL

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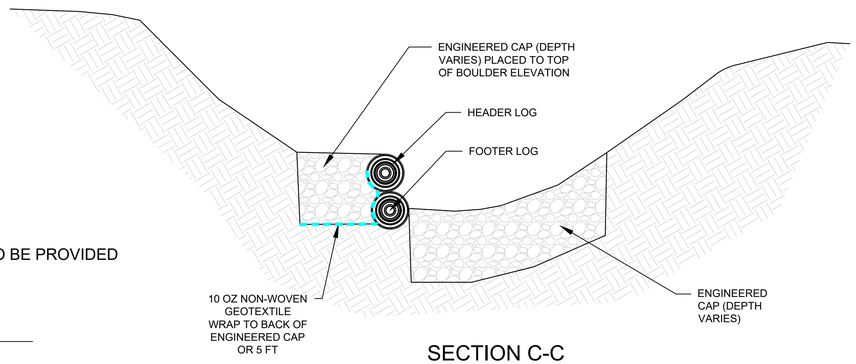
STRUCTURE POINT TABLE AND ELEVATIONS TO BE PROVIDED IN NEXT SUBMISSION

4 LOG J HOOK
NOT TO SCALE



SECTION C-C

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS				
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CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DETAILS - LOG J HOOK

SR7005

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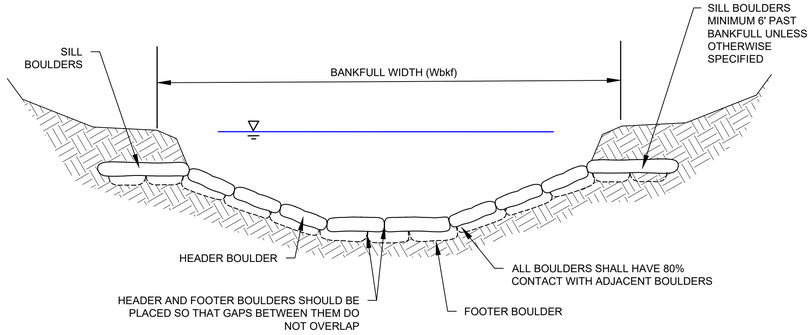
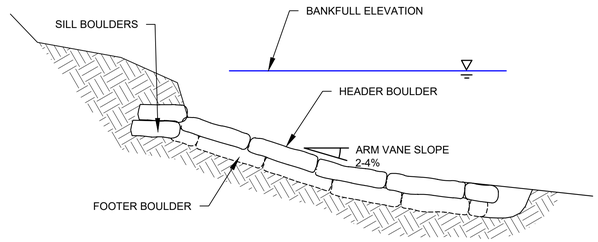
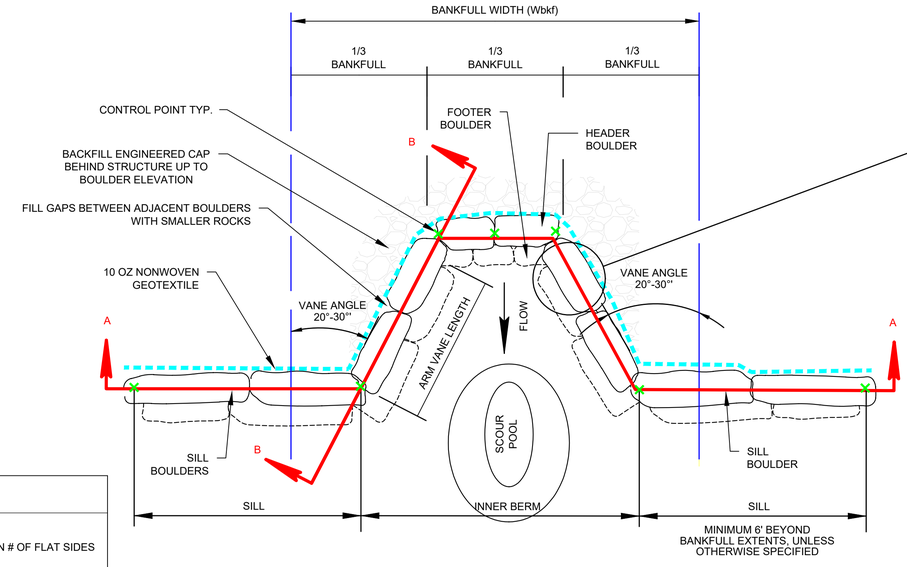


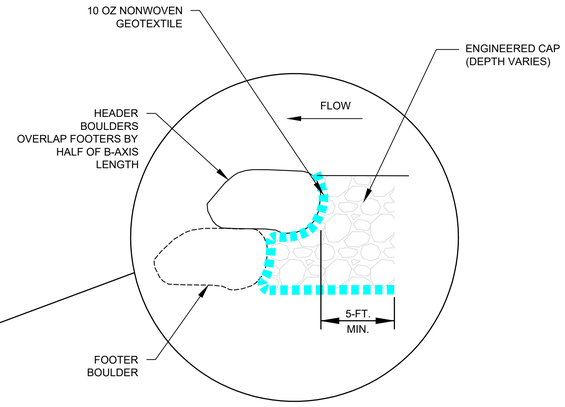
SECTION A-A



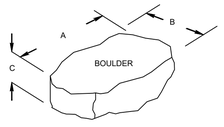
SECTION B-B



PLAN VIEW



PROPER HEADER AND FOOTER BOULDER PLACEMENT



HEADER AND FOOTER BOULDER SIZES FOR BOULDER CROSS VANES						
	MAX SHEAR STRESS (PSF)	MIN. DENSITY (PCF)	A-AXIS SIZE (FT)	B-AXIS SIZE (FT)	C-AXIS SIZE (FT)	MIN # OF FLAT SIDES
HEADER BOULDERS	TO BE DETERMINED					1
FOOTER BOULDERS	TO BE DETERMINED					2

NOTES:
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STRUCTURE POINT TABLE AND ELEVATIONS TO BE PROVIDED IN NEXT SUBMISSION

5 BOULDER CROSS VANE
NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

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APPROVED BY:
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HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DETAILS - BOULDER CROSS VANE

SR7006

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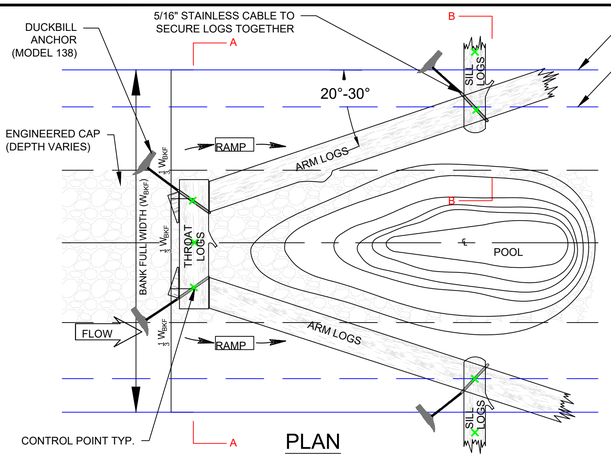
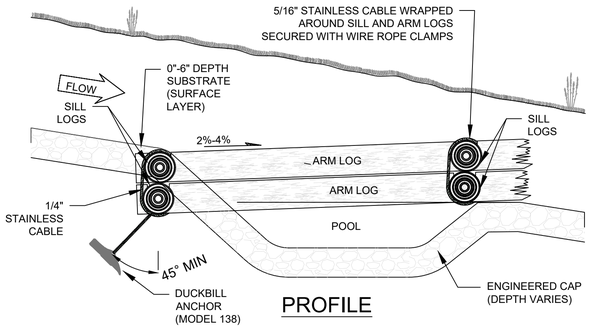


PLAN



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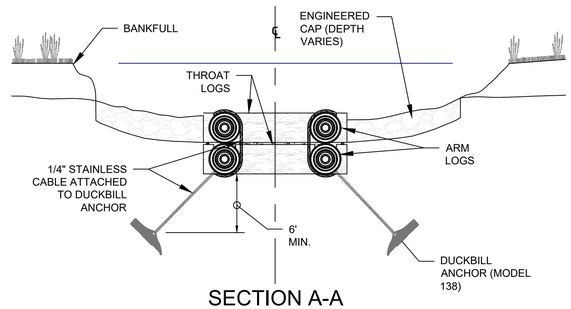
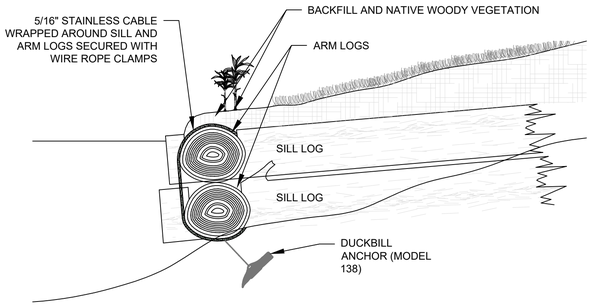
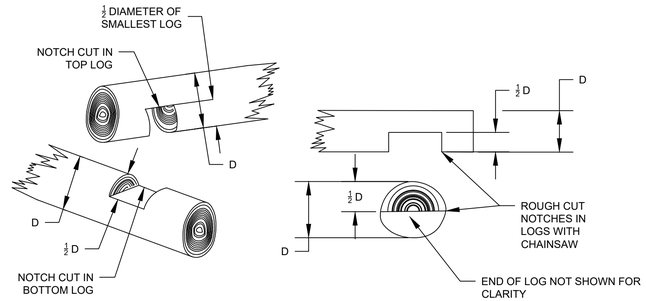


SECTION A-A



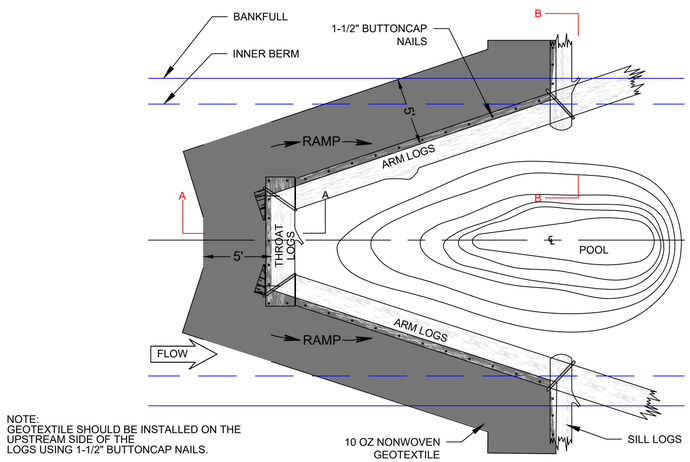
SECTION B-B

NOTES:
1. NOTCHES ARE CUT IN THROAT LOGS AND SILL LOGS TO ACCOMMODATE ARM ALONG AS DESCRIBED IN THE SPECIFICATIONS. CONSULT CONSTRUCTION MANAGER OR PROJECT ENGINEER IF GUIDANCE IS REQUIRED FOR PROPER LOG JOINING TECHNIQUE.
2. CONTROL POINT ELEVATIONS ARE MEASURED AT THE TOP OF LOGS. LOG CROSS VANE CONTROL POINT IDS INCREASE FROM LEFT BANK SIDE TO RIGHT BANK SIDE WHEN LOOKING DOWNSTREAM.



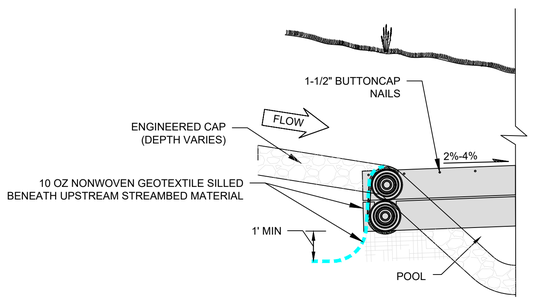
SQUARE NOTCH JOINT DETAIL

NOTE:
1. EACH NOTCH CUT SHOULD BE CUT TO A DEPTH OF 1/2 DIA. OF THE SMALLER OF THE TWO LOGS BEING USED FOR THE STRUCTURE. LOGS BEING USED TO FORM STRUCTURE SHOULD BE WITHIN 0.25' DIA. OF ONE ANOTHER WHEN DIAMETER ARE COMPARED.
2. LOGS SHALL BE JOINED TOGETHER AND SHOULD SIT FLUSH AGAINST ONE ANOTHER WITH NO SIGNIFICANT GAPS. GAPS MAY BE CHINKED OR CORRECTED AT THE DIRECTION OF THE CONSTRUCTION MANAGER OR PROJECT ENGINEER USING WOOD BLOCKS OR ROCKS PLACED AT THE BACKSIDE OF THE LOG SO THEY MAY NOT ESCAPE THROUGH THE GAP.

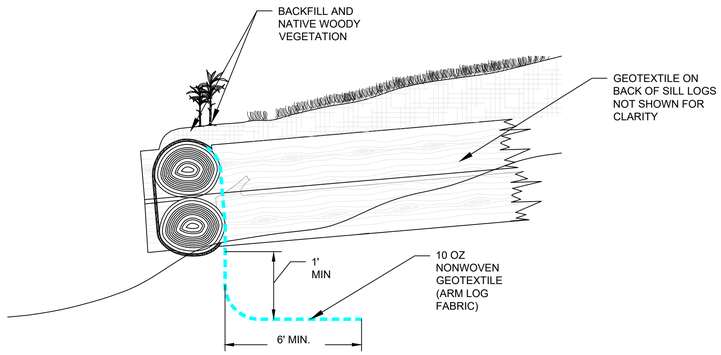


NOTE:
GEOTEXTILE SHOULD BE INSTALLED ON THE UPSTREAM SIDE OF THE LOGS USING 1-1/2" BUTTONCAP NAILS.

PLAN



SECTION A-A



SECTION B-B

6 LOG CROSS VANE
NOT TO SCALE

STRUCTURE POINT TABLE AND ELEVATIONS TO BE PROVIDED IN NEXT SUBMISSION

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS

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APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DETAILS - LOG CROSS VANE

SR7007

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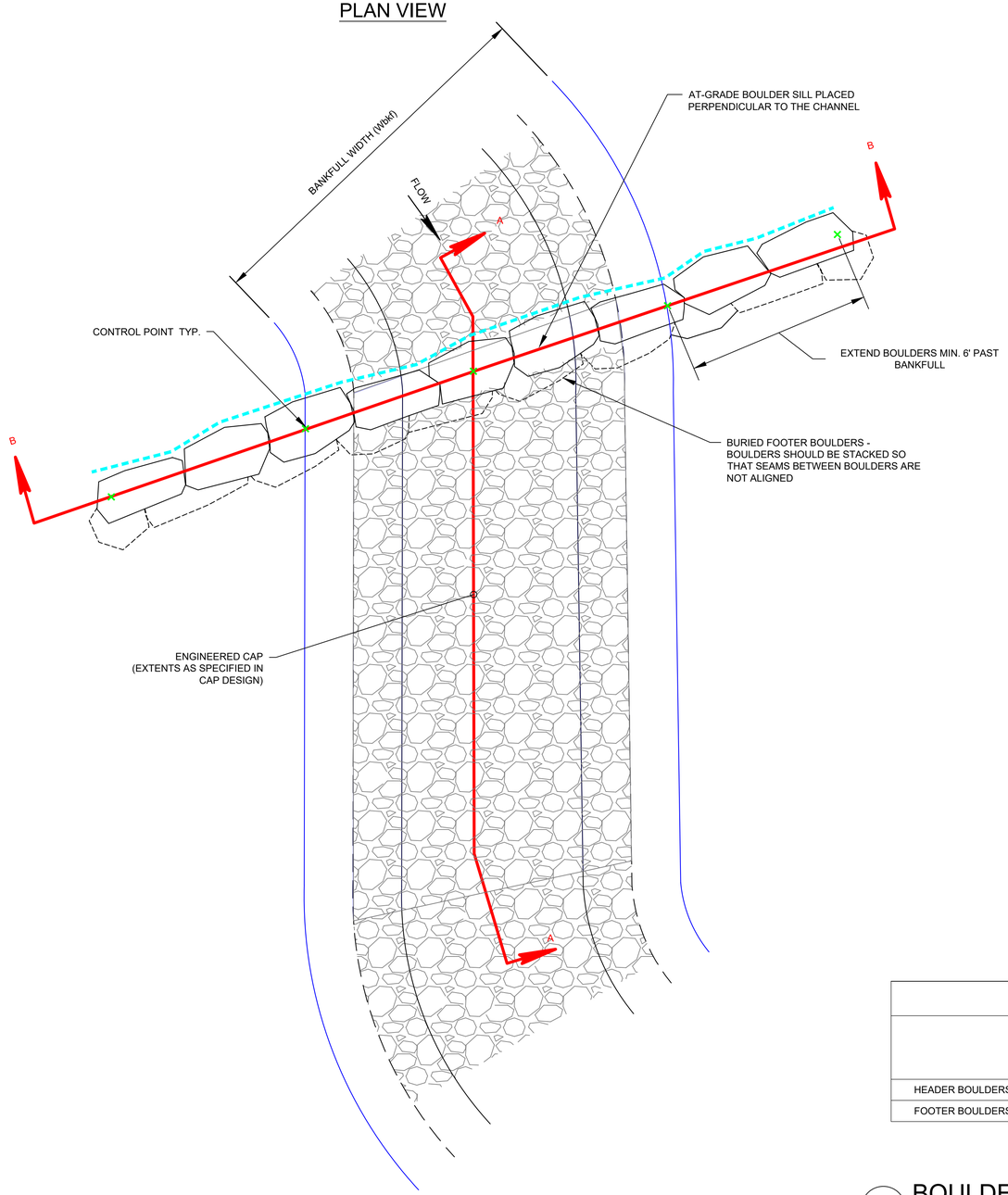
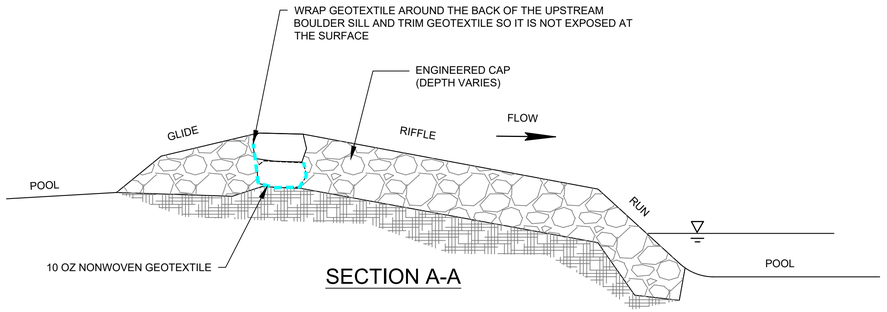
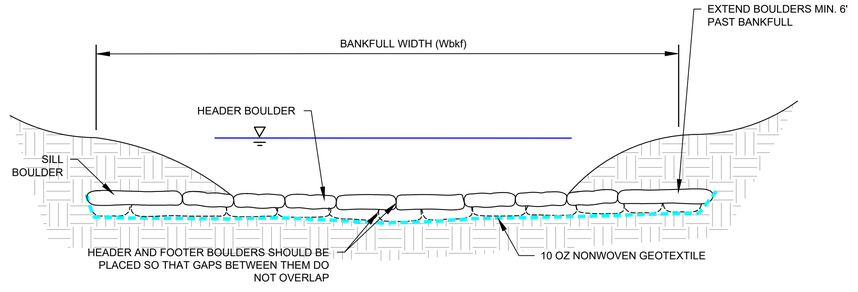
PLAN VIEW

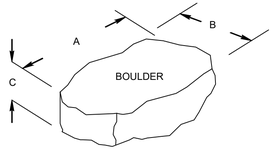




SECTION A-A



SECTION B-B



NOTES:
1. BOULDERS WILL BE ANGULAR AND NATURAL IN COLOR (WHITE, BROWN, YELLOW, TAN, OR GRAY).
2. CONSULT THE CONSTRUCTION MANAGER OR PROJECT ENGINEER FOR USE OF BOULDERS THAT DO NOT FIT THESE SIZE SPECIFICATIONS WITHIN 6 INCHES FOR ANY PARAMETER. BOULDERS THAT MATCH THE REQUIRED MINIMUM WEIGHT MAY BE SUBSTITUTED.

HEADER AND FOOTER BOULDER SIZES FOR SILLS						
	MAX SHEAR STRESS (PSF)	MIN. DENSITY (PCF)	A-AXIS SIZE (FT)	B-AXIS SIZE (FT)	C-AXIS SIZE (FT)	MIN # OF FLAT SIDES
HEADER BOULDERS	TO BE DETERMINED					1
FOOTER BOULDERS	TO BE DETERMINED					2

STRUCTURE POINT TABLE AND ELEVATIONS TO BE PROVIDED IN NEXT SUBMISSION

7 BOULDER SILL
NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

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1 PLASTICS AVENUE
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GENERAL ELECTRIC COMPANY

GEOMORPHIC DETAILS - BOULDER SILL

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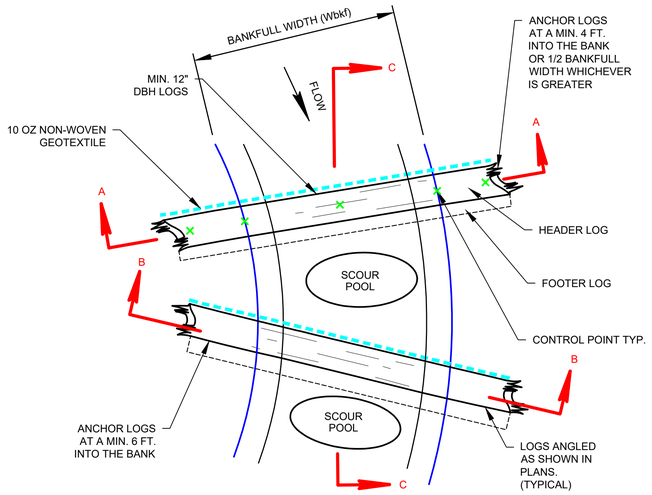
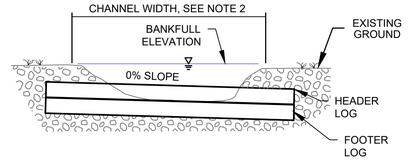


PLAN VIEW



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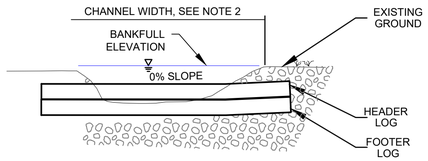
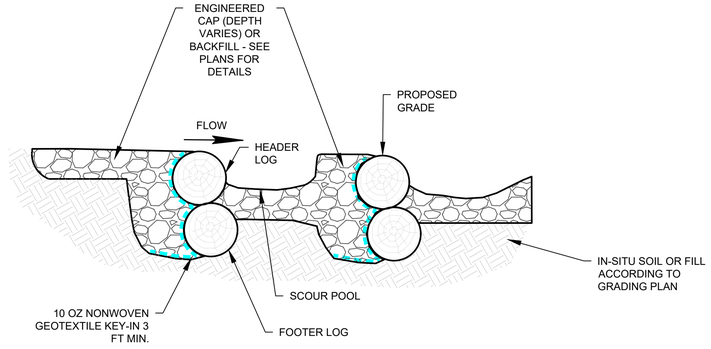


SECTION B-B



SECTION C-C

NOTE:
1. 10 OZ NONWOVEN GEOTEXTILE SHOULD BE INSTALLED ON THE UPSTREAM SIDE OF THE LOGS USING 1-1/2" BUTTONCAP NAILS.
2. IF THE THALWEG IS NOT NEAR THE CENTER OF THE LOG A SMALL NOTCH SHOULD BE ADDED TO DIRECT THE FLOW INTO THE CENTER OF THE CHANNEL.

STRUCTURE POINT TABLE AND ELEVATIONS TO BE PROVIDED IN NEXT SUBMISSION

8 LOG SILL
NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

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1 PLASTICS AVENUE
PITTSFIELD, MA 01201

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REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DETAILS - LOG SILL

SR7009

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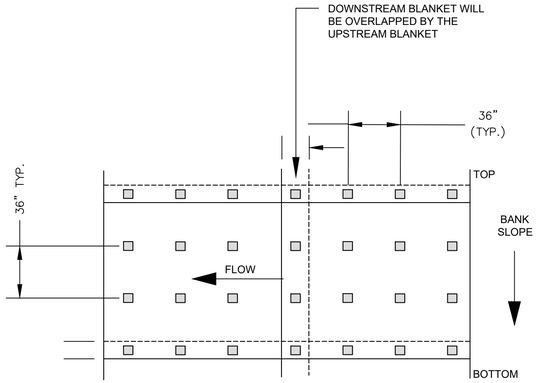
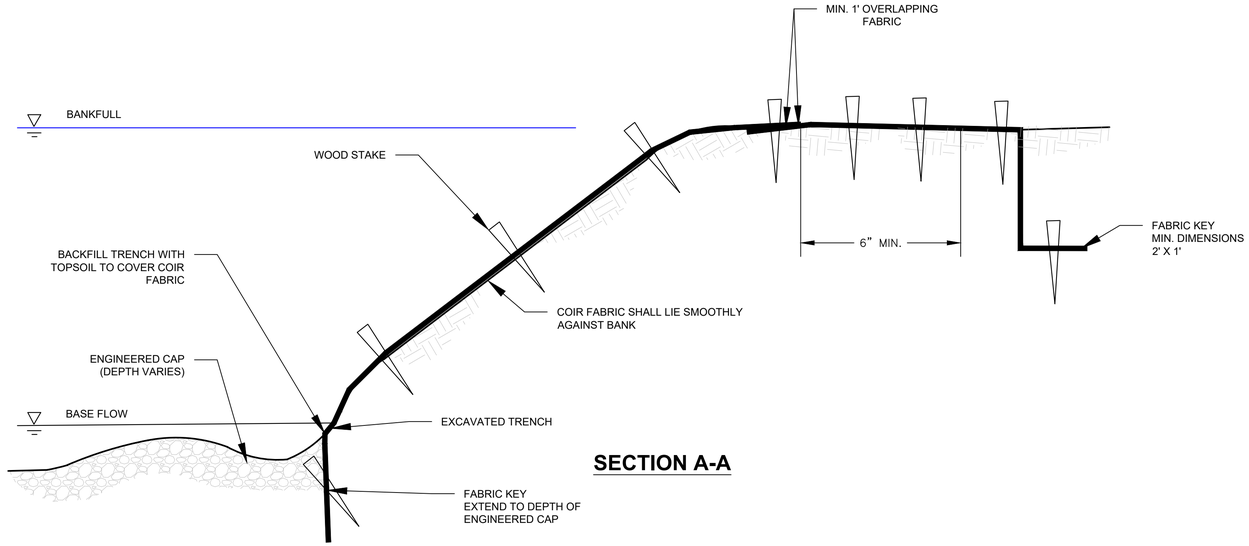
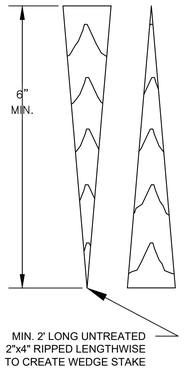


MATTING STAKING VIEW

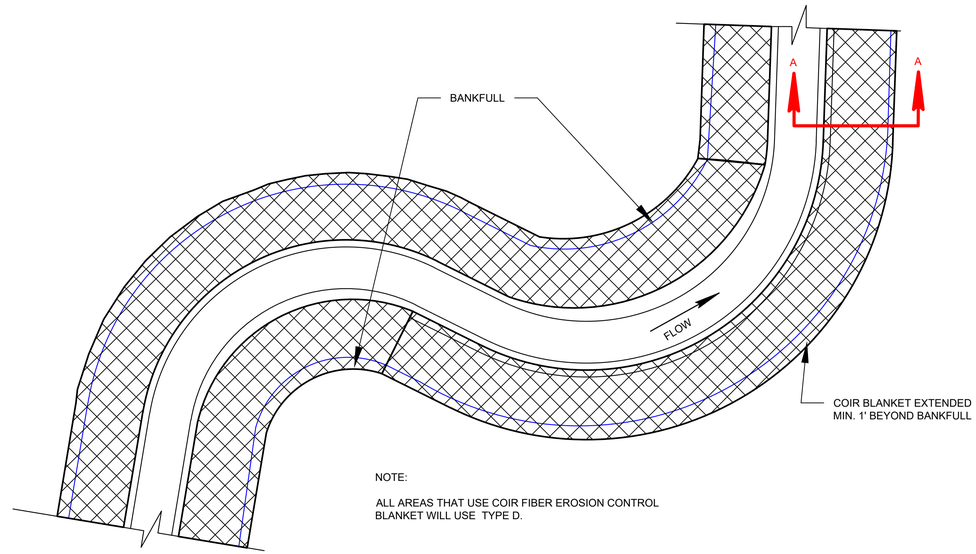


SECTION A-A



STAKE NOTES:

1. PRE-MANUFACTURED WOOD OR BIODEGRADABLE STAKES OF SUFFICIENT LENGTH MAY BE USED IN PLACE OF 2"x4" RIPPED WEDGE STAKES. NO METAL OR NON BIODEGRADABLE FASTENERS MAY BE USED IN PLACE OF WOOD STAKES.



NOTE:

ALL AREAS THAT USE COIR FIBER EROSION CONTROL BLANKET WILL USE TYPE D.

9 COIR MATTING
NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

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1 PLASTICS AVENUE
PITTSFIELD, MA 01201

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GENERAL ELECTRIC COMPANY

GEOMORPHIC DETAILS - COIR MATTING

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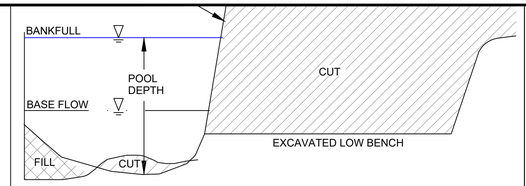
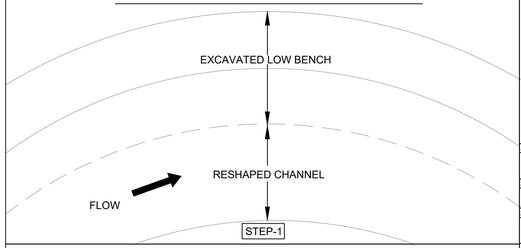
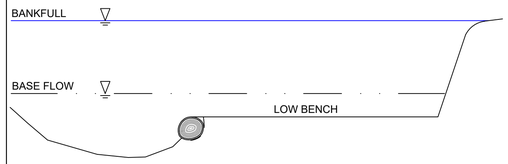


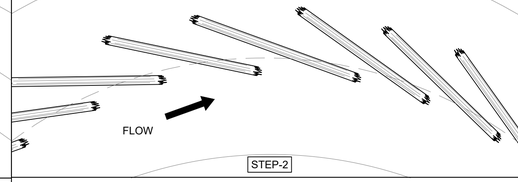
RESHAPE CHANNEL AND EXCAVATE BENCH



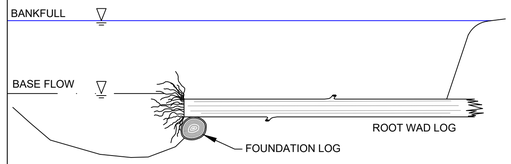
STEP-1



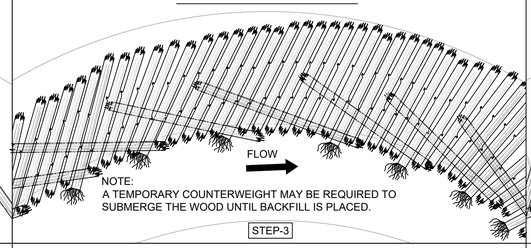
DIG TRENCH IN LOWER BENCH FOR FOUNDATION LOG
AND PLACE LOG IN TRENCH



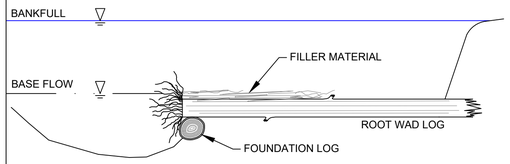
STEP-2



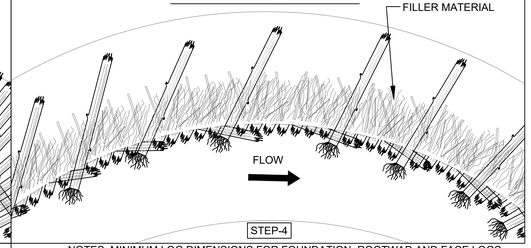
CANTILEVER THE ROOT WAD LOGS OVER FOUNDATION LOGS
AND PLACE FILLER LOGS



STEP-3



PLACE TOPS, LIMBS AND BRUSH BETWEEN THE ROOT WAD LOGS
ON TOP OF FILLER LOGS



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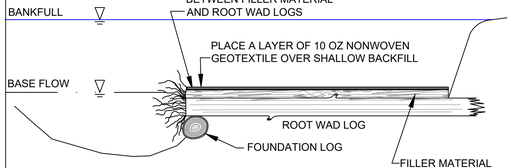
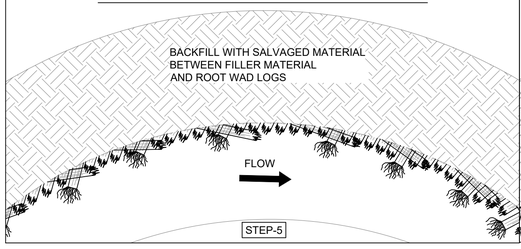


BACKFILL WITH SALVAGED STREAMBED MATERIAL



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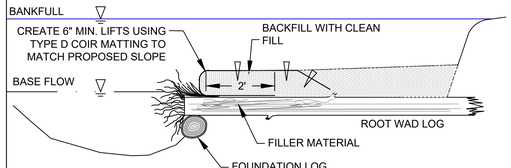
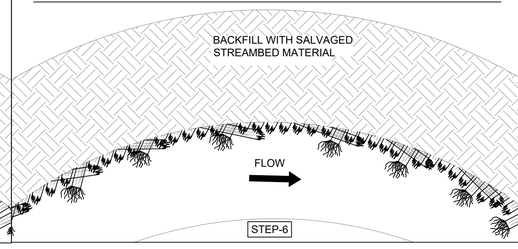
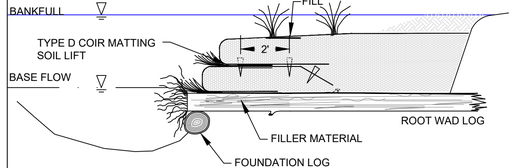


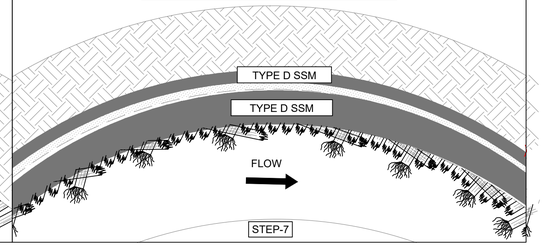
INSTALL CUTTINGS AND PLACE A SOIL LIFT



STEP-6



CONTINUE ALTERNATING CUTTINGS AND REINFORCED SOIL LIFTS
UP TO BANKFULL STAGE



STEP-7

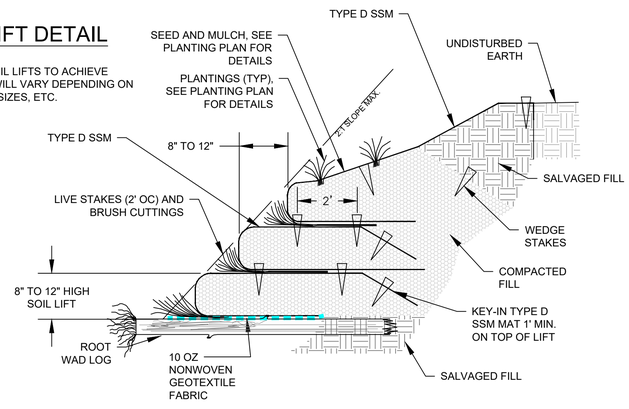
NOTES: MINIMUM LOG DIMENSIONS FOR FOUNDATION, ROOTWAD AND FACE LOGS BY BANKFULL WIDTH FOR TOE WOOD.

MINIMUM LOG DIAMETER (IN)	MINIMUM LOG LENGTH (FT)
12-30	25-30

1. SHALLOW ROOTED SPECIES WITH FAN DIAMETER OF MINIMUM 3 FEET ARE PREFERRED; AVOID NARROW FAN DIAMETER LESS THAN 3 FEET. SPACING BETWEEN THE ROOT WAD CENTERS AT 1.5-2 TIMES THE FAN DIAMETER (MINIMUM 4.5').
2. SEE STRUCTURE TABLE FOR LOCATION CONTROL POINTS. CONTROL POINTS INDICATE THE LOCATIONS ALONG THE FACE OF THE STRUCTURE WHERE THE STRUCTURE WHERE THE STRUCTURE BEGINS AND ENDS.
3. ON BANKS WHERE TOEWOOD IS PROPOSED, THE BANK SHALL BE STABILIZED UP TO BANKFULL WITH EITHER SOIL LIFTS OR RIPRAP. RIPRAP BANKS ARE DEPICTED ON THE PLAN VIEW. ALL OTHER BANKS SHALL BE STABILIZED WITH SOIL LIFTS.

SOIL LIFT DETAIL

NOTES:
1. THE NUMBER OF SOIL LIFTS TO ACHIEVE BANKFULL GRADE WILL VARY DEPENDING ON BANK HEIGHT, LOG SIZES, ETC.

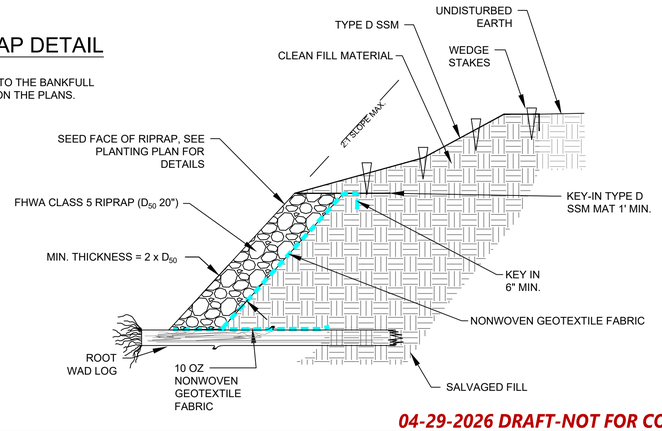


STRUCTURE POINT TABLE AND ELEVATIONS TO BE PROVIDED IN NEXT SUBMISSION

10 TOEWOOD
NOT TO SCALE

RIPRAP DETAIL

NOTES:
1. RIPRAP SLOPE UP TO THE BANKFULL EXTENTS SHOWN ON THE PLANS.



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PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

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GEOMORPHIC DETAILS - TOEWOOD

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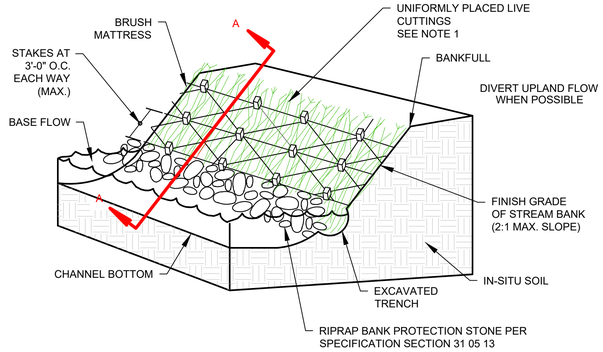
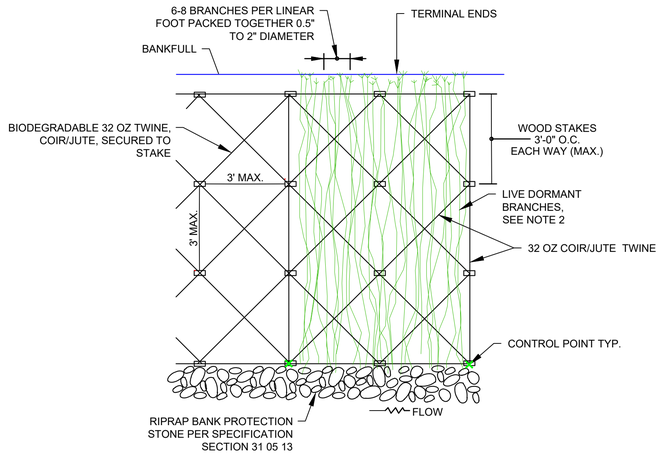
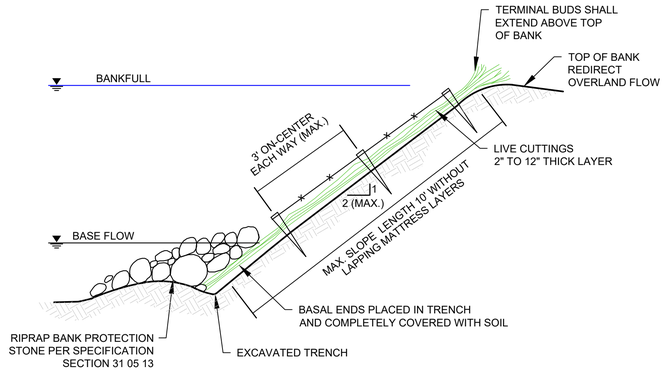


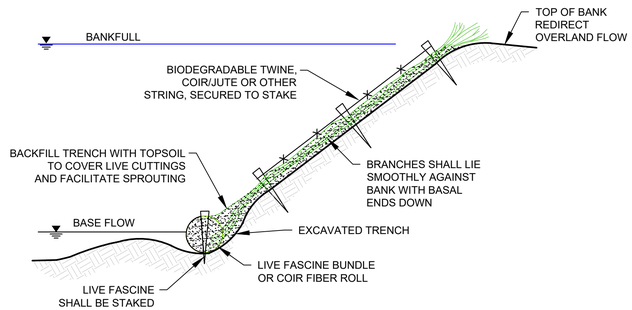
ISOMETRIC VIEW



PLAN VIEW



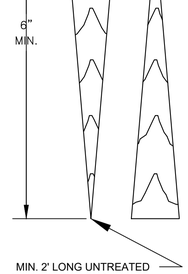
SECTION A-A



EXAMPLE OF ALTERNATIVE STABILIZATION AT TOE OF SLOPE

NOTES:

1. BASAL ENDS OF CUTTINGS SHALL EXTEND INTO TRENCH AND SHALL BE COVERED WITH TOPSOIL PRIOR TO PLACEMENT OF LONGITUDINAL STONE TOE OR ALTERNATIVE ANCHORING OR TOE STABILIZATION.
2. BRANCHES SHOULD BE PLACED PERPENDICULAR TO FLOW.



STAKE NOTES:

1. PRE-MANUFACTURED WOOD OR BIODEGRADABLE STAKES OF SUFFICIENT LENGTH MAY BE USED IN PLACE OF 2"x4" RIPPED WEDGE STAKES. NO METAL OR NON BIODEGRADABLE FASTENERS MAY BE USED IN PLACE OF WOOD STAKES.

STRUCTURE POINT TABLE AND ELEVATIONS TO BE PROVIDED IN NEXT SUBMISSION

11 BRUSH MATTRESS

NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DETAILS - BRUSH MATTRESS

SR7012

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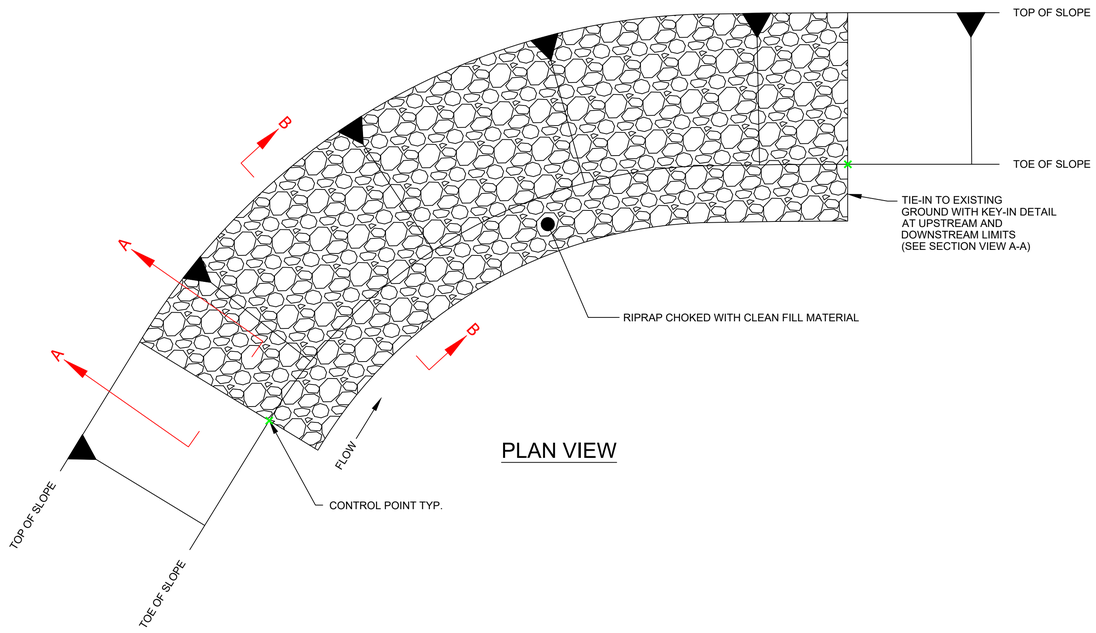
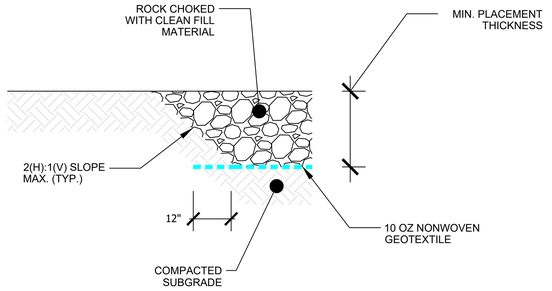
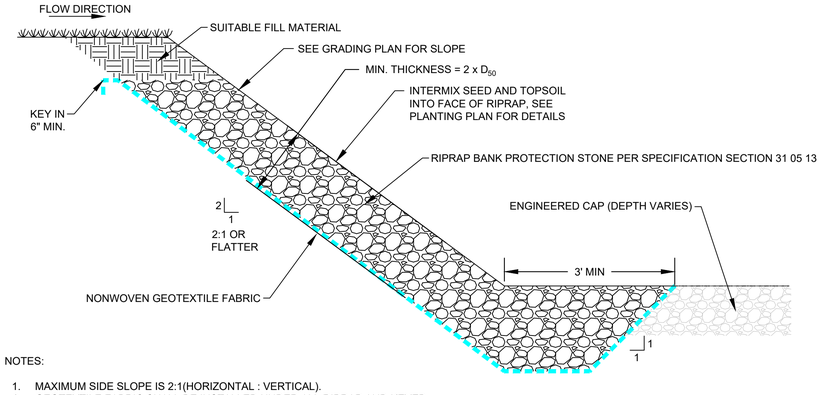


PLAN VIEW



SECTION VIEW A-A
KEY-IN DETAIL



NOTES:

1. MAXIMUM SIDE SLOPE IS 2:1(HORIZONTAL : VERTICAL).
2. GEOTEXTILE FABRIC SHALL BE INSTALLED UNDER ALL RIPRAP AND KEYED IN MINIMUM 6".

SECTION VIEW B-B

STRUCTURE POINT TABLE AND ELEVATIONS TO BE PROVIDED IN NEXT SUBMISSION

12 RIPRAP BANK PROTECTION
NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

04-29-2026 DRAFT-NOT FOR CONSTRUCTION

AECOM

GENERAL ELECTRIC
1 PLASTICS AVENUE
PITTSFIELD, MA 01201

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER
REACH 5A REMEDIATION
GENERAL ELECTRIC COMPANY

GEOMORPHIC DETAILS - RIPRAP BANK PROTECTION

SR7013

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Appendix B
Technical Specifications

HOUSATONIC RIVER – REST OF RIVER
PITTSFIELD, MASSACHUSETTS
REACH 5A REMEDIATION

TECHNICAL SPECIFICATIONS

DATE: APRIL 29, 2026

PREPARED FOR: GENERAL ELECTRIC COMPANY

PREPARED BY: ANCHOR QEA
IN CONJUNCTION WITH ARCADIS U.S., INC., AND AECOM

TECHNICAL SPECIFICATIONS SECTIONS LIST

SECTION NUMBER	SECTION TITLE
01353	Cultural Resources
01571	Operations, Environmental Restrictions, and Controls
02 21 00	Surveys
02 51 00	Decontamination
02 61 15	Handling and Disposal of Impacted Materials
02 72 00	Water Management and Treatment
13 80 01	Temporary Access Roads and Staging Areas
31 05 13	Soils and Aggregates
31 11 00	Clearing and Grubbing
31 13 18	Removal of In-River Debris and Shoreline Vegetation
31 23 00	Soil Excavation and Fill
31 25 00	Erosion and Sediment Controls
31 32 19	Geotextiles
32 30 00	Restoration, Planting, and Seeding
35 02 00	Marine Equipment and Transportation
35 24 00	Sediment and Riverbank Soil Removal
35 28 00	Engineered Cap
35 40 00	Temporary Stream Diversion
35 43 37	Riprap and Stone Protection
35 44 10	Log In-Stream Structure
35 44 20	Boulder In-Stream Structure
35 44 30	Brush Mattress
35 44 40	Soil Coir Lift
35 44 50	Coir Matting
35 44 60	Toewood
35 44 70	Log Sill
35 81 00	Resuspension Control

SECTION 01353 – CULTURAL RESOURCES

PART 1 – GENERAL

1.01 DESCRIPTION

A. Previous cultural resources investigations have been conducted for the Reach 5A Remediation Project (Project) in accordance with federal and state regulatory requirements. Cultural resources include archaeological sites and historic structures and properties. These investigations have not identified archaeological resources within Reach 5A remediation or support areas.

1.02 DEFINITIONS

A. Archaeological Resources means an archaeological site on land or underwater that has been determined to be significant by the U.S. Environmental Protection Agency.

B. Archaeological Debris means manufactured objects such as pottery jugs, glass bottles, and isolated timbers that do not constitute significant archaeological resources as defined above.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

A. The General Electric Company (GE) will conduct a short archaeological resource identification training program for remediation field staff in advance of the Work. This training program will be presented by the Project's cultural resource professional and is intended to help remediation staff identify unanticipated discoveries in the field and report them to the Construction Manager.

B. When encountering any debris that may appear to be an archaeological resource, the Contractor shall immediately notify the Construction Manager. The Construction Manager will halt all activities in the immediate vicinity that may damage or alter such resources. The Contractor shall secure and protect the area from damage or disturbance to the satisfaction of the Construction Manager. The Construction Manager will then promptly notify GE and the appropriate regulatory personnel in accordance with the Cultural Resources Unanticipated Discoveries Plan.

C. In the event that human remains are discovered, the Contractor shall halt Work in the immediate vicinity that may damage or alter the human remains, notify the Construction Manager, and secure and protect the area from damage or disturbance. The Construction manager will then promptly notify GE and the appropriate regulatory personnel in accordance with the Cultural Resources Unanticipated Discoveries Plan. The local law enforcement agency and medical examiner will subsequently be notified.

D. The Contractor shall resume any halted Work activities following notification from the Construction Manager.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. The Contractor shall conduct all Work in compliance with the Housatonic Rest of River Quality of Life (QOL) Standards established for air quality, noise, odor, and lighting. The QOL Standards were established in the U.S. Environmental Protection Agency (EPA)-approved Second Revised Quality of Life Compliance Plan (QOL Compliance Plan; Anchor QEA and Arcadis 2025[1]). The QOL Standards are listed in Paragraph 1.01.B.
2. The Contractor shall conduct all Work in compliance with the Surface Water Action Levels established in Section 3.9 of the Project Operations Plan (POP; Arcadis 2025[2]). The Surface Water Action Levels are listed below in Paragraph 1.01.C.
3. The Contractor shall supply and maintain all labor, equipment, tools, methods, controls, materials, temporary construction, and mitigation measures necessary to ensure all Work is compliant with the QOL Standards.
4. The Construction Manager, or a third party under the direction of the Construction Manager or General Electric Company (GE), will perform monitoring to demonstrate compliance with the applicable QOL Standards and Surface Water Action Levels and as warranted in response to Reach 5A Remediation Project (Project) related complaints. Monitoring for compliance with the QOL Standards will be conducted in accordance with the QOL Compliance Plan and the POP, including Attachment D (Ambient Air Monitoring Plan) and Attachment G (Construction Monitoring Plan). Monitoring for compliance with the Surface Water Action Levels will be conducted in accordance with Section 3.9 of the POP. The Contractor may choose to conduct its own monitoring; however, the monitoring conducted by the Construction Manager or third party shall form the basis for decisions regarding compliance with the QOL Standards and Surface Water Action Levels.
5. If any QOL Standards and Surface Water Action Levels are exceeded or a Project-related complaint is received that requires corrective action, the Contractor will be notified by the Construction Manager, and the Contractor shall implement controls and any necessary mitigation measures to address the exceedance or complaint. If such an exceedance or complaint occurs, the Contractor shall assist the Construction Manager in investigating the cause of the

[1] Anchor QEA and Arcadis, 2025. *Second Revised Quality of Life Compliance Plan. Housatonic River – Rest of River.* Prepared for General Electric Company, Pittsfield, Massachusetts. May 2025

[2] Arcadis, 2025. *Project Operations Plan GE-Pittsfield/Housatonic River Site.* Prepared for the General Electric Company, Pittsfield, Massachusetts. May 2025.

exceedance and determining any additional engineering or operational controls needed.

B. QOL Standards

1. Air Quality QOL Standards
   a. Air Quality QOL Standard for Particulate Matter
      1) The QOL Standard for Particulate Matter applies to particulates smaller than 10 micrometers in diameter (PM_{10}) and includes both a Notification Level and an Action Level.
      2) PM_{10} Notification Level: 10-hour average PM_{10} concentration of 120 micrograms per cubic meter ($\mu g/m^3$).
      3) PM_{10} Action Level: 10-hour average PM_{10} concentration of 150 $\mu g/m^3$.
      4) Compliance with the QOL Standard for Particulate Matter will be determined based on PM_{10} monitoring by the Construction Manager or a third party in accordance with the QOL Compliance Plan, Ambient Air Monitoring Plan (Attachment D of the POP), and Construction Monitoring Plan (Attachment G of the POP). PM_{10} monitoring will occur for a minimum of 10 hours when construction is ongoing and throughout the duration of construction activities. If the duration of construction activities on a particular day is longer than 10 hours, the data collected over the full monitoring period will be averaged and compared to the PM_{10} Notification Level and Action Level.
      5) If the workday average PM_{10} Notification Level is exceeded at any time, the Contractor shall implement additional engineering or operational controls, as necessary, to reduce dust generation and prevent a PM_{10} Action Level exceedance from occurring.
      6) If the workday average PM_{10} Action Level is exceeded at any time, the Contractor shall implement additional engineering or operational controls, as necessary, to reduce dust generation and prevent another exceedance of the PM_{10} Action Level.
      7) If the workday average PM_{10} Action Level is exceeded on two consecutive days, the Contractor shall temporarily stop dust-generating Work in the vicinity of the location where the exceedance was observed. The stop-work requirement will continue until directed by the Construction Manager based on EPA approval of appropriate response actions to prevent another exceedance of the Action Level.
   b. Air Quality QOL Standard for Polychlorinated Biphenyls (PCBs)
      1) The QOL Standard for PCBs includes both a Notification Level and an Action Level for total PCB concentrations.
      2) The PCB Notification Level is 0.05 $\mu g/m^3$ based on a 24-hour average.
      3) The PCB Action Level is 0.1 $\mu g/m^3$ based on a 24-hour average.
      4) Compliance with the QOL Standard for PCBs will be determined based on PCB air monitoring by the Construction Manager or a third party in accordance with the QOL Compliance Plan, Ambient Air Monitoring Plan

(Attachment D of the POP), and Construction Monitoring Plan (Attachment G of the POP).

5) During construction, PCB monitoring will initially be performed in the vicinity of potential sources of PCB emissions for two sequential 24-hour periods (i.e., two back-to-back daily events) at the start of each new type of construction activity in each construction season to confirm that representative airborne concentrations for PCBs do not exceed the designated standards.
6) If the initial PCB monitoring indicates air PCB levels are acceptable, one 24-hour monitoring event will be conducted weekly for each area of active construction for the duration of that construction activity. In addition, monitoring will be reinstituted when a new type of remediation activity occurs in an area.
7) If the 24-hour average PCB concentration exceeds the PCB Notification Level, additional response actions will be implemented, in consultation with EPA, to prevent exceedances of the Action Level. The actions to be considered in such circumstances include the types of measures described in Section 4.3.4 of the QOL Compliance Plan.
8) If the 24-hour average PCB concentration exceeds the PCB Action Level, the Contractor shall temporarily stop PCB-generating Work in the vicinity of the location where the exceedance was observed. The stop-work requirement will continue until directed by the Construction Manager based on EPA approval of appropriate response actions to prevent another exceedance of the Action Level from occurring.

c. Air Quality QOL Standard for Visible Dust
   1) The QOL Standard for Visible Dust is to mitigate Project-related visible dust from leaving the Site.
   2) The Construction Manager will investigate, with assistance by the Contractor, the cause of visible dust if observed leaving the Site. If warranted, the Construction Manager will notify the Contractor if corrective action is required to address observations of visible dust.

2. Noise QOL Standards
   a. The primary objective of the Noise QOL Standards is to limit potential impacts of noise generated by the Project on the surrounding communities.
   b. For residential areas, separate Noise QOL Standards were established for daytime and nighttime periods, and the residential daytime noise standard includes both a Notification Level and an Action Level. The residential nighttime noise standard and nonresidential noise standard (applicable any time of day) are both Action Levels.
   c. The Noise QOL Standards are listed in the table below. All sound levels are presented in decibels on an A-weighted scale (dBA).

TYPE	NUMERICAL STANDARD (MAXIMUM HOURLY AVERAGE)
Notification Level: Residential Daytime (7:00 a.m. to 9:00 p.m.)	75 dBA
Action Level: Residential Daytime (7:00 a.m. to 9:00 p.m.)	80 dBA
Action Level: Residential Nighttime (9:00 p.m. to 7:00 a.m.)	65 dBA
Action Level: Nonresidential (Day or Night)	80 dBA

d. When nighttime work occurs in an area adjacent to both residential and nonresidential receptors, the residential nighttime noise standard will apply.
e. Compliance with the Noise QOL Standards will be determined based on noise monitoring conducted by the Construction Manager or a third party in accordance with the QOL Compliance Plan and the Construction Monitoring Plan (Attachment G of the POP).

3. Odor QOL Standard
   a. The primary objective of the Odor QOL Standard is to protect the surrounding communities from nuisance odors that unreasonably interfere with the comfortable enjoyment of life and property or the conduct of business.
   b. For general odors, the Odor QOL Standard is to mitigate the presence of uncomfortable Project-related odors identified by Project workers, GE, EPA, or via an odor complaint from the public. The standard will be considered not met if uncomfortable Project-related odors are identified frequently and recurrently or if such objectionable odors are not mitigated in a timely manner.
   c. For hydrogen sulfide (H_2S) odors, a numerical QOL Standard is triggered in the event that a complaint or report is received from a worker, the public, or EPA that is related to the distinct rotten-egg smell of H_2S.
   d. The numerical Odor QOL Standard for H_2S is a 1-hour average concentration of 0.01 part per million (ppm; 14 $\mu g/m^3$).
   e. Compliance with the numerical Odor QOL Standard for H_2S will be determined based on monitoring by the Construction Manager or a third party in accordance with the QOL Compliance Plan and Construction Monitoring Plan (Attachment G of the POP).

4. Lighting QOL Standard
   a. The Lighting QOL Standard is to mitigate nuisance Project-related lighting impacts based on any complaints from nearby receptors.
   b. The Lighting QOL Standard will be considered to be not met if frequent, recurrent lighting complaints related to Project activities occur, or if Project-related nuisance lighting impacts are not mitigated in a timely manner.

c. The Lighting QOL Standard does not supersede worker health and safety lighting requirements established by the Occupational Safety and Health Administration (OSHA) and U.S. Coast Guard (USCG), where applicable.

C. Surface Water Action Levels

1. Turbidity
   a. Turbidity Action Level:

$$\text{Turbidity}_{\text{Downstream}} > \text{Turbidity}_{\text{Upstream}} + 50 \text{ NTU}$$

   b. Compliance with the Turbidity Action Level will be determined based on turbidity monitoring within the river by the Construction Manager or a third party in accordance with the Construction Monitoring Plan (Attachment G of the POP). For each active work area in the river, two continuous turbidity monitors will be deployed, one upstream of the active work area and one downstream of the active work area. The upstream monitoring station will be approximately 100 feet upstream of the active work area, and the downstream monitoring station will be approximately 500 feet downstream of the most downstream active work area. At each monitoring location, turbidity will be monitored in real time and reported in nephelometric turbidity units (NTU). Turbidity levels will be logged a minimum of every 15 minutes and downloaded and reviewed at least once per day to assess potential changes in water column turbidity.
   c. In the event that any of the 15-minute readings recorded at the downstream location exceeds the above Turbidity Action Level, a number of Site assessment activities will be initiated under the direction of the Construction Manager or GE, including, but not limited to, the following:
      1) Review of the ongoing removal and/or other construction activities and the potential need for modification of the condition or performance of the existing erosion and sedimentation control measures
      2) Continued monitoring at the downstream location to determine whether the exceedance was an anomaly or whether the elevated reading was a short-duration event.
   d. If it is determined that the Turbidity Action Level exceedance was not an anomaly or short-duration event (e.g., if an exceedance is observed for two or more consecutive 15-minute readings), evaluative water column samples will be collected at both the upstream and downstream locations for analysis of total PCBs and total suspended solids (TSS). The resulting data will be compared to the upstream and downstream turbidity data to assess whether the elevated downstream turbidity reading is also reflected in the PCB and TSS data. This additional, evaluative water column sampling will be continued daily until the Turbidity Action Level is no longer exceeded.
   e. If these assessment activities indicate the elevated downstream turbidity reading reflects a water quality impact that could persist or recur and that it is related to the removal or other construction activities, the Construction

Manager will direct the Contractor to modify construction activities to the extent feasible and/or to implement additional controls. These measures shall remain in place until compliance with the Turbidity Action Level is achieved and until directed by the Construction Manager.

f. PCB Action Levels

2. PCB water sampling data will be reviewed during construction to assess potential impacts to the water column within the river. Upstream and downstream PCB data collected from within the river will be compared with the following PCB Action Level:

$$PCBs_{Downstream} > PCBs_{Upstream} + 5 \text{ micrograms per liter}$$

3. Compliance with the PCB Action Level will be determined based on water sampling within the river by the Construction Manager or a third party in accordance with the Construction Monitoring Plan (Attachment G of the POP). The water samples will be analyzed for PCB congeners and TSS.
4. Sample collection will begin at a weekly frequency. If the results from the first three weeks of routine water column samples indicate PCB levels are acceptable (i.e., do not exceed the PCB Action Level), routine sampling will then be conducted every other week for each area of active construction for the duration of that construction activity. Should the data collected every other week indicate construction activities are not significantly impacting water quality, GE may propose to further reduce the routine water column sampling frequency.
5. In the event the PCB Action Level is exceeded, a number of Site assessment activities will be initiated under the direction of the Construction Manager or Owner, including, but not limited to, the following:
   a. Review of the ongoing removal activities and the potential need for modification of the condition or performance of the existing control measures
   b. Collection of additional, evaluative water column samples from various locations within or adjacent to the removal area in an effort to identify the potential source(s) of the elevated PCB result
6. If these assessment activities indicate the elevated downstream PCB result reflects a water quality impact that could persist or recur and that it is related to removal activities, the Construction Manager will direct the Contractor to modify the construction activities to the extent feasible and/or to implement additional response measures. These measures shall remain in place until compliance with the PCB Action Level is achieved and until directed by the Construction Manager.

D. Surface Water Visual Observation

1. The Contractor and other Project personnel will visually observe the water surface for the presence of turbidity and/or sheens during in-water construction activities (i.e., intrusive remediation activities in the river and along the riverbanks,

including sediment removal and riverbank soil removal, and intrusive remediation activities in backwaters or any other waterbody with a hydraulic connection to the Housatonic River).

2. If water quality impacts are observed, the observer will notify the Construction Manager and GE, and turbidity monitoring data will be reviewed.
3. GE will make any notifications required by law. In addition, if a visible sheen is observed to be generated during remediation activities, GE will notify EPA. If EPA issues a stop-work order after such a notification, the Construction Manager will direct the Contractor to implement corrective actions to mitigate the observed conditions. The corrective actions shall remain in place until directed by the Construction Manager.

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

1. Second Revised Quality of Life Compliance Plan (Anchor QEA and Arcadis 2025)
2. Project Operations Plan (Arcadis 2025), including Ambient Air Monitoring Plan (Attachment D) and Construction Monitoring Plan (Attachment G)
3. 29 *Code of Federal Regulations* (CFR) 1926.52

1.03 SUBMITTALS

A. Pre-Construction

1. The following plans may be submitted separately or as part of the Contractor's Operations Plan.
2. Submit a Dust and PCB Emissions Control Plan that, at a minimum, includes the following: a description of routine control measures, methods, and best management practices (BMPs) that will be implemented by the Contractor during each phase of the Work to control on-site dust and PCB emissions generation and migration from Work areas and to prevent an exceedance of the Air Quality QOL Standards; identification of the water source(s) to be used by the Contractor for dust suppression and control; a contingency plan that details the procedures, additional controls, and mitigation measures that will be followed if there is an exceedance of the PM_{10} Notification Level, PM_{10} Action Level, PCB Notification Level, PCB Action Level or QOL Standard for Visible Dust; and a description of any air quality sampling or monitoring that the Contractor will perform at its own discretion.
3. Submit a Noise Control Plan that, at a minimum, includes a description of routine control measures, methods, and BMPs that will be implemented by the Contractor during each phase of the Work to prevent an exceedance of the Noise QOL Standards and nuisance to neighboring properties; specific controls, methods, and mitigation measures that will be employed to control or reduce noise during sheet-pile installation (if applicable); an inventory of noise levels for noise-generating equipment that will be used by the Contractor during the Work; a contingency

plan that details the procedures, additional controls, and mitigation measures that will be followed if there is an exceedance of the Noise QOL Standards or if a noise complaint is received that is determined by the Construction Manager to require mitigation; and a detailed description of noise monitoring that will be performed by the Contractor, including the monitoring equipment, procedures, frequency, and locations.

4. Submit an Odor Control Plan that, at a minimum, includes a description of routine control measures, methods, and BMPs that will be implemented by the Contractor during each phase of the Work to mitigate and minimize odor emissions into the air during the Work as necessary to maintain compliance with the Odor QOL Standard; specific controls, methods, and mitigation measures that will be employed to control or reduce odors during management of sediments and decaying organic matter (e.g., aquatic plants and other organisms), if applicable; a contingency plan that details the procedures, additional controls, and mitigation measures that will be followed if there is an exceedance of Odor QOL Standard or if an odor complaint determined by the Construction Manager to require mitigation is received; and a description of any sampling or monitoring the Contractor will perform at its own discretion.
5. Submit a Lighting Control Plan that, at a minimum, includes the types and locations of lighting to be used by the Contractor, along with the energy sources to power the lighting; a description of routine control measures, methods, mitigation measures, and BMPs that will be implemented by the Contractor during each phase of the Work to prevent an exceedance of the Lighting QOL Standard and nuisance to neighboring properties, to minimize impacts from lights to neighboring properties, and to protect against potential light impacts on traffic safety; a contingency plan in the event of power outages or if certain lights fail to operate; and a contingency plan for if the Lighting QOL Standard is exceeded, including potential contingency response actions and mitigation measures.
6. Submit a Turbidity/Sheen Control Plan that, at a minimum, includes a description of the methods that will be implemented by the Contractor to comply with the water quality requirements; proposed methods and equipment to be used for turbidity control; proposed manufacturer's specification sheets detailing any material and equipment to be used for any turbidity control systems; proposed plan for performing visual inspections of the water surface for turbidity and sheens; proposed maintenance plan to ensure adequate performance of any turbidity control systems; a description of response actions and procedures to be implemented in the event that sheens are observed during active construction operations, including the equipment, materials, and procedures that will be used and procedures for the management, storage, and disposal of materials used for sheen containment and control; and a contingency plan for if any Surface Water Action Levels are exceeded and require corrective action or if a surface water visual observation requires corrective action, including potential contingency response actions and mitigation measures to be implemented in the event of an exceedance.

7. Submit manufacturer's product data, specifications, storage requirements, and application instructions for any proposed dust, PCB emissions, and/or odor mitigation agents.
8. Submit shop drawings, material data, and other applicable details for any structures, barriers, or enclosures identified to control noise (e.g., temporary noise barriers, acoustic barrier enclosures, or other noise suppression devices).

B. During Construction and Operations

1. Submit the results for any dust, PCB emissions, noise, odor, lighting, and turbidity/sheen monitoring conducted by the Contractor in a format acceptable to the Construction Manager.
2. Submit Corrective Action Reports within 24 hours of notification by the Construction Manager for any exceedance of a QOL Standard, Surface Water Action Level, or for any Project-related complaint that requires corrective action. Corrective Action Reports shall include a description of the exceedance or complaint, causes of the exceedance or complaint, and actions taken or to be taken to mitigate the exceedance or complaint and to prevent the incident from recurring.

PART 2 – PRODUCTS

2.01 DUST AND PCB EMISSIONS CONTROLS

A. Clean, potable water

B. Mitigation agents selected by the Contractor to control site-specific dust and PCB emissions generated during the Work

1. Specific dust mitigation agents shall be identified by the Contractor in the Dust and PCB Emissions Control Plan and in any Corrective Action Reports.

C. Application measures and equipment applicable for water and any other selected dust mitigation agents, including for proper mixing, storage, and application

2.02 NOISE CONTROLS

A. Noise monitoring equipment

B. Engineering controls (e.g., temporary noise barriers, acoustic barrier enclosures, mufflers, or other noise suppression devices) for use as necessary

C. Specific noise control measures shall be identified by the Contractor in the Noise Control Plan and in any Corrective Action Reports

2.03 ODOR CONTROLS

A. Mitigation agents selected by the Contractor to control site-specific odors generated during the Work

1. Specific odor mitigation agents shall be identified by the Contractor in the Odor Control Plan and in any Corrective Action Reports. Any selected odor control agents shall be compatible with the Contractor's water treatment system (if any).

B. Odor mitigation agents may include, but, are not limited to, BioSolve Pinkwater (by The BioSolve Company), Atmos Shield 645 (AC-645) Foam Concentrate (by Atmos Technologies), or ConCover 180 spray-on cover (by New Waste Concepts, Inc.).

C. Application measures and equipment applicable for selected odor mitigation agents, including for proper mixing, storage, and application

2.04 LIGHTING CONTROLS

A. Engineering controls (e.g., light shrouds, temporary light barriers, or other light control devices) for use as necessary

B. Specific lighting control measures shall be identified by the Contractor in the Light Control Plan and in any Corrective Action Reports

2.05 SURFACE WATER CONTROLS

A. Sorbent booms and pads

B. Specific turbidity control measures shall be identified by the Contractor in the Turbidity/Sheen Control Plan and in any Corrective Action Reports

PART 3 – EXECUTION

3.01 GENERAL

A. If a QOL Standard or Surface Water Action Level is exceeded or a Project-related complaint that requires corrective action is received, the Contractor will be notified by the Construction Manager. In the event of an exceedance or a Project-related complaint that requires corrective action, the Contractor shall do the following:

1. Assist the Construction Manager in the investigation and evaluation of the cause of the exceedance or complaint and the need for additional and modified engineering or operational controls.

2. Document the Project and non-Project events occurring at the time and location of the exceedance or complaint.

3. Submit a Corrective Action Report describing the exceedance or complaint, causes of the exceedance or complaint, and actions taken to mitigate the exceedance or complaint and prevent the incident from recurring.
4. Implement additional or modified engineering controls, operational controls, or other mitigation measures, as appropriate, to address such exceedance and prevent another exceedance from occurring.

B. If the Contractor receives a complaint related to dust, odor, noise, or light, the Construction Manager shall be notified immediately.

C. The Contractor shall immediately clean up any waste spilled or spread into non-contaminated areas.

3.02 DUST AND PCB EMISSIONS CONTROL

A. The Contractor shall implement appropriate methods, engineering controls, operational controls, or other mitigation measures, as needed, to conduct Work in compliance with the QOL Standards for Particulate Matter, PCBs, and Visible Dust listed in Paragraph 1.01.B and to prevent dust from becoming a nuisance to nearby properties.

B. The Contractor shall provide positive means to prevent airborne dust and PCB emissions from dispersing into the atmosphere and use only potable water when a water misting system is to be used for dust and particulate control.

C. Water applications shall be applied as frequently as required without creating nuisances such as excessive mud and ponding of water.

D. Do not use chemical means for dust, PCB emissions, or particulate control without the Construction Manager's prior approval.

E. Employ construction methods, routine control measures, and BMPs throughout the duration of the Work, including during nonworking periods, to control on-site dust and PCB generation and dust particulate matter migration from Work areas during each phase of the Work. Construction methods, control measures, and BMPs to control dust and PCB emissions may include, but are not limited to, the following:

1. Removing, placing, handling, loading, and unloading soils and materials using methods that minimize the generation of and emissions from PCB
2. Applying water to control the generation of airborne and PCB emissions
3. Applying a temporary cover on exposed soil or material stockpiles
4. Using temporary vegetative cover on disturbed soil areas, where appropriate
5. Controlling the speed of construction vehicles
6. Using covers on trucks hauling fine or dusty material
7. Preventing tracking of soils onto haul routes

8. Modifying haul routes or surfaces to control and reduce dust generation
9. Assessing wind conditions to determine if construction methods or operational controls warrant modification to control and reduce PCB emissions generation

F. Apply water to haul routes, open excavations, soil-covered areas, material staging piles, and loading and unloading areas as needed during Work activities, as needed during nonworking periods, and if requested by the Construction Manager to minimize dust and PCB emissions generation.

G. Ensure that potential dust-generating and PCB-generating areas are thoroughly wetted at the end of each working day, unless precipitation is occurring, to prevent the generation of dust during nonworking periods. Apply mulch, wetting, or other methods approved by the Construction Manager prior to long Work stoppages to prevent the generation of dust and PCB emissions during nonworking periods.

H. The Construction Manager may stop Work at any time if the Contractor's control measures are inadequate for the wind conditions or if the Contractor's control measures are not sufficient for controlling the release of Work-related dust, PCB emissions, or particulates. Any stop-work order shall remain in effect until directed by the Construction Manager.

3.03 NOISE CONTROL

A. The Contractor's activities shall minimize noise emissions to the greatest degree practicable.

B. The Contractor shall provide all equipment, controls, and mitigation measures to conduct Work in compliance with the Noise QOL Standards in Paragraph 1.01.B and to minimize nuisance to adjacent properties.

C. The Contractor shall comply with OSHA regulations related to occupational noise exposure (29 CFR 1926.52).

D. The Contractor shall obtain written approval from the Construction Manager prior to performing noise-generating Work between 9:00 p.m. and 7:00 a.m. or on weekends or state or federal holidays, except in the case of emergencies (in which case GE and the Construction Manager shall be notified of such Work as soon as practicable).

E. When Work is performed during overnight hours (i.e., between 9:00 p.m. and 7:00 a.m.) near residential receptors, activities that generate or have the potential to generate loud or disruptive noise shall be minimized to the extent practicable, except where necessary to address an emergency condition. Loud equipment operation, sheet-pile driving, and stone material handling shall not be conducted when working near residential receptors during overnight hours.

F. Use properly muffled equipment and conduct routine preventive maintenance on equipment and exhaust systems to minimize the noise generated by the Contractor's

equipment and reduce the potential for exceedance of the Noise QOL Standards or nuisance to neighboring properties.

G. Employ proactive construction methods, routine control measures, and BMPs throughout the duration of the Work, including during nonworking periods, to control noise during each phase of the Work. Construction methods, control measures, and BMPs to control noise may include, but are not limited to, the following:

   1. Using shrouds, barriers, or other sound-attenuating walls around stationary equipment (e.g., generators and pumps) or between noise sources and receptors
   2. Scheduling the Work to minimize or avoid equipment use that might result in prolonged or excessive elevated noise levels during early morning or overnight hours
   3. Controlling the speed at which equipment is operated
   4. Using broadband/white noise backup alarms on construction equipment that frequently operate in reverse (e.g., front-end loaders and dump trucks)
   5. Using electric- or battery-powered vehicles or equipment, where practicable

H. The Contractor shall perform noise monitoring initially at the start of a new type of construction activity in each construction season to assess representative noise levels and confirm the noise levels do not exceed the designated standards. This initial noise monitoring will be conducted on a day representative of full-scale operations in a given area (as opposed to the first day of any operations in the area). The monitoring will be conducted using a sound-level meter to measure levels between the construction activities and the nearest receptor(s). Initial noise monitoring will be continuous during hours of operation so 1-hour averages can be computed across the entire construction day, as activities will likely vary throughout the day. If work is conducted during the night, the initial monitoring will be conducted over a 24-hour period. Should noise monitoring by the Contractor suggest a potential for an exceedance of the specified requirements, the Contractor shall immediately inform the Construction Manager. The Contractor shall submit all noise monitoring data in a format acceptable to the Construction Manager.

I. If the initial monitoring indicates noise levels are acceptable, subsequent monitoring will occur as follows: 1) biweekly for each type of construction activity to verify noise levels; 2) when a new remediation activity, equipment, or reduced distance to receptors has the potential to increase noise levels; 3) if work hours are extended to the nighttime period (i.e., between 9:00 p.m. and 7:00 a.m.); and 4) in response to noise complaints. Like the initial monitoring, this subsequent monitoring will be continuous during hours of operation so 1-hour averages can be computed across the entire construction day.

J. If the Construction Manager notifies the Contractor that any Noise QOL Standards were exceeded or that a complaint has been received that requires corrective action, the Contractor shall implement operational controls, engineering controls, or other sound

mitigation measures as quickly as possible but no longer than 4 hours after notice by the Construction Manager.

3.04 ODOR CONTROL

A. The Contractor shall implement appropriate methods, engineering controls, operational controls, or other mitigation measures, as needed, to conduct Work in compliance with the Odor QOL Standard listed in Paragraph 1.01.B and to minimize nuisance to adjacent properties.

B. The Contractor must proactively employ odor controls during the Work and evaluate and modify construction techniques and Site management practices, as necessary and appropriate, to control objectionable odors caused by the Work, the Contractor's operation of vehicles and equipment, and other actions.

C. The Construction Manager may stop Work at any time if the Contractor's control measures are not sufficient for controlling Work-related odors as specified in this Section. Any stop-work order shall remain in effect until directed by the Construction Manager.

3.05 LIGHTING CONTROL

A. The Contractor shall provide all equipment, controls, and mitigation measures to conduct Work in compliance with the Lighting QOL Standard in Paragraph 1.01.B and to minimize nuisance to adjacent properties.

B. Lighting shall be maintained such that it is not a nuisance to the neighboring properties or the community.

C. All Work shall be conducted in compliance with regulations set by OSHA and USCG, where applicable. The Lighting QOL Standard shall not supersede lighting requirements established by OSHA or USCG.

D. The Contractor shall supply sufficient lighting to Work areas to provide safe conditions during low-light and nighttime operations.

E. Fixed lighting shall be installed where necessary for safe illumination of frequent access areas, such as around walkways, temporary office facilities, and Temporary Staging Areas.

F. Lighting shall be directed toward Work areas and away from adjacent properties.

G. Measures shall be implemented to protect against potential lighting impacts on traffic safety on public or private roadways.

H. The Contractor shall employ routine control measures and BMPs to minimize or limit potential off-site nuisance impacts generated by lighting. Routine control measures and

BMPs may include, but are not limited to, proper positioning of lights, proper setting of beam direction, adjusting the brightness of lights, limiting the heights of light masts, and shielding.

I. The Contractor shall provide engineering controls (e.g., light shrouds, balloon lights, temporary light barriers, or other light-control devices) for use, as necessary, to minimize impacts from lights to neighboring properties.

3.06 WATER QUALITY CONTROL

A. The Contractor shall implement appropriate methods, engineering controls, operational controls, or other mitigation measures, as needed, to conduct Work in compliance with the Surface Water Action Levels specified in Paragraph 1.01.C.

B. The Contractor shall employ routine control measures and BMPs to minimize or limit potential releases to the water column.

C. The Contractor shall furnish, install, deploy, inspect, relocate, and maintain any turbidity control systems in accordance with the manufacturer's recommended procedures, consistent with the layout and design provided with the Contractor's Turbidity/Sheen Control Plan and to the satisfaction of the Construction Manager.

D. The Construction Manager reserves the right to suspend Work at any time as necessary if there is a water quality concern that may cause contamination of adjacent areas.

3.07 SHEEN RESPONSE AND CONTROL

A. The Contractor shall have a vessel and crew for monitoring and deploying oil sheen control and oil-sorbent booms and pads to address observed oil sheens at the direction of the Construction Manager.

B. At all times, the Contractor shall have sufficient sheen response personnel, booms, sorbents, vessels, and all other necessary equipment and materials on site to respond to oil sheens in accordance with this Section. When oil sheens are present, the response crews shall be actively engaged in sheen control actions. Sheen response personnel may perform other activities when sheen response activities are not required but shall be available at the Site to respond quickly if sheens are observed, and they shall be dedicated to sheen response activities while sheens are present.

C. The Contractor shall monitor the water surface for the presence of oil sheens using available vantage points from ongoing Work to inspect for the presence of oil sheens and identify their development, location, appearance, drift direction, and rate of movement.

D. If the Contractor observes one or more oil sheens on the water surface, the Contractor shall immediately notify the Construction Manager. The Construction Manager will also

monitor for the presence of oil sheens and will notify the Contractor if any oil sheen is observed.

E. If one or more oil sheens are observed on the water surface by the Contractor or the Construction Manager, the Contractor shall, at a minimum, implement the following responses:

1. The Contractor shall deploy and maintain oil-containment booms, oil-sorbent booms, and oil-sorbent materials to intercept and control the sheen. The oil-sorbent booms and oil-sorbent materials shall be deployed, adjusted, and maintained in a configuration that will allow continued in-water Work within the contained area. The oil-sorbent boom and oil-sorbent material shall extend for the same length as the oil-containment boom and shall be located on the side of the oil-containment boom closest to the operation. The ends of oil-containment boom(s), oil-sorbent booms, and oil-sorbent materials shall be secured or otherwise connected in a manner that provides continuous coverage where deployed but does not adversely impact or hinder the construction operation.
2. Once sheens are observed and the oil-containment boom(s) and oil-sorbent materials are deployed, the Contractor shall visually inspect and verify the condition and effectiveness of the position of the deployed booms and oil-sorbent materials at least once every hour. The Contractor shall adjust the boom(s) and oil-sorbent materials so as to maximize the potential to oil containment oil sheens.
3. The Contractor shall sweep areas where oil sheens are observed with oil-sorbent material if necessary to minimize the escape of sheens downstream.
4. If oil sheens are observed to have collected behind the oil-containment boom(s) or other stationary locations, the Contractor shall actively collect the sheens and any other floating debris in contact with the sheen.
5. The Contractor shall perform maintenance of all deployed oil-containment booms and oil-sorbent materials at least once per shift, including, but not limited to, removing any trapped floating material and sheens along the boom system and replacing ineffective, oil-laden, or worn sorbents to ensure oil-containment booms and sorbent materials function as intended. Sorbent materials shall be replaced following the requirements of this Section, every 5 days of continuous deployment, or at the request of the Construction Manager, whichever occurs first.
6. When deployed, oil-sorbent booms and oil-sorbent materials shall remain in place at all times, except as necessary to allow vessels or equipment access. Prior to opening or removing oil-sorbent booms and oil-sorbent materials, the Contractor shall visually inspect the opening for the presence of sheens.
7. If sheens are observed, sweep or actively collect the sheens prior to opening the booms. If the materials must be moved to facilitate access, the time when the oil-sorbent booms and oil-sorbent materials are open shall be kept to an absolute minimum and be closed immediately after the vessel(s) passes.

8. If no oil sheens have been observed within 48 hours of performing an oil sheen response, the Contractor may suspend the use of oil-containment booms and oil-sorbent materials. The oil-sorbent booms and oil-sorbent materials shall be redeployed immediately in accordance with this Section if oil sheens are observed in that location.

F. All used sorbent materials, sorbent booms, and other materials generated during the collection, control, and containment of sheens shall be removed for proper disposal by the Contractor.

END OF SECTION

PART 1 – GENERAL

1.01 GENERAL

A. This Section establishes requirements for surveying, documentation, and measurement activities associated with the construction and restoration Work.

B. Surveying activities covered by this Section include the collection of horizontal and vertical control data, topographic surveys, feature layout and location surveys, progress surveys, and as-built documentation necessary to support construction, restoration, verification of Work, and documentation of pre- and post-construction conditions.

C. Except as noted herein, the Contractor shall be responsible for performing and furnishing all surveys, measurements, documentation, and related quality control (QC) and quality assurance (QA) services necessary for the planning, execution, and verification of the Contractor's Work.

D. General Electric Company's (GE's) third-party surveyor, reporting to the Construction Manager, will perform specific verification and acceptance surveys for dredging and engineered cap construction within the river channel and along riverbanks, as described in Article 1.03. These surveys shall serve as the authoritative basis for acceptance and quantity determination for dredging and engineered cap placement.

E. Although the Contractor may elect to perform independent surveys for operational or QC purposes, survey data and determinations made by GE's third-party surveyor shall govern final determinations regarding dredging completion, engineered cap completion, and related quantities.

F. The Construction Manager reserves the right to have a third-party surveyor or engineer perform QC checks on the Contractor's survey data and calculations.

G. Where survey activities are governed by other Sections, the accuracy, survey methods, and documentation requirements specified in those Sections shall govern.

H. Nothing in this Section relieves the Contractor of responsibility for performing the Work in accordance with the Contract Documents, regardless of survey results.

1.02 CONTRACTOR SURVEY RESPONSIBILITIES

A. The Contractor shall be responsible for all surveys and documentation necessary to plan, execute, verify, and document the following categories of Work, as applicable, including, but not limited to, the following:

1. Floodplain and Vernal Pool soil removal, backfilling, grading, and restoration.

2. Backfilling and restoration of the Intermittent Side Channel.
3. Pre-construction, post-construction, and post-restoration documentation of Temporary Access Roads and Temporary Staging Areas.
4. Location, layout, and as-built documentation of installed in-river, shoreline, and riverbank features and structures, including, but not limited to, single-arm vanes, cross vanes, sills, J-hooks, toewood, coir lifts, stone toes, and riprap bank protection.
5. Progress surveys documenting the extent, status, and sequencing of the Contractor's Work.
6. Verification and documentation of utilities within and adjacent to the Work Areas.
7. Documentation of existing shoreline and in-river structures within or adjacent to the Work Areas.
8. Survey and documentation of existing riprap and shoreline protection measures where required for establishment of dredging offsets, in accordance with Section 35 24 00 – Sediment and Riverbank Soil Removal.
9. Location and documentation of trees with diameter at breast height (DBH) of greater than or equal to 6 inches that are identified for removal.
10. Survey and documentation of existing large debris within and along the river channel identified for removal.
11. Any additional survey activities required to support the Contractor's means and methods that are not performed by GE's third-party surveyor.

B. The Contractor shall furnish all labor, supervision, tools, equipment, materials, services, and incidentals necessary for performing the surveying activities described herein and for preparing required survey data, as-built surveys, and drawings.

C. The Contractor shall provide survey control sufficient for surveying existing conditions, Work progress, and completed Work.

D. Survey data generated by the Contractor shall be retained and made available to the Construction Manager upon request.

E. For verification and as-built surveys, the Contractor shall subcontract a Massachusetts-licensed Professional Land Surveyor (PLS). Survey deliverables requiring professional certification shall be sealed and signed by the Contractor's PLS (or a Massachusetts-licensed Professional Engineer, where appropriate).

1.03 GE'S THIRD PARTY SURVEYOR RESPONSIBILITIES

A. GE's third-party surveyor, under the direction of the Construction Manager, will perform verification and acceptance surveys for the following:

1. Sediment and riverbank soil removal.
2. Engineered cap construction.

B. Surveys performed by GE's third-party surveyor shall constitute the authoritative record for the following:

1. Verification of dredging completion.
2. Verification of engineered cap completion.
3. Compliance determinations for dredging and capping.
4. Calculation of dredging and capping quantities.

C. In the event of discrepancies between Contractor-performed surveys and surveys performed by GE's third-party surveyor, the surveys performed by GE's third-party surveyor shall govern.

1.04 RELATED SECTIONS

1. Section 13 80 01 – Temporary Access Roads and Staging Areas
2. Section 31 13 18 – Removal of In-River Debris and Shoreline Vegetation
3. Section 31 23 00 – Soil Excavation and Fill
4. Section 35 24 00 – Sediment and Riverbank Soil Removal
5. Section 35 28 00 – Engineered Cap
6. Section 35 43 37 – Riprap and Stone Protection
7. Section 35 44 10 – Log In-Stream Structure
8. Section 35 44 20 – Boulder In-Stream Structure
9. Section 35 44 30 – Brush Mattress
10. Section 35 44 40 – Soil Coir Lift
11. Section 35 44 60 – Toewood
12. Section 35 44 70 – Log Sill

1.05 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. U.S. Army Corps of Engineers (USACE), 2013. Engineering and Design – Hydrographic Surveying (EM 1110-2-1003).

B. USACE, 2007. Engineering and Design – Control and Topographic Surveying (EM 1110-1-1005), dated January 1, 2007, or the most current version.

C. American Society for Photogrammetry and Remote Sensing (ASPRS) Positional Accuracy Standards for Geospatial Data

D. U.S. Geological Survey (USGS) Lidar Base Specification

1.06 PROJECT DATUMS

A. All topographic and hydrographic surveys shall be prepared using the Project datums listed in these Specifications and as shown on the Design Drawings:

1. Horizontal Datum shall be based on Massachusetts State Plane, Mainland Zone, North American Datum of 1983 (NAD83), U.S. survey feet.

2. Vertical Datum shall be based upon North American Vertical Datum of 1988 (NAVD88), U.S. survey feet.

1.07 SURVEYOR QUALIFICATIONS

A. Topographic surveys shall be performed in accordance with USACE Engineering Manual (EM) 1110-1-1005 guidance. The Contractor's topographic surveyor shall be a Massachusetts-licensed PLS with qualifications acceptable to the Construction Manager. The topographic surveyor shall have actively engaged in topographic survey operations during the past 3 years and have a minimum of 5 years of experience in topographic surveying working in similar conditions.

B. Hydrographic surveys shall be performed in accordance with USACE EM 1110-2-1003 guidance. The hydrographic surveyor selected by the Contractor shall be a registered hydrographic surveyor certified by the National Society of Professional Surveyors with qualifications acceptable to the Construction Manager. The hydrographic surveyor shall have actively engaged in hydrographic survey operations during the past 3 years and have a minimum of 5 years of experience in hydrographic surveying working in similar marine conditions.

C. The qualifications of the Contractor's surveyor(s) shall be submitted in the Survey Work Plan outlined herein. The Construction Manager reserves the right to disallow the person(s) proposed by the Contractor for surveying. If, in the Construction Manager's opinion, the person is not qualified to do the Work, the Contractor shall select another surveyor and submit qualifications until a qualified person is approved.

1.08 SURVEY CONTROL, STANDARDS, AND COORDINATION

A. Survey control for construction, documentation, and verification purposes shall be the responsibility of the Contractor, except where surveys are performed by GE's third-party surveyor as described in Article 1.03.

B. All surveys performed by the Contractor shall be referenced to the Project horizontal and vertical datums specified in the Contract Documents and shall be performed by qualified survey personnel using appropriate equipment and procedures.

C. GE will provide survey benchmarks for the Contractor's surveyor to establish horizontal and vertical control. The Contractor shall safeguard all survey control points and benchmarks.

D. Survey control points damaged or destroyed by the Contractor shall be re-established by the Contractor at no additional cost to GE.

E. From established control points, the Contractor shall establish lines, grades, and elevations necessary to control the Work and to achieve the tolerances specified in the Contract Documents.

F. The Contractor shall establish, place, maintain, and replace any survey stakes, markers, and reference points necessary for construction control, intermediate checks, and guidance of construction operations.

G. The Contractor shall coordinate all survey activities with the Construction Manager and GE's third-party surveyor to avoid conflicts, duplication of effort, and interference with verification surveys.

1.09 PROJECT SURVEY REQUIREMENTS

A. General

1. Surveys performed by the Contractor under this Section shall be of sufficient accuracy, resolution, and coverage to support construction control, documentation of completed Work, and verification of conformance with the Contract Documents.

2. Survey data processing shall consider the horizontal extents of the remediation boundaries to avoid edge effects with averaging data inside and outside of the boundaries.

3. The Contractor shall make all measurements of length, depth, and area required to calculate quantities of the Work consistent with the Specifications and as shown on the Design Drawings. The results of these survey measurements and all relevant backup calculations shall be provided to the Construction Manager for review and approval.

4. Survey procedures, including, but not limited to, positioning modes, calibration, data reduction, adjustment, processing, and plotting shall conform to recognized industry standards. Horizontal location observations shall compensate for errors, geodetic corrections, and atmospheric variations as needed.

B. Survey Data Records

1. Raw and processed survey data (including XYZ or CSV files with easting, northing, and elevation) along with associated contour maps and, where applicable, isopach or comparison maps in PDF and CAD format, shall be provided to the Construction Manager.
2. Furnish copies of Project field notes, computations, layout records, and software information necessary to interpret survey data to the Construction Manager for review and approval.
3. Survey data shall be provided in X, Y, Z, D (easting, northing, elevation, description) format with a descriptive file header identifying software, equipment, Project name, datums, units, survey type, alignment, and stationing.
4. Maintain a complete and accurate log of survey activities throughout the Work.
5. Submission or acceptance of survey data does not constitute a transfer of responsibility or acceptance of accuracy by the Construction Manager or GE.

C. Topographic Surveys: Topographic surveys performed to document Floodplain and Vernal Pool soil removal and backfill, grading, restoration features, Temporary Access Roads, Temporary Staging Areas, Intermittent Side Channel backfill, utilities, and other terrestrial or nearshore features requiring construction control or verification shall meet the following minimum performance criteria:

1. Achieve a horizontal accuracy of ±0.1 foot and a vertical accuracy of ±0.1 foot relative to the Project datums.
2. Provide survey point density and coverage sufficient to accurately characterize surface conditions and calculate volumes (subject to approval by the Construction Manager).
3. Unless otherwise approved, survey point spacing shall not exceed 10 feet in either direction.

D. Hydrographic Surveys: Hydrographic surveys performed to document in-river conditions, constructed in-river features, or other submerged elements assigned to the Contractor that require construction verification shall meet the following minimum performance criteria:

1. Be performed in general accordance with USACE EM 1110-2-1003 – Hydrographic Surveying, unless otherwise specified herein.
2. Achieve an overall vertical (elevation/depth) accuracy of ±0.2 foot or better, with survey systems demonstrating repeatable elevation measurements on the order of ±0.1 foot under prevailing Site conditions.
3. Achieve horizontal positioning accuracy of ±0.5 foot.

4. For single-beam surveys, collect soundings along transects parallel and perpendicular to the river stationing shown on the Design Drawings, with transect spacing not exceeding 10 feet, unless otherwise approved.
5. Use real-time kinematic differential global positioning system technology or equivalent positioning technology capable of achieving the required accuracy.

E. Inventory and Reconnaissance-Level Surveys.

1. Surveys performed for the purpose of identifying, inventorying, and documenting existing features that do not require precise dimensional control (e.g., trees identified for removal and existing large debris within or along the river channel) may be performed at a lower accuracy commensurate with their intended use.
2. For such surveys, mapping-grade or reconnaissance-grade positioning accuracy may be used, including handheld GPS equipment, provided that the resulting data are sufficient to identify the feature, support planning and coordination of the Work, and distinguish features from adjacent elements. These surveys are not required to meet the accuracy requirements specified for the construction-level topographic or hydrographic surveys.

F. Lidar Surveys.

1. Light detection and ranging (lidar) survey methods may be proposed by the Contractor. If lidar survey methods are employed, the Contractor's surveyor shall perform all required system calibration and accuracy-validation surveys in accordance with current industry standards, including applicable ASPRS Positional Accuracy Standards and USGS Lidar Base Specifications. All calibration, ground control, and checkpoint validation activities shall be conducted using survey-grade methods sufficient to demonstrate that the resulting lidar data meet the Project's specified horizontal and vertical accuracy requirements. If lidar survey methods are used, the average elevation of the lidar data within each grid will be used to document compliance with the Project requirements.

G. Survey Performance and QC

1. The Contractor shall demonstrate the ability to achieve, monitor, and report the required survey accuracies in the Survey Work Plan. Survey methods and equipment shall be appropriate for the intended use of the data, and reported accuracies shall reflect the combined effects of positioning, sensor performance, vessel motion (if applicable), environmental conditions, and data processing.

1.10 PERFORMANCE CRITERIA/QUALITY ASSURANCE

A. The Contractor shall conduct and document the QC procedures recommended by the survey equipment manufacturer for the equipment used.

B. Surveying shall be conducted to meet the requirements specified herein, including, but not limited to, documenting the completed construction Work with accuracy sufficient to allow for evaluation and confirmation that the Work has been completed in conformance with the Contract Documents.

C. When applicable, the Contractor shall regularly resurvey benchmarks for comparison with original elevations and positions. Where the Contractor uses a laser for control, the Contractor shall periodically check the grade and alignment during each day's operation. The Contractor shall promptly notify the Construction Manager if changes in elevations or positions from what is shown in the Design Drawings are identified.

D. For QA purposes, at the Construction Manager's discretion, GE may provide a third-party surveyor to witness the surveys completed by the Contractor. The Contractor shall provide at least three working days advance notice to the Construction Manager before any compliance surveys.

1.11 SUBMITTALS

A. Submit survey data, drawings, and documentation associated with Contractor-performed surveys in formats acceptable to the Construction Manager.

B. Survey submittals shall clearly identify the purpose of the survey, date, survey methods, datum references, and accuracy achieved.

C. Unless otherwise specified herein, submit both unedited (raw) survey data and processed survey results in accordance with the Survey Data Records requirements in Paragraph 1.09.B.

D. Pre-Construction

1. Prepare and submit a Survey Work Plan as part of the Contractor's Operations Plan for review and approval by the Construction Manager prior to the start of any survey-related field Work. The Survey Work Plan shall, at a minimum, include the following:
   a. Name, address, phone number, and qualifications (including licensure and certifications) of the Contractor's surveyors and the personnel proposed for each required survey type.
   b. Survey equipment, methods, and procedures proposed for each required survey type.
   c. A list and description of all surveying tasks and Work Areas to be surveyed, including survey objectives and intended data uses.
   d. Planned methods and frequencies for Progress surveys.
   e. Description of survey methods, including equipment, calibration procedures and frequency, and estimated precision and accuracy.
   f. Milestone schedule for completing field survey activities.

g. Listing of all control points and benchmarks to be used, clearly identifying those provided by GE and those established by the Contractor.
h. Proposed survey deliverable formats, including example electronic files.
i. Description of survey recordkeeping procedures.

2. Survey Control Certification: Submit a letter from the Contractor's surveyor certifying that Project survey control points and benchmarks are located as required by the Contract Documents. If discrepancies are identified, notify the Construction Manager immediately and submit documentation describing and illustrating the inconsistencies.
3. Utility Survey results.
4. Pre-Construction Conditions Survey documentation.
5. Debris and Tree survey documentation and an assessment of whether pre-dredging removal is required.
6. Pre-construction topographic survey data.
7. Unless otherwise approved by the Construction Manager, submit pre-construction survey datasets (raw and processed) within 10 workdays of collection.

E. During Construction

1. Progress Surveys: Submit progress survey data as required by the Specifications and as requested by the Construction Manager.
2. Verification Surveys: Submit Contractor-performed verification survey data and quantity calculations to document completion of the Work.
3. Submit, upon request, documentation supporting survey accuracy, including survey logs, field notes, and QC records.
4. Unless otherwise approved by the Construction Manager, submit verification survey datasets (raw and processed) within 2 workdays of collection.

F. Post-Construction

1. Survey Record Drawings: Upon completion of major phases of Work, submit Survey Record Drawings. Record Drawings shall be provided in a format compatible with AutoCAD Civil 3D (2023 or later) and PDF and shall, at a minimum, document the following:
   a. Horizontal and vertical control points and benchmarks used during the Work.
   b. Pre- and post-excavation and final backfill conditions for Floodplain and Vernal Pool remediation areas.
   c. Pre- and post-backfill conditions for the Intermittent Side Channel.
   d. Post-construction locations and elevations of installed restoration features (e.g., vanes, sills, toewood, and riprap bank protection).

e. Pre-construction, post-construction, and post-restoration conditions for Temporary Access Roads and Temporary Staging Areas.
f. General Site features, including drainage structures, utilities, fencing, and other relevant elements.

2. Post-Construction Conditions Survey documentation.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

A. The Contractor shall perform surveys as required to support construction control, documentation of existing conditions, Work progress, and documentation of completed Work.

B. The Contractor shall exercise care during the execution of the Work activities to minimize any disturbance to existing property and to the landscape and waters in the areas surrounding the Work Areas. Survey crews shall not traverse into controlled areas or private property without first obtaining approval from the Construction Manager.

C. The Contractor shall reference survey points to the provided survey control points and record all survey locations, with horizontal and vertical data, on Project record documents. Survey controls shall be established at the start of the Work and maintained throughout the construction activities. Survey benchmarks are shown on the Design Drawings so that the Contractor's licensed surveyor(s) can establish appropriate horizontal and vertical control consistent with the existing survey data.

D. Unless otherwise agreed to by the Construction Manager, the same survey method and survey measurement spacing shall be used for Pre- and Post-Construction Surveys within a given area.

E. Prior to construction, the Construction Manager will provide to the Contractor the required perimeter and internal survey points within each Floodplain and Vernal Pool remediation area to be used to survey pre-construction, post-excavation (if required), and post-construction elevations. The grid spacing will be determined in consultation with the Contractor and will be presented in the Supplemental Information Package (SIP) following selection of the Contractor and approval by the Construction Manager. The Contractor shall complete all elevation measurements at the provided survey point locations for the duration of the Project (i.e., the same control points will be used to measure elevations prior to and following soil removal activities, as well as to document final post-backfilling limits and elevations), unless otherwise approved by the Construction Manager. Surveying shall be performed to verify that the required

horizontal and vertical limits of removal, backfill placement, and amendment placement have been obtained and that the required surface grade has been achieved.

F. Where other Specifications require Construction Manager review or approval prior to proceeding (e.g., stakeout approval), the Contractor shall coordinate survey and layout activities so that such review and approval occur prior to construction of the affected Work.

3.02 CONTRACTOR-PERFORMED SURVEYS

A. Utilities Survey

1. The Contractor shall survey and verify the locations of aboveground and at-grade utilities in, or immediately adjacent to, the Work Area to confirm clearance with the Work.
2. The Contractor shall survey and verify the locations of any submerged utilities that cross the river.
3. The Contractor shall provide utility survey results to the Construction Manager within 10 days of survey completion.

B. Pre-Construction/Post-Construction Conditions Surveys

1. The Contractor shall perform a Pre-Construction Conditions Survey before commencement of the Work and a Post-Construction Conditions Survey after completion of the Work as described herein.
2. At a minimum, Pre-Construction and Post-Construction Conditions Surveys shall be completed annually for support areas, structures, access roads, haul routes, exposed utilities, sewer manholes, drainage features (e.g., culvert pipes, subsurface pipes, manholes, catch basins, ditches, swales, pipe inlets/outlets, riprap protection, check dams, and berms), and other relevant features in and adjacent to the Work Areas.
3. Pre-Construction and Post-Construction Conditions Surveys shall consist of digital photographs and videos. An index of videos and photographs is required. Videos and photographs shall be organized and clearly labeled by Work Area. A key plan shall be provided to show the location and orientation of each photograph and video.
4. Documentation of the Pre-Construction Conditions Survey shall include a written description of the condition of key features for each structure in and adjacent to the Work Areas. The documentation shall note any evident structural faults and deficiencies or recent repairs.
5. As part of the Pre-Construction and Post-Construction Conditions Surveys, the Contractor shall conduct topographic surveys upland areas that will be or are disturbed during the performance of the Work. This requirement may be

completed using lidar survey methods. The topographic surveys shall document the elevations and contours within the Work Area. The survey shall also document the locations, types, and sizes of utilities and structures within and immediately adjacent to the Work Area or that may need to be altered to perform the Work.

6. Prior to construction of Temporary Access Roads, the Contractor shall conduct pre-construction inspection and photographic documentation of existing culverts and swale crossings that will be crossed by Temporary Access Roads. Post-construction documentation shall be provided as necessary to demonstrate restoration of pre-construction hydraulic function.

C. Debris and Tree Surveys

1. Where required for tree removal planning, the Contractor shall document the location, size, and condition of trees proposed for removal. The tree documentation shall clearly identify trees with DBH greater than or equal to 8 inches where prior Construction Manager approval is required by the applicable vegetation/tree removal specification.
2. Prior to debris removal activities, the Contractor shall conduct a visual survey of Work Areas, jointly with the Construction Manager, to identify debris requiring removal.

D. Pre-Construction Surveys and Documentation

1. The Contractor shall perform pre-construction topographic surveys to document baseline elevations and conditions within Floodplain and Vernal Pool remediation areas and the Intermittent Side Channel prior to soil excavation or backfill activities.
   a. Pre-excavation surveys shall cover the full extent of the removal areas that will be excavated and any nearby areas that will be disturbed. The pre-excavation surveys must be accepted by the Construction Manager before commencing soil removal in each area.
   b. The Contractor shall perform a pre-backfill survey of the Intermittent Side Channel prior to the start of backfill activities. The Pre-Backfill Survey shall cover the full extent of the Intermittent Side Channel that will be backfilled and any nearby areas that will be disturbed. The pre-backfill surveys must be accepted by the Construction Manager before commencing backfill placement in each area.
2. The Contractor shall perform pre-construction surveys and documentation of existing conditions and elevations within areas to be disturbed by Temporary Access Roads and Temporary Staging Areas.
3. Where required, the Contractor shall conduct probing and surveying to identify the riprap-mudline interface along shorelines and establish riprap offsets in accordance with Section 35 24 00 – Sediment and Riverbank Soil Removal.

4. Where required, the Contractor shall conduct probing and surveying around in-river structures in accordance with Section 35 24 00 – Sediment and Riverbank Soil Removal.

E. Construction Control, Layout, and Progress Surveys

1. The Contractor shall perform progress surveys, as necessary, to document the extent, status, and sequencing of the Work. The progress surveys shall be used to support submittal of daily documentation of construction progress.
2. The Contractor may perform progress surveys in dredging and capping areas for operational planning and progress documentation; however, dredging and engineered cap acceptance and associated quantity determinations are governed by GE's third-party surveyor as described in Articles 1.03 and 3.03.
3. The Contractor shall stake out the locations and extents of in-river, shoreline, and riverbank features and structures (e.g., single-arm vanes, cross vanes, sills, J-hooks, toewood, coir lifts, stone toes, and riprap bank protection) and review such stakeout with the Construction Manager prior to construction. Construction shall not begin until the extents are approved.
4. Where temporary stream diversion or containment structures are part of the Contractor's means and methods, the Contractor shall provide survey and layout support as necessary to support proposed layouts, field verification, and utility coordination.

F. Post-Construction and Post-Restoration Surveys

1. The Contractor shall conduct post-construction surveys to document completion and conformance of Floodplain and Vernal Pool soil removal and backfill and Intermittent Side Channel backfill.
   a. Post-excavation surveys shall be used to verify whether excavations comply with the Design Drawings and Section 31 23 00 – Soil Excavation and Fill. The Contractor shall submit post-excavation survey results to the Construction Manager for review and approval prior to commencing backfill placement in each area.
   b. The Contractor shall submit post-backfill placement survey results and survey comparisons for each backfill layer. Separate post-backfill placement surveys shall be performed following placement of each backfill layer to the required thickness or elevation. The Construction Manager will verify whether the backfill layer thicknesses and elevations, as applicable, achieve the requirements specified in Section 31 23 00 – Soil Excavation and Fill. The Construction Manager will review and approve each layer prior to placement of subsequent layers.
   c. The Contractor shall calculate and submit quantities (nearest cubic yard) for soil excavated and backfill placed, including by backfill layer where

applicable, and shall provide supporting survey calculations for Construction Manager review.

d. If required excavation or backfill placement has not been achieved as determined by the Construction Manager, the Contractor shall implement corrective action and resurvey the area at no additional expense to the Owner.

2. The Contractor shall conduct post-construction surveys to document as-built locations and extents of and to confirm adherence to the specified requirements for installed in-river, shoreline, and riverbank restoration features and structures (e.g., single-arm vanes, cross vanes, sills, J-hooks, toewood, coir lifts, stone toes, and riprap bank protection). The Construction Manager will verify whether installation of each feature meets the requirements of the applicable specification.

3. The Contractor shall perform post-construction surveys of Temporary Access Roads and Temporary Staging Areas and shall prepare Survey Record Drawings documenting pre-construction, post-construction, and post-restoration conditions and elevations, consistent with Section 13 80 01 – Temporary Access Roads and Staging Areas.

3.03 THIRD-PARTY SURVEYS

A. General

1. The Contractor shall provide the Construction Manager and GE's third-party surveyor reasonable access to Work Areas and safe means to perform required verification surveys.

2. In-river and riverbank surveys performed by GE's third-party surveyor will use topographic survey methods or single- or multi-beam hydrographic survey methods, depending on access and water depths. The determination of which survey method is used will be made by the Construction Manager based on Site conditions. Preference will be given to performing surveys using hydrographic survey methods where sufficient water depths and access exist.

B. Sediment and Riverbank Soil Removal

1. GE's third-party surveyor, under the direction of the Construction Manager, will conduct pre-construction and post-construction surveys to verify compliance with the specified requirements for sediment and riverbank soil removal.

2. Post-dredging survey data in each Cap Certification Unit (CCU) will be compared with the Required Elevations in the Dredge Prism Files to verify whether dredging has achieved the requirements specified in Section 35 24 00 – Sediment and Riverbank Soil Removal.

C. Engineered Cap Construction

1. GE's third-party surveyor, under the direction of the Construction Manager, will conduct pre-construction and post-construction surveys to verify compliance with the specified requirements for engineered cap construction.
2. Unless otherwise directed by the Construction Manager, the post-dredging survey in each CCU will serve as the basis for the pre-cap placement survey for the initial cap layer.
3. Separate post-cap placement surveys will be performed following placement of each cap layer.
4. The Construction Manager will verify whether the cap layer thicknesses and elevations achieve the requirements specified in Section 35 28 00 – Engineered Cap.
5. The post-cap placement surveys of each cap layer must be approved by the Construction Manager prior to commencing placement of subsequent cap layers.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope

1. The Contractor shall furnish all materials, equipment, and labor necessary to construct, maintain, and operate decontamination areas associated with decontamination of vehicles, equipment, materials, and personnel, as well as to collect, characterize, and dispose of decontamination fluids and solids.
2. The Contractor is responsible for decontamination of all vehicles, equipment, and personnel that come into contact with contaminated materials at the Site prior to handling clean materials or prior to demobilization from the Site.
3. Track and report the decontamination status of equipment daily.

B. Related Sections

1. Section 02 61 15 – Handling and Disposal of Impacted Materials
2. Section 02 72 00 – Water Management and Treatment
3. Section 31 23 00 – Soil Excavation and Fill
4. Section 13 80 01 – Temporary Access Roads and Staging Areas
5. Section 35 24 00 – Sediment and Riverbank Soil Removal

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (October 1985), as prepared by the National Institute of Occupational Safety and Health, Occupational Safety and Health Administration (OSHA), and U.S. Environmental Protection Agency (EPA).

B. Code of Federal Regulations 40 *Code of Federal Regulations* 761.

C. EPA SW-846 Method Compendium

1.03 SUBMITTALS

A. The Contractor shall submit Safety Data Sheets (SDSs) for all cleaning and decontamination solutions as part of the Contractor's Health and Safety Plan (HASP). SDSs shall be provided for review by the Construction Manager prior to being brought on site.

B. The Contractor shall prepare and submit a Decontamination Plan as part of the Contractor's Operations Plan for review and approval by the Construction Manager that outlines the facilities, measures, and controls to manage and prevent contamination outside of the Work Area limits and includes, at a minimum, the following:

   1. Methods and procedures for equipment and personnel decontamination (e.g., bulk material removal, high-pressure water sprays, manual brushing, and boot washes) and methods of storage, transport, and disposal for decontamination wastes
   2. Method, frequencies, and locations for conducting wipe sampling of equipment prior to it leaving the Site
   3. Any decontamination products to be used
   4. Planned locations of decontamination activities and methods to reduce contact with impacted materials
   5. A description of the locations where equipment and personnel decontamination will be conducted
   6. Methods to track and report the daily decontamination status of all equipment

C. The Contractor shall submit an Equipment Decontamination Documentation Report to the Construction Manager to certify decontamination has been completed on all equipment before it is demobilized. The Equipment Decontamination Documentation Report shall include, at a minimum, the following:

   1. The methods and procedures used for equipment and personnel decontamination and documentation of decontamination storage, transport, and disposal
   2. A list of the decontamination products to be used
   3. The locations of decontamination activities and methods used to reduce contact with impacted materials
   4. Description of the locations where equipment and personnel decontamination were conducted
   5. A report on the daily decontamination status of all equipment
   6. An estimated quantity of decontamination products used and disposed of

PART 2 – PRODUCTS

A. The Contractor shall use only those cleaning and decontamination materials that will not create hazards to health or property and will not damage surfaces.

B. The Contractor shall use only those cleaning and decontamination materials and methods recommended by the manufacturer of the surface material to be cleaned.

C. The Contractor shall use cleaning materials only on surfaces recommended by the cleaning material manufacturer.

D. SDSs shall be kept on site at all times for all cleaning products in accordance with the Contractor's HASP.

PART 3 – EXECUTION

3.01 GENERAL REQUIREMENTS

A. All non-disposable equipment that comes in contact with polychlorinated biphenyl (PCB)-containing material shall be decontaminated by the Contractor prior to handling clean materials or prior to demobilization from the Site.

B. The Contractor shall decontaminate all vehicles leaving the Work Area to prevent the tracking of soil material outside of the limits of Work Area and onto Temporary Access Roads or other local roads. Vehicles and equipment that come into contact with impacted materials shall be visually inspected and decontaminated to the satisfaction of the Construction Manager. Any visible soil or other debris shall be promptly removed and appropriately disposed of in accordance with this Section and to the satisfaction of the Construction Manager.

C. The Contractor shall construct and maintain an equipment cleaning area that will be graded to form a slope to a sump where construction water shall be collected, containerized, and transported off site for treatment and disposal in accordance with Section 02 72 00 – Water Management and Treatment. The equipment cleaning area shall be underlain with an impermeable barrier (e.g., high-density polyethylene [HDPE] sheeting), then a geotextile to protect the HDPE liner, then a layer of dense graded aggregate (Section 31 05 13 – Soils and Aggregates).

D. Primary and secondary access roads shall be constructed to support truck traffic and be designated and maintained as clean travel ways. Equipment that has contacted floodplain soils shall not return onto the primary or secondary access road surface until tires or tracks have been decontaminated. All vehicles requiring decontamination shall be washed sufficiently to remove all visible soil from the vehicle body, undercarriage, and tires/tracks. The Contractor shall ensure no visible tracking of soils onto Temporary Access Roads or public roadways occurs, as visually confirmed by the Construction Manager.

E. Any incidental tracking or spills of contaminated soils or water on the Temporary Access Roads surfaces shall be cleaned up as soon as practicable so as not to be spread further on access roads.

F. Tire cleaning stations located at the egresses onto public roads shall be used as a final measure to eliminate tracking of nuisance nonimpacted soils onto public roads.

G. Temporary construction mats or panels used for Temporary Access Roads and Staging Areas shall be cleaned by the Contractor prior to removal from the site or reuse. The Contractor shall use high-pressure water spray to remove all visible soil and sediment. The Contractor shall collect wipe samples from the mats at a minimum frequency of one sample per 50 mats or panels to verify that PCB concentrations are below 10 micrograms (µg) per 100 square centimeters (cm^2) prior to off site removal. The Construction Manager direct the Contractor to reduce the sampling frequency if results consistently demonstrate concentrations below 10 µg per 100 cm^2.

   1. If initial wipe sampling confirms that cleaning procedures are effective (i.e., PCB concentrations are less than 10 µg per 100 cm^2), decontamination of construction mats or panels that are dedicated for future reuse may be verified by visual inspection by the Contractor and Construction Manager, following removal of visible soil and sediment.

H. The Contractor is responsible for the cleaning and off-site removal of non-disposable equipment that has been used during implementation of the Reach 5A Remediation Project (Project) and has come in contact with impacted materials or otherwise become soiled.

I. Material handing equipment that has been used to remove or handle impacted materials shall be cleaned in an equipment cleaning area before the following: (1) it handles clean materials (e.g., backfill or capping materials); (2) it is moved to another Project work area over public roads; or (3) it is demobilized from the Site.

J. The Contractor is responsible for post-cleaning wipe sampling for PCBs with oversight by the Construction Manager and analysis of those wipe samples for any equipment that has been in contact with impacted materials prior to demobilization. The equipment will not be allowed to leave the Site until wipe sample results verify PCB results are less than 10 micrograms (µg) per 100 square centimeters (cm^2). If testing indicates decontamination procedures were not effective, the Contractor shall adjust its decontamination procedures and conduct additional wipe testing with oversight by the Construction Manager to demonstrate effective decontamination. Wipe test locations and frequencies are subject to approval by the Construction Manager.

K. Wipe samples shall be collected using a hexane-soaked gauze pad provided by an approved analytical laboratory following EPA's standard wipe test methodology (i.e., using a 10-by-10-centimeter template and wiping the surface with the gauze pad while applying uniform pressure from left to right and then top to bottom within the template). The wipe samples shall be submitted to an approved analytical laboratory by the Contractor for analysis for PCBs in accordance with EPA SW-846 Method 8082.

L. The decontamination process shall be performed in such a manner that all liquids generated during decontamination are captured and managed in accordance with Section 02 72 00 – Water Management and Treatment and all applicable laws and regulations.

M. Decontamination-related solids and personal protective equipment (PPE) shall be managed for disposal in accordance with Section 02 61 15 – Handling and Disposal of Impacted Materials.

N. The Contractor shall take precautions to limit contact between the vehicle/equipment, personnel performing the decontamination activities, and any decontamination liquids that may accumulate in the decontamination area. PPE, including disposable clothing for personnel engaged in decontamination activities, shall be used as required by the Contractor's HASP.

3.02 DECONTAMINATION AREAS

A. Construct and maintain decontamination area(s) in accordance with the Contract Documents to accommodate all loads, vehicles, equipment, and migration scenarios.

B. Construct the decontamination area at locations approved by the Construction Manager prior to construction. This will include decontamination areas local to each Work Area, as well as tire wash stations at the egress from Temporary Access Roads to public roadways, as shown in the Design Drawings.

C. Construct and maintain appropriately sized decontamination areas for personnel. Locate personnel decontamination areas within the contamination-reduction zone and include facilities necessary to decontaminate personnel upon exiting the Work Area (exclusion zone) in accordance with the Contractor's HASP and local, state, and federal laws and regulations.

END OF SECTION

PART 1 –GENERAL

1.01 DESCRIPTION

A. Scope:

1. Furnish all labor, materials, tools, equipment, transportation, accessories, and appurtenances necessary to perform transferring, handling, processing, and dewatering of excavated soil, dredged sediments, debris, and residual wastes. This Work includes, but is not limited to, the following:
   a. Constructing and maintaining facilities to support excavated soil and dredged sediment handling and dewatering
   b. Transferring material from removal location to the material processing area at the Temporary Staging Area
   c. Segregating material for disposal by type (off-site disposal at an approved facility(ies)- or on-site disposal at the Upland Disposal Facility [UDF])
   d. Handling, mixing, and dewatering, as required, of removed material to develop a homogeneous mixture to render the materials suitable for disposal
2. Furnish all labor, materials, tools, equipment, transportation, accessories, and appurtenances necessary to perform transportation and disposal of material identified for disposal. This Work includes, but is not limited to, the following:
   a. Performing all necessary waste characterization
   b. Loading of materials into appropriate containers for transportation and disposal
3. Transportation and disposal of materials by truck/railcar to a disposal facility approved by General Electric Company (GE) and permitted to receive such wastes. This Work includes, but is not limited to, the following:
   a. Transporting loaded containers to the Utility Drive rail transload area
   b. Loading containers to railcars, with separate railcars for material designated for off- or on-site disposal
      1) Coordination with the railroad operator to convey railcars with material for off-site disposal to a disposal facility(ies) approved by GE and permitted to receive such wastes
      2) Coordination with the railroad operator to convey railcars with material for on-site disposal to the Woods Pond rail transload area
   c. Unloading containers with material designated for on-site disposal from railcars at the Woods Pond rail transload area
   d. Transporting containers with material designated for on-site disposal to the UDF for disposal of the materials
   e. Providing all necessary waste shipping and disposal documentation

4. Transportation and disposal of materials directly by truck, as a contingency transportation method, to a disposal facility(ies) approved by GE and permitted to receive such wastes
   a. Providing all necessary waste shipping and disposal documentation
5. The Contractor shall be responsible for obtaining the appropriate permits and equipment necessary for the transportation of waste materials.
6. Water generated during the waste management process will be treated in accordance with Section 02 72 00 – Water Management and Treatment.

1.02 REFERENCES

A. United States Environmental Protection Agency (EPA), 2004. *Method 9095B Paint Filter Liquids Test, Revision 2*. November 2004

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. The Contractor shall comply with the following rules and regulations:
      a. Occupational Safety and Health Administration (OSHA) rules and regulations, including 29 *Code of Federal Regulations* (CFR) Parts 1910 and 1926
      b. EPA rules and regulations, including 40 CFR
      c. United States Department of Transportation (USDOT) rules and regulations, including 49 CFR Parts 171 and 172
      d. National Institute of Occupational Safety and Health recommendations
      e. Massachusetts Department of Transportation (MassDOT) rules and regulations
      f. Applicable rules and regulations of any other states or municipalities receiving waste materials generated during the remediation activities
      g. When there is a conflict or overlap of the above-referenced documents, the most stringent provision shall be applicable.
      h. If any requirement of this Section contradicts any such regulatory requirement, the Contractor shall immediately notify GE and the Construction Manager of such.

1.04 SUBMITTALS

A. Submit a Waste Management Plan (may be included in the Contractor's Operations Plan), which will include means and methods for material handling, transport, staging, dewatering, and disposal. The information shall include, but not be limited to, the following:
   1. Site plan showing locations and sizes of access roads, soil/sediment dewatering pad, impacted material staging areas, and any other constructed surfaces required for handling and disposal of waste materials

2. Description of on-site soil/sediment and debris handling and transport including from the removal location to the dewatering area
3. Description of the approach, including equipment, methods, layout, and sequence, for management, stockpiling, and dewatering of waste materials in the dewatering area and/or other ancillary support/staging areas
4. Technical Specifications, including, but not limited to, materials, dimensions, manufacturer and vendor information, installation, verification, and construction methods for the impacted material staging and dewatering areas; contingency storage pad (if needed); and any other constructed surface required for handling and disposal of waste materials
5. Proposed solidification agent (e.g., Portland cement Type IL or other approved solidification agent), solidification agent blending rate, and approach for use of solidification agent
6. Description of all necessary containment systems for waste material staging, including handling and containment of materials for off- and on-site disposal as separate waste streams
7. Description of all necessary measures and materials for covering stockpiles and limiting exposure of waste materials to inclement weather
8. Description of the equipment, methods, layout, location, and sequencing for loading trucks/vessels for waste transport for off- or on-site disposal
9. Description of the number and type of trucks/intermodal containers or other vehicles to be used for on- and off-site waste transport
10. Description and specifications of intermodal container liners and covers, and procedures for the installation of container liners and covers
11. Description of the equipment, methods, layout, location, and sequencing for unloading/loading intermodal containers to/from trucks and from/to railcars for waste transport for off- or on-site disposal
12. The name, location, contact name, and permit number for off-site disposal facility(ies) to be used
13. Documentation from the off-site disposal facility(ies) identifying the type of material that the disposal facility will accept, the acceptance protocols, and sampling requirements
14. The name, contact name, and permit number for the waste hauling subcontractor(s), if applicable
15. Procedures that will be used to ensure safe waste handling during the excavating, handling, temporary staging, and storage, loading, and transporting
16. 24-hour telephone contact information in the event of an accident during waste transportation.

B. Waste Profiles and Draft Manifests/Bills of Lading: Submit waste profiles and example waste manifests/bills of lading to the Construction Manager for review and GE approval prior to the transport of waste.

C. Waste Transporter Permits: Submit a copy of the valid waste transporter permit for each transporter hauling contaminated material.

D. Waste Handling Daily Reports: Submit daily reports to the Construction Manager and provide a daily summary of waste transported, including, but not limited to, quantity and type waste removed (e.g., soil/sediment for off-site disposal and soil/sediment for on-site disposal, debris, and vegetation), quantity and type of material delivered to the impacted material staging area, quantity of excavated soil/dredged sediment solidified, quantity of drying agent used (by ton and percent of agent added), quantity and type of waste staged at the Site, quantity and type of waste transported for disposal, quantity of treated water discharged from the Site, discharge location of treated water, analytical waste characterization results, and results of the paint filter tests performed by the Contractor.

E. Disposal Records: Submit countersigned manifests, bills of lading, weight tickets, receipts, and/or invoices for each disposal facility monthly.

F. Delivery Tickets: Submit copy of delivery ticket for each load of off-site material delivered to the Site. Each delivery ticket shall indicate supplier name and source address, project name, contract number, date, material type, MassDOT item number when applicable, and quantity delivered.

1.05 PROJECT CONDITIONS

A. Material removed from the areas identified on the Design Drawings will be classified as follows:

1. Material suitable for on-site disposal in the UDF
2. Material for off-site disposal at a GE approved facility(ies) (i.e., material not suitable for on-site disposal in the UDF)

B. There are currently no wastes that will require transport and disposal at an off-site Resource Conservation and Recovery Act (RCRA)-compliant facility. In the unlikely event that RCRA material is encountered, it would be handled in accordance with local, state, and federal regulations.

C. The Construction Manager will provide surface files and designate the required material removal depths and extents for each material type (i.e., material for on- and off-site disposal), as shown in the Design Drawings, to the Contractor prior to mobilization.

D. Information regarding the physical and chemical properties of material to be removed is available to the Contractor in reference documents based on prior field investigations and laboratory testing of the materials from the River.

E. The Contractor is encouraged to assess the geotechnical characteristics of the soils and sediments at the Site through their own exploratory methods and/or as removal progresses and to use that information to supplement the reference information provided. Any additional Work of this nature shall be at no additional cost to GE.

F. Debris removed from the Site will be characterized according to the sediment and soil from which it was removed. If the Contractor elects to decontaminate and sample debris, the Construction Manager and EPA review and approval of analytical results will be required prior to disposal. Additional debris handling requirements are described in Paragraph 3.03A.

G. Material Segregation:

1. Material designated for off-site disposal shall be segregated from material for on-site disposal.
2. Material stockpiles shall be labeled clearly and marked to distinguish areas for material designated for off-site disposal from areas for material designated for off-site disposal.

PART 2 –PRODUCTS

2.01 DRYING AGENT

A. Drying Agent: Provide Portland cement (Type IL), lime kiln dust, or approved nonbiodegradable sorbent containing no more than 50% reactive (free) calcium oxide and magnesium oxide by weight.

B. The Contractor shall provide drying agent(s) in sufficient quantity to complete the dewatering activities as specified and without delay.

C. Other products may be proposed by the Contractor for approval by the Construction Manager prior to acquisition, shipment to the Site, and use.

2.02 WASTE MATERIAL TRANSPORTATION AND DISPOSAL

A. The Contractor shall load waste material (deemed suitable for disposal) into lined intermodal containers for transportation to the Utility Drive rail transload area. For waste material (deemed suitable for disposal) to be transported directly to the UDF, the Contractor shall load waste material (deemed suitable for disposal) into lined intermodal containers, roll-off containers, and/or lined dump trailers for transportation directly to the UDF.

B. The Contractor is responsible for properly containerizing, staging, and preparing waste material for disposal. Each waste medium (e.g., sediment, decontamination water, waste debris, personal protective equipment) shall be properly containerized via USDOT-approved 55-gallon drums, temporary tanks, lined and covered roll-off containers, lined and covered dump trailers, lined or covered intermodal containers, or lined and covered staging areas and properly labeled and staged with like materials.

C. The Contractor shall coordinate transportation and, at a minimum, shall be responsible for the following:

1. Provision/preparation of a uniform Hazardous Waste Manifest or Bill of Lading to be signed by GE or an authorized representative and the truck driver
2. Preparation and submittal (as part of the daily progress report) of a daily summary sheet that indicates the temporary stockpile area; analytical data; and, at a minimum, the following information regarding each truckload
3. Load number (sequential)
4. Uniform hazardous waste manifest number or bill of lading number
5. Truck ID number (license plate number of the truck and/or trailer used)
6. Time of departure from the Site
7. Estimated load weight
8. Material type (designated for on- or off-site disposal)
9. Final destination

2.03 COVERS AND LINERS

A. The Contractor shall use container liners (6-mil polyethylene sheeting) to provide separation between the waste and containers.

B. The Contractor shall cover open-top containers used for transport with a soft pull-tarp cover mounted on the container. The tarp shall extend over the container and shall be secured in accordance with USDOT standards.

PART 3 –EXECUTION

3.01 GENERAL

A. The Contractor shall adhere to local, state, and federal regulations that pertain to transportation and traffic control.

B. The Contractor shall handle, transport, unload, treat, and dispose of waste in a manner that is protective of the environment and public health and safety.

1. Emission controls shall be employed as necessary in accordance with Section 01500 – Temporary Facilities and Controls. Emission controls shall be to the satisfaction of GE, the Construction Manager, and EPA during on-site material handling.

C. The Contractor shall be responsible for management and tracking of waste materials and material handling equipment, from the removal location to the impacted material handling and dewatering area, between staging areas and/or rail transload areas (as applicable), and to approved disposal facility(ies).

D. The Contractor shall label all temporary waste storage containers and areas with the contents.

E. The Contractor shall be responsible for characterizing waste streams as required by the approved disposal facilities.

F. The Contractor shall not transport wastes until the waste manifests and transport have been approved by GE.

G. The Contractor shall be responsible for completion, management, and tracking of all transportation and disposal documentation including bills of lading, waste manifests, inventory and location information, and certificates of disposal.

H. The Contractor shall be responsible for the logistics associated with waste handling.

3.02 PREPARATION

A. Impacted Material Handling and Dewatering Area Construction:

1. Construct in accordance with the Design Drawings and Section 13 80 01 – Temporary Access Roads and Staging Areas.
2. The Contractor is responsible for constructing and maintaining any impacted material handling and dewatering area(s) to accommodate all loads, vehicles, equipment, and migration scenarios.
3. Special precautions shall be taken to permit access at all times to fire hydrants, fire alarm boxes, driveways, and other points where access may involve the safety and welfare of the general public. Site access for GE personnel shall be maintained at all times.

B. Waste Characterization:

1. The Contractor will perform all waste characterization required by the proposed disposal facilities (if required). The overall characterization approach (e.g., frequencies, analyses) will be based on the acceptance criteria of the proposed disposal facility(ies). The Contractor is responsible for the following:

a. Identifying disposal facility(ies) characterization requirements (e.g., number of samples, analyses)
b. Collecting and analyzing characterization samples in accordance with disposal facility(ies) requirements
c. Preparing waste profiles

2. Waste profiles will be prepared by the Contractor based on the results of the waste characterization sampling and signed by GE (or the Construction Manager acting as an authorized agent for GE).

3. Completed waste profiles will be maintained on site by the Contractor in the project file.

C. Impacted Material Removal:

1. Impacted material shall be removed in accordance with the applicable Sections of the Contract Documents, including, but not limited to the following:
   a. Section 31 23 00 – Soil Excavation and Fill
   b. Section 35 24 00 – Sediment and Riverbank Soil Removal

3.03 ON-SITE MATERIAL HANDLING

A. Debris Handling:

1. Segregate debris intermingled with soil and sediment as required for disposal.

2. Nonporous debris (e.g., boulders and riprap) that has been appropriately decontaminated may be repurposed or recycled with approval from the Construction Manager. Debris shall be adequately cleaned to remove adhered soil or sediment, as determined by the Construction Manager.

3. See Section 31 11 00 – Clearing and Grubbing for requirements related to removal and disposal of cleared materials, including vegetation. Nonimpacted vegetation (e.g., trees and shrubs) may be repurposed or recycled with approval from GE and the Construction Manager. On-site reuse of nonimpacted vegetation shall be in accordance with Section 31 11 00 – Clearing and Grubbing.

4. Wood debris or other porous debris that is in contact with impacted soil or sediment shall be cut/crushed/downsized in the impacted material staging area to render the materials suitable for disposal. Material shall be transported to and disposed of at the approved disposal facility(ies). See also Section 31 13 18 – Removal of In-River Debris and Shoreline Vegetation.

5. All debris shall be downsized to a 3-foot dimension or less and verify the debris does not release free water prior to loading and transport.

B. Initial Handling and Dewatering of Material

1. If removed soil is dry enough to pass the paint filter test and the required waste characterization is complete (Paragraph 3.02.B), it may be loaded directly into sealed vehicles for transport to the selected disposal facility.
2. If removed soil or sediment cannot be loaded directly for transport to a disposal facility(ies), drain saturated materials within the removal limits (i.e., from the removal bucket suspended over the contained removal area) prior to being loaded directly for transfer to the impacted material handling area(s) (Paragraph 3.03.E).
    a. If field conditions are encountered, such as the presence of visible sheens, that preclude the use of this initial drainage technique, alternative handling methods will be implemented as directed by the Construction Manager.
3. If the removed materials are not sufficiently dewatered by such drainage for loading directly for transport to the impacted material handling and dewatering area, dewater using methods such as placing the saturated materials in drier areas within the removal limits or adjacent removal limits (Paragraph 3.03.C) subject to subsequent excavation, construction and use of a lined and contained dewatering area adjacent to the removal area, use of a roll-off container, and/or another equivalent method.
    a. Removed materials staged adjacent to the removal area shall be placed on a bermed gravel staging area lined with 30-millimeter-thick HDPE sheeting and will otherwise be handled in accordance with Paragraph 3.03.C.

C. Temporary Staging of Excavated Materials Within Removal Limits

1. Temporary stockpiles shall be covered at all times (i.e., during both working and nonworking hours) with a minimum 10-mil thick plastic cover, except when materials are actively being placed or removed. The cover shall be properly anchored to prevent uplift due to wind conditions and shall be maintained for the duration of staging. Soil, debris, or other excavated materials shall not be used to anchor the sheeting.
2. Temporary stockpiles shall be transported to the appropriate impacted material and handling and dewatering area within 24 hours of placement unless longer durations are approved by GE and the Construction Manager.
3. Staged material shall be inspected daily, and any noted deficiencies shall be immediately corrected by the Contractor.
4. Liquids collected within excavation areas shall be treated on site in accordance with Section 02 72 00 – Water Management and Treatment.

D. Transfer of Excavated/Dredged Materials to Impacted Material Handling and Dewatering Area(s)

1. Excavated/dredged material shall be loaded into appropriate watertight, structurally sound off-road vehicles, dump trailers, or containers, barges, or scows, or other hauling equipment and transported to the impacted material handling and dewatering area for processing and staging prior to final transport for disposal. No excavated/dredged material shall be staged directly on the ground or on plastic sheeting placed directly on the ground, unless specified otherwise.
2. Material handling and conveying equipment used to transport excavated/dredged material shall be loaded and unloaded in such a manner that minimizes spillage and does not cause any other safety concerns. The Contractor shall take appropriate measures to avoid or minimize possible spillage during loading and unloading procedures. Provide sufficient freeboard to prevent spillage during transport travel.
3. A spill plate or approved equivalent shall be used for transfer of dredged material, as appropriate, so that any material that is potentially spilled during loading/unloading over water can be intercepted by the spill plate to mitigate material from entering the water or accumulating on the side of the vessel.
4. The Contractor shall conduct all loading, transport, and disposal activities such that no spillage occurs. If unanticipated spills or leaks occur, the Contractor shall be responsible for conducting any and all activities necessary to remediate such spills at no additional cost to GE.
5. Immediately clean up any waste spilled or spread into noncontaminated areas in accordance with Section 01571 – Operations Environmental Restrictions and Controls and this Section.

E. Material Processing and Staging Within Impacted Material Handling and Dewatering Area:

1. General:
   a. All solidification, mixing, segregation, and/or downsizing of removed materials and impacted debris shall be conducted within the limits of the impacted material handling and dewatering area.
   b. Material management in the impacted material handling and dewatering area(s) shall not involve any equipment or procedures that may jeopardize the integrity of the area.
   c. Stockpiled material at the impacted material handling and dewatering area shall be covered with a minimum 10-mil-thick plastic cover whenever the material is not actively being placed into or removed from the stockpile, during overnight and/or weekend hours, during periods of precipitation, or whenever directed by the Construction Manager. The cover shall be properly anchored to prevent uplift due to wind conditions and shall be maintained for the duration of staging. Sediment, soil, debris, or other impacted materials shall not be used to anchor the sheeting.

2. Material Segregation:
   a. Material designated for off-site disposal shall be segregated from material designated for on-site disposal based on waste characterization sampling.
3. Material Dewatering/Solidification:
   a. The Contractor shall dewater/stabilize excavated and dredged materials as necessary to pass the paint filter liquids test, as defined in EPA Method 9095B. Material shall also and meet all other requirements of the selected disposal facility prior to transport and disposal.
   b. Material dewatering/solidification shall include the following:
      1) Gravity dewatering a minimum 24 hours before adding drying agent
      2) Mixing wet materials with drier materials
         a) Dried material designated for off-site disposal may be mixed with wetter material designated for off-site disposal to facilitate dewatering; such resulting mixed material will still be designated for off-site disposal.
         b) Drier material designated for on-site disposal may be mixed with wetter material designated for off-site disposal, only if approved by the Construction Manager, to facilitate dewatering; such resulting mixed material will be designated for off-site disposal.
      3) Mixing wet materials with drying agent
         a) Addition of drying agent shall only be performed after a minimum 24 hours of gravity dewatering.
         b) Addition of drying agent for material classified as TSCA-regulated (i.e., containing greater than 50 mg/kg PCBs) shall not be performed until the material has passed the paint filter liquids test EPA Method 9095B.
         c) Drying agent shall be determined by the Contractor to meet the requirements of this Section and shall not be blended at a rate >10% by weight, unless otherwise approved by the Construction Manager. The Contractor shall provide a means for accurate measurement and documentation for tracking quantities of drying agent added to soil or sediment.
         d) Bulking of excavated materials is prohibited.
4. Liquid Management:
   a. Liquids that accumulate within impacted material handling and dewatering area(s) shall be removed by the Contractor periodically to not exceed the storage capacity of the area. Removed liquids shall be handled/managed in accordance with Section 02 72 00 – Water Management and Treatment.

3.04 LOADING, TRANSPORT, AND DISPOSAL

A. General:

1. The Contractor shall be responsible for all coordination and scheduling activities associated with the loading, transport, and disposal of the waste. The Contractor shall coordinate the arrival and departure of waste transportation vehicles/vessels and shall consider access and space restrictions at the Site.
2. The Contractor shall provide appropriately sized vehicles, vessels, and equipment to load waste materials for transport. All transportation shall be performed in watertight containers that prevent leakage of sediment, soil, debris, and free liquids.
3. Load, handle, and/or transport waste material in a manner that prevents spillage or spreading of these materials. Immediately clean up any waste spilled or spread into noncontaminated areas in accordance with Section 01571 – Operations Environmental Restrictions and Controls and this Section.
4. Waste materials shall be transported for disposal at facilities approved by GE in consideration of the matrix of the waste material and the results of waste characterization performed by the Contractor in accordance with this Section.

B. Loading:

1. The transfer of materials into and out of the impacted material handling and dewatering area(s) shall not involve any equipment or procedures that may jeopardize the integrity of the area.
2. Vehicles and vessels shall be loaded in such a manner as to avoid contamination of their exteriors including tires (e.g., loaded with a minimum 6-mil polyethylene sheeting draped over the side of the truck, and a spill plate used between loading equipment and barges).
3. The Contractor shall load containers only to a volume that can safely be transported and minimize possible spillage due to material shifting. Provide sufficient freeboard to prevent spillage during transport.
4. All transport beds or open-top containers shall be securely closed and tarped before leaving their point of loading. Transports shall remain closed and tarped until the transport arrives at the approved disposal facility(ies).

C. Shipping and Disposal Documents:

1. The Contractor shall prepare waste profiles for each waste stream (as required by the approved waste disposal facility(ies)), waste manifests (and Land Disposal Restriction Notification Forms, as appropriate), and/or bills of lading for each shipment of waste material and other waste transportation and disposal-related documents (as required by applicable

rules and regulations). GE (or the Construction Manager acting as GE's authorized representative) will review and sign the waste profiles, manifests, and other documentation.

2. Prepare all waste manifests or bills of lading for each shipment of waste material.
3. Schedule delays and/or increased costs due to improper completion of waste profiles or shipping documentation or unreasonable documentation review times for GE and the Construction Manager are the responsibility of the Contractor.
4. The Construction Manager will maintain a log tracking all material transported for disposal. This log will include shipment date, manifest/bill of lading number, transporter name, vehicle/vessel ID number (tractor or trailer number and/or barge number), destination facility(ies), and material type (e.g., sediment, debris).

D. Waste Transportation

1. All transports that travel public roads shall be gross-vehicle-weight legal and comply with all federal, state, and local vehicle transport standards and regulations.
2. All transports that travel public railroads shall be gross-railcar-weight legal and comply with all federal, state, and local vehicle transport standards and regulations.
3. The Contractor shall be required to have all appropriate local, state, and federal transport permits, licenses, and approvals. Transportation of all waste streams shall be in accordance with all federal, state, and local laws, rules, and regulations.
4. All transports leaving the impacted material handling area shall have all visible mud and waste removed prior to leaving. Each transport leaving the impacted material handling area will be inspected and decontaminated, as necessary, by the Contractor.
5. No shipment of waste will be allowed to leave the impacted material handling area without inspection and review by the Construction Manager.
6. The Contractor shall take control measures to ensure any free liquid that may potentially be liberated from sediment during truck or rail transport is not released from the trucks/containers.
7. For truck transport:
   a. The Contractor shall keep all pavements/access roads clean and free from dirt, mud, stone, and other hauled materials.
   b. Traffic control measures shall be implemented to facilitate safe and orderly execution of the waste transportation and other vehicular traffic entering and exiting the Site. Traffic control measures may include flag personnel, police officers, and other measures, as required

and appropriate to facilitate safe and orderly ingress and egress to and from the impacted material handling area. The Contractor shall be responsible for these traffic control measures.

E. Container Loading/Unloading at Rail Transload Areas

1. A visual inspection of each container will be performed at the rail transload area to verify that liners have performed properly. If the liners have performed properly, container cleaning will not be required. If liner failure has occurred, investigation into the cause and container cleaning or container replacement will be required.
2. The transfer of containers into and out of the rail transload area(s) shall not involve any equipment or procedures that may jeopardize the integrity of the area or the container.

F. Disposal:

1. A visual inspection of each container will be performed at the disposal or transload facilities to verify that liners have performed properly. If the liners have performed properly, container cleaning will not be required. If liner failure has occurred, investigation into the cause and container cleaning or container replacement will be required.
2. The Contractor shall transport removed material to the approved disposal facilities
   a. The Contractor shall propose disposal facilities for approval by GE, Construction Manager, and EPA. The Contractor will be required to provide all waste characterization requirements for the proposed disposal facility and demonstrate that the alternate proposed disposal facility(ies) is a more efficient and effective disposal option.
   b. One month prior to the anticipated start of removal activities, the Contractor will complete the Off-Site Rule (OSR) request form for all proposed facilities and submit the completed form to the Construction Manager, unless otherwise informed by the Construction Manager. An example OSR request form is provided in Attachment A; however, the Contractor shall confirm the most current OSR request form with the Construction Manager before completion and submittal. Following the Construction Manager's review, the Construction Manager will submit the OSR request form to the EPA.
3. The Contractor shall follow up with the disposal, recycling, and reclamation facilities and shall secure copies of fully executed waste manifests, bills of lading, scale tickets, and certificates of disposal/destruction/recycling/reclamation within time frames specified by applicable rules and regulations, but no later than within 20 calendar days of the acceptance of waste/recyclable materials by a disposal, recycling, or reclamation facility. At a minimum, the waste manifests and bills of lading shall show the quantity of waste materials accepted by a final disposal

facility and a certification that the waste has been disposed of/recycled/reclaimed in accordance with applicable rules and regulations.

ATTACHMENT

Attachment A: Example Off-Site Rule Form Template, which follows the "End of Section" designation, is part of this Section:

END OF SECTION

Example Off-Site Rule Request Form Template

Receiving Facility Information

Estimated Initial Shipping Date:
Estimated Shipping Completion Date:

Supporting Documentation Attached: ☐ Yes ☐ No

1.) Name of Facility Receiving CERCLA Waste

2.) Address of Facility

3.) City

4.) County

5.) State

6.) Zip Code

7.) EPA Facility I.D. (Hazardous Waste or Municipal Waste I.D.)

RCRA Info Webpage

Facility Type
Subtitle C ☐ Subtitle D ☐ Other ☐ _____

State Permit No.

8.) Any other pertinent I.D. numbers that may apply (License Numbers, etc.)

9.) Facility Phone Number

Contact Name

10.) Facility Fax Number (if available)

11.) Email Address

Generating Site Information

12.) Name of CERCLA Site

13.) Address of CERCLA Site

14.) City

15.) County

16.) State

17.) Zip Code

18.) CERCLA Site I.D.

19.) CERCLA Waste Median (e.g. Soil, Water, Air etc.)

Hazardous and/or Non-Hazardous (check all that apply)
RCRA Hazardous ☐ Non-Hazardous ☐

20.) CERCLA Waste Contaminates (e.g. tce, pcb, Mercury, Lead, etc.)

21.) Amount of CERCLA Waste (e.g. Gallons, Pounds, Tons, etc.)

22.) Person Making Request(s)/Affiliation & Phone Number

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PART 1 –GENERAL

1.01 DESCRIPTION

A. Review the required discharge criteria, presented in Attachment 02 72 00-A – Discharge Criteria for Treated Wastewater of this Section, and design an appropriate temporary water treatment system (TWTS) to meet the required minimum discharge criteria. Submit design to the Construction Manager for review and approval.

B. Scope:

1. Provide all labor, materials, equipment, and incidentals required to furnish, install, test, and place into satisfactory operation a TWTS at the location(s) shown in the Design Drawings and as specified herein. The TWTS shall include the material, equipment, and incidentals required to collect, store, convey, treat, and discharge all liquids generated during performance of the Work. Liquids that shall be handled, treated, and discharged include, but may not be limited to, the following:
   a. Rainfall runoff that accumulates in containment or staging areas
   b. Direct precipitation in containment or staging areas
   c. Water generated from soil and sediment staging
   d. Water generated from equipment and/or personnel decontamination
   e. Other water generated as a result of remedial activities.
2. Provide all labor, materials, equipment, and incidentals required to provide power and to operate and maintain the TWTS. The TWTS specified herein is a typical TWTS designed based on sound, industry-accepted design principles and consists of proven treatment technologies and configurations. The Contractor shall have the opportunity to propose an alternate TWTS design that, at a minimum, shall meet the performance standards, design, construction, and operational intent established herein. The TWTS shall include the following major components:
   a. Berms, containment, and collection sump
   b. Influent equalization tanks
   c. Suspended solids removal system
   d. Polymer dosing and mixing system
   e. Multimedia filter vessels
   f. Bag filters
   g. Liquid-phase granular activated carbon (GAC) treatment vessels
   h. Treated water storage tanks
   i. Sludge holding tanks
   j. Centrifugal pumps
   k. Air operated double diaphragm pumps
   l. Air compressor
   m. Conveyance pipe, hose, valves, and appurtenances
   n. Flow indicating transmitters and totalizers
   o. Level float switches and transmitters
   p. Process instrumentation and control system

q. Spare parts

C. Coordination: Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with or before the TWTS.

1.02 QUALITY ASSURANCE

A. Materials, procedures, operations, and methods shall be in strict conformance with the Contract Documents, except as otherwise authorized in writing by the Construction Manager.

B. Manufacturer's Qualifications: Equipment manufacturers shall have a minimum of 5 years of experience producing substantially similar equipment and shall be able to show evidence of at least five installations in satisfactory operation for at least 5 years.

C. Component Compatibility: All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall assembly by the Contractor.

D. Contractor's Testing Laboratory:

1. The Contractor shall retain the services of an independent testing laboratory authorized to operate in the state of Massachusetts to perform quality assurance testing required in this Section.
2. Testing laboratory shall have current National Environmental Laboratory Accreditation Program and Massachusetts Environmental Laboratory Approval Program certification for specific methods they are performing from a recognized state or federal laboratory accreditation program.
3. The laboratory shall be capable of providing reporting limits at or below the criteria included in Attachment 02 72 00-A – Discharge Criteria for Treated Wastewater or as indicated in the revised (2023) Field Sampling Plan/Quality Assurance Project Plan or any U.S. Environmental Protection Agency (EPA)-approved revision and addenda of that document, whichever is lower, to allow for comparison of the analytical results to those objectives.

1.03 SUBMITTALS

A. Shop Drawings: Complete layout and installation drawings for the equipment and electrical panels showing mounting details, dimensions, fitting locations, materials of construction, containment details, and updated system piping and instrumentation diagram. Complete electrical single line diagram showing electrical service sizing and voltage, electrical loads, electrical distribution, panelboard schedules, and cable/conduit schedules. Submit manufacturer's literature, catalog cuts, and specifications for major equipment and for all appurtenances (e.g., piping, valves, instrumentation) showing performance data, electrical wiring and control diagrams, installation and operation instructions, and applicable certifications.

B. Calculations: Submit hydraulic head loss calculations and electrical load calculations.

C. Operation and Maintenance Manual (O&M Manual): Complete Operation and Maintenance Manual, including, but not limited to, the following (as applicable): description of operation, startup and testing procedures, normal (daily) operational procedures, normal and emergency shutdown procedures, alarm responses, maintenance data and schedules, daily log sheet, equipment manufacturer's manuals, sampling plan, and schedule to maintain consistent system operations and effluent control, manufacturer's recommended spare parts inventory, and calibration and alignment information

D. Supervisory Control and Data Acquisition (SCADA) System: Submit a copy of the SCADA system program and updated interlock table.

E. Laboratory: Submit names and qualifications of analytical laboratory proposed by the Contractor for the Reach 5A Remediation Project (Project) use to the Construction Manager for review and approval in advance of their use.

F. Analytical Results:

1. Startup testing analytical results.
2. Analytical results for discharge sampling during operation.

1.04 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading: Deliver materials to the Site to ensure uninterrupted progress of the Work.

B. Storage and Protection: Store materials to permit easy access for inspection and identification. Keep all material off the ground using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

C. Acceptance at Site: All boxes, crates, and packages shall be inspected by the Contractor upon delivery to the Site. Contractor shall notify the Construction Manager, in writing, of any loss or damage to equipment or components. Replace loss and repair damage to new condition in accordance with manufacturer's instructions.

PART 2 –PRODUCTS

2.01 EQUIPMENT PERFORMANCE

A. General:

1. Design, construct, and operate the TWTS to treat collected liquids at an instantaneous flow rate of at least 100 gallons per minute (gpm). The equipment requirements provided in Article 2.02 are anticipated minimum product features

for the components listed in Article 1.01; however, the Contractor shall submit the features of the specific equipment included in their design for review and approval by the Construction Manager.

2. Construct the TWTS with any instrumentation, controls, alarms, or telemetry necessary to operate the system unattended.
3. Winterize the system as needed to protect equipment, pipes, and other components from damage during periods of freezing weather while the system is not in operation.

2.02 EQUIPMENT

A. Berms, Containment, and Collection Sump

1. Construct a containment area for the TWTS. Contractor shall propose appropriate containment approach, and the containment area shall be constructed in accordance with the approved Contractor submittals.
2. The area to be used to stage the TWTS shall be graded and sloped to a low point to form a collection sump.
3. A berm shall be constructed around the perimeter of the TWTS containment area to provide secondary containment equal to 1.5 times the total capacity of the treatment system.
4. Construct the berm such that the height is at least 6 inches inches above the 100-year storm elevation or otherwise protect TWTS, as necessary.

B. Influent Equalization Tanks

1. Propose minimum capacity for influent equalization tanks based on maximum daily water flow and to avoid/minimize downtime during system maintenance. Minimum total influent storage capacity shall be designed to store sufficient volume to accommodate a minimum of 1.5 hours of treatment time.
2. Influent equalization tanks will likely be of steel construction and shall be equipped with inlet and outlet pipe connections, operable tops that can be opened by personnel for visual inspection and water level measurements, access stairs and guardrails meeting U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) Safety and Health Standards 29 *Code of Federal Regulations* (CFR) 1910/1926 requirements and level monitoring and control instrumentation including high-high and low-low level float switches and level transmitters.

C. Suspended Solids Removal System

1. Propose minimum capacity and design for suspended solids removal system based on maximum daily water flow and influent total suspended solids (TSS) concentration.

2. The suspended solids removal system tanks will likely be of steel construction and shall be equipped with inlet and outlet pipe connections, over and under weirs or other proposed technology to induce settling of solids and capture of floatables, operable tops that can be opened by personnel for visual inspection and water level measurements, access stairs and guardrails meeting U.S. Department of Labor, OSHA Safety and Health Standards 29 CFR 1910/1926 requirements, and level control instrumentation including high-high and low-low level float switches and level transmitters.

D. Polymer Dosing and Mixing System

1. Propose a polymer dosing and mixing system to enhance settling in the suspended solids removal system based on the maximum daily water flow and influent TSS concentration.
2. At a minimum, the polymer dosing and mixing system shall include a polymer storage drum, polymer dosing pump, and inline static mixer.

E. Multimedia Filter Vessels

1. The multimedia filter vessel system shall be appropriately sized and capable of operation at the maximum treatment system flowrate and compliance with the required minimum discharge criteria (Attachment 02 27 00-A – Discharge Criteria for Treated Wastewater).
2. The multimedia filter vessel system will likely be equipped with interconnected piping, valves, sample taps, pressure gauges, and instrumentation to monitor differential pressure across the vessels.
3. Piping and valves shall be configured to allow for continuous operation at the maximum treatment system flowrate through online vessels while simultaneously backwashing offline vessels. Valves shall isolate individual vessels from the filter process, allowing for continuous service of the remaining vessels during media removal and replacement.
4. Multimedia filter vessels will likely be carbon steel construction built to American Society of Mechanical Engineers pressure vessel standards and be rated for a maximum working pressure of 150 pounds per square inch (psi).
5. Multimedia filter vessels shall be designed to meet or exceed the removal of suspended solids down to 20 microns.

F. Bag Filters

1. Bag filter systems shall be capable of operation at the maximum treatment system flowrate.
2. Each bag filter system will likely be equipped with bag filter housings, bag support baskets, legs, interconnecting piping, shutoff valves, sample taps (at inlet and outlet of each housing), pressure gauges (at inlet and outlet of each housing), and instrumentation to monitor differential pressure across the vessels.

3. Piping and valves will likely be configured to allow each bag filter system to operate in parallel or vessel flow isolation mode. Valves shall isolate individual housing from the filter process, allowing continuous service of the remaining housings during filter bag removal and replacement.
4. Bag filter housing will likely be carbon steel construction built to American Society of Mechanical Engineers pressure vessel standards and be rated for a maximum working pressure of 150 psi.
5. Bag filter housings F-301/F-302 shall be capable of using 5-micron high-efficiency bag filters.
6. Bag filter housings F-601/F-602 shall be capable of using 1-micron high-efficiency bag filters.
7. Bag filter housing F-901 shall be capable of using 1-micron high-efficiency bag filters.

G. Liquid Phase GAC Vessels

1. The GAC treatment vessels/system shall be appropriately sized and capable of operation at the maximum treatment system flowrate and compliance with the required minimum discharge criteria for polychlorinated biphenyls (PCBs)/organic compounds (see Attachment 02 72 00-A – Discharge Criteria for Treated Wastewater).
2. GAC vessels shall have a minimum empty bed contact time of 10 minutes per vessel at 100 gpm.
3. GAC vessels within each GAC vessel train shall be plumbed in series during normal treatment system operations. When the primary GAC vessel becomes spent (i.e., breakthrough of constituents at concentrations above permitted limits or other proposed action levels), the Contractor will change out the carbon media in the primary vessel. The secondary vessel within the train shall be moved to the primary position, and the new GAC vessel shall be placed in the secondary position.
4. Two lead/lag GAC vessel trains shall be plumbed in parallel to allow for continuous treatment system operation at the maximum flow rate during GAC removal, replacement, and wetting.
5. The Contractor may propose installing a third standby GAC vessel in lieu of two lead/lag GAC vessel trains.
6. The GAC vessel system will likely be equipped with interconnected piping, valves, sample taps, pressure gauges, and instrumentation to monitor differential pressure across the vessels.
7. Piping and valves shall be configured to allow all vessels to be placed in the lead or lag position and allow for backwashing.

H. Treated Water Storage Tanks

1. Provide treated water storage tanks. The appropriate minimum total treated water storage capacity shall be in accordance with the backwash volume needs of the GAC and multimedia filter media, per manufacturer specifications.
2. The treated water storage tanks shall be equipped with piping, valves, inlet and outlet connections, and level monitoring and control instrumentation including high-high and low-low level float switches and level transmitters.

I. Sludge Holding Tanks

1. Provide sludge holding tanks to contain sludge from the suspended solids removal system or other sources of solids. Propose minimum sludge storage capacity based on the maximum daily solids production rate.
2. The sludge holding tanks shall have conical bottoms and stands.
3. The sludge holding tanks shall be equipped with piping, valves, inlet and outlet connections, and level monitoring and control instrumentation including high-high and low-low level float switches and level transmitters. Tank outlets shall be configured to allow for pump of settled solids from the tank bottom and removal of supernatant from above the sludge accumulation level.

J. Centrifugal Pumps

1. Size centrifugal transfer pumps for the maximum treatment system flowrate at a total dynamic head appropriate for the water treatment system proposed, including allowance for fouling of filters and media.
2. Size centrifugal backwash pump for the necessary GAC and multimedia filter backwash flowrate, per multimedia filter and GAC media manufacturer specifications. The total dynamic head produced by the backwash pump shall be appropriate for the water treatment system proposed.
3. In general, each centrifugal transfer pump shall have an installed spare.

K. Air Operated Double Diaphragm Pumps

1. Size air operated double diaphragm pumps based on the maximum daily solids production rate. The total dynamic head produced by the air operated double diaphragm pumps shall be appropriate for the water treatment system proposed.
2. The air operated double diaphragm pumps shall be equipped with piping, valving, and instrumentation to allow for automated disabling of the pumps when high pressure is observed at the pump discharge.

L. Air Compressor

1. Size air compressor based on the operating requirements for the air operated double diaphragm pumps, per manufacturer specifications. Include additional capacity to accommodate ancillary compressed air needs within the TWTS area.

M. Conveyance Pipe, Hose, Valves, and Appurtenances

1. Provide all necessary piping, hose, valves, instrumentation, and appurtenances required for installation and operation of the TWTS.
2. Piping located inside the TWTS containment area shall be Schedule 80 polyvinyl chloride (PVC). Hoses shall be Versiflo 150 by Goodyear Tire and Rubber Co., Inc., or approved equal. Piping located outside the TWTS containment area shall be single-wall, high-density polyethylene standard dimension ratio 11 with butt-fused connections. HDPE pipe shall be Driscoplex by Performance Pipe, CP Chemical Co., or approved equal.
3. Piping, hose, valves, and appurtenances shall conform to applicable ASTM International standards.
4. Piping shall be secured to prevent displacement, supported in accordance with manufacturer's instructions, and protected from vehicular traffic when placed on the ground surface.

N. Flow Indicating Transmitters and Totalizers

1. Provide flow indicating transmitters (FITs) capable of displaying instantaneous flow rate and totalized flow volume. FITs shall display flow rate and totalized volume locally and transmit these values to the SCADA system.

O. Process Instrumentation and Control System

1. Evaluate and select a treatment system control method commensurate with the anticipated hours of operator staffing and degree of system component monitoring required: manual, semi-automatic, automatic. The degree of instrumentation and control shall be in accordance with the minimum requirements for equipment operation indicated in manufacturer's specifications.
   a. Include a main control panel (MCP), either skid-mounted or fabricated, to include at a minimum, system alarms, interlocks, and motor controls. The MCP shall be equipped with a human-machine interface, data logging capabilities, and remote access. At a minimum, the data log shall include hourly readings for flow rate, totalized flow volume, pump run times, tank levels, and system alarms.
2. Provide, at a minimum, automation for control of treatment flowrate, chemical feed rates, and water quality as necessary for operation of the treatment system. Logic for system automatic operation and related pump and valve controls based on measured process variables, including level, pressure, flow, and other parameters, shall be included. The Contractor shall provide for the shutdown of the treatment system due to critical alarms such as high-high or low-low level, differential pressure, or chemical storage low-low level as appropriate.
   a. Provide measurement devices that measure the water levels, flows, pressure, flow rates, and polymer dosages.
   b. Flow meters shall be provided to measure flowrates in gpm within the range of anticipated treatment flows. Flow meters shall include a totalizer to measure flow volume in gallons.

c. Automatic controllers shall be provided to control polymer dosage as appropriate for the suspended solids removal system.
d. An emergency stop button shall be installed at the MCP or other centralized location. When engaged, the emergency stop shall disable all TWTS equipment.

P. Spare Parts

1. Furnish spare parts and accessories necessary to operate and maintain the TWTS for the duration of the Work.
2. Stock equipment manufacturer's recommended spare parts at the Site. Spare parts shall be identical and interchangeable with original equipment parts.
3. Stock spare Schedule 80 PVC pipe, fittings, valves, transfer hose, and pressure gauges necessary to make timely repairs to the TWTS conveyance piping.
4. Store spare parts in a secure location in accordance with manufacturer's instructions.

PART 3 –EXECUTION

3.01 TREATMENT SYSTEM INSTALLATION AND GENERAL REQUIREMENTS

A. Locate the TWTS within the Temporary Staging Areas available to the Contractor as shown in the Design Drawings.

B. Operate the TWTS within spill containment berms to collect water that may leak/leave the treatment system prior to treatment (e.g., due to leaks in hoses or pipe connections). Any water that accumulates within the containment berms shall be collected and treated by the water treatment system.

C. All equipment shall be installed and maintained in strict compliance with the manufacturer's installation instructions and design approved by the Construction Manager.

D. Provide a power and electrical service connection(s) as appropriate to operate and maintain the TWTS and associated water conveyance systems. Such service shall be installed in accordance with applicable federal, state, and local regulations and requirements.

1. The electrical service connection shall include a manual transfer switch to allow the TWTS to be powered by a temporary generator in the event of a utility power failure.

E. Contractor shall be responsible for routine inspection of all components of the treatment system for leaks. Leaks (if observed) shall be addressed by the Contractor (including any required cleanup actions) immediately upon observation.

F. Water treatment system components shall be fully winterized and capable of operating in subfreezing conditions if necessary to achieve Contractor's proposed schedule for completion of the Work. the Contractor shall be prepared (if necessary and at the request of GE) to cease water treatment during prolonged periods of subfreezing conditions. During these periods, Contractor shall be prepared to adequately drain and protect the TWTS (including its components) from damage.

3.02 INITIAL STARTUP AND TESTING

A. Coordinate and perform startup testing for individual system components, portions of the system, and the overall system prior to initiating full-scale (normal) operations as described herein, in accordance with the manufacturer and supplier/vendor instructions, and as indicated in the Contractor-prepared O&M Manual, which has been reviewed by the Construction Manager. The initial startup testing requirement apply to the initial start of construction and the restart of construction after each winter shutdown, as applicable.

B. Procure the services of the supplier/vendor of the treatment-related components of the overall system to assist in the performance of startup activities at the Site and to provide instructions and training to the Contractor related to operation, monitoring, and maintenance of the system, as needed.

C. System startup and testing are intended to demonstrate and troubleshoot, as necessary, system operations and to provide planning-level information regarding subsequent operations related to extraction rate/timing and other related operations.

1. Startup testing shall occur once the conveyance system and treatment system components have been installed and individually tested, as appropriate.
2. Prior to the initial startup, the Contractor will perform a clean water test to demonstrate general treatment system operation (e.g., no leaks and proper alarm, controls, and gauge and meter functionality) prior to testing with contaminated water.
3. As part of initial startup, the Contractor shall collect influent samples from water from the soil/sediment staging area (e.g., from dewatered material) and/or the first excavation area (i.e., water that has been in contact with sediment/soil to be removed). The initial treatment volume (i.e., initial "batch") will be at least 20,000 gallons. During the startup test, the TWTS shall be operated in recirculation mode at the peak flowrate until the entire at least 20,000-gallon batch is treated.
4. The Contractor shall continuously monitor and record readings (every 15 minutes, minimum) from all pressure gauges, flow meters, and other installed instrumentation necessary to demonstrate that the system is operating as designed, including backwash, bypass, and recycle functions to the satisfaction of the Construction Manager.
5. Contractor shall collect startup testing effluent samples following treatment of the initial batch.

6. The treatment system will remain in recirculation mode until analytical results indicate that water may be discharged.
7. Samples collected during startup testing shall be submitted for laboratory analyses in accordance with the parameter list presented in the Table 02 72 00-A.

TABLE 02 72 00-A
LABORATORY TESTING PARAMETERS

PARAMETER –METHOD NO.	INFLUENT/EFFLUENT	MID-PROCESS
PCBs – 608	Yes	Yes
VOCs – 624.1	Yes[2]	Yes[2]
SVOCs – 625.1	Yes[2]	Yes[2]
Total Metals – 200.8	Yes[2]	Yes[2]
TSS – SM 2540D	Yes	Yes
pH – 150.1	Yes	Yes

Notes:
Testing of the system may also be required during normal operations. Some or all of these mid-process locations may be eliminated as operating experience is gained.
1. Mid-process samples shall be collected downstream of the equalization tank, downstream of the suspended solids removal system, downstream of the multimedia filters, downstream of the lead GAC vessels, downstream of the lag GAC vessel, and downstream of the effluent bag filters (F-601/F-602). Where the treatment train is divided into parallel streams, samples from each parallel stream shall be collected. Samples shall be collected during general startup.
2.Samples will only be analyzed for the list of select compounds listed in Attachment 02 72 00-A – Discharge Criteria for Treated Wastewater.
SM: Standard Method
SVOC: semivolatile organic compound
VOC: volatile organic compound

8. Compare analytical results (i.e., PCBs, volatile organic compounds, semivolatile organic compounds, and metals) to the required minimum discharge criteria (Attachment 02 72 00-A – Discharge Criteria for Treated Wastewater).
   a. If the analytical results are below the discharge criteria and pH is between 6 and 9, discharge the treated water in accordance with Paragraph 3.03.D of this Section.
9. If the analytical results are above one or more of the discharge criteria or pH is outside the desired range, investigate the potential cause(s), modify the system (if necessary), retreat the water, collect a sample from the retreated water, and submit that sample for the appropriate laboratory analyses. (Field verification may be allowed for retesting pH, with prior approval by the Construction Manager.)

10. This process will be repeated until two consecutive batches of ≥20,000 gallons have undergone successful treatment.

D. Following confirmation that the discharge criteria have been met for two consecutive batches, the Contractor may elect to directly discharge future treated water for the construction season (i.e., until winter shutdown) with approval from the Construction Manager. Sampling of effluent water shall be conducted by the Contractor in accordance with Paragraph 3.03.C and Attachment 02 72 00-A – Discharge Criteria for Treated Wastewater.

3.03 SYSTEM OPERATION

A. General:

1. Provide for a qualified, trained system operator to be on site at all times during initial operation and maintenance of the TWTS, including discharge. While the system is operating, the operator shall have no other duties that interfere with the manual operation of the TWTS. As operating experience is gained, the Contractor may add controls and alarms approved by Construction Manager to eliminate the need for a dedicated on-site system operator. If the Contractor elects to operate the TWTS continuously during nonworking hours, such a plan must be formally communicated (in writing) to the Construction Manager for review and approval.
2. The non-PCB discharge criteria are established as benchmarks; if any such benchmark exceedances occur, Contractor shall do the following:
   a. Notify the Construction Manager and GE of the exceedance. GE's Construction Manager will notify EPA.
   b. Evaluate potential causes for the exceedance of the discharge criteria and propose to the Construction Manager in writing within 24 hours of notification of the exceedance corrective actions to adjust/modify (as appropriate) the TWTS so as not to exceed the discharge criteria. At that time, the Construction Manager, in consultation with the trained system operator, as needed, will determine the need for and scope of any modifications to the discharge monitoring program.
   c. GE will notify EPA and propose corrective actions or explain why corrective actions are not necessary.
3. If there are any results in the treated effluent water above the PCB discharge criteria, Contractor shall do the following:
   a. Notify the Construction Manager and GE of the exceedance. GE's Construction Manager will notify EPA.
   b. Evaluate potential causes for the exceedance of the discharge criteria and propose to the Construction Manager in writing within 24 hours of notification of the exceedance corrective actions to adjust/modify (as appropriate) the TWTS so as not to exceed the discharge criteria. At that time, the Construction Manager, in consultation with the trained system operator, as needed, will determine the need for and scope of any modifications to the discharge monitoring program.

c. GE will notify EPA and propose corrective actions or explain why such actions are not necessary.
d. This process shall also be followed if there are detections above the laboratory-specific method detection limit but below the discharge criteria.

4. Only Site-generated wastewater is authorized for treatment and discharge.
5. Any use of corrosion/scale inhibitors, biocidal-type compounds, or other water treatment chemicals used in the treatment process must be approved by the Construction Manager prior to use.

B. Operation and Maintenance:

1. Operate and maintain the treatment system in accordance with the manufacturer's recommendations, Contractor-prepared O&M Manual (which has been reviewed by the Construction Manager), and the approved Access and Site Preparation Plan provided in the Contractor's Operations Plan.
2. Closely coordinate and monitor the system operations with respect to potential impacts and disruptions to the overall Project implementation and schedule. Under no circumstances shall Contractor exceed the storage capacity of the influent and effluent storage tanks. Any determination regarding modifications to the discharge rate, method, and/or location shall be made between the Contractor and Construction Manager.
3. Continuously monitor the operation of the treatment system. During each day of operation, inspect hoses, tanks, and vessels for signs of cracks and/or leaks. As required, perform routine maintenance/repair of the treatment system.
4. Coordinate required routine maintenance to minimize interruption to the overall Project implementation. Routine system maintenance is anticipated to include, but not be limited to, the following:
   a. Changing treatment media (i.e., bag filters and GAC);
   b. Backflushing system components (i.e., multimedia filters and GAC vessels) as necessary and as recommend by the water treatment vendor(s)
   c. Periodic collection and removal of sediment/sludge that accumulates in the equalization tank(s), suspended solids removal system, or sludge holding tank(s).
   d. Consolidation of spent treatment media and sediment/sludge from maintenance activities at the impacted material staging and dewatering area.
5. Minimize spills and leaks to the extent practicable from the treatment system or during transfer of water to or from the treatment system. Observed leaks in the water treatment system or associated piping shall be addressed and remedied as soon as they are observed.
6. Minimization of Suspended Solids:
   a. Conduct Project activities to minimize the presence of solids in the water subject to treatment. Such activities include, but are not limited to, the following:

1) Minimizing pumping of sediment from sediment/soil staging area into the TWTS Influent Tanks
2) Maximizing the retention time of water held in temporary staging tanks to allow gravity-based settling to occur prior to transferring water to the treatment system
3) Positioning and operating the influent pumps within any temporary staging tanks such that water is not drawn from either the lower or upper portion of standing water within the tanks to minimize the potential transfer of solids or floating materials to subsequent components of the treatment system
4) Operating the treatment system components in accordance with the supplier's/manufacturer's recommendations
5) Regularly cleaning and removing solids accumulated within various components of the treatment system

b. Review overall operations throughout the performance of the Project with respect to the presence of solids in the water subject to treatment and take measures as appropriate to minimize the presence of solids.

C. Discharge Sampling and Monitoring:

1. The Contractor shall collect, at a minimum of once per day, water quality field data consisting of turbidity measurements to provide indications of system performance. As operating experience is gained, and following approval of the Construction Manager, the Contractor may reduce the frequency of the monitoring. Samples shall be collected in the individual treatment trains at the following locations:
   a. Equalization tank
   b. Downstream of the suspended solids removal system
   c. Downstream of multimedia filters
   d. Downstream of GAC vessels
   e. Downstream of effluent bag filters (F-601/F-602)
2. During the first month of operation, operational water quality shall be tested once per week. During and after the second month of operation, extending until system shutdown, testing shall be conducted once per month. Operational samples shall be collected and analyzed in accordance with Table 02 72 00-A and compared to the discharge criteria provided in Attachment 02 72 00-A – Discharge Criteria for Treated Wastewater, unless otherwise approved by the Construction Manager.
3. Downtime related to the laboratory turnaround time shall be incorporated into the Contractor's planned operation of the system and coordination of related Project activities.
4. Analytical results and reports for discharge sampling shall immediately be provided by the Contractor's analytical laboratory to the Construction Manager by email upon receipt by the Contractor. See Paragraph 3.03.A for general conditions if the discharge criteria are exceeded at any time.

D. Treated Water Discharge: Treated waters shall be discharged back to the Housatonic River. Under no circumstances shall treated water be reused on site for any purposes, including, but not limited to, dust suppression and equipment/personnel decontamination. The Contractor shall design, construct, and maintain energy dissipation control(s) to prevent erosion and sediment resuspension at the TWTS discharge.

E. Following confirmation that the discharge criteria provided in Attachment 02 72 00-A – Discharge Criteria for Treated Wastewater have been met for an analyte for three rounds of operational water quality testing, the Contractor may reduce or eliminate operational testing of that analyte for the remainder of the construction season (i.e., until winter shutdown), with approval from the Construction Manager.

3.04 CORRECTIVE ACTIONS

A. Contact the Construction Manager immediately following discovery of problems with TWTS operations and provide immediate notification of major repairs necessary to maintain operation.

B. Implement corrective actions as necessary to maintain specified TWTS performance in the event of an upset condition and/or operating conditions that result in noncompliant effluent quality. During corrective actions, the Contractor may be required to mobilize additional effluent storage tanks, treatment units or media, and/or repeat startup and testing procedures. If the Contractor fails to make these corrections, or if the improved equipment fails to meet specified requirements, GE, notwithstanding having made partial payment for Work and materials that have entered into the manufacture of said equipment, may reject said equipment and order the Contractor to remove it from the premises at the Contractor's expense.

C. The Contractor shall make no claims for delays associated with maintenance, repairs, or documentation to correct performance of the TWTS and/or the associated water conveyance systems.

3.05 DECOMMISSIONING

A. Following each construction season, the Contractor shall decommission the TWTS including associated conveyance system and energy-dissipation controls.

B. TWTS shall be decontaminated and decommissioned in accordance with the Contractor's Health and Safety Plan (Section 01350 – Health and Safety), Section 02 51 00 – Decontamination, and the vendor/supplier/manufacturer's recommendations.

C. The Contractor shall be responsible for the proper handling, transportation, and off-site disposal (including waste characterization for off-site disposal, if required) of wastes generated from treatment and any decontamination water created following decommissioning of the TWTS in accordance with all laws and regulations.

3.06 DOCUMENTATION

A. Maintain a daily operations log (i.e., tabulated results) to record, at a minimum: flowrate, volume treated, volume discharged, sampling completed, media changeouts, and any issues identified/corrected. In addition, all activities related to operations and maintenance of the TWTS shall be documented in the Daily Activities Report. The Daily Activities Report shall be kept on site and made available to the Construction Manager on demand.

3.07 ATTACHMENTS

A. Attachment 02 72 00-A – Discharge Criteria for Treated Wastewater, which follows the "End of Section" designation, is part of this Section:

END OF SECTION

SECTION 02 72 00 – WATER MANAGEMENT AND TREATMENT
ATTACHMENT 02 72 00-A - DISCHARGE CRITERIA FOR TREATED WATER

Parameter	Reach 5A Discharge Criteria (ppb)
VOCs (Method 624.1)	
Acetone	7,970
SVOCs (Method 625.1)	
Acenaphthylene	40
Benzo(a)anthracene	1,000
Benzo(a)pyrene	500
Benzo(b)fluoranthene	400
Benzo(g,h,i)perylene	20
Benzo(k)fluoranthene	100
Chrysene	70
Fluoranthene	200
Indeno(1,2,3-cd)pyrene	100
Phenanthrene	10,000
Pyrene	20
Arsenic	104
Barium	2,000
Beryllium	4
Cadmium	10.2
Chromium	323
Copper	242
Iron	5,000
Lead	160
Mercury	0.739
Nickel	1,450
Selenium	235.8
Silver	35.1
Vanadium	4,000
Zinc	420
Total PCBs	0.25

Note:

1 Non-PCB criteria are established as benchmarks; if any such benchmark exceedances occur, GE will notify EPA and propose corrective actions or explain why corrective actions are not necessary.

2 For PCBs, EPA Method 608.3 will be used for the analysis of PCB Aroclors in treated effluent water, with a minimum required Reporting Limit of 0.25 ug/L. If there are any results in the treated effluent water above the limit of 0.25 µg/L, GE will notify EPA and propose corrective actions or explain why such actions are not necessary. In addition, if there are detections above the laboratory-specific method detection limit but below the limit of 0.25 µg/L, GE shall notify EPA and propose corrective actions or explain why such actions are not necessary.

Abbreviations:

EPA = Environmental Protection Agency
PCB = polychlorinated biphenyl
ppb = parts per billion; equivalent to microgram per liter (ug/L)
SVOC = semi-volatile organic compounds
VOC = volatile organic compounds

PART 1 – GENERAL

1.01 DESCRIPTION

A. The Contractor shall furnish all supervision, labor, tools, materials, equipment, services, and appurtenances necessary for the construction, stability, maintenance, and repairs of Temporary Access Roads and Temporary Staging Areas as necessary to complete the execution of the Work.

B. The Contractor shall furnish all labor, materials, equipment, tools, and services necessary to adequately safeguard the Work and public from construction hazards with a minimum of inconveniences. Work includes, but is not limited to, the scheduling, routing, and coordinating of Project vehicle traffic to and from the Site; erection, maintenance, and removal of temporary construction barriers and traffic control signage; employing flaggers to support traffic control; and installation and maintenance of other traffic control devices necessary.

C. The Contractor shall be responsible for the design of Temporary Access Roads and Temporary Staging Areas, including their layout, locations, construction materials, thicknesses, and width. To the extent practicable, the Temporary Access Roads and Temporary Staging Areas shall be in areas previously cleared or disturbed areas. Temporary Access Roads and Temporary Staging Areas shall not be constructed within any designated Vernal Pools or Sensitive Vegetation Areas, except when access to such remediation areas is specified on the Drawings. Approximate locations for the Temporary Access Roads and Temporary Staging Areas are shown on the Design Drawings. Any modifications proposed by the Contractor to the road layout shown on the Design Drawings shall be subject to approval by the Construction Manager.

D. Planned Primary Temporary Access Roads as shown in the Design Drawings are defined as temporary roads to be constructed by the Contractor using geotextile and gravel (or other approved alternate materials) to support frequently traveled areas to allow access for trucks hauling materials and equipment to or from Temporary Staging Areas. Portions of these roads follow existing, cleared pathways as shown in the Design Drawings. Primary Temporary Access Roads are anticipated to be 24 feet wide where necessary to accommodate two-way traffic and 16 feet wide where frequent two-way traffic is not anticipated. Other widths may be required to accommodate turn radii of Contractor's equipment or based on field conditions. The Contractor shall be responsible for clearing the routes, construction of these roads, and road removal and restoration following completion of construction.

E. Planned Secondary Temporary Access Roads as shown in the Design Drawings are defined as temporary roads to be constructed by the Contractor using geotextile and gravel, timber mats, composite mats (if appropriate), or other approved material to

access specific Work Areas or River Access points (Subparagraph 1.01.G). Secondary Temporary Access Road widths are anticipated to be approximately 12 feet wide or a different width proposed by the Contractor and approved by the Construction Manager. The Contractor shall be responsible for clearing the routes, construction of these roads, and road removal and restoration following completion of construction.

F. The locations and configurations of Temporary Staging Areas shown on the Design Drawings identify potentially available areas for such use. The layout and uses within each area are subject to development by the Contractor based on selected means and methods. The Contractor is encouraged to minimize the extent of each identified area that is cleared and used for Temporary Staging Areas in order to minimize habitat impacts, hydrological impacts, and the extent of restoration required. The Contractor's planned use and layout of each Temporary Staging Area shall be defined in the Contractor's Operations Plan.

G. Planned River Access Points are defined as temporary access or river crossing points to be constructed by the Contractor for the purpose of navigating to various Work Areas within or across the river. The River Access points shown in the Design Drawings are subject to change based on Contractor input and the final layout of Temporary Access Roads.

H. The Contractor shall construct and maintain Temporary Access Roads of width and load-bearing capacity to support the safe and efficient transit of vehicles, equipment, and all other appurtenances necessary for the performance of the Work.

I. The Contractor shall exercise care to prevent disturbing or damaging any utilities during the construction, operation, and removal of Temporary Access Roads and Temporary Staging Areas. Where Temporary Access Roads or Temporary Staging Areas are constructed above or near existing utilities, appropriate measures (e.g., engineered measures, air bridges, or load restrictions) shall be taken to protect the utilities in consultation with the utility owner and Construction Manager.

J. The Contractor shall construct Temporary Access Roads and Temporary Staging Areas to minimize disturbance of existing trees greater than 8 inches in diameter at breast height.

K. The Contractor shall construct Temporary Access Roads and Temporary Staging Areas to minimize impacts to rare species, including completing Work in accordance with the Wood Turtle Management Plan provided by the Construction Manager. This shall include installation of Turtle Exclusion Barriers adjacent to Temporary Access Roads and Staging Areas in accordance with the Wood Turtle Management Plan.

L. The Contractor shall construct Secondary Temporary Access Roads to minimize impacts to the subgrade elevation and vegetation under oversight by the Construction Manager. For any wetland areas and areas with soft organic soils, the Contractor shall

use methods to avoid, to the extent practicable, excessive soil compaction that could result in detrimental impacts to restoration. This shall include use of construction matting or low-ground-pressure construction equipment. The Contractor's proposed means and methods shall be detailed in the Contractor's Operations Plan and must be approved by the Construction Manager prior to the start of Work associated with these features.

M. The Contractor shall construct Temporary Staging Areas as necessary to support construction activities, including dredged material, debris, excavated soil, backfill, and amendment temporary staging, soil dewatering and stabilization as needed, and equipment and personnel decontamination. Temporary Staging Areas shall be constructed and operated as necessary to allow safe and efficient execution of the Project to minimize habitat impacts to the surrounding area and prevent spread of contamination from the Work Areas to surrounding areas.

N. The Contractor shall anticipate variable surface and subsurface conditions within the roadway alignments and staging areas, including low-lying and wet areas.

O. As shown in the Design Drawings, there are multiple existing culverts under and adjacent to the Temporary Access Roads. The Contractor shall maintain these culverts in their current condition to avoid impacting surface water hydrology to the surrounding areas (i.e., do not increase or decrease flow capacity through the culverts). To accomplish this, the Contractor shall conduct pre-construction inspection and photographic documentation of each culvert prior to construction. Appropriate measures shall be taken by the Contractor to ensure their protection or reconstruction to maintain their pre-construction functionality.

P. As shown in the Design Drawings, there are multiple existing swales that will be crossed by the Temporary Access Roads. The Contractor shall install and improve crossings, where necessary, to complete the Work and avoid impacting surface water hydrology to the surrounding areas (i.e., do not increase or decrease flow capacity through the swales). The Contractor shall conduct pre-construction inspection and photographic documentation of each swale crossing prior to construction. At the completion of the Project, the Contractor shall return the crossings to their pre-construction conditions, unless not required by the property owner, subject to approval by the Construction Manager.

Q. In areas where the construction of Temporary Access Roads may affect existing drainage areas, the Contractor shall install new culverts beneath the Temporary Access Roads and avoid impacting surface water hydrology in the surrounding areas (i.e., do not cut off drainage pathways).

R. Preservation of the existing topography adjacent to Floodplain areas, Vernal Pools, Backwaters, and Other Waterbodies shall be maintained throughout Site access and all

other construction activities. The Contractor shall maintain surface water flows to and from these features consistent with pre-construction conditions.

S. The Contractor shall field-verify conditions on its own and improve/construct Temporary Access Roads and Staging Areas as appropriate.

T. Erosion and sedimentation controls must be installed and maintained along the Temporary Access Roads and Staging Areas in accordance with the requirements of Section 31 25 00 – Erosion and Sediment Controls.

U. The Contractor shall perform routine maintenance of the Temporary Access Roads and Temporary Staging Areas for the entire duration of the Work, including, but not limited to, snow removal and repairs due to damage or wear associated with the Work.

V. The Contractor shall inspect and evaluate field conditions (including pipe and manhole conditions and soil cover depth) and perform an independent analysis to confirm the viability of constructing Temporary Access Roads along existing City of Pittsfield sanitary sewer mains as described in Article 3.03.

W. The Contractor shall implement best management practices (BMPs), controls, and other measures necessary to maintain compliance with the Surface Water Action Levels and Quality of Life Standards described in Section 01571 – Operations, Environmental Restrictions, and Controls.

X. At the end of construction season, the Contractor shall be responsible for winterization of the Temporary Staging Areas and any equipment and materials used for the Work. In addition, at the end of each construction season, the Contractor shall be responsible for cleaning and decommissioning the exclusion zone at the Temporary Staging Areas. All contaminated materials, including dredged sediment, excavated soil, debris, and wastewater, shall be removed and disposed of properly and shall not be stored over a winter season at any Temporary Staging Area.

1.02 RELATED SECTIONS

A. Section 01571 – Operations, Environmental Restrictions, and Controls

B. Section 02 21 00 – Surveys

C. Section 02 61 15 – Handling and Disposal of Impacted Materials

D. Section 02 51 00 – Decontamination

E. Section 31 05 13 – Soils and Aggregates

F. Section 31 11 00 – Clearing and Grubbing

G. Section 31 25 00 – Erosion and Sediment Controls

1.03 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO), 2024. *Load and Resistance Factor Design (LRFD) Bridge Design Specifications*. 10th Edition.

B. National Oceanic and Atmospheric Administration (NOAA), National Weather Service, and Hydrometeorological Design Studies Center, 2019. *NOAA Atlas 14, Volume 10, Version 3: Precipitation-Frequency Atlas of the United States, Northeastern States*.

C. Geosynthetic Research Institute (GRI), 2021. *GRI GM13 – Standard Specification for Test Methods, Test Properties, and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes*, Revision 16. March 17, 2021.

1.04 SUBMITTALS

A. Pre-Construction

1. Temporary Access Road Construction Plan: The Contractor shall prepare a Temporary Access Road Construction Plan that shall, at a minimum, include the following:
   a. Details for the proposed layout, widths, thicknesses, and construction materials for Primary and Secondary Access Roads
   b. Figures showing the layout and sizing for Primary and Secondary Access Roads, and traffic patterns and the locations of Turtle Exclusion Barriers
   c. Plans showing where any grading of existing soil is proposed along the Temporary Access Roads
   d. Details where the Temporary Access Roads intersect with public roads, including any proposed traffic control measures and signage
   e. A written summary and calculations for an evaluation performed by the Contractor to confirm the viability of constructing Temporary Access Roads along existing City of Pittsfield sanitary sewer mains, including details on the maximum vehicular loading that will be allowed along the sewer mains and calculations that verify that the structural integrity of the sewer system will not be affected
      1) This evaluation shall identify any additional protection or use limitations that will be required as part of the implementation.
2. Submit civil survey, sampling, and testing data generated by the Contractor.
3. Temporary Staging Area Construction Plan: The Contractor shall prepare a Temporary Staging Area Construction Plan to address the design and operational requirements for each Temporary Staging Area as presented in this Specification, including Article 1.05. The submittal shall be based on the Contractor's proposed means and methods for accomplishing the dredging, material transport, and

sediment dewatering/processing operations and the Contractor's approved Operations Plan. Additional design submittals may be required by the Construction Manager based on the Contractor's approved Operations Plan and comments received from the U.S. Environmental Protection Agency (EPA). The Temporary Staging Area Construction Plan shall, at a minimum, include the following:

a) Staging Area Layout Plan: Include the proposed layout and sizing for sediment material staging, dewatering, and processing; import fill material staging; the water treatment system; equipment storage/laydown, fuel storage, and fueling locations; office trailers; sanitary facilities; utility connections; waste storage areas; secondary containment systems; fencing/barriers; locations of Turtle Exclusion Barriers; and traffic patterns.

b) Containment System: Include the design for the impermeable containment system for the areas where dredged sediment, debris, and water containing PCBs will be dewatered/processed, staged, and handled and areas that may come in contact with PCB-containing materials. Provide construction-level layout drawings, Site plans, and cross sections showing the proposed containment area and including all critical dimensions and materials to be incorporated into the Work. Provide manufacturer specifications for materials to be used to construct the containment system. Provide details for installation of the containment system, including details for installation of the Flexible Membrane Liner (FML) system. Describe how the integrity of the containment system will be protected from vehicle traffic. Provide details on the collection, capture, and treatment of liquids from the containment system.

c) Excavation and Grading Plan: Provide an excavation and grading plan for the Temporary Staging Areas. This shall include a description of how soils targeted for remediation within the boundaries of Temporary Staging Areas will be excavated and managed as part of the construction process.

d) Flood Protection: Include the design for protecting all areas used for staging of dredged material, dewatering/processing of dredged material, staging of processed sediment, and fuel/chemical storage from flooding up to and including a 100-year flood event. Identify the time needed to install flood-protection systems and provide a plan to proactively monitor river stage and weather conditions and forecasts.

4. Winterization Plan: For each construction season, the Contractor shall submit an annual Winterization Plan to the Construction Manager for review and approval. The Winterization Plan shall be submitted at least 90 days prior to the end of the construction season or as otherwise approved by the Construction Manager. At a minimum, each Winterization Plan shall include the following items:

a. A schedule for completing the winterization activities, including a detailed description of when and how Work Areas and equipment will be winterized at the end of the construction season
b. Procedures for shutting down operations at the Temporary Staging Areas for the offseason
c. Procedures for winterization and storage of construction equipment, piping, pumps, process equipment, instruments, control systems, and any other equipment requiring winterization
d. Procedures for winterization of the water treatment system
e. Plans and procedures for any flood protection measures that will remain in effect during the offseason period
f. A list of equipment and materials that will remain at the Site during the offseason
    1) Provide a drawing showing the proposed staging locations.

5. Temporary Staging Area Decommissioning Plan: The Contractor shall prepare and submit a Decommissioning Plan to the Construction Manager for review and approval. The Decommissioning Plan shall describe the Contractor's proposed measures for decontaminating and removing the exclusion zone at the Temporary Staging Area after all remediation waste handling activities are completed. The Decommissioning Plan shall be submitted at least 90 days prior to initiating decommissioning activities or as otherwise approved by the Construction Manager. At a minimum, the Decommissioning Plan shall include, but not be limited to, the following:
    a. A description of the methods and steps to be taken for decontaminating and demobilization all surfaces, equipment, structures, and other items within the exclusion zone (e.g., decontamination of equipment and surfaces, disposal of residual wastes, removal of equipment)
    b. The plan for sampling and analysis of construction materials for potential reuse or disposal in accordance with Part 3.06 below.
    c. A description of the means and methods for removing all equipment, materials, structures, staging areas, utilities, services, accessways, and other items within the exclusion zone
    d. A description of and estimated quantities for each type of material that will be retained by the Contractor, decontaminated, and removed from the Site.
    e. A demobilization schedule, including a detailed description of when and how materials, supplies, equipment, and personnel will be demobilized from the Site
    f. A description of the plan and approach for restoration of the affected areas following removal of each Staging Area

B. During Construction

1. The Contractor shall submit a daily visual presentation of construction progress for Temporary Access Roads and Staging Areas as part of the Daily Activities Report.

C. Post-Construction

1. Post-Temporary Access Roads and Staging Areas Construction Surveys in accordance with Section 02 21 00 – Surveys
2. Survey Record Drawings documenting pre-construction and post-construction conditions and elevations for all Temporary Access Roads and Temporary Staging Areas in accordance with Section 02 21 00 – Surveys

1.05 TEMPORARY STAGING AREA DESIGN REQUIREMENTS

A. Review the available materials, data, drawings, and reports related to the designated Work area and surrounding area.

B. Perform all sampling, testing, examination, survey, geotechnical investigation, and data collection as deemed necessary by the Contractor to support the design, construction, commissioning, operation, and maintenance of the Temporary Staging Areas.

C. Determine the size and layout requirements for the proposed operations at the Temporary Staging Areas. The Temporary Staging Areas shall be sized to incorporate all the Contractor's operations including, but not limited to, parking, temporary offices, personnel facilities, dredged material and debris unloading, sediment dewatering/processing, storage, material staging, stormwater management/collection, water treatment/discharge, processed sediment and debris loading, dredged material transportation, imported fill material staging, and related Work.

D. All areas at the Temporary Staging Areas that are used for staging dredged material, sediment dewatering/processing, staging processed sediment, and fuel/chemical storage shall be designed and protected from flooding up to and including a 100-year river flood. Equipment, materials, and systems to protect against flooding shall be built during Temporary Staging Area construction or shall be stored at or near the Temporary Staging Areas. If the flood-protection system is stored at or near the Temporary Staging Area and must be installed prior to flood events, the Contractor shall identify the amount of time needed to install flood-protection systems and provide a plan to proactively monitor river stage, weather conditions/forecasts, and implement flood control measures prior to the Temporary Staging Areas becoming inundated by floodwaters. The Contractor's design submittal shall include detailed information, proposed materials, and procedures describing how the area will be protected against flooding.

E. Water pumped or drained from excavations, or any sewers, drains, or water courses encountered in the Work, shall be disposed in a suitable manner without disturbance to adjacent property, the Work under construction, or to pavement, roads, drives, and water courses. Water shall not be discharged to surface waters, sanitary sewers, or wetlands unless otherwise approved by the Construction Manager. All water discharge locations shall be approved by the Construction Manager. Provide erosion control at all water discharge locations in conformance with the Contractor's approved Stormwater Pollution Prevention Plan (SWPPP), which shall be submitted to and approved by the Construction Manager (see Section 31 25 00 – Erosion and Sediment Controls). Any damage caused by or resulting from dewatering operations shall be the sole responsibility of the Contractor.

F. Protect Sensitive Habitat Areas from disturbance during the construction, operation, and decommissioning of the Temporary Staging Areas.

G. Removal of trees for the construction and operation of the Temporary Staging Areas shall be minimized to the extent practical. Prior to tree removal, perform a field inspection with the Construction Manager to review all trees proposed by the Contractor for removal. The pre-Work size, condition, and species of all trees proposed for removal shall be documented by the Contractor and submitted in a form acceptable to the Construction Manager for approval. Tree removal shall not proceed until approved by the Construction Manager.

H. The Temporary Staging Areas shall include parking locations for the Contractor's staff and a minimum of four (4) parking spaces for staff from General Electric Company (GE), the Construction Manager, monitoring personnel representing GE, and EPA's oversight personnel and their contractors. The parking area shall be maintained and kept free of oils and other materials.

I. The Temporary Staging Areas shall be designed to contain, collect, convey, treat, and discharge all water generated during the dredging operations and received at the Temporary Staging Areas, process water generated during sediment dewatering/processing, and stormwater.

J. The stormwater conveyance and treatment system shall be designed to contain, store, and treat the volume of stormwater runoff resulting from a 10-year, 24-hour storm event as defined by the NOAA Atlas 14 precipitation-frequency estimates and obtained from the NOAA Precipitation Frequency Data Server.

K. Any stormwater that contacts the containment system shall be collected and treated prior to discharge in accordance with Section 02 72 00 – Water Management and Treatment.

L. Design, install, test, and maintain an impermeable containment system in all areas of the Temporary Staging Areas where PCB-containing materials will be processed, staged, and handled or which may come into contact with PCB-containing materials. The

containment system shall be designed to prevent contamination of the underlying soils and groundwater at the property. The containment system shall be designed and installed to contain, collect, and treat all liquids (e.g., stormwater, leachate, and process water) from the Temporary Staging Areas. The containment system shall be designed and installed to include, but not be limited to, the following:

1. The containment system shall be designed to contain the volume of stormwater runoff resulting from a 10-year, 24-hour storm event as defined by the NOAA Atlas 14 precipitation-frequency estimates, and obtained from the NOAA Precipitation Frequency Data Server.
2. A berm shall be constructed at the perimeter of the containment area to contain liquids within the containment area and to mitigate the potential for surface water runoff into the containment area.
3. The containment system shall be designed to maintain its integrity under all anticipated vehicle and equipment loadings.
4. The design, installation, and testing of the containment system shall be performed in accordance with the manufacturer's recommendations and the latest standards, codes, specifications, and requirements from ASTM International (ASTM) and GRI.
5. The containment system design shall include a high-density polyethylene (HDPE) FML system. The HDPE FML material shall be textured, have sufficient thickness to prevent tears and punctures, and conform to the test property requirements prescribed in GRI GM13. The FML thickness shall be determined by the Contractor to maintain its integrity under all loadings and operations and to prevent contamination of underlying soils and groundwater.
6. Prepare the FML subgrade in accordance with manufacturer recommendations. The FML subgrade shall be firm, uniform, and free of all sharp or angular objects that may damage the FML.
7. Provide and install sand, gravel, geotextile, and/or other material approved by the Construction Manager as a marker layer between the existing soils and the impermeable containment system in the Temporary Staging Areas. The marker layer shall clearly define and easily identify the underlying soils under the containment system.
8. The Contractor's design shall include the requirement to provide and install cushion layer materials above and below the FML to ensure damage to the containment system does not occur during Temporary Staging Area construction or operations.
9. The Contractor's design shall identify seaming and quality control (QC) testing requirements for the liner system in accordance with the manufacturer's recommendations and the latest standards, codes and requirements from ASTM and GRI.

10. Resins used for welding the FML shall be identical to the liner material. All welding materials shall be of the type recommended and supplied by the FML manufacturer and shall be delivered in original sealed containers.
11. The Contractor's design shall include details for any pipe and structure penetrations (if applicable) to create a seal around the penetrations.
12. The Contractor shall conduct QC testing in accordance with manufacturer recommendations. Documentation of QC testing shall be submitted to the Construction Manager.
13. The containment area shall be inspected daily, and any noted deficiencies shall be promptly corrected.

M. The Temporary Staging Areas shall include provisions for equipment cleaning, tire wash, and anti-tracking pads to minimize the potential for relocation of impacted materials beyond the areas used for processing of impacted materials.

PART 2 – PRODUCTS

2.01 GENERAL

A. Materials shall be adequate in capacity for the required usage, shall not create unsafe conditions, and shall comply with the requirements of all applicable codes and standards and requirements of the Design Drawings and Specifications.

B. Imported materials or components of the Temporary Access Roads and Temporary Staging Areas shall be clean and in good condition to the satisfaction of the Construction Manager and shall meet the requirements of Section 31 05 13 – Soils and Aggregates. If any deficiencies are identified by the Construction Manager upon inspection of the materials, the Contractor shall address such deficiencies as soon as possible.

2.02 MATERIALS

A. Aggregate

1. Aggregate used for construction of Temporary Access Roads and Temporary Staging Areas shall conform to the testing requirements specified in Section 31 05 13 – Soils and Aggregates.
2. The Contractor shall place aggregate as a component of the Temporary Access Roads and Temporary Staging Areas within the limits shown on the Design Drawings or as otherwise approved by the Construction Manager.

B. Woven Geotextile

1. Woven geotextile used for construction of Temporary Access Roads and Temporary Staging Areas shall meet AASHTO M288-05 survivability requirements for separation geotextiles.

C. Temporary Matting

1. Temporary matting used for Temporary Access Roads and/or Temporary Staging Areas shall consist of preassembled/premanufactured matting that can be placed directly on existing subgrade and decontaminated following removal. Mats shall be of appropriate stiffness and size to support and distribute loads.
2. Timber matting may be an acceptable alternative. If proposed, the Contractor must provide details on how the timber matting will be handled following construction, including decontamination and/or disposal methods as appropriate.

PART 3 – EXECUTION

3.01 GENERAL

A. The Contractor shall construct Temporary Access Roads and Temporary Staging Areas in a neat and reasonable uniform appearance that is structurally adequate for the required purposes. Temporary Access Roads shall be kept clear of soil, sediment, refuse, and debris; maintained during execution of the Work; and repaired as necessary throughout the duration of Site operations to minimize rutting or other significant deformations.

B. The Contractor shall maintain Temporary Access Roads and Temporary Staging Areas to the satisfaction of the Construction Manager for the duration of the Work for which the Temporary Access Roads and Temporary Staging Areas are required. If any deficiencies are noted by the Construction Manager, the Contractor shall address such deficiencies as soon as possible. This shall include maintaining all controls, grading, and placement of supplemental aggregate, as required.

C. The Contractor shall obtain required approvals from the Construction Manager regarding the placement of traffic-control devices, which may impact public and private roadways associated with the Work. All approvals shall be in written form. Verbal communications will not be applicable as approval verification. The Contractor shall submit copies of written communications to the Construction Manager for review.

3.02 CONSTRUCTION OF TEMPORARY ACCESS ROADS AND STAGING AREAS

A. The Contractor shall provide all equipment, materials, and labor to construct and maintain the Temporary Access Roads and Temporary Staging Areas, and associated entrances and swing gates to public roadways as necessary to complete the Work and as generally shown on the Design Drawings.

B. The Contractor shall construct Temporary Access Roads and Temporary Staging Areas to minimize impacts to rare species, including completing Work in accordance with the Wood Turtle Management Plan provided by the Construction Manager. This shall include installation of Turtle Exclusion Barriers adjacent to Temporary Access Roads and Temporary Staging Areas in accordance with the Wood Turtle Management Plan.

C. The Contractor shall notify the Construction Manager when Temporary Access Road and Temporary Staging Area construction is completed. The Contractor and Construction Manager must conduct a Site walk to verify installation has been completed in accordance with the Contractor's approved plans, Specifications, and Design Drawings.

D. The Contractor shall not use methods that pull root systems or stumps during the construction of Temporary Access Roads that are above or near City of Pittsfield sanitary sewer lines or structures. The Contractor shall not disturb the integrity of the sewer structures. Grinding methods are preferred.

E. Temporary Access Road locations are approximate and generally intended to follow existing roads and paths when possible. Adjustments to design layout may occur, subject to approval by the Construction Manager, based on field conditions and Contractor equipment, and to provide a minimum of 5 feet of clearance from any delineated vernal pool areas.

F. Temporary Staging Areas shown on the Design Drawings represent approximate areas available for use by the Contractor to support tasks including consolidation of excavated material, dewatering, water treatment, loadout of processed materials, import and staging of fill materials, equipment and material storage, office trailers, and parking areas. The Contractor shall identify and develop the area needed and the specific layout of Temporary Staging Areas within the available areas indicated based on planned means and methods, subject to approval by the Construction Manager. The entirety of areas indicated need not be disturbed or developed into Temporary Staging Areas if not needed. The Contractor shall provide proposed layout drawings for review and approval by the Construction Manager prior to beginning construction.

3.03 VEHICLE LOAD RESTRICTIONS ALONG CITY SEWER EASEMENTS

A. Where Temporary Access Roads are constructed above the City of Pittsfield sanitary sewer, at least 3 feet of cover soils or aggregate shall be provided and maintained from the top of the sewer pipeline to the top of the access roads. Where the cover thickness is less than 3 feet, the Temporary Access Road shall be routed to avoid the sewer line, or additional fill shall be placed to provide at least 3 feet of total cover above the top of the sewer pipeline.

B. A geotechnical evaluation was conducted as part of the remedial design to assess the amount of cover soils, based on pipe burial depth, required to protect the sewer line

during anticipated traffic loads associated with remedial operations. A summary of the geotechnical evaluation is available to the Contractor for reference. That assessment assumed that vehicular access within sanitary sewer easements would be restricted to vehicles producing load effects not exceeding AASHTO HL-93 design loading as defined in AASHTO (2024).

C. The Contractor shall perform an independent engineering analysis to confirm the feasibility of constructing Temporary Access Roads along existing City of Pittsfield sanitary sewer mains. Such analysis shall consider, at a minimum, factors including sewer component condition, pipe burial depth, Temporary Access Road design, and surcharge loading associated with proposed equipment and operating conditions. The analysis shall identify the maximum vehicle loading permitted along the sewer mains, including maximum axle loads and gross vehicle weight limits, and shall include calculations demonstrating that the structural integrity of the sewer system will not be adversely affected. The analysis shall also identify any additional protective measures, design modifications, or use restrictions required for implementation.

D. All construction, maintenance, and service vehicle access within or along sanitary sewer easements shall comply with the maximum allowable vehicle loading identified by the Contractor's approved analysis, including axle load and gross vehicle weight limitation.

E. The Contractor shall install and maintain clearly visible, durable signage at all entrances to Temporary Access Roads located within or along sanitary sewer easements indicating the maximum permissible axle load(s) and maximum allowable gross vehicle weight.

F. Any damage to the sanitary sewer system resulting from construction traffic or Temporary Access Road use shall be repaired by the Contractor at no additional cost to the Owner.

3.04 WINTERIZATION

A. The Contractor shall perform winterization in accordance with the Contractor's approved Winterization Plan. Any Temporary Staging Areas that are not removed and decommissioned shall be winterized before any winter shutdown period.

B. At the end of each construction season, all remediation waste generated during the construction season shall be removed from Temporary Staging Areas prior to any winter shutdown and disposed of properly. This shall include all sediment, soil, dredge, and water generated as part of the Work.

C. All fuel stored at Temporary Staging Areas or other parts of the Site shall be emptied from fuel containers and construction equipment and managed properly.

D. No fuel containers, empty or with fuel, shall be staged within the 100-year flood zone, including at Temporary Staging Areas within the flood zone, over the winter shutdown

period. All such containers shall be removed from flood zone and properly managed at the end of each construction season.

E. No construction equipment shall be staged within the 100-year flood zone, including at Temporary Staging Areas within the flood zone. Any such equipment remaining at the Site over the winter shutdown period shall be staged at locations approved by the Construction Manager.

F. It is the Contractor's responsibility to maintain the security of their equipment during the winter months when construction is not occurring. There shall be no claim to GE for any damage or other loss that occurs to equipment.

G. At the end of each construction season, the Contractor shall remove sediment from, clean, and decontaminate the construction equipment in accordance with Section 02 51 00 – Decontamination.

H. At the end of each construction season, all Site roadways, access routes, and the exclusion zone areas at Temporary Staging Areas shall be cleaned by the Contractor to remove residual sediment and debris. Cleaning shall include sweeping and scraping surfaces, washing the areas with high-pressure water, and other methods to remove and collect accumulated solids. The cleaned areas shall be visibly free of sediment as determined by the Construction Manager. The Contractor shall notify the Construction Manager to perform an inspection of the Temporary Staging Area after cleaning.

I. Decontamination water resulting from cleaning activities will be tested and transferred to the water treatment system for subsequent treatment in accordance with Section 02 72 00 – Water Management and Treatment. Solids generated during the cleaning activities shall be collected and disposed in accordance with Section 02 61 15 – Handling and Disposal of Impacted Materials.

J. All process equipment, piping, instruments, and systems associated with the water treatment systems shall be drained of all liquid and cleaned.

K. All pumps not in operation during the winter shall be drained to ensure the pump casing is protected.

L. Any overstock chemicals and materials (e.g., polymer, stabilization amendments) shall be adequately containerized and removed from the Site or securely stored at an appropriate location in accordance with manufacturer recommendations.

M. The Contractor shall lockout/tagout any source of energy not required for offseason operations.

N. The Contractor shall perform winterization procedures as recommended by equipment manufacturers.

O. The Contractor shall add desiccant to any electrical panels, unless a heater is operated.

3.05 TEMPORARY STAGING AREA DECOMMISSIONING

A. After construction operations for a given Project area and after approval by the Construction Manager, the Contractor shall thoroughly clean the exclusion zone at the Temporary Staging Area. Cleaning shall include sweeping, scraping, washing with high-pressure water, and other methods to remove and collect accumulated solids from all surfaces.

B. The Contractor shall remove bulk solids from tanks and flush the inside with water to remove the solids. All process equipment, piping, instruments, and systems shall be drained of all liquid and cleaned. The cleaned areas shall be visibly free of solids as determined by the Construction Manager. The Contractor shall notify the Construction Manager to perform a final inspection after cleaning.

C. Unless otherwise directed by the Construction Manager, the Contractor shall completely remove all items and structures established or installed at the Temporary Staging Area. This shall include dismantling, disconnecting, and removing all equipment, materials, structures, facilities, utilities, staging areas, accessways, control measures, and services.

D. The Contractor shall decontaminate all personnel, equipment, structures, and non-disposable materials that have come in contact with remediation waste materials. Decontamination shall be performed in accordance with Section 02 51 00 – Decontamination.

E. Decontamination water resulting from cleaning activities will be tested and transferred to the water treatment system for subsequent treatment in accordance with Section 02 72 00 – Water Management and Treatment. Solids generated during the cleaning activities shall be collected and disposed in accordance with Section 02 61 15 – Handling and Disposal of Impacted Materials.

F. After cleaning the exclusion zone surfaces, the Contractor shall remove the construction materials associated with the Temporary Staging Areas and reuse or dispose of those materials as specified in Article 3.06.

3.06 REUSE AND DISPOSAL OF AGGREGATE MATERIALS

A. The Contractor may reuse aggregate materials used for the construction of Temporary Access Roads and Staging Areas if sampling confirms that the material contains PCB concentrations below 1 milligram per kilogram (mg/kg).

1. The Contractor shall submit a proposed sampling plan to the Construction Manager for review and approval. The sampling plan shall identify the proposed sampling locations and methods.
2. The Contractor shall collect samples of the construction materials at a frequency of one sample per 500 linear feet along Temporary Access Roads and one sample per 2,500 square feet for Temporary Staging Areas. The Contractor shall submit the samples for laboratory analysis of PCBs.
3. Upon receipt, the Contractor shall submit the laboratory analytical results to the Construction Manager along with a written summary of the results and a figure(s) showing the sampling locations.
4. If PCB concentrations are below 1 mg/kg in the representative samples, the Contractor may, following Construction Manager approval, reuse the corresponding aggregate materials for constructing Temporary Access Roads and Temporary Staging Areas in other areas of the Site. The Contractor may temporarily stockpile or stage the materials prior to reuse subject to approval by the Construction Manager.
5. If PCB results are detected above 1 mg/kg in the representative samples, the materials shall not be reused and shall be transported for disposal in the Upland Disposal Facility (UDF) (if PCB concentrations are less than 50 mg/kg) or to a commercial offsite disposal facility (if PCB concentrations are greater than or equal to 50 mg/kg).
6. Materials used to construct the Temporary Access Roads and Temporary Staging Areas (e.g., aggregate, geotextile fabric, liners, tarps, geogrid, or similar materials) that are not designated for reuse shall be transported for disposal in the UDF (if PCB concentrations are less than 50 mg/kg) or commercial offsite disposal facility (if PCB concentrations are greater than or equal to 50 mg/kg).

3.07 RESTORATION OF TEMPORARY ACCESS ROADS AND STAGING AREAS

A. The Contractor shall decontaminate, as appropriate, prior to removal from the Site, materials installed as components of temporary matting. Decontamination activities shall be performed in accordance with Section 02 51 00 – Decontamination.

B. The Contractor shall remove all material used to construct Primary and Secondary Temporary Access Roads and Temporary Staging Areas upon completion of the Work, and the areas shall be restored.

C. Decontamination of roadway materials such as construction mats prior to moving to a new area of the Site, or removal from the Site, shall be completed consistent with Section 02 51 00 – Decontamination.

D. Disposal of any material resulting from removal of Temporary Access Roads or Temporary Staging Areas shall be completed consistent with Section 02 61 15 – Handling and Disposal of Impacted Materials.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. The Contractor shall provide all labor, supervision, materials, tools, equipment, services, accessories, and incidentals as shown, specified, and required to furnish, stockpile, transport, and install soils and aggregates for construction of components as indicated on the Design Drawings and in the Specifications.

B. The Contractor shall be responsible for all sampling and testing of soil and aggregate materials to verify compliance with the specified requirements.

C. The Contractor shall be responsible for sourcing and procuring the specified soil and aggregate materials, transporting the materials to Temporary Staging Areas, unloading and staging the materials, blending and mixing the materials with amendments as required to achieve specified requirements, loading and transporting materials to the locations of placement, and placing the materials in accordance with the Design Drawings and Specifications.

D. The Contractor shall implement best management practices (BMPs), controls, and other measures necessary to maintain compliance with the Surface Water Action Levels and Quality of Life Standards described in Section 01571 – Operations, Environmental Restrictions, and Controls.

1.02 RELATED SECTIONS

1. Section 01571 – Operations, Environmental Restrictions, and Controls
2. Section 02 21 00 – Surveys
3. Section 13 80 01 – Temporary Access Roads and Staging Areas
4. Section 31 23 00 – Soil Excavation and Fill
5. Section 35 28 00 – Engineered Cap

1.03 APPLICABLE CODES, STANDARD, AND REFERENCES

A. Arcadis, 2023. *Revised Field Sampling Plan and Quality Assurance Project Plan GE-Pittsfield/Housatonic River Site*. Prepared for General Electric Company, Pittsfield, Massachusetts. July 2023.

B. Arcadis, 2025. *Project Operations Plan GE-Pittsfield/Housatonic River Site*. Prepared for General Electric Company, Pittsfield, Massachusetts. May 2025.

C. ASTM International (ASTM): References to ASTM standards shall mean the latest edition in effect at the time of bid:

1. ASTM C29 – Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
2. ASTM C88 – Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
3. ASTM C127 – Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
4. ASTM C128 – Standard Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate
5. ASTM C131 – Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
6. ASTM C136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
7. ASTM D854 – Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer
8. ASTM D1140, Standard Test Methods for Amount of Material in Soils Finer Than No. 200 (75 μm) Sieve
9. ASTM D2216 – Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
10. ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
11. ASTM D2974 – Standard Test Methods for Determining the Water (Moisture) Content, Ash Content, and Organic Material of Peat and Other Organic Soils
12. ASTM D4254 – Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
13. ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
14. ASTM D4972 – Standard Test Methods for pH of Soils
15. ASTM D5084 – Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
16. ASTM D6913 – Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

D. Commonwealth of Massachusetts Department of Transportation (MassDOT) Standard Specifications for Highways and Bridges, 2026 Edition, Division III.

E. U.S. Environmental Protection Agency (EPA) SW-846 – Test Method for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition.

1.04 QUALITY ASSURANCE

A. Materials, procedures, operations, and methods shall be in strict conformance with the Contract Documents. Materials shall be subjected to strict quality control monitoring as detailed herein. The placed materials shall conform exactly to the Contract Documents, except as otherwise authorized in writing by the Construction Manager.

B. Sampling and analysis of soil and aggregate materials used for construction shall be conducted by the Contractor in accordance with General Electric Company's (GE's) revised Field Sampling Plan/Quality Assurance Project Plan (Arcadis 2023) and Sections 2 and 3 of the Soil Cover/Backfill Characterization Plan included as Attachment B of GE's revised Updated Project Operations Plan (Arcadis 2025).

1.05 SUBMITTALS

A. Pre-Construction

1. The Contractor shall submit background information for each proposed material source to the Construction Manager for review as part of the source's initial screening for acceptance. At a minimum, background information shall include the following:
   a. The location of the material source, including state, county, municipality, address, block, and lot numbers.
   b. The names, contact information, and relationship of persons involved with the source material preparation and transport of the fill from the material source to the receiving site.
   c. A description of the borrow site, including use history.
   d. Identification of specific areas within the borrow site on a scaled Site plan where material will be obtained for use at the Site.
   e. Identification of specific areas within the borrow site on a scaled Site plan where samples for analytical and geotechnical testing will be obtained.
   f. A description of sampling methodology to be used to obtain geotechnical and analytical samples.
   g. The results of geotechnical testing previously performed and a description of the geotechnical properties of the fill material and indication that the material meets the Project's geotechnical specifications.
   h. Evidence of required permits and other necessary approvals shall be provided; if such approvals are not in place, the process and schedule for obtaining permits and other approvals shall be provided.
   i. A certification letter from the borrow source owner or operator certifying that the source is not from an industrial site or suspected to have been modified by the addition of manufactured chemicals and that the material does not contain oil or hazardous material as supported by test data to be provided with certification letter and a copy of applicable current permits and approvals.

2. Material Transport, Storage, and Handling Plan
   a. The Contractor shall submit a Material Transport, Storage, and Handling Plan that, at a minimum, includes the following:
      1) Details for material transport and stockpiling, including transportation methods, schedules, and routing.
      2) Maps showing the transportation routes from the source locations to the Temporary Staging Areas (or other approved location).
      3) A schedule for procurement, testing, and delivery of the backfill and cap materials.
      4) Details for the equipment that will be used to transport backfill and cap materials from the source locations to the Temporary Staging Areas (or other approved location).
      5) Figures showing the soil and aggregate material storage locations, including details on any protection of materials.
      6) Details on how the differing cap and backfill materials will be segregated by material type and how the materials will be segregated from any contaminated areas or materials.
      7) Details on how the cap amendments (i.e., powdered activated carbon [PAC]) will be stored prior to use.
      8) Expected time frames the materials that will be stored.
      9) Details on the personnel and equipment required to take delivery, store, and handle the soil and aggregate materials.
      10) Manufacturer's instructions for the storage and handling of materials and products.
3. Pre-Construction Testing Reports: The Contractor shall submit Pre-Construction Testing Reports that include the results of laboratory chemical and physical analysis of each material type from each borrow pit as required in this Section. The Contractor shall include written confirmation that the materials meet the required criteria per this Section.
4. The Contractor shall submit two 5-gallon buckets with a sample of each proposed type of material for inspection by the Construction Manager.

B. During Construction

1. The Contractor must submit chemical and geotechnical results of testing for each material type and source at the frequency specified in this Section.
2. The Contractor must document the total amount and type of material imported to the Site. All import quantities must be based on tared material weight slips of transport trucks and provided to the Construction Manager.

1.06 DELIVERY

A. The Contractor shall notify the Construction Manager no less than 1 week in advance of deliveries of all soil and aggregate material shipments.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Chemical Isolation Layer (sand with PAC)

1. The Chemical Isolation Layer shall consist of a blended mixture of sand and PAC to achieve a minimum in-place dry weight PAC content of 1.0%.
2. The sand component of the Chemical Isolation Layer shall be run-of-bank materials or screened run-of-bank materials.
3. The sand component of the Chemical Isolation Layer shall have the following gradation:

PARTICLE SIZE OR U.S. SIEVE SIZE	PERCENT PASSING (DRY-WEIGHT BASIS)
2 inches	100%
5/8 inch	65% to 85%
No. 6	30% to 50%
No. 200	0% to 10%

4. The PAC component of the Chemical Isolation Layer shall meet the requirements of Section 35 28 00 – Engineered Cap, Article 2.02.

B. Type A Gravel Armor Material (Type A Cap)

1. The Gravel Armor Layer for the Type A Cap shall have the following gradation:

PARTICLE SIZE OR U.S. SIEVE SIZE	PERCENT PASSING (DRY-WEIGHT BASIS)
3 inches	100%
2 inches	30% to 70%
1 inch	20% to 40%
No. 4	0% to 25%
No. 200	0% to 5%

C. Type B Coarse Gravel Armor Material (Type B Cap)

1. The Coarse Gravel Armor Layer for the Type B Cap shall have the following gradation:

PARTICLE SIZE OR U.S. SIEVE SIZE	PERCENT PASSING (DRY-WEIGHT BASIS)
4 inches	100%
3 inches	30% to 50%
No. 4	0% to 25%
No. 200	0% to 5%

D. Sand Habitat Layer Material

1. The Sand Habitat Layer material shall be run-of-bank materials or screened run-of-bank materials.
2. The Sand Habitat Layer material shall have the following gradation:

PARTICLE SIZE OR U.S. SIEVE SIZE	PERCENT PASSING (DRY-WEIGHT BASIS)
3 inches	100%
0.75 inch	80% to 100%
No. 4	60% to 90%
No. 10	40% to 80%
No. 40	20% to 50%
No. 200	0% to 10%

E. Gravel Habitat Layer Material

1. The Gravel Habitat Layer material shall have the following gradation:

PARTICLE SIZE OR U.S. SIEVE SIZE	PERCENT PASSING (DRY-WEIGHT BASIS)
4 inches	100%
3 inches	30% to 50%
No. 4	0% to 25%
No. 200	0% to 5%

F. Grading Fill and General Fill

1. The Grading Fill and General Fill material shall be run-of-bank materials or screened run-of-bank materials.
2. The Grading Fill and General Fill material shall have the following gradation:

PARTICLE SIZE OR U.S. SIEVE SIZE	PERCENT PASSING (DRY-WEIGHT BASIS)
3 inches	100%
0.75 inch	80% to 100%
No. 4	60% to 90%
No. 10	40% to 80%
No. 40	20% to 50%
No. 200	0% to 10%

G. Sand

1. The Sand shall be run-of-bank materials or screened run-of-bank materials.
2. Sand shall be free from debris, loam, clay, roots, sod, rubbish, surface coatings, foreign material, or other deleterious materials.
3. Sand shall have the following gradation:

PARTICLE SIZE OR U.S. SIEVE SIZE	PERCENT PASSING (DRY-WEIGHT BASIS)
No. 4	100%
No. 6	60% to100%
No. 40	20% to100%
No. 100	0% to 30%
No. 200	0% to 10%

H. Topsoil

1. Topsoil shall be imported from a naturally occurring source approved by the Construction Manager.
2. Topsoil shall be fertile, friable, natural-loam surface soil capable of sustaining vigorous plant growth and free of any admixture of subsoil, clods of hard earth, plants or roots, sticks, stones larger than 1 inch in diameter, pests and pest larvae, seeds of noxious weeds, or other extraneous material harmful to plant growth.
3. Topsoil shall be free of unsuitable materials, including, but not limited to, the following:
   a. Commercially or municipally produced organic waste, sewage sludge, or composted waste materials.
   b. Frozen material or material containing snow or ice.
   c. Trees, stumps, branches, roots, or other wood or lumber.
   d. Wire, steel, cast iron, cans, drums, or other foreign material.
4. Topsoil shall have the following properties:

a. A loam texture with Unified Soil Classification System classification of SM (silty sands and sand-silt mixtures) or SC (clayey sands and sand-clay mixtures) granular soil material
b. A weak granular structure and friable consistency
c. 3.8% to 6.1% organic matter by weight (ASTM D2974)
d. A pH between 5.9 and 6.2 in accordance with ASTM D4972

5. Prior to acceptance, imported topsoil samples shall be analyzed by the Contractor for texture, organic matter content, nutrients, and pH to verify they meet the above specifications or are otherwise acceptable to the Construction Manager.

I. Silty Loam Backfill

1. The Silty Loam Backfill shall have the following acceptable content:
   a. 50 to 80% silt-sized material
   b. 10 to 20% clay
   c. 10 to 20% sand
2. The Silty Loam Backfill shall have a vertical permeability no greater than 10^{-5} meters per second (ASTM D5084).

J. Type 1 Backfill

1. Type 1 Backfill shall be produced by blending or mixing General Fill (Paragraph 2.01.F) with Topsoil (Paragraph 2.01.H) at a ratio of 50% by volume of each material type. The material shall be blended to produce a homogeneous mixture.

K. Dense Graded Aggregate

1. Dense Graded Aggregate (DGA) material shall be a naturally or artificially graded mixture of natural or crushed gravel, crushed stone, or natural or crushed sand. Crushed slag is unacceptable.
2. DGA material shall meet the gradation MassDOT standard specification requirements for Dense Graded Crushed Stone for Sub-Base (M2.01.7-1), as follows:

PARTICLE SIZE OR U.S. SIEVE NO.	PERCENT PASSING (DRY-WEIGHT BASIS)
2 inches	100%
1-1/2 inches	70% to 100%
3/4 inch	50% to 85%
No. 4	30% to 55%
No. 50	8% to 24%
No. 200	3% to 10%

L. Riprap Bank Protection Stone

1. Riprap Bank Protection Stone shall conform to the requirements of MassDOT Standard Specifications for Highways and Bridges, Division III, Section M2.02.0 – Riprap, except as modified herein.
2. Riprap shall be sound, durable rock that is angular in shape and free from seams, cracks, shale, or other defects that would adversely affect strength. Rounded stones, boulders, sandstone, or similar soft stone or relatively flat, elongated, or slab-shaped stones are not acceptable.
3. Riprap Bank Protection Stone shall consist of large armor stone generally ranging from approximately 18 to 30 inches in nominal diameter and a median stone size (D50) of approximately 20 inches. The material gradation shall be suitable for interlocking and stability under design hydraulic conditions.

2.02 SOURCE QUALITY CONTROL

A. The Contractor shall provide imported soil and aggregate materials from permitted mines, pits, quarries, or commercial processing facilities, including naturally occurring materials and materials that have been processed (e.g., screened, blended, or otherwise prepared) to achieve the required gradation and material properties.

B. Soil and aggregate materials shall not be obtained from an industrial site or suspected to have been modified by the addition of manufactured chemicals or petroleum products.

C. Initial Borrow Source(s) Assessment: The Contractor shall conduct an initial assessment in coordination with the Construction Manager (if not previously conducted for the proposed material and borrow sources) to evaluate whether the materials at the borrow sources are potentially suitable for use, subject to further evaluation through sampling and analysis. This assessment will likely include some or all of the following: a field visit to evaluate the materials and the location of the materials and discussions with the owner of the materials or the property owner regarding the origin of the materials, the historical use of the borrow source area(s), and any chemical/physical characterization data that may already exist for the material at the source(s). The level of detail involved in this initial assessment will depend on the candidate materials and will be limited if the potential materials are undisturbed in-place materials. If the initial assessment indicates the materials at the borrow sources are potentially usable and thus warrant further evaluation, the Contractor shall coordinate with the Construction Manager for sampling and testing of the potential materials as described in this Section. The initial assessment shall also meet the requirements described in the Soil Cover/Backfill Characterization Plan.

D. The Contractor shall collect samples for geotechnical and chemical analyses in accordance with the requirements herein.

E. The Contractor shall provide the Construction Manager with the ability to conduct an inspection of the proposed sources.

F. If materials from any proposed source do not meet or cannot reasonably be screened to meet specified requirements, the Contractor shall locate and identify an alternative source(s).

G. Acceptance of material or a source shall not preclude future rejection by the Construction Manager if the material fails to conform to the specified requirements, lacks uniformity, or if its field performance is found to be unsatisfactory.

H. Prior to approval of material sources, the Construction Manager reserves the right to visit each soil and aggregate material source and conduct visual observation of the materials proposed for use. The Contractor shall coordinate access with the material sources for the Construction Manager to perform visits.

I. The final approval or rejection of sources for all soil and aggregate materials will be at the discretion of the Construction Manager. Any proposed change in source shall require approval of the Construction Manager.

J. The Contractor is solely responsible for ensuring that the selected soil and aggregate material sources are able to meet the delivery schedule to produce material of the required quality and in sufficient quantity for the Project. If the Contractor is unable to obtain a sufficient amount of acceptable material from an approved source to meet the progress of construction, the Contractor shall identify and obtain Construction Manager approval for an alternate source(s). All costs incurred due to change of material sources, including sampling and testing requirements, shall be borne by the Contractor. In addition, no extension of Project schedule milestones shall be allowed due to change of material sources.

2.03 SOURCE AND MATERIAL QUALITY

A. Imported soil and aggregate materials must be free of chemical contamination, below the specified acceptance criteria, and approved by the Construction Manager prior to delivery to the Site based on chemical characterization testing performed in accordance with this Section.

B. The imported soil and aggregate materials shall meet the following chemical criteria, per the Soil Cover/Backfill Characterization Plan:
    a. Polychlorinated biphenyl (PCB) Aroclors shall be non-detect or less than 0.021 milligram per kilogram.
    b. Volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) shall be non-detect.
    c. Metals and cyanide concentrations shall meet the criteria in Table B-1 in Section 3.1.2.2 of the Soil Cover/Backfill Characterization Plan.

C. Chemical characterization testing shall be performed for imported soil and aggregate materials (e.g., topsoil, sand, and gravel). Chemical characterization will not be required for stone materials (e.g., cobbles, riprap, and boulders), provided that those materials are from a source determined by the Construction Manager to be acceptable from the Initial Borrow Source(s) Assessment.

D. Materials shall meet the physical requirements and the chemical characterization criteria specified herein. The Contractor shall be responsible for maintaining gradations as specified herein. Soil and aggregate materials that do not meet gradation or chemical characterization requirements as specified herein will be rejected, and no payment will be made, regardless of any general or provisional acceptance of materials from a stockpile or borrow source.

E. The Contractor shall inform the Construction Manager of proposed soil and aggregate material sources at least 30 days prior to scheduled delivery of materials to the Site to verify the specified physical properties, chemical properties, and gradations.

F. The Construction Manager reserves the right to undertake independent investigations and assessments when necessary, including tests other than the tests prescribed herein, to verify that the soil and aggregate materials comply with the specified requirements.

G. The Contractor shall inform the Construction Manager of any unacceptable conditions immediately upon discovery.

H. The Contractor shall visually inspect imported materials upon delivery. Imported materials shall be inspected for the presence of foreign, recycled, or reprocessed material. The Construction Manager may, at any and all times, perform an independent inspection of the imported materials. The Construction Manager may also, at any and all times, conduct independent screening of materials using a photoionization detector (PID) to verify the materials do not contain elevated levels of volatile organic vapors. Imported materials may be rejected if identified as substandard or if test results show them to be substandard. Imported materials may be segregated for testing based on appearance or odor. The Construction Manager reserves the right to request that the Contractor test the segregated materials according to designated procedures at the Construction Manager's discretion.

2.04 MATERIAL TESTING REQUIREMENTS

A. The Contractor shall furnish all labor, materials, tools, supervision, shipping, and transportation necessary to perform materials testing and analysis to meet the testing requirements as specified herein. The Contractor shall comply with all testing requirements with a specified frequency based on the quantity delivered to the Site.

1. Pre-construction testing shall be performed for each soil and aggregate material type and for each material source. Pre-construction testing results shall be submitted to the Construction Manager with identification of the proposed

material sources. Pre-construction physical testing shall be performed for each specified parameter as described in this Section.

2. In addition to pre-construction tests, tests shall be conducted as required based on the quantity of material delivered to the Site or at the direction of the Construction Manager if material characteristics are visibly different.
3. Prior to submitting material test results, the Contractor shall confirm all necessary material testing documentation is provided and all material testing results meet the specified requirements.
4. Each borrow source material sample collected for chemical characterization testing shall be screened by the Contractor using a PID as described in EPA SW-846 Test Method 3815 to verify the materials do not contain elevated levels of volatile organic vapors. The Contractor shall provide the results of PID screening together with the chemical characterization testing results.

B. The Contractor shall coordinate, collect, and submit samples for laboratory analysis and pay for laboratory testing of each material to verify conformance with the Contract Documents.

C. Sampling for geotechnical and chemical quality of the imported materials shall be performed at the source locations prior to shipment to the Site unless otherwise approved by the Construction Manager.

D. Sampling for testing of physical and chemical quality of the imported materials shall be performed at the source locations prior to shipment to the Site unless otherwise approved by the Construction Manager. Do not ship soil or aggregate material to the Site until the proposed material, source, and supplier are accepted by the Construction Manager. For material types that require the blending of materials (e.g., Chemical Isolation Layer material), testing for chemical parameters may be performed on the source materials before blending, except where sampling of blended materials is required specified elsewhere.

E. Geotechnical Testing: If the results of the Initial Borrow Source Assessment indicate the candidate borrow source and materials may be suitable for use, the Contractor shall obtain representative samples of each material type for laboratory geotechnical testing to verify conformance with the Contract Documents.

1. Geotechnical testing shall be completed prior to placement of the material and at a frequency of one per 2,000 cubic yards (cy) of imported off-site materials, unless otherwise approved by the Construction Manager.
2. Geotechnical sample testing results shall be provided to the Construction Manager to verify acceptability of the materials for on-site use. Fill material may not be accepted for import until results of geotechnical analysis are approved by the Owner.

3. Representative samples from each distinct source (excluding topsoil) shall be submitted for the following geotechnical tests:
   a. Grain size distribution (ASTM D6913 or C136)
   b. Moisture content (ASTM D2216)
   c. Weight per unit volume of uncompacted materials (ASTM D4254 or C29)
   d. Particle specific gravity (ASTM D854 or C128)
4. Geotechnical testing for Topsoil shall include the following tests:
   a. Grain size distribution (ASTM D6913 or C136)
   b. Material classification (ASTM D4827)
   c. Moisture content (ASTM D2216)
   d. Organic content (ASTM D2974)
   e. pH (ASTM D4972)
5. The Silty Loam Backfill shall also be tested for vertical permeability (ASTM D5084).
6. Geotechnical testing for DGA shall include the following tests:
   a. Grain size distribution (ASTM D6913 or C136)
   b. Weight per unit volume of uncompacted materials (ASTM D4254 or C29)
7. Stone materials (cobbles, riprap, and boulders) used within the river shall be tested for the following analyses:
   a. Grain size distribution (ASTM D6913, ASTM C136, or alternate approved by the Construction Manager)
   b. Los Angeles abrasion and impact testing (ASTM C131)
   c. Sodium Sulfate Test for Soundness (ASTM C88)
   d. Weight per unit volume of uncompacted materials (ASTM D4254, ASTM C29 modified as described as follows, or equivalent). When testing unit weight using ASTM C29, do not oven dry the sample during sample preparation. Conduct the test with a wet or moist sample such that the weight per unit volume will be in its stockpiled state. Calculate bulk density as moist bulk density.

F. Chemical Testing: If the results of the Initial Borrow Source Assessment indicate the candidate borrow source and materials may be suitable for use, the Contractor shall obtain representative samples of each material type, in coordination with the Construction Manager, for chemical testing of the materials. Chemical testing of stone materials (e.g., riprap, cobbles, boulders, and drainage stone) is not required, provided that those materials are from a source found to be acceptable in the Initial Borrow Source Assessment. Chemical testing shall be performed as follows:

1. The frequency of sampling/analysis for chemical contaminants is dependent on the source/location of the proposed off-site fill material:
   a. If the candidate material is from an undisturbed in-place source (e.g., an active gravel or borrow pit), the source shall provide a letter certifying that the material is virgin, and one representative sample of the material shall be

collected and analyzed. The analytical data from this chemical characterization shall be submitted to the Construction Manager, who will compare the data with the criteria described in Section 3.1.2.2 of the Soil Cover/Backfill Characterization Plan. If the data are acceptable, the Construction Manager will submit sample test results to EPA for approval. The results of this sample will be considered to represent the materials that originate from this virgin source for up to 20,000 cy of material from the borrow source or until such time as the physical characteristics of the source location significantly change.

b. For off-site materials that have not been certified as a virgin source, the frequency of borrow source characterization testing shall involve the collection of one composite sample for each 2,000 cy from the borrow source and for each distinct material type specified in the technical design documents. If the volume of material to be characterized is less than 2,000 cy, one composite sample shall still be collected from that material. Each composite sample shall be composed of 10 discrete "grab" subsamples that shall be collected at spatially distributed locations within the source material and composited into a single sample to be submitted to a laboratory for the appropriate chemical analyses identified in this Section. A PID headspace screening shall be performed for all 10 subsample locations used to form the composite sample. However, for analysis of VOCs, each sample shall be a single discrete grab sample collected at one of the 10 subsample locations used to form the composite sample. The analytical data from this chemical characterization shall be submitted to the Construction Manager, who will compare the data with the criteria described in Section 3.1.2.2 of the Soil Cover/Backfill Characterization Plan. If the analytical results from this sampling are acceptable, the Owner will submit sample test results to EPA for approval. The initial sampling frequency shall be used to characterize up to 2,000 cy of material from the borrow source.

c. If more than one off-site source is proposed for the soil fill material, samples shall be collected and analyzed from each source at the appropriate frequency provided in the above Subparagraphs.

2. Each material type shall be collected and sampled in accordance with the Soil Cover/Backfill Characterization Plan and, in particular, shall be tested as follows:

a. Each borrow source material sample shall be analyzed for PCBs (as Aroclors) and the VOCs, SVOCs, and metals listed in Appendix IX of 40 *Code of Federal Regulations* 264, plus cyanide, benzidine, 2- chloroethyl vinyl ether, and 1,2-diphenylhydrazine.

b. Each borrow source material sample collected for chemical characterization testing shall also be screened using a PID as described in Appendix A2 (Standard Operating Procedure for Photoionization Detector Field Screening) of GE's revised (2023) Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP) to verify that the materials do not contain elevated levels of

volatile organic vapors. All samples shall be collected, analyzed, and validated in accordance with that revised FSP/QAPP or any EPA-approved revision of that document.

3. Topsoil shall be evaluated for pH and organic content.
4. Chemical testing shall be completed prior to shipment of soil material to the Site. Soil material may not be accepted for import to the Site until results of chemical analysis are approved by the Construction Manager.

G. Proposed analytical reporting limits should be included in the Contractor Quality Control Plan for review and approval by the Construction Manager. Additional analytical results shall be submitted for these analyses if the source of a material changes or as otherwise directed by the Construction Manager. The results shall be approved by the Construction Manager prior to material transport to the Site.

H. Laboratory Testing Requirements

1. All material testing shall be performed by an independent and certified laboratory. The Contractor shall employ and pay for services of an independent laboratory authorized to operate in Massachusetts.
2. The laboratory shall have current National Environmental Laboratory Accreditation Program and certification for specific methods the laboratory is performing from a recognized state or federal laboratory accreditation program.
3. Retesting or reinspection required because of nonconformance to specified requirements shall be performed by the same independent laboratory at no additional cost to GE.
4. Testing laboratory reports: After each test, the Contractor shall promptly submit testing reports to the Construction Manager, along with the Contractor's interpretation of test results.
5. The results of all tests shall be provided to the Construction Manager. The results of each test shall be provided in a report that clearly identifies the following:
   a. Source of samples
   b. Sampling dates
   c. Chain of custody
   d. Sampling locations
   e. Test results
   f. Contractor's certification that the samples tested and the results provided are representative of the cap and backfill materials that will be delivered to the Site.

PART 3 –EXECUTION

3.01 GENERAL

A. The Contractor shall implement measures to prevent soil or aggregate materials from being misplaced on land or in the river during material delivery, storage, and loading and unloading.

B. The Contractor shall provide the Construction Manager with access at all times for inspection and testing of the soil or aggregate materials at source(s), material stockpiles, and vessels or vehicles loaded with materials.

3.02 TRANSPORTATION AND DELIVERY

A. The Contractor shall transport and handle soil and aggregate materials in accordance with requirements of all federal, state, and local laws.

B. All materials and items delivered to the Site shall be unloaded and placed in a manner that will not hamper the Contractor's normal construction operations or those of subcontractors and other contractors and will not interfere with the flow of necessary traffic.

C. The Contractor shall provide necessary equipment and personnel to unload all materials delivered to the Site.

D. The Contractor shall promptly inspect shipments to ensure products comply with requirements, quantities are correct, and materials are undamaged. The Contractor shall notify the Construction Manager verbally and in writing of any problems and describe the proposed corrective action and schedule.

E. Soil and aggregate materials delivered to the Site shall be weighed on certified scales at the source location. The Contractor shall provide copies of weight tickets for all soil and aggregate materials transported to the Site. Weight tickets shall indicate the weight, time, and date of weighing for all truck loads.

F. The Contractor shall deliver and stockpile soil and aggregate materials at the Temporary Staging Areas in sufficient quantities to meet schedule requirements.

3.03 TEMPORARY STOCKPILING AND STAGING OF MATERIALS

A. The Contractor shall store soil and aggregate materials on solid flat surfaces in a well-drained area within the Temporary Staging Areas or at another location approved by the Construction Manager.

B. The Contractor shall prevent soil and aggregate material mixing with native sediments, soils, and foreign matter.

C. Soil and aggregate materials shall be segregated from any areas used for remediation waste material handling or staging.

D. The Contractor shall construct and maintain stockpiles so they are tidy, well-drained, free of foreign materials, free of standing surface water, and of adequate bearing capacity to support the weight of materials placed thereon.

E. The Contractor shall separate differing soil and aggregate materials with substantial dividers or stockpile them apart to prevent mixing.

F. All soil and aggregate material stockpiles shall be labeled with a sign to indicate the material type.

G. The Contractor shall install and maintain erosion control measures, as needed, around material stockpiles.

H. The Contractor shall follow the manufacturer's specifications and instructions for storing PAC. PAC shall be suitably packaged during transportation and storage to isolate the material from the environment. The Contractor shall coordinate with the Construction Manager to allow the Construction Manager to conduct a visual inspection of PAC during unloading and staging to identify if any packaging has been damaged. Material in damaged packaging shall be marked and further inspected for product integrity. The Contractor shall handle PAC in accordance with the manufacturer's instructions.

I. The Contractor shall remove and dispose of rejected soil or aggregate materials as directed by the Construction Manager at no additional cost to GE.

J. Remove excess backfill and cap materials from the Project Site and cleanup area or move unused materials as directed by the Construction Manager.

END OF SECTION

SECTION 31 11 00 – CLEARING AND GRUBBING

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. The Contractor shall provide all labor, materials, equipment, and incidentals required to perform clearing and grubbing as needed to allow completion of the Work.
2. The Contractor shall be responsible for removing and disposing or reusing of trees, shrubs, brush, logs, vegetation, rubbish, and other objectionable material.
3. The Contractor shall implement best management practices, controls, and other measures necessary to maintain compliance with the Surface Water Action Levels and Quality of Life Standards described in Section 01571 – Operations, Environmental Restrictions, and Controls.

B. Related Sections:

1. Section 01571 – Operations, Environmental Restrictions, and Controls
2. Section 02 81 02 – Transportation and Disposal of Waste Material
3. Section 13 80 01 – Temporary Access Roads and Staging Areas
4. Section 31 23 00 – Soil Excavation and Fill
5. Section 31 25 00 – Erosion and Sediment Controls
6. Section 32 30 00 – Restoration, Planting, and Seeding
7. Section 35 44 00 – Riverbank Stabilization and Treatment

1.02 SUBMITTALS

A. The Contractor shall prepare and submit a Clearing and Grubbing Plan for review and approval by the Construction Manager prior to mobilization as part of the Contractor's Operations Plan that outlines the areas, methods, and equipment to be used for clearing and grubbing.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 PREPARATION

A. Protection:

1. Protect existing Site improvements, including streets, drives, underground and aboveground utilities, and adjacent property and structures throughout the Work. Repair damage caused by the Contractor to original condition or replace in kind to the satisfaction of the Construction Manager at no additional cost to General Electric Company (GE).
2. Protect trees, shrubs, and vegetation to remain by providing temporary fencing, barricades, wrapping, or other methods as needed.
3. Do not remove trees without the approval of the Construction Manager.

B. Site Preparation:

1. Delineation of Clearing and Grubbing Limits:
   a. Locate and clearly flag trees, vegetation, and other items to remain within the limits of clearing and grubbing.
   b. Provide flagging to delineate limits of areas to be cleared or grubbed. Review the limits at the Site with the Construction Manager before initiating clearing and grubbing Work.
   c. Replace flagging that is lost, removed, or destroyed until clearing and grubbing Work is complete and the Construction Manager allows removal of flagging.
2. Erosion and Sediment Controls:
   a. Install applicable erosion and sediment controls before initiating clearing and grubbing Work.
   b. Comply with erosion and sediment control requirements of Section 31 25 00 – Erosion and Sediment Controls.
   c. Adjust, relocate, or install additional erosion and sediment controls as clearing and grubbing Work progresses to previously uncleared, ungrubbed areas of the Site.

3.02 CLEARING AND GRUBBING

A. Clearing and grubbing shall not be performed until the Construction Manager provides approval to initiate construction activities.

B. All tree removal and any associated chipping shall be conducted under the oversight of a Certified Arborist retained by the Contractor and shall adhere to the Noise Quality of Life Standards in Section 01571 – Operations, Environmental Restrictions, and Controls.

C. Remove trees less than 8 inches in diameter at breast height (DBH), shrubs, brush, logs, vegetation, rubbish, and other surface material as needed to complete the excavation

within the limits of the Work Areas. Stumps and roots removed from within soil excavation areas during excavation activities and managed as contaminated material.

D. Remove small trees, shrubs, brush, logs, vegetation, rubbish, and other material within the support areas and associated with Temporary Access Road construction and improvement only as necessary and as approved by the Construction Manager. Blanket tree removal is prohibited. The goal is to minimize impacts to trees, shrubs, and vegetation in these areas.

E. Mature trees in all areas with DBH greater than 8 inches shall be left in place to the extent practicable, unless approved by the Construction Manager. This will necessitate special excavation adjacent to mature trees within and adjacent to the excavation areas as detailed in Section 31 23 00 – Soil Excavation and Fill.

F. Where tree cutting is necessary, trees shall be cut flush with the ground and roots left in place to the extent practicable.

G. Trees and shrubs to remain that have been damaged or require trimming shall be treated and repaired under the oversight of the Construction Manager at no additional cost to GE.

3.03 DISPOSAL OF CLEARED AND GRUBBED MATERIALS

A. The aboveground portions of all cleared vegetation not impacted by contaminated soil will be managed on site in a manner supportive of the local ecology, such as spreading of smaller and chipped material for erosion control; placement of tree trunks, brush, and branches within the remediated areas as habitat features; or creation of adjacent brush or log piles as approved by the Construction Manager.

B. Vegetation that has been in contact with contaminated soil shall be segregated for disposal based on the designation of the surrounding soil (transported to the UDF or an off-site disposal facility).

C. As necessary, large debris items shall be cut to size at the Temporary Staging Areas to facilitate transport and to meet the requirements of the disposal destination in accordance with Section 02 81 02 – Transportation and Disposal of Waste Materials.

D. The on-site use of non-impacted vegetation shall be in accordance with Section 32 30 00 – Restoration, Planting, and Seeding and Section 35 44 00 – Riverbank Stabilization and Treatment.

END OF SECTION

SECTION 31 13 18 – Removal of In-River Debris and Shoreline Vegetation

PART 1 – GENERAL

1.01 DESCRIPTION

A. Provide all supervision, labor, materials, tools, equipment, accessories, and appurtenances necessary for or incidental to handling/removing obstacles, debris, and vegetation that require removal to complete in-river dredging, capping, riverbank excavations, and restoration operations.

B. Remove/handle debris within the dredge and riverbank Work areas prior to or during construction in a manner that prevents the release or incidental spillage of sediment or soils in accordance with Section 35 81 00 – Resuspension Control.

C. Trim shoreline vegetation and remove trees to the extent necessary for equipment access, excavation, and capping. Where trees are trimmed, the roots shall be left in place unless removal is needed to complete the specified riverbank soil removal and grading.

D. Transport and dispose of trees and vegetation removed in accordance with Section 02 61 15 – Handling and Disposal of Impacted Material.

E. Trees with a diameter at breast height (DBH) of greater than or equal to 8 inches, stumps, and root balls within the Work areas shall be left in place unless otherwise approved by the Construction Manager and except where removal is necessary to complete the specified riverbank grading and excavations.

F. The Contractor shall implement best management practices (BMPs), controls, and other measures necessary to maintain compliance with the Surface Water Action Levels and Quality of Life Standards described in Section 01571 – Operations, Environmental, Restrictions, and Controls.

1.02 RELATED SECTIONS

A. Section 01571 – Operations, Environmental Restrictions, and Controls

B. Section 02 61 15 – Handling and Disposal of Impacted Materials

C. Section 02 51 00 – Decontamination

D. Section 35 24 00 – Sediment Removal

E. Section 35 81 00 – Resuspension Control

1.03 SUBMITTALS

A. Pre-Construction

1. A Shoreline Vegetation Trimming Plan shall be prepared by a Certified Arborist and submitted to the Construction Manager prior to mobilization as part of the Contractor's Operations Plan. Describe all equipment and procedures to be used to remove, transport, and dispose of shoreline vegetation and provide a schedule for operations. Identify the procedures and locations for chipping vegetation removed.
2. A Tree Removal Plan shall be submitted to the Construction Manager prior to mobilization as part of the Contractor's Operations Plan. Identify all trees with a DBH of 6 inches or greater that the Contractor proposes to remove along the shoreline to facilitate the dredging and capping Work. The survey shall identify trees greater than or equal to 8 inches that require approval prior to removal and other smaller trees to define the scope of the overall tree removal effort. The Tree Removal Plan must be prepared by a Certified Arborist and shall include the location, size, type, and condition of each tree that the Contractor is proposing to remove. The Tree Removal Plan shall describe the equipment and procedures to be used to remove, transport, and dispose of trees and provide a schedule for operations. Describe the procedures and locations for chipping and sizing removed trees. Prior to approval of the Tree Removal Plan, the Contractor shall perform a field inspection with the Construction Manager to review all trees proposed by the Contractor for removal. The Contractor shall not conduct tree removal activities until the Tree Removal Plan is approved by the Construction Manager.

B. During Construction

1. Daily Activities Report: The Contractor's Daily Activities Report shall identify the types and estimated quantities of debris and vegetation removal and the locations where such removal occurred. The Daily Activities Report shall also summarize the number, locations, and sizes of trees removed with a DBH of 6 inches or greater.

1.04 DEFINITIONS

A. Debris: Debris includes manufactured and natural objects present in the sediments/soils in the dredge and riverbank Work Areas that, if not removed, will result in the inefficient removal of sediment/soil in accordance with Section 35 24 00 – Sediment Removal.

B. Shoreline Vegetation: Shoreline vegetation includes branches, limbs, shrubs, brush, logs, trees, and other surface material that would prevent equipment from accessing Work Areas along the shoreline of the river, prevent the placement of backfill/capping material along the shoreline, and/or prevent installation of shoreline stabilization measures.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

A. Prior to tree removal, perform a field inspection with the Construction Manager to review all trees proposed by the Contractor for removal. Tree removal shall not proceed until the Tree Removal Plan is approved by the Construction Manager.

B. Prior to conducting debris removal, the Contractor shall conduct a visual survey of Work areas to identify any debris targets for removal in advance of the sediment removal and riverbank excavation. The visual survey shall be conducted jointly with the Construction Manager.

C. Removal of live trees with DBHs of greater than 8 inches is not permitted without prior approval from the Construction Manager, except where necessary to complete the specified riverbank soil removal and grading.

D. The Contractor shall remove all debris that will interfere with sediment removal, riverbank excavations, capping operations, and restoration operations. The Contractor shall remove debris and obstructions as necessary to facilitate dredging to the required elevations. Debris removal may be conducted prior to dredging or as part of dredging in accordance with Section 35 24 00 – Sediment Removal.

E. Transport debris that has come in contact with river sediment or contaminated soils to the Temporary Staging Areas for processing and subsequent disposal.

F. All tree removal shall be conducted under the oversight of a Certified Arborist retained by the Contractor.

G. All tree removal and any associated chipping shall adhere to the Noise Quality of Life Standards in Section 01571 – Operations, Environmental Restrictions, and Controls.

H. Trim shoreline vegetation as necessary to facilitate access to shoreline Work areas. Limit the removal of shoreline vegetation to the extent needed to provide access for completing the Work.

I. Remove and transport shoreline vegetation and trees that have not come in contact with river sediment or contaminated soils using different equipment than is used for debris in contact with river sediment or contaminated soils or the excavated soil/sediment removal, unless the equipment has satisfied the decontamination requirements of Section 02 51 00 – Decontamination.

3.02 DISPOSAL OF DEBRIS AND SHORELINE VEGETATION

A. The aboveground portions of cleared shoreline vegetation not impacted by contaminated sediment/soil shall be managed on site in a manner supportive of the local ecology, such as spreading of smaller and chipped material for erosion control; placement of tree trunks, brush, and branches within the remediated areas as habitat features; or creation of adjacent brush or log piles as approved by the Construction Manager.

B. Debris and shoreline vegetation that has been in contact with contaminated soil or sediment shall be segregated for transportation and disposal based on the designation of the surrounding soil (i.e., transported to the UDF or to an off-site disposal facility). As necessary, large debris items shall be cut to size at the Temporary Staging Areas to facilitate transport and to meet the requirements of the disposal destination in accordance with Section 02 61 15 – Handling and Disposal of Impacted Materials.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. The Contractor shall provide all labor, materials, equipment, and incidentals required to perform excavation and backfilling in Floodplain and Vernal Pool remediation areas as shown on the Design Drawings and in accordance with this Section.

B. The Contractor shall provide all labor, materials, equipment, and incidentals required to perform filling in the Intermittent Side Channel as shown on the Design Drawings and in accordance with this Section.

C. Riverbank soil excavation shall be performed as described in Section 35 24 00 – Sediment and Riverbank Soil Removal.

D. In accordance with Section 02 21 00 – Surveys, an independent licensed surveyor contracted by the Contractor shall conduct pre- and post-construction surveys to confirm adherence to the specified requirements for soil removal and backfill within Floodplain and Vernal Pool remediation areas and for backfill in the Intermittent Side Channel. The Contractor's surveyor shall be responsible for generating the required survey data and calculations to support decisions by the Construction Manager concerning completion of this Work and the determination of the quantities. The Construction Manager reserves the right to have a third-party surveyor or engineer perform quality control checks on the Contractor's survey data and calculations.

E. Perform excavation and fill Work in a manner that prevents damage to property, structures, and utilities.

F. Perform 1-foot deep excavations and associated fill Work in a manner that prevents damage to trees larger than 8 inches in diameter at breast height (DBH). All trees in excavation areas deeper than 1 foot shall be removed prior to or as part of the excavation.

G. Perform excavation and backfilling Work within the limits and to the depths or elevations shown on the Design Drawings.

H. Heavy construction equipment operated within undeveloped wetland and areas with soft organic soils in the floodplain not subject to excavation and backfill shall be operated from construction mats to distribute the equipment loads and minimize disturbance or compaction of the underlying and adjacent soils to the extent practicable. Heavy construction equipment operated within wetland and areas with soft organic soils in the floodplain subject to excavation and fill shall be low-ground-pressure equipment or

operated from construction mats to distribute the equipment loads and minimize compaction of the underlying soils and adjacent soils to the extent practicable.

I. To the extent practicable, excavation and filling associated with Floodplain, Vernal Pools, and Intermittent Side Channel shall be scheduled and performed, to the extent practicable, when groundwater levels and surface water are lowest to minimize water management.

J. The Contractor shall not enter any Vernal Pools and Sensitive Vegetation Areas except where Work is specified on the Drawings.

K. The Contractor shall implement best management practices (BMPs), controls, and other measures necessary to maintain compliance with the Surface Water Action Levels and Quality of Life Standards described in Section 01571 – Operations, Environmental, Restrictions, and Controls.

1.02 RELATED SECTIONS:

A. Section 01140 – Work Restrictions

B. Section 01571 – Operations, Environmental, Restrictions, and Controls

C. Section 02 21 00 – Surveys

D. Section 02 51 00 – Decontamination

E. Section 02 72 00 – Water Management and Treatment

F. Section 31 05 13 – Soils and Aggregates

G. Section 31 11 00 – Clearing and Grubbing

H. Section 31 25 00 – Erosion and Sediment Controls

I. Section 35 24 00 – Sediment and Riverbank Soil Removal

1.03 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. Occupational Safety and Health Administration (OSHA) excavation safety standards (29 *Code of Federal Regulations* [CFR] Part 1926.650 Subpart P).

1.04 SUBMITTALS

A. Excavation and Backfilling Plan: The Contractor shall prepare and submit an Excavation and Backfilling Plan as part of the Contractor's Operations Plan for review and approval

by the Construction Manager prior to starting excavation Work. At a minimum, the Excavation and Backfilling Plan shall include the following:

1. Equipment, procedures, means, and methods for excavation, dewatering, and backfilling within the designated upland Work Areas (i.e., Floodplain, Vernal Pools, and Intermittent Side Channel). If different procedures or equipment will be used at different locations, indicate where each procedure and equipment item will be used.
2. Procedures to protect trees with a DBH greater than 8 inches in 1-foot-deep excavation areas.
3. Proposed methods for fine excavation by hand or using other methods that minimize disturbance to the root system to trees that will remain in place.
4. Details for material transport and staging, which include, at a minimum, transportation methods, schedules, and routing; locations and layout of material staging areas within the Temporary Staging Areas; details for the equipment that will be used to transport excavated materials to the Temporary Staging Areas; and details for the equipment that will be used to transport fill materials from the source locations to the Temporary Staging Areas and from the Temporary Staging Areas to the designated backfill locations.
5. Details of the estimated or effective ground pressure for any equipment working within or adjacent to wetland areas, sensitive habitat areas, and Floodplain Areas with soft organic or saturated soils, including equipment weights and methods to distribute the equipment loads and minimize disturbance and compaction of the soils and adjacent soils. These details shall include the proposed types and sizes of construction matting that will be used and describe how the matting will be placed, maneuvered, and removed to facilitate the excavation and backfilling operations.
6. Pumping and Discharge Plan describing procedures to be used in the event that water is encountered within excavation area that requires removal, filtering, treatment, and discharge, as appropriate, to achieve the excavation limits shown on the Design Drawings.
7. Procedures to excavate and handle excavated materials to be disposed of at the Upland Disposal Facility (UDF) and the appropriate off-site facility.
8. Procedures, means, methods, and BMPs that will be implemented to minimize dust generation during excavation, material handling, and backfilling.
9. Planned sequence of excavation and backfilling operations.
10. Detailed schedule of excavation and backfilling Work.

B. Daily Reports: The Contractor shall prepare and submit a Daily Excavation Report. The Daily Excavation and Backfill Reports may be included as a component of the Daily Activities Report. These reports shall be submitted to the Construction Manager the day

following the Work performed. At a minimum, the Daily Excavation and Backfill Reports shall include the following:

1. A description of general Work activities.
2. The location of excavation and backfilling operations, and daily production rates for each.
3. Daily surveys to show the progress of excavation and backfilling activities.
4. Drawings or other visual presentation showing the excavation and backfilling progress for the day.
5. Material Hauling Trip Logs, including the date; number of trucks filled and destination (i.e., staging area, UDF, or off-site disposal facility); type of material loaded (e.g., soil, debris, and vegetation); and estimated quantity of material.
6. Hours of downtime, and cause(s) of downtime.
7. Any loss of material, accidents, or other incidents that impacted normal operations.

C. Any measures taken in response to exceedance of environmental monitoring compliance standards in accordance with Section 01571 – Operations, Environmental Restrictions, and Controls

1.05 SITE CONDITIONS

A. Data and information from previous investigations are available in the Reference Documents provided to the Contractor.

B. The results of prior surveys and investigations are indicative of general conditions at their respective locations considering the sampling and survey equipment employed. Variations in the properties of the materials are to be expected. Information regarding the physical and chemical properties of materials to be removed or otherwise associated with the Work is provided in the supplemental reference information identified in the Reference Documents. The information is based on field investigation and laboratory testing of the materials. The data and results of prior surveys and investigations reflect available information at the time of data collection, are approximate, and may have changed since the time of data collection. Although the results of such investigations are considered generally representative of conditions at their respective locations at the time of the investigation, local variations in the materials are to be expected and, if encountered, shall not be considered materially different within the purview of the Contract.

C. Shallow subsurface conditions generally consist of woodland soils (generally silty loam) that may contain significant tree and other vegetation roots and woody debris. Soils may be inundated, saturated, or partly saturated.

D. The Contractor shall be responsible for identification, location, and protection of all utilities and structures (e.g., manholes, utility poles, sewer lines, water lines, gas lines, overhead lines, and other structures/utilities) prior to and during the Work in accordance with Section 01140 – Work Restrictions.

PART 2 –PRODUCTS

2.01 MATERIALS

A. See Section 31 05 13 – Soils and Aggregates

PART 3 – EXECUTION

3.01 INSPECTION

A. The Contractor shall conduct field reconnaissance and survey activities as necessary to plan the Work and identify any potential obstacles.

B. Provide the Construction Manager with sufficient notice and with means to examine areas and conditions under which excavating, filling, and grading Work will be performed.

C. Do not proceed with the Work until unsatisfactory conditions are corrected.

D. Prior to any excavation, the Construction Manager and the Contractor will complete a visual inspection of Work Areas to be excavated to identify and document key features that will need to be re-created during backfilling. This includes microtopography and drainage paths and features.

3.02 PREPARATION

A. Survey Control: The Contractor shall establish and maintain survey control prior to and throughout the duration of Work as described in Section 02 21 00 – Surveys.

B. Pre-Construction Survey: The Contractor shall conduct pre-excavation topographic surveys in accordance with Section 02 21 00 – Surveys to document baseline elevations and conditions. As part of this survey, the Contractor shall stake the excavation limits.

C. Erosion and Sediment Controls: Provide temporary erosion and sediment controls in accordance with the Design Drawings and Section 31 25 00 – Erosion and Sediment Controls.

D. Dust, Air Quality, Noise, and Odor Controls: Provide dust, air quality, noise, and odor controls in accordance with Section 01571 – Operations, Environmental, Restrictions, and Controls.

E. Site Preparation:

1. Clearing and Grubbing: The Contractor shall conduct pre-excavation clearing and grubbing as necessary to facilitate the excavation activities, but such activity shall be minimized to the extent practicable. Comply with Section 31 11 00 – Clearing and Grubbing.

F. Temporary Barriers:

1. Provide temporary barriers or demarcations surrounding excavations and excavation Work Areas to provide temporary protection to persons and property. The barriers shall have openings only at vehicular, equipment, and worker access points.
2. During nonworking hours, completely enclose all sides of excavation with temporary barriers or demarcations.

3.03 DEWATERING

A. General:

1. Provide and maintain adequate drainage and dewatering equipment to manage and remove surface and Construction Water as defined in Section 02 72 00 – Water Management and Treatment.

B. Temporary Dewatering System:

1. The Contractor shall design, provide, operate, and maintain dewatering of the excavation areas as necessary to facilitate dewatering of excavated soils, verification of excavation depths, and placement of backfill. The dewatering methods shall be determined by the Contractor based on the amount of water observed and other location-specific factors.
2. Locate elements of the temporary dewatering system to allow continuous dewatering operation without interfering with the Work to the extent practicable.
3. The Contractor shall prepare a Pumping and Discharge Plan approved by the Construction Manager prior to initiating any pumping. The Contractor shall minimize entrainment of sediments at the suction end of piping to avoid impacts to the river.
4. Water more than 1-foot deep within excavation areas can be pumped and discharged to the River after the water is filtered to remove suspended solids. Any water pumped below 1-foot deep within excavation areas shall be containerized and transported by the Contractor to the Temporary Water Treatment System for

treatment in accordance with Section 02 72 00 – Water Management and Treatment.

C. Disposal of Water Removed by Dewatering System:

1. Water resulting from excavation and fill area dewatering shall be temporarily stored and managed in accordance with Section 02 72 00 – Water Management and Treatment.

3.04 EXCAVATION

A. The Contractor shall excavate soils to the extents, depths, and elevations as shown on the Design Drawings. Excavation shall include removing and handling of earth, rock, woody debris, and other materials within the excavation limits. The over-excavation allowance is 3 inches below the target removal depths within Floodplain and Vernal Pool remediation areas. The Contractor shall minimize over excavation to the greatest extent practicable.

B. The Contractor shall be responsible for determining the methods and equipment to be used for excavation.

C. The Contractor shall excavate, handle, stage, segregate, and dispose of excavated materials to be transported to the UDF separately from materials to be transported to an appropriate off-site disposal facility.

D. Mature trees within and adjacent to 1-foot-deep excavation areas with a DBH greater than 8 inches shall be left in place to the extent practicable, and fine excavation methods shall be implemented. Fine excavation is defined as excavation using hand excavation or other approved methods such as using an air-powered excavation, hydro excavation and vacuum extraction, or similar techniques approved by the Construction Manager, that minimizes disturbance to the tree root system. Fine excavation is required to preserve flow of water, food and nutrients between the tree's roots and canopy, and the structure integrity and stability of the tree and its root system (i.e., minimize the potential for windthrow). Trees to be preserved will be verified in the field by the Construction Manager prior to construction activities. Multiple fine excavation methods may be required depending on Site conditions.

1. Trees classified as "healthy" by a qualified scientist under direction of the Construction Manager shall be subject to fine excavation, while those deemed "unhealthy" or are unlikely to survive the root pruning process do not require fine excavation.
2. Invasive species such as Norway maple are not included in the fine excavation process.
3. If root pruning is deemed necessary in areas of fine excavation, sharp tools shall be used to ensure a clean and smooth cut that does not pull on the roots. Root

pruning shall not be cut or torn with a backhoe or other dull instruments and shall not be cut roots greater than 4 inches in diameter unless directed by the Construction Manager.

4. Proper care should be taken to not damage any roots being preserved. Once roots are exposed, roots shall be covered within 8 hours with topsoil or burlap and watered.
5. Fine excavation shall be implemented within a radius of three times the tree's DBH measured from the tree trunk or to the dripline of the tree canopy, whichever is greater (typically referred to as the "critical root zone"), for trees remaining.
6. Acceptable methods of fine excavation soil removal around trees that are to remain include the following:
   a. Soil removal by hand using shovels or similar hand tools.
   b. Air-powered or pneumatic excavation. This method may be used under the tree canopy (i.e., the critical root zone) to minimize root damage and to allow for the potential reuse of treated soils.
   c. Hydro-excavation. This method may be used to liquefy soil to create a slurry that the Contractor would vacuum-extract. This method may generate regulated drilling mud waste and may impact roots and site moisture.

E. The Contractor shall install and maintain temporary barriers or demarcations around open excavations. Excavations shall be backfilled as soon as practicable following approval from the Construction Manager. The duration that excavations are left open shall be minimized to the greatest extent practicable.

F. All excavation and trenching shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926.650 Subpart P) and state and local requirements. Where conflict between OSHA, state, and local regulations exists, the most stringent requirements shall apply.

G. Excavation Protection: The Contractor shall be responsible for implementing measures to maintain stable excavations and grades. Provide excavation protection systems in accordance with laws and regulations to prevent injury to persons and property, including surface structures and underground facilities.

H. Unauthorized Excavation: All excavations outside the extents shown or indicated and not approved by ethe Construction Manager, together with removing and disposing of the excavated material and backfilling with suitable material, shall be the sole responsibility of the Contractor. It shall be the Contractor's sole responsibility to fill unauthorized excavations at the direction and to the satisfaction of the Construction Manager at no additional cost to GE.

I. Excavation Verification

1. Approval of excavation depths and limits will be based on a comparison of pre-excavation topographic survey results and post-excavation topographic survey results to verify required elevations and grades have been achieved.
2. In sloped areas, verification of removal based on thicknesses shall be measured perpendicular to the slope.
3. Excavation elevation compliance will be assessed on a 10-foot by 10-foot grid cell layout. The grid layout will be maintained prior to, during, and following excavation Work. Survey data at each 10-foot by 10-foot grid node will be reviewed by the Construction Manager to verify if the excavation depth (in 1-foot excavation areas) or elevation (in excavation areas exceeding 1-foot depth) have been achieved.
   a. Additional soil shall be removed in instances where the survey data at each grid node indicates that the target depth or elevation, as appropriate, has not been reached.
4. Special considerations may be made, at the Construction Manager's discretion, where excavation is not able to achieve the specified elevations (e.g., roots or steep slopes). In these areas, verification will be evaluated, at the Construction Manager's discretion, on a case-by-case basis considering specific field conditions, which may include exemptions or adjustments to acceptance criteria for these areas.
5. The Contractor shall document and verify target excavation depth or elevations have been achieved, as appropriate, as detailed in Section 02 21 00 – Surveys subject to approval by the Construction Manager.

3.05 BACKILL PLACEMENT

A. The Construction Manager will notify the Contractor when excavated Floodplain Areas and Vernal Pools are ready for placement of backfill material after the verification of the completed excavation. Placement of backfill materials shall be completed within 1 week after such notice from the Construction Manager or as otherwise approved by the Construction Manager.

B. Equipment that has been used to remove or handle impacted materials shall be cleaned in accordance with Section 02 51 00 – Decontamination prior to handling clean backfill materials.

C. The Contractor shall maintain functional erosion and sedimentation control measures and shall stabilize disturbed soils until permanent vegetation or stabilization measures are established. The Contractor shall install temporary soil stabilization measures if excavated or backfilled areas remain exposed for more than 48 hours. The Contractor's proposed erosion, sedimentation, and stabilization methods shall be described in the Excavation and Backfilling Plan.

D. Backfill material shall be placed in the excavated Floodplain Areas and Vernal Pool to the appropriate thickness to return excavated areas to pre-excavation grades, except in areas specified for riverbank soil removal and grading as shown on the Design Drawings and/or Dredge Prism Files and unless otherwise directed by the Construction Manager. Where restoring pre-excavation grade is not practicable due to steep pre-excavation slopes, the excavation areas shall be restored to a stable slope. The proposed backfill elevations and grades in excavated areas shall be approved by the Construction Manager after review of the pre-excavation surveys.

E. The Contractor shall adhere to the following requirements for the placement of backfill in Floodplain Areas located outside of Vernal Pools:

   1. The Contractor shall place and compact General Fill from the bottom of the excavation to a depth of 12 inches below the final required grade. The General Fill shall meet the requirements of Paragraph 2.01.F in Section 31 05 13 – Soils and Aggregates.

   2. The upper 12 inches of the backfill shall be Topsoil and shall be uncompacted to return the excavated areas to pre-excavation grades. The Topsoil shall meet the requirements of Paragraph 2.01.H in Section 31 05 13 – Soils and Aggregates. Excavation areas requiring 1-foot removal shall be backfilled with uncompacted topsoil only.

F. The Contractor shall adhere to the following requirements for the placement of backfill within the footprint of Vernal Pools:

   1. For excavations targeting a depth of 1 foot within Vernal Pools, the Contractor shall place uncompacted Topsoil to return the excavated areas to pre-excavation grades. Topsoil shall meet the requirements of Paragraph 2.01.H in Section 31 05 13 – Soils and Aggregates.

   2. For excavations targeting depths greater than 1 foot within Vernal Pools, the Contractor shall adhere to the following requirements for the placement of backfill:
      a. The Contractor shall place and compact General Fill backfill to 15 inches below the final ground elevations. The General Fill backfill shall be placed in lifts not greater than 8 inches. The thickness of the General Fill backfill will vary by location. The General Fill shall meet the requirements of Paragraph 2.01.F in Section 31 05 13 – Soils and Aggregates.
      b. Above the General Fill backfill, the Contractor shall place and compact a 3-inch layer of Silty Loam Backfill to limit drainage.
         1) The 3-inch-thick layer (final, compacted thickness) shall be compacted under moist conditions and tracked in place with a suitably sized metal-tracked dozer or similar equipment. Care shall be taken to avoid over compaction of the soil layer by making only the minimum number passes needed to adequately place and grade the material.

2) The Silty Loam Backfill shall meet the requirements of Paragraph 2.01.I in Section 31 05 13 – Soils and Aggregates.

c. The upper 12 inches of the backfill shall be Topsoil and shall be uncompacted to return the excavated areas to pre-excavation grades. The Topsoil shall meet the requirements of Paragraph 2.01.H in Section 31 05 13 – Soils and Aggregates.

G. The Contractor shall place backfill to establish the grades and elevations shown on the Design Drawings and as follows:

1. Re-create microtopography and drainage features as identified in Paragraph 3.01.D.
2. The Contractor shall place backfill materials in lifts not greater than 8 inches as measured before compaction.
3. The Contractor shall not compact topsoil backfill materials.

H. The Contractor shall place backfill within the Intermittent Side Channel to match the lines and grades shown on the Design Drawings. The Contractor shall adhere to the following requirements for the placement of backfill in the Intermittent Side Channel:

1. The Contractor shall place and compact General Fill backfill to 12 inches below the final ground elevations. The General Fill backfill shall be placed in lifts not greater than 8 inches. The thickness of the General Fill backfill will vary by location. The General Fill shall meet the requirements of Paragraph 2.01.F in Section 31 05 13 – Soils and Aggregates.
2. Above the General Fill backfill, the Contractor shall place and compact a 3-inch layer of Silty Loam Backfill to limit drainage.
   a. The 3-inch-thick layer (final, compacted thickness) shall be compacted under moist conditions and tracked in place with a suitably sized metal-tracked dozer or similar equipment. Care shall be taken to avoid over compaction of the soil layer by making only the minimum number passes needed to adequately place and grade the material.
   b. The Silty Loam Backfill shall meet the requirements of Paragraph 2.01.I in Section 31 05 13 – Soils and Aggregates.
3. The upper 9 inches of the backfill shall be Topsoil and shall be uncompacted. The Topsoil shall meet the requirements of Paragraph 2.01.H in Section 31 05 13 – Soils and Aggregates.

I. Backfill placement shall be accomplished in such a manner that placed materials provide a uniform layer of required thickness within the tolerances detailed herein.

J. Backfill Verification

1. The Contractor shall submit a post-placement survey for each backfilled area for approval by the Construction Manager in accordance with Section 02 21 00 – Surveys.
2. Approval of backfill placement will be based on a comparison of pre-placement survey results and post-placement topographic survey results to verify required elevations and grades have been achieved on a grid node by grid node basis.
3. Post-placement elevations at each grid node shall not exceed 3-inches above pre-excavation grade.
4. Backfill elevation compliance will be assessed on the same 10-foot by-10-foot grid established prior to initiating excavation activities. Topographic survey data at each 10-foot by-10-foot grid node will be reviewed by the Construction Manager to verify that the backfill layer requirements have been achieved (i.e., compacted general fill has been placed to within 12 inches of final grade and 12 inches of uncompacted topsoil has been placed).
   a. Additional backfill shall be placed in instances where the survey data at each grid node indicates that the target backfilling criteria have not been achieved.
   b. If backfill material is over-placed above the pre-excavation grade (with an allowable tolerance plus 3 inches), the Contractor shall remove or grade the material as necessary to achieve the compliance requirements specified herein.
5. Special considerations may be made, at the Construction Manager's discretion, for areas where backfill is not able to restore pre-excavation elevations (e.g., roots or steep slopes). In these areas, verification will be evaluated, at the Construction Manager's discretion, on a case-by-case basis considering specific field conditions, which may include exemptions or adjustments to acceptance criteria for these areas.
6. The Contractor shall document and verify target backfill elevations have been achieved as detailed in Section 02 21 00 – Surveys subject to approval by the Construction Manager.

K. Following backfilling in the areas subject to fine excavation due to tree roots, the backfilled material shall be thoroughly wetted to enhance root/soil contact.

L. Do not place backfill when significant standing water is present on the surface of the area where material will be placed unless otherwise approved by the Construction Manager. Manage Construction Water in accordance with Section 02 72 00 – Water Management and Treatment.

M. Do not place backfill material in a frozen condition or on top of frozen material.

N. The Contractor shall repair observed or measured areas of settlement that occur within 7 days of placement. The Contractor shall make repairs and replacements as required within 5 days after being advised by the Construction Manager.

3.06 COMPACTION

A. The Contractor shall lightly compact the backfill material to provide a firm and stable surface. The Contractor shall place material under moist conditions and lightly compact the material using an excavator bucket, track in place using low-ground-pressure equipment, or other methods approved by the Construction Manager. Care shall be taken to avoid over-compaction by making only the minimum number of passes needed to adequately place and grade the backfill. The Contractor's proposed compaction methods shall be described in the Excavation and Backfilling Plan.

B. The Contractor shall not compact topsoil backfill materials.

3.07 FIELD QUALITY CONTROL

A. Earthwork Inspections:

1. Perform daily or more frequent inspections of all excavations, adjacent areas, and protective systems as required by laws and regulations and this Section to ensure their continued effectiveness and integrity and the safety of exposed employees.
2. Inspections shall be performed by the Contractor's supervisor or competent person, as required, together with the Construction Manager, at the following times:
   a. Prior to the start of Work and as needed throughout the day
   b. After every significant rainstorm or other hazard-increasing occurrence
3. Document the date, time, and outcome of each inspection in a dedicated log. Submit a copy of the inspection log to the Construction Manager with the Daily Activities Report.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. A Draft Stormwater Pollution Prevention Plan (SWPPP) will be prepared by others under the direction of General Electric Company (GE) to meet the substantive provisions of the latest National Pollutant Discharge Elimination System (NPDES) Construction General Permit. This shall be used by the Contractor as a basis for developing the final SWPPP that will describe controls and inspection requirements to reduce pollution from erosion and sedimentation during the Reach 5A Remediation Project (Project) and protect nearby water resources. The SWPPP will be included in the Supplemental Information Package (SIP) that will be submitted for U.S. Environmental Protection Agency review and approval prior to construction.
2. The Contractor shall prepare the final SWPPP to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities. In particular, the plan shall identify control measures to mitigate erosion and sedimentation into wetlands and Vernal Pools not intended for excavation or disturbance during the Work. The plan shall identify all stormwater management activities needed during land disturbance and construction, including source control and pollution prevention measures, best management practices (BMPs) to address erosion and sedimentation, stabilization measures, and procedures for operating and maintaining the BMPs, especially in response to wet weather events and frost. The plan shall include a schedule for sequencing construction and stormwater management activities that minimizes land disturbance by ensuring vegetation is preserved to the extent practicable and disturbed portions of the Site are stabilized as quickly as possible.
3. The Contractor shall be responsible for implementation of the SWPPP for the duration of the Contract, including installing, maintaining, and inspecting the necessary controls and stabilization measures. Implementation of the SWPPP shall be required until the disturbed area is fully stabilized and the temporary erosion and sedimentation controls are removed. The Contractor shall not remove temporary erosion and sedimentation controls until written approval is provided by the Construction Manager.

1.02 RELATED SECTIONS:

1. Section 13 80 01 – Temporary Access Roads and Staging Areas
2. Section 31 11 00 – Clearing and Grubbing

3. Section 31 23 00 – Soil Excavation and Fill
4. Section 32 30 00 – Restoration, Planting, and Seeding
5. Section 35 20 24 – Excavated Material Processing and Handling

1.03 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. Clean Water Act, NPDES Regulations (stormwater discharges) and 40 *Code of Federal Regulations* 122.26(c)(1)(ii)(C) and 122.44(k)

B. Massachusetts Clean Water Act, Water Quality Certification Regulations, 314 Code of Massachusetts Regulations (CMR) 9.00 et seq., including 9.06 and 9.07

C. Massachusetts Clean Water Act and Wetlands Protection Act—Stormwater Management Standards, 310 CMR 10.05(6)(k) and 9.06(6)(a)

D. Massachusetts Department of Environmental Protection (MassDEP) Stormwater Handbook and Stormwater Standards

1.04 SUBMITTALS

A. The Contractor shall prepare and submit the SWPPP.

B. The Contractor shall submit the manufacturer's product data, specifications, and installation instructions for all products listed in the SWPPP.

C. The Contractor shall documentation of inspection and maintenance of erosion and sedimentation controls as required by the SWPPP.

PART 2 – PRODUCTS

2.01 EROSION AND SEDIMENT CONTROLS

A. General:

1. Materials used for erosion and sediment controls shall be in accordance with the applicable regulatory requirements and the approved SWPPP.

B. Reinforced Silt Fencing:

1. Filter Fabric:
   a. Material: Geotextile shall comply with MassDEP guidelines for Soil Erosion and Sediment Control standard and specifications for silt fencing.
   b. Height shall be 16 inches minimum.
2. Fence Support Posts:
   a. Material: Hardwood or steel posts may be used.

1) Hardwood posts shall be at least 1.25 by 1.25 inches in cross section.
2) Steel posts shall be "T" or "U" in shape in cross section with a minimum weight of 1 pound per linear foot.

b. Length shall be at least 4 feet.

3. Wire Reinforcing: Wire fencing shall be at least 14 gauge with a maximum 6-inch mesh opening or otherwise as approved by the Construction Manager.

4. Fabric fasteners shall be heavy-duty staples, wire ties, or other fasteners compatible with support post material.

C. Temporary Erosion Control Blankets: Type 3.B, in accordance with Federal Highway Administration FP-03, Section 713.17.

1. Product and Manufacturer: Provide one of the following:
   a. ECSC-2B by East Coast Erosion Blankets, LLC
   b. Curlex II FibreNet by American Excelsior Company
   c. Equal as approved by the Construction Manager

2. Erosion control blankets shall be 100% natural and biodegradable and shall not incorporate plastic netting of any kind. Acceptable materials include jute, excelsior, straw or coconut fiber, and cotton.

3. Staples or anchoring stakes shall be 100% biodegradable.

D. Straw Wattles:

1. 12-inch diameter, biodegradable straw wattle, 100% weed free

2. Up to 24-month life expectancy

3. 1/8-inch mesh opening

4. Minimum strength of 180 pounds per square inch per ASTM International 5035

PART 3 – EXECUTION

3.01 EROSION AND SEDIMENT CONTROL

A. Installation and Maintenance:

1. General:
   a. No land disturbance activities shall commence until the SWPPP is approved as part of the SIP.
   b. Install and maintain erosion and sediment controls as shown on the Design Drawings and as specified in the approved SWPPP. Install erosion and sediment controls prior to any land disturbance activities and maintain the controls throughout the duration of the Work.

c. Use necessary methods to successfully control erosion and sedimentation, including ecology-oriented construction practices, vegetative measures, and mechanical controls. Use BMPs in accordance with applicable laws and regulations, and regulatory requirements to control erosion and sedimentation during the Project.
d. Plan and execute construction, disturbances of soils, and earthwork by methods to control surface drainage from cuts and fills to prevent erosion and sedimentation. Provide temporary measures for controlling erosion and sedimentation as indicated in the SWPPP.
e. Regulate drainage and control erosion and sedimentation in areas cleared for storage of materials or equipment, or for temporary facilities.
f. Provide erosion and sediment controls, including stabilization of soils, at the end of each workday.

2. Provide all required erosion and sediment control measures for the areas where soil will be disturbed before commencing activities that will disturb soil at the Site.
3. Provide erosion and sediment control measures to divert rainfall runoff from entering Work Areas and open excavations.
4. Implement construction procedures associated with, or that may affect, erosion and sediment control to ensure minimum damage to the environment during construction.
5. Straw wattles will be used as needed, including along gravel access roads, in areas where surface water flow is evident (e.g., scour zones or swales) to prevent material migration. Installation procedures for straw wattles include the removal of vegetation, native leaf litter, and debris so that wattles will be in firm contact with the soil surface.
6. Vegetation Removal:
   a. Remove only those shrubs, grasses, and other vegetation that must be removed for construction. Protect remaining vegetation in accordance with Section 31 11 00 – Clearing and Grubbing.
7. Earthwork and Temporary Controls:
   a. Control erosion to minimize transport of silt from the Site into existing waterways and surface waters. Such measures shall include, but are not limited to, using berms, silt fencing, gravel or crushed stone, and slope drains. Apply such temporary measures to erodible materials exposed by activities associated with the remedial construction.
   b. Hold the areas of bare soil exposed at one time to a minimum.
   c. Provide special care in areas with steep slopes. Minimize vegetation disturbance to maintain soil stability.
8. Inspection and Maintenance:

a. The Contractor shall inspect areas of earthwork and areas where soil is disturbed to identify evidence of the start of erosion and sedimentation daily; apply corrective measures as required to control erosion and sedimentation. Continue inspections and corrective measures until soils are permanently stabilized and permanent vegetation has been established.
b. Inspect erosion and sediment controls daily and prior to conducting any intrusive activities. During Work, erosion and sediment controls shall be inspected at least once every 7 days until restoration is complete.
c. Repair or replace damaged erosion and sediment controls within 1 day of becoming aware of such damage.
d. Periodically remove silt and sediment that has accumulated in or behind sediment and erosion controls. Properly dispose of silt and sediment.

9. Duration of Erosion and Sediment Controls:
   a. Maintain erosion and sediment controls in effective working condition until the associated drainage area has been permanently stabilized.
   b. Maintain erosion and sediment controls until the Site is restored, underlying soils are permanently stabilized, and permanent vegetation has been established.
   c. Remove silt fencing from within the boundaries of the Work Areas and from around perimeters prior to the first post-restoration winter freeze, upon direction by the Construction Manager.
10. Work Stoppage: Provide additional temporary controls necessary to prevent environmental damage to the Site and adjacent areas if the Work is temporarily stopped or suspended for any reason.

B. Reinforced Silt Fencing:

1. Locations of Reinforced Silt Fencing:
   a. Install silt fencing at the locations shown in the Design Drawings and elsewhere as needed to control runoff in accordance with SWPPP.
   b. On slopes, install silt fencing at intervals that do not exceed the maximum lengths indicated in the table below unless otherwise approved by the Construction Manager.

Maximum Length of Upgradient Slope Between Runs

SLOPE	UPGRADIENT SLOPE LENGTH (FEET)
<2%	N/A
2%–10%	250
10%–20%	150
20%–33%	80
33%–50%	70
>50%	30

c. Provide silt fencing around the perimeter of each stockpile of topsoil, general fill material, and excavated material. Install silt fencing before expected precipitation and maintain it until the stockpile is removed.
d. Do not install silt fencing at the following types of locations:
   1) Area of concentrated stormwater flows such as ditches, swales, or channels
   2) Where rock or rocky soils prevent full and uniform anchoring of silt fencing
   3) Across upstream or discharge ends of stormwater piping or culverts

2. Installation:
   a. Securely fasten filter fabric to each support post in no fewer than four locations. Spacing between support posts shall not exceed 8 feet (center to center).
   b. When two sections of filter fabric abut each other, fold over edges and overlap by at least 6 inches and securely fasten to wire mesh.
   c. Embed posts in the ground to the depth necessary for proper controls but not less than 16 inches below ground surface.
   d. Extend filter fabric at least 6 inches below ground and at least 16 inches above ground.
   e. Bury filter fabric at bottom of silt fence in a trench, in a “J” configuration, to a depth of 6 inches below grade.

3. Maintenance:
   a. Conduct routine inspection at least once every 7 days until final restoration.
   b. Remove accumulated sediment when depth reaches half the effective height of the sediment control.
   c. Repair and reinstall silt fencing as required.
   d. Do not allow formation of concentrated stormwater flows on slopes above silt fencing unless so shown or indicated in the Contract Documents. If unauthorized concentrated stormwater flows occur, stabilize the slope via earthmoving and other stabilization measures as required to prevent flow of concentrated stormwater flows toward silt fencing.

3.02 REMOVAL OF EROSION AND SEDIMENT CONTROLS

A. Remove erosion and sediment controls only when directed by the Construction Manager.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. The Contractor shall provide all labor, materials, equipment, services, and incidentals required to furnish and install geotextiles.

B. Related Sections:

1. Section 13 80 01 – Temporary Access Roads and Staging Areas
2. Section 31 23 00 – Soil Excavation and Fill
3. Section 31 25 00 – Erosion and Sediment Controls

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. Geosynthetics Research Institute (GRI) GT13, Test Methods and Properties for Geotextiles Used as Separation Between Subgrade Soil and Aggregate

B. American Association of State Highway and Transportation Officials (AASHTO) M288, Standard Specification for Geotextile Specification for Highway Applications

1.03 SUBMITTALS

A. Prior to shipment of any geotextile materials, the Contractor shall submit the following information on the geotextile product to the Construction Manager:

1. Lot and roll identification numbers for materials
2. Quality control certificates that provide reference to the lot and roll identification numbers, sampling procedures, test methods and results, and other items such as the following:
   a. Name of Manufacturer
   b. Chemical Composition
   c. Product Identification
   d. Statement of Compliance
3. All certificates shall be signed by a representative of the manufacturer.
4. Geotextile quality assurance tests from the manufacturer including the following:
   a. Unit weight: ASTM International (ASTM) D5261
   b. Flow rate: ASTM D4491
   c. Permittivity: ASTM D4491
   d. Trapezoidal tear strength: ASTM D4533
   e. Grab elongation: ASTM D4632

f. Apparent opening size: ASTM D4751
g. California Bearing Ratio (CBR) puncture: ASTM D6241

5. Unless otherwise specified or approved by the Construction Manager, the quality assurance tests by the manufacturer shall be conducted at the frequency of one per lot or one per each 50,000 square feet (ft^2) to be confirmed by the Contractor. One lot is defined as a group of consecutively numbered rolls or panels from the same manufacturing line and using raw materials from the same resin batch.
6. The Contractor shall replace any rolls that are rejected for noncompliance with these Specifications.
7. If a sample fails to meet the quality control requirements, the Contractor shall ensure the manufacturer tests each roll manufactured from the same resin batch or at the same time as the failing roll.
8. Testing shall be at the Contractor's expense and continue until a pattern of acceptable test results is established.

1.04 GENERAL

A. QUALITY ASSURANCE

1. The geotextile manufacturer shall be a specialist in the manufacture of geotextile separation and stabilization fabrics and shall have produced and successfully installed a minimum of 5 million ft^2 of geotextile material.

B. DELIVERY STORAGE AND HANDLING

1. Each roll of geotextile delivered to the Site shall be labeled by the manufacturer identifying the manufacturer's name, product identification, lot number, roll number, and roll dimensions.
2. The Contractor shall inspect all rolls and packages upon delivery to the Site to confirm the materials have not been damaged due to improper transportation, handling, or storage. If the protective wrapping is damaged, or if damage to the roll is suspected, separate the roll from the lot for more detailed inspection.
3. The Contractor shall notify Construction Manager if any loss or damage to the geotextile exists. The Contractor will replace the loss and repair the damage to new condition in accordance with the manufacturer's instructions.
4. The Contractor shall protect geotextile from UV light exposure, precipitation or other inundation, mud, dirt, dust, puncture, cutting, or any other damaging or deleterious conditions. Geotextile rolls shall be shipped and stored in relatively opaque and watertight wrappings.
5. The Contractor shall place geotextile only after the required submittals have been received and reviewed by the Construction Manager and the placement surface has been fully prepared and deemed acceptable for geotextile deployment.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Nonwoven Geotextile

1. Nonwoven geotextile shall be of needle-punched construction and consist of long-chain polymeric fibers or filaments composed of polypropylene. The nonwoven geotextile shall be chemically inert to naturally encountered chemicals, acids, and bases and resist biological degradation.
2. Nonwoven geotextile shall be used as a separation layer between dissimilar material types as shown on the Design Drawings. The nonwoven geotextile shall meet GRI GT13 specifications and have the following minimum average roll values (MARVs):

Requirements for Nonwoven Geotextiles

PROPERTY	ASTM TEST METHOD	UNIT	VALUE (MARV)
Unit weight	D5261	$oz./yd^2$	10
Grab tensile strength	D4632	lb	230
Grab tensile elongation	D4632	%	50
Trapezoidal tear strength	D4533	lb	95
Permittivity	D4491	sec^{-1}	1.3
CBR puncture strength	D6241	lb	700
UV resistance (at 500 hours)	D7238	% strength retained	70

B. Woven Geotextile

1. Woven geotextile shall be composed of high-tenacity polypropylene yarns woven into a stable network such that the yarns retain their relative position. The woven geotextile shall be chemically inert to naturally encountered chemicals, acids, and bases and resist biological degradation.
2. Woven geotextile shall be used as a separation layer between the native soil layer and the general fill materials for Temporary Access Roads and Temporary Staging Areas.
3. The woven geotextile shall meet AASHTO M 288-05 requirements for a Class 2 separation geotextile, consist of 95% weight polyethylene or polyester, and have the following MARVs:

Requirements for Woven Geotextiles

PROPERTY	ASTM TEST METHOD	UNIT	VALUE (MARV)
Grab tensile strength	D4632	lb	250
Grab tensile elongation	D4632	%	15
Trapezoidal tear strength	D4533	lb	90
CBR puncture	D6241	lb	700
Permittivity	D4491	sec^{-1}	0.1
Flow rate	D4491	$gal/min/ft^2$	4
Apparent Opening Size	D4751	mm	0.425
UV resistance (at 500 hours)	D4355	% strength retained	70

PART 3 –EXECUTION

3.01 INSPECTION

A. The Contractor shall examine the areas and conditions under which the Work will be performed and notify the Construction Manager in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected in a manner acceptable to the Construction Manager.

3.02 PREPARATION

A. The Contractor shall protect existing Site improvements, including streets, drives, underground and aboveground utilities, and adjacent property and structures throughout the Work. The Contractor shall repair any damage to original condition or replace in kind to the satisfaction of the Construction Manager.

B. The Contractor shall excavate or fill subgrade, as required, to bring subgrade to elevations shown or indicated on the Design Drawings. Confirm that subgrade is at proper elevations and that no further earthwork is required to bring the subgrade to proper elevations. Provide subgrade elevations that slope parallel to finished grade and, in the direction, shown on the Design Drawings.

C. The Contractor shall remove all stones greater than two inches in any dimension, construction debris, trash, rubble, and all other extraneous materials from the subgrade.

D. The Contractor shall notify the Construction Manager that subgrade has been prepared and obtain the Construction Manager's approval before installing geotextile.

3.03 INSTALLATION

A. Place (roll out) geotextiles in the direction of most frequent vehicular travel.

B. Overlap adjoining edges of geotextiles a minimum of 12 inches, unless otherwise specified or approved by the Construction Manager.

C. Weight geotextiles with sandbags or equivalent when required. Install sandbags (or equivalent) during placement and maintain until replacement with cover materials.

D. During placement of geotextiles, take care not to entrap excessive dust, mud, or moisture in the geotextile stone that could damage or cause clogging of the geotextile or hamper subsequent seaming.

E. Use proper tools to cut and size geotextiles; exercise care while cutting geotextiles.

F. Do not expose geotextiles to precipitation prior to being installed, and do not expose geotextiles to direct sunlight for more than 15 days.

3.04 PLACEMENT OF MATERIALS ON GEOTEXTILE

A. Place all fill materials located on top of the geotextile in such a manner as to ensure the following:

1. No damage of the geotextile or underlying layers
2. Minimal slippage between the geotextile and the underlying layers
3. No excess tensile stresses in the geotextile

B. Do not drive vehicles or equipment directly on the geotextile.

C. Utilize equipment exerting the lowest ground pressure practicable to place the granular materials to minimize the potential for damage to the geotextile. Under no circumstances shall the placement equipment exert more than 5 pounds per square inch of ground pressure.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. The Contractor shall furnish all labor, materials, equipment, and incidentals required for planting and seeding in Reach 5A as detailed in this specification and the Restoration Drawings, and in the tables provided in the Housatonic River Reach 5A Restoration Plan (Reach 5A Restoration Plan) including, but not limited to, the following as applicable:

1. Table 5-1. Preliminary Bank Restoration Seed Mix.
2. Table 5-2. Bank Restoration Live Stake Planting List.
3. Table 6-1. Planting Table for Portions of BW5A-1 Subject to Dredge and Cap Activities.
4. Table 6-2. Planting Table for Portions of BW5A-2 Subject to Dredge and Cap Activities.
5. Table 6-3. Planting Table for Portions of BW5A-3 Subject to Dredge and Backfill Activities.
6. Table 6-4. Planting Table for Portions of BW5A-4 Subject to Dredge and Cap Activities.
7. Table 6-5. Planting Table for Portions of BW5A-5 Subject to Dredge and Cap Activities.
8. Table 6-6. Planting Table for Portions of BW5A-6 Subject to Dredge and Backfill Activities.
9. Table 7-1. Planting Table for Intermittent Side Channel Restoration.
10. Table 7-2. Planting Table for West Pond (OWB-WP) Restoration Area.
11. Table 8-1. Planting Tables for Floodplain Remediation Areas (including access and staging) Located within Transitional Floodplain Forests.
12. Table 8-2. Planting Tables for Floodplain Remediation Areas (including access and staging) Located within High-Terrace Floodplain Forests.
13. Table 8-3. Planting Tables for Floodplain Remediation Areas (including access and staging) Located within Shrub Swamp Habitats.
14. Table 8-4. Planting Tables for Floodplain Remediation Areas (including access and staging) Located within Wet Meadow Habitats.
15. Table 8-5. Planting Tables for Floodplain Remediation Areas (including access and staging) Located within Forested Upland Habitats.

16. Table 9-1. Planting Table for 5A-VP-13.

B. Perform planting and seeding Work within all planned habitat restoration areas described in the Reach 5A Restoration Plan, shown or indicated on the Drawings, and referenced herein; these include, but are not limited to, the following habitat, as applicable:

1. Riverine Habitat
2. Riverbank Habitat
3. Backwater Habitat
4. Other Waterbody Habitat
5. Floodplain Habitats
6. Other Upland Habitats
7. Vernal Pool Habitat
8. In accordance with the Restoration Corrective Measures Coordination Plan (RCMCP) and Health and Safety Plan (HASP), perform Work in a safe manner that prevents injury to people and adequately protects property, including, but not limited to, utilities, abutter property, public and private property, environmentally sensitive areas, demarcated work exclusion zones, and preemptively flagged vegetation to remain, as marked in the field or shown or indicated on the Drawings.

C. Perform Work such that it does not interfere, conflict with, prevent, or compromise any neighboring operations aligned with remediation, construction, or restoration.

D. The planting and seeding submittals and Work performed by the Contractor will be subject to review and field observations by specialized Restoration Specialists, including, but not limited to, a Project Wetland Scientist. The Construction Manager will coordinate reviews and field observations by the Restoration Specialists.

E. Where necessary, applicable, or requested, and only with the approval of GE or the Construction Manager, coordination or communication between the Contractor and Native Plant Trust (NPT) (contracted separately by GE) may be a factor in revegetation as part of restoration.

1.02 RELATED SECTIONS:

A. Section 31 05 13 – Soils and Aggregates

B. Section 31 11 00 – Clearing and Grubbing

C. Section 31 13 18 – Removal of In-River Debris and Shoreline Vegetation

D. Section 31 23 00 – Soil Excavation and Fill

E. Section 35 43 37 – Riprap and Stone Protection

F. Section 35 44 50 – Coir Matting

1.03 SUBMITTALS

A. The Contractor shall prepare and submit a Restoration Planting and Seeding Plan as part of the Contractor's Operations Plan for review and approval by the Construction Manager prior to the start of any restoration planting and seeding fieldwork. At a minimum, the Plan shall include the following:

1. Means by which final grades will be checked and verified by the Contractor prior to seeding and planting.
2. Means by which the completion or status of any Natural Channel Design (NCD) structures and features incorporated or sequenced with vegetation establishment will be checked and verified by the Contractor prior to seeding and planting.
3. Methods, equipment, procedures, and sequence for seeding, planting, placement of tree and shrub guards, and watering. Include fertilizer application and protection fabric if required.
4. Seed mix product datasheets, certificates, and source information. The seed certificates shall include the following: botanical or scientific name and common name of all species included in the seed mixture; percentage of each species of seed by weight in a mixture; percentage of pure seed for each species included in the mixture; germination percentage; amount of undesirable plant seed present in the mixture; date of packaging; name and address of supplier; and county and state of origin.
5. A list of all plants that will be planted, including the target habitat to be restored, locations, species, quantity of each species, and sizes of each item.
6. Fertilizer Certificate, if required. Product datasheet and certificate confirming conformance with this Specification.
7. Protection Fabric, if required. Submit manufacturer product data, as well as delivery, handling, storage, installation, and repair methods.
8. A maintenance (including watering) and inspection schedule that coincides with and adheres to the Restoration and Performance Objectives Evaluation Criteria (RPOEC) and this specification.

1.04 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall ensure that the seed is delivered in vendor's unopened packages bearing labels showing vendor's name and seed analysis by weight.

B. The Contractor shall store all seed at the Project Site in a cool, dry place at locations approved by the Construction Manager. The Contractor shall replace any seed damaged during storage.

C. The Contractor shall store seed in weather- and rodent-proof enclosures.

D. All seed shall have the proper stratification or scarification, in accordance with the producer's instructions, to break seed dormancy.

E. Plants shall be maintained in proper moist conditions and protected from wind, herbivory, or other adverse effects.

F. Plants must be free of insects and diseases, appear healthy, and exhibit visible signs of viability such as green leaves or stems. Plants must not appear chlorotic or exhibit signs of desiccation. Plants must not exhibit visible signs of herbivory. Leaf margins must be predominantly green with limited areas of spots or blotches. Dormant plants must exhibit healthy roots, rhizomes, and leaf buds. All plant materials, including any collected field stock, must comply with state and federal laws with respect to an inspection for plant diseases and insect infestations. Collected plant materials must be obtained in strict compliance with any applicable state or federal wetland or species protection programs

G. Each plant species must be handled and placed in a manner that is consistent with good trade practice to verify plants are in acceptable condition at their time of arrival at the Site. Plants that are not in acceptable condition will be rejected from use.

H. All plant stock must be stored in above-ground locations in non-construction areas accepted by the Construction Manager, if not directly transplanted. All plant stock must have soil placed around the roots sufficient to protect from desiccation and to provide nourishment during storage. All plants stored in the field prior to installation must be kept cool and must be sheltered from the drying effects of direct sunlight and prevailing winds. Plants should not be subject to freezing or drying. It is the Contractor's responsibility to supply adequate water for all plant stock to maintain it in a healthy, vigorous state suitable for transplanting.

I. The Contractor shall ensure fertilizer, if required, is delivered in manufacturer's standard size bags or cartons showing weight, analysis, and the name of the manufacturer. The Contractor shall store as approved by the Construction Manager.

PART 2 –PRODUCTS

2.01 SEED

A. Seed mixtures should be delivered in original sealed containers. Seed contained in wet, torn, or otherwise obviously damaged packaging are not acceptable. The Contractor shall label containers with the following information: analysis of seed mixture; percentage of pure seed by species; year of production; net weight; date tagged and location; percentage of germination; and name and address of distributor.

B. All seed mixes, used for restoration shall be certified weed-free and free of any invasive plant material, including but not limited to seeds, roots, and rhizomes. All material shall be inspected ahead of utilization by the Construction Manager. All plants must be obtained from nursery stock in the northeastern United States and produced from species that are native to the region. The source of plant material must be submitted to the Construction Manager, who will coordinate review by a Project Wetland Scientist. Any field collected plant material (e.g., seeds or live stakes) must be collected from the same region.

C. Seeding is not anticipated for Riverine Habitat restoration. See Section 2.02.A.

D. Appropriate Riverbank Habitat restoration seed mix will constitute the seed composition and application rate as provided in Table 5-1 of the Reach 5A Restoration Plan or similar seed mix as approved by the Construction Manager.

E. Backwater Habitat restoration areas BW5A-1, BW5A-2, BW5A-3, BW5A-4, BW5A-5, and BW5A-6 are to have New England Wetland Plants “WetMix”, or similar seed mix as approved by the Construction Manager, applied at the prescribed rates and locations for each backwater provided in Table 6-1 through Table 6-6, respectively.

F. Other Waterbody Habitat restoration seed mix is dependent on the habitat type present and will be applied as follows:

1. Intermittent Side Channel
    a. Habitat Specific seed mix as available from NPT, or similar, approved by the Construction Manager at the application rate provided in Table 7-1 of the Reach 5A Restoration Plan for Transitional Floodplain Forest habitat present.
    b. New England Wetland Plants “WetMix” or similar seed mix as approved by the Construction Manager at the application rate provided in Table 7-1 of the Reach 5A Restoration Plan for Wet Meadow habitat present.
2. West Pond
    a. New England Wetland Plants “WetMix” or similar seed mix as approved by the Construction Manager at the application rate provided in Table 7-2 of the Reach 5A Restoration Plan for Shrub Swamp habitat present.

3. Seeding is not anticipated at the Lower Sykes Brook confluence due to Riverine Habitat prevalence. See Section 2.02.A.

G. The seed mix and application rate for Floodplain Habitat areas (including access and staging) to be restored is dependent on the habitat type present. Transitional Floodplain Forest, High-Terrace Floodplain Forest, and Forested Uplands habitat are to have a Habitat Specific mix as available from NPT, or similar, approved by the Construction Manager at the application rates and locations provided in Table 8-1. Table 8-2, and Table 8-5, respectively. Shrub Swamp and Wet Meadow habitats are to have New England Plants "WetMix", or similar, approved by the Construction Manager at the application rate provided in Table 8-3 and Table 8-4, respectively.

H. Restoration of applicable areas within Other Upland Habitats will include stabilization seeding, consisting of a cultural grassland or agricultural field Habitat Specific mix, or similar, as approved by the Construction Manager and the local farmer (where applicable) working that field post-construction.

I. Vernal Pool 5A-VP-13 is to have New England Wetland Plants "WetMix" or similar seed mix as approved by the Construction Manager applied at the prescribed rates and locations for each backwater provided in Table 9-1.

2.02 PLANTS

A. Active planting of native aquatic vegetation in the main channel and the Lower Sykes Brook confluence as part of Riverine Habitat Restoration is generally not anticipated and that natural recolonization from upstream will occur as suitable substrate conditions develop.

B. Areas to be planted in Reach 5A include all mapped habitat extents designated for restoration planting and seeding following remedial activities. These include, but are not limited to, Riverbank Habitat, Backwater Habitat, Other Waterbody Habitat, Floodplain Habitats, Other Upland Habitats, and Vernal Pool Habitats.

C. Cover type, scientific name, common name, size, total number of plantings and pertinent notes for, each habitat area are detailed in Tables 5-1 and 5-2, Tables 6-1 and 6-6, Tables 7-1 and 7-2, Tables 8-1 and 8-5, and Table 9-1 of the Reach 5A Restoration Plan (Appendix D). Plantings must be installed as detailed in the Drawings or as otherwise directed by the Construction Manager.

2.03 FERTILIZERS

A. Fertilizing plants is not anticipated. Any request for fertilizers would require approval by U.S. Environmental Protection Agency and the Construction Manager. If needed, fertilizer mixes and rates of application shall be made based on laboratory testing of the backfill and the recommendations of the Cornell Cooperative Extension.

2.04 WATERING

A. Water shall be from a source approved by the Construction Manager. The Contractor shall provide a scheduled watering plan that is approved by the Construction Manager in accordance with Section 1.03.A.3.

2.05 PROTECTION OF TREES AND SHRUBS

A. The Contractor shall purchase and properly install physical guards for tree and shrub plantings. Guards must be designed to protect young plantings from wind, deer grazing, and rodents. The guards must be durable, well ventilated, UV stable for at least 4 years, and either self-supported or supported and anchored to a wooden stake in accordance with manufacturer requirements.

B. The Contractor must provide the Construction Manager with the proposed plant guard product information, including manufacturer, materials, quantities, pricing, and installation and maintenance requirements prior to purchase.

PART 3 –EXECUTION

3.01 WOOD TURTLE PROTECTION

A. The Contractor shall follow all procedures and requirements detailed in the Wood Turtle Protection Plan, Drawings, and direction of the Construction Manager who will coordinate reviews by a qualified Project herpetologist.

3.02 PREPARATION

A. Protection:

1. Heavy equipment used to perform the Work within wetlands, vernal pools, along banks, floodplain habitats, and in any other environmentally sensitive or outstanding areas to be revegetated as part of restoration must be low ground pressure and/or operated from construction mats to prevent compression of soils. Approved access routes are to be utilized for heavy equipment selected to complete the work.
2. Protect existing site improvements, including streets, drives, parking areas, trails and walkways and other facilities to remain, and adjacent property and structures throughout the Work. Repair damage caused by the Contractor to original condition or replace in kind, to satisfaction of the Construction Manager at no additional cost to GE.
3. Protect trees, shrubs, and herbaceous vegetation to remain by providing temporary fencing, barricades, wrapping, or other methods shown, specified, or accepted by

Construction Manager. Correct damage caused by the Contractor outside the limits of work at no additional cost to GE.

4. Desirable vegetation intended to be preserved on the site will be flagged by a Project Wetland Scientist under direction of the Construction Manager prior to the start of construction.
5. Do not remove trees or shrubs without the approval of the Construction Manager, unless otherwise shown or indicated for removal on the Drawings or Specifications.
6. Protect remedial activities completed prior to planting and seeding. Planting and seeding restoration shall not compromise the integrity of any simultaneous or preceding construction.
7. Store construction equipment, materials, or stockpiles within areas approved by the Construction Manager.

B. Timing and sequencing of remediated habitat restoration through planting and seeding will be determined by the Construction Manager and subsequently coordinated with the Contractor.

C. Unless manufacturer instructions for prescribed or similar and Construction Manager-approved specific habitat type seed mixes dictate otherwise, planting and seeding within areas to be restored shall be done when there is no standing water.

3.03 RESTORATION

A. In addition to re-establishing pre-existing community composition and structure, Riverbank Habitat restoration vegetative plantings (cover crop, seeding, plugs, and live stakes) will supplement/support bioengineering methods for riverbank restoration. This involves the insertion of plugs and/or live stakes between rip rap and bioengineered bags, among other methods.

B. Backwater Habitat restoration natural recolonization and active planting efforts are predicated on proposed sand cap material and backfill substrate expectations to serve as adequate growth mediums for vegetation recovery. Backwater areas treated with an activated carbon-based amendment will not be planted.

C. Other Waterbody Habitat planting and seeding restoration is dependent on habitat type.

1. The Intermittent Side Channel Transitional Floodplain Forest and Wet Meadow disturbed areas will be restored with appropriate floodplain vegetation to create a stable floodplain habitat upon completion of disconnection from the main river channel, placement of clean backfill, and grading to approved design elevations.
2. West Pond planting and seeding restoration will be done for cover types within Shrub Swamp, Shallow Emergent Marsh, and Deep Emergent Marsh habitat.

Natural recolonization and active planting efforts for deep marsh plant species are predicated on proposed backfill substrate expectations to serve as a suitable growth medium for vegetation recovery.

3. At the Lower Sykes Brook confluence, with the exception of two state-listed species that have been documented in the vicinity of Sykes Brook outlet (matted spike-sedge and Frank's lovegrass), active planting of native aquatic vegetation is not anticipated, with natural recolonization expected as suitable substrate conditions develop. To the extent that matted spike-sedge and/or Frank's lovegrass are removed by the remediation, they will be replanted.

D. Floodplain Habitats

1. Following completion of grading and placement of suitable surface soils, the restored surface will be stabilized using an initial seed mix or temporary cover appropriate for floodplain conditions to stabilize the soil surface, reduce erosion potential, and suppress invasive recolonization while the site transitions toward final planting.
2. After this initial establishment period, final plantings will be installed. These plantings will include a mix of tree, shrub, and herbaceous species appropriate to the target floodplain community and hydrologic setting. Woody plantings will be distributed in a manner that reflects natural floodplain heterogeneity rather than rigid uniform spacing, except where spacing is needed to meet performance requirements or facilitate monitoring.
3. Natural recruitment of native species from adjacent intact floodplain habitats will also be allowed to contribute to restoration success where consistent with the design objectives and invasive species management needs. Where feasible, mature native trees or discrete areas of native herbaceous or shrub vegetation will be preserved at the margins of work areas and salvaged coarse woody debris will be incorporated into the restored forested wetland areas to accelerate development of structural habitat complexity.

E. Other Upland Habitats outside of the floodplain that are disturbed by temporary access, staging, or related support activities will be restored to reflect the specific baseline condition of the affected area and the final intended post-construction use. At a minimum, restoration of these upland areas will include removal of temporary construction materials and surfacing, grading to pre-construction contours or approved final contours, decompaction where necessary, and placement or re-spreading of topsoil suitable for revegetation. Areas that were previously open field, herbaceous, or otherwise disturbed conditions will be restored primarily through stabilization seeding, invasive-species control, and natural recolonization, supplemented by active planting where needed to re-establish the desired cover type. Areas that supported woody vegetation prior to disturbance will be restored through a combination of initial

stabilization seeding and subsequent installation of native trees and shrubs appropriate to the pre-existing upland habitat.

F. Vernal Pool 5A-VP-13 will be remediated through excavation and backfilling with suitable soils for wetland plant community development. Following planting densities outlined in Table 9-1 and on Figure D-22 of the Restoration Drawings provided in Appendix D of the Reach 5A Restoration Plan, trees and shrubs from different species and herbaceous plant species suitable for shallow and deep emergent marsh habitats will be planted in this pool. These include aquatic emergent species for planting around the pool margins and one submergent species to be included in deeper areas of the pool. In addition, wetland seed mix will be evenly distributed along the margins of the vernal pool, which will provide additional plant diversity into the local wetland system.

3.04 SEEDING AND PLANTING

A. Seeding and planting shall only occur after site preparations have been reviewed and approved by the Construction Manager.

B. The Contractor shall not apply seed or install plantings if the ground is frozen.

C. Seeding and planting shall only occur immediately after approval by the Construction Manager.

D. Seeding and planting shall not be performed when the temperature may drop below 35 degrees Fahrenheit (°F) or rise above 90°F over the forthcoming week.

E. The Contractor shall provide notice to the Construction Manager at least 48 hours prior to seeding and planting.

F. Plant species, quantities, sizes, and placement shall be conducted in accordance with the Construction Drawings and under the oversight and direction of the Construction Manager.

G. The Contractor shall use the seed mixes and seeding rates specified in the Construction Drawings and Tables 5-1 and 5-2, Tables 6-1 and 6-6, Tables 7-1 and 7-2, Tables 8-1 and 8-5, and Table 9-1 of the Reach 5A Restoration Plan, unless alternative mixtures and application formulae have been approved by the Construction Manager.

H. Seed shall not be applied when wind conditions are such that materials would be carried beyond designated areas or that materials would not be uniformly applied and when wind velocity exceeds 15 miles per hour.

I. Seeding activities shall not be carried out on days with heavy precipitation that may result in the washing out of seed.

J. The Contractor shall apply seed in a way that ensures the entire required area receives seed. The Contractor shall reseed areas where gaps in the seeded areas exceed 4 square feet.

K. The Contractor shall lightly rake seeded areas within 12 hours to ensure proper soil-seed contact.

L. The Contractor shall not seed areas inundated by water.

M. Seeding shall overlap adjoining vegetation by at least 12 inches.

N. The Contractor shall water seeded areas to promote seed germination and growth. The Contractor shall avoid creating rills and furrows because of watering and repair and reseed any rills and furrows resulting from overwatering.

O. The Contractor shall mark seeded areas to prevent intrusion from foot traffic and equipment.

3.05 PROTECTION FABRIC

A. If determined necessary, erosion protection fabric shall be installed after seeding is accepted by the Construction Manager.

B. The surface shall be free of rocks, clods, sticks, and vegetation prior to fabric installation. Fabric shall be placed to have good contact with the soil.

C. The Contractor shall lay protection fabric loosely and stake or staple the fabric to the slope to maintain direct contact with the soil. The fabric shall not be stretched during installation.

D. The Contractor shall install the fabric blankets vertically from top of slope to bottom of slope.

E. The Contractor shall bury and anchor the top of slope and toe of slope portions of the fabric.

3.06 MAINTENANCE

A. Maintenance will be conducted in accordance with applicable sections of the RPOEC.

B. The Contractor shall maintain the seeded and planted areas throughout the contracted Warranty period, inclusive of the respective amount of full growing seasons following seeding. Maintenance responsibilities begin immediately after seeding and planting after the Construction Manager has accepted the seeding and planting.

C. Maintenance will include control of invasive species and herbivores and other vectors that threaten the establishment of the seeding. The Contractor shall remove undesirable plant material that interferes or inhibits the growth of the plants installed by the Contractor. The Contractor shall take necessary action to correct and restore the unacceptable areas.

D. The Contractor shall maintain vegetative cover by watering, weeding, and reseeding and replanting. In addition, the Contractor shall control prohibited and regulated invasive plant species.

E. The Contractor shall repeat watering weekly for at least 4 weeks after seeding if natural rainfall is less than one (1) inch per week at a minimum.

F. The Contractor shall reseed and replant areas that are unacceptable during the maintenance period. Bare areas greater than 4 square feet shall be reseeded with the specified seed mix.

G. The Contractor shall conduct corrective action and maintenance within 30 days to address unacceptable areas specified herein. This includes the removal of trash or other non-native debris.

H. The Contractor shall notify the Construction Manager 48 hours prior to and following any maintenance activity.

I. Approval of seeded and planted areas will be by the Construction Manager at the end of the growing season the year after seeding and planting. Approval will be provided if all requirements have been met, including the following:

1. Seeded and planted areas are properly established.
2. Seeded and planted areas are free of eroded, bare, or dead spots and free of prohibited and regulated plant species.
3. Planted shrubs and trees have remained viable during the contracted maintenance period.
4. Contractor has provided an approved treatment of invasive species as necessary and prescribed with prior coordination and approval from the Construction Manager.
5. Mean percent survival rate of native target species is equal to or greater than 80 percent in each design plant community type.
6. Mean percent cover of invasive or likely invasive plant species (https://massnrc.org/mipag/) is equal to or less than 10 percent cover.

3.07 WARRANTY

A. The Contractor shall guarantee the plantings for the contracted Warranty period following approval from the Construction Manager. During this Warranty period, monthly inspections of plantings during March through November are to be conducted to document and communicate the current condition of plants established. Measures in accordance with Section 3.06 are to be taken if conditions at the time of inspection dictate maintenance. Inspection reports are to be submitted to the Construction Manager within forty-eight (48) hours of the inspection. Dead or stressed plants noted in inspections shall be replaced with new plants of same size and species within one (1) month or in first month of next growing season, whichever comes first, as permitted by specifications. An arborist can be contracted if necessary to determine plant vitality, however the Construction Manager will have ultimate and final say regarding replanting. Replacement plants shall be installed according to the Drawings and Specifications.

B. Notify the Construction Manager at least one (1) month in advance of requested date of final inspection at end of the contracted Warranty period. Submit to the Construction Manager, at least fourteen (14) days before final inspection, a compiled list of plants replaced during the Warranty period with species, location, and replacement dates.

C. At the end of the Warranty period, plant guard or bracing material acquired and installed according to Section 2.05 deemed no longer necessary by the Construction Manager shall be removed from applicable plantings. All dead or unsatisfactory areas shall be addressed according to Section 3.06 until satisfactory growth with intended species has occurred, as a condition of completion of all Work at final inspection.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. This section is applicable whenever the Contractor carries out the Work using vessels or other marine equipment.

B. For the purposes of this specification, marine equipment refers to all vessels, floating plant, and vessel-mounted or vessel-required equipment used to perform Work on the water, including barges, push boats, tow boats, dredges, scows, work platforms, and all required navigation, communication, lifesaving, fire protection, and safety equipment.

C. This section is not applicable to construction equipment that are not situated on vessels, barges, or floating platforms.

D. The Contractor shall furnish labor, materials, and equipment necessary to provide, operate, track, and maintain all vessels and marine equipment necessary to perform the Work, inspect marine equipment, and control and coordinate marine traffic in the Work Area designated on the Design Drawings and in accordance with Section 01140 – Work Restrictions.

1.02 RELATED SECTIONS

A. Section 01140 – Work Restrictions

B. Section 02 51 00 – Decontamination

C. Section 35 24 00 – Sediment and Riverbank Soil Removal

D. Section 35 28 00 – Engineered Cap

1.03 SUBMITTALS

A. Pre-Construction

1. Vessel List: The Contractor shall submit a list of all the Contractor's proposed vessels, including marine construction and ancillary support vessels, to the Construction Manager. The list shall also include all vessels proposed by subcontractors. An ullage (displacement) table for each material transport scow or barge shall also be provided.
2. Marine Equipment Safety Inspection Report: The Contractor shall prepare and submit a Marine Equipment Safety Inspection Report, including photographs, for all the Contractor's and subcontractor's vessels to the Construction Manager for acceptance prior to mobilization of the individual pieces of equipment to the Site

and prior to each construction season. Reports shall be prepared by an independent licensed marine Surveyor whose credentials have been submitted to the Construction Manager for written approval in advance of the first Marine Equipment Safety Inspection Report. Each report shall detail the inspection conducted by the marine Surveyor, including photographs and a statement regarding the vessels' stability, condition, and effectiveness, considering its intended role and functions and its ability to perform the intended roles and functions in conducting the Work. All deficiencies must be remedied by the Contractor, and the vessel must be reinspected, if necessary, and approved by the marine Surveyor before mobilization of the individual pieces of equipment to the Site.

3. Anchoring Plan: The Contractor shall submit an Anchoring Plan to the Construction Manager for review and approval prior to the start of marine Work. At a minimum, the Anchoring Plan shall include the locations, methods, procedures, and protocols that will be used to secure the Work-related vessels (including dredges, barges, and other Work vessels), including during active Work and non-Work periods; the proposed locations of any temporary mooring and anchoring, the locations and procedures for securing vessels during storm conditions and high-flow conditions, and procedures to avoid anchoring in previously capped areas.

B. During Construction

1. Weekly Report: The Contractor shall provide weekly report for submittal to the Construction Manager. Weekly reports shall include a summary of marine-based operations and an up-to-date list of all the Contractor's or subcontractor's vessels on site. Each weekly report shall include a summary of inspections of each vessel to confirm it is in good working condition for continued and safe operation and is appropriately equipped with mooring lines in good working condition, lighting in accordance with U.S. Coast Guard (USCG) regulations, an adequate number of fire extinguishers, a first aid kit, a throwable Type IV floatation device, and personal floatation devices. In addition, the report shall include a log of all traffic control and emergency communications, including times, vessel identification, location, and activity.

PART 2 – PRODUCTS

2.01 GENERAL VESSEL REQUIREMENTS

A. Vessels

1. All marine vessels and associated equipment shall conform to USCG regulations and requirements.

B. Marine VHF Radios

1. The Contractor shall provide at least two marine VHF radios per Project vessel that are capable of clearly receiving and transmitting radio communications throughout the Site.
2. General Electric Company reserves the right to purchase radios and other communication equipment to be managed and maintained by the Contractor for the duration of the Project.
3. Where applicable, the Contractor shall supply depth-sounding equipment, radar, a corrected compass, and/or any other navigation-safety equipment, charts, maps, and publications required by 33 *Code of Federal Regulations* 164 and 401.

PART 3 – EXECUTION

3.01 GENERAL

A. The Contractor shall comply with and adhere to all applicable USCG rules and regulations.

B. The Contractor shall maintain marine equipment and provide safety equipment in accordance with USCG regulations and to the satisfaction of the Construction Manager.

C. The Contractor shall establish safe buffer zones and provide, install, and maintain temporary aids to navigation (e.g., signage and buoys) as necessary to allow safe passage of Project and non-Project vessels around Work Areas.

D. The Contractor shall maintain a minimum of 1 foot of water between the hull and the river bottom for all barges and tow boats.

E. The Contractor shall immediately report all groundings to the Construction Manager.

3.02 EQUIPMENT

A. A qualified person must inspect marine equipment, including dredges, cranes, support barges, or other support equipment, before such equipment is entered into service to ensure safe operating conditions. The qualified person must have a recognized degree, certificate, or license or professional standing, as well as extensive knowledge, training, and experience in solving problems related to the Work. Inspections must be documented and submitted to the Construction Manager in accordance with Subparagraphs 1.04.A.2 and 1.04.B.1.

B. Tow Boats

1. All tow boats used for propelling barges and other equipment shall be equipped with VHF radios, an automatic identification system transponder, and depth-

sounding equipment, all of which are to be maintained in good operating condition during each tow.

2. The Contractor's tow boats shall be of adequate size for pushing the anticipated load and shall have necessary reserve power for maneuvering with material barges under emergency conditions.

C. Material Barges

1. The Contractor shall provide and maintain markings on all material barges that clearly indicates the draft of the barge. During the entire period of Work, the Contractor shall provide and maintain sufficient spotlights or floodlights such that the draft markings on the sides of material barges at bow and stern are legible from the tow boat at night and when visibility is impaired. The transport of materials shall be in watertight, structurally sound barges of appropriate dimensions for transport.
2. Split hull scows are not permitted, even if welded prior to use. Barges shall be in a condition approved by the Construction Manager and shall be free of leaks and other damages.
3. All corners and sides of material barges shall be marked with retroreflective materials, such that they can be clearly identified by vessels traveling in the river in low-light conditions.
4. All edges of barges shall be clearly painted with highly reflective paint to aid workers in identifying the edges of barges at night.
5. Empty and loaded material barges used in shallow draft areas shall be capable of being maneuvered with small craft that can operate in shallow water while minimizing disturbance of the river bottom.

D. Lighting and Markers

1. All operations performed during the non-daylight hours shall be properly illuminated to allow for the complete performance and inspection of the Work. This shall consist of providing, installing, operating, maintaining, moving, and removing portable light towers and equipment-mounted lighting fixtures for nighttime construction operations. For lighting performance specifications, nighttime operations consist of Work that occurs after sunset and before sunrise.
2. Each worknight, 30 minutes before sunset, 30 minutes after sunrise, and during periods of restricted visibility, the Contractor shall provide lights according to USCG regulations, for floating plants, ranges, and markers. Lights for buoys that could endanger or obstruct navigation shall also be provided. Lights shall be provided for installed equipment being used to perform the Work, even when it is not in use. The Contractor shall immediately repair any non-functioning lights and shall check all lights at the start of each shift.

3. Lighting shall conform to USCG requirements for location, visibility, and color.
4. Signage, buoys, or flags shall be installed to clearly identify the Work Areas, vessels, barges, in-water equipment, and other obstructions (e.g., floating or submerged pipelines) to provide proper warning to mariners in accordance with USCG requirements.
5. The Contractor shall comply with all Private Aids to Navigation regulations and permit requirements regarding navigation, lighting, signage, and marine notifications to the satisfaction of the Construction Manager.

E. Access to Vessels

1. The Contractor shall notify the Construction Manager prior to the mobilization of the individual vessels so the Construction Manager may inspect the Contractor's vessels. Pre-mobilization inspection locations and times shall be determined in coordination with the Construction Manager. The Contractor shall provide the Construction Manager with complete access to its vessels for scheduled and non-scheduled inspections.

F. Communication Devices

1. The Contractor shall establish a communication system that is capable of communicating clearly at all times. This can be either radio or phone-based communication.
2. If the communication system is radio based, the Contractor shall provide the Construction Manager with a minimum of two new radios compatible with the Contractor's communication system. The Contractor shall install and maintain all antennas, power amplifiers, antenna towers, and other associated hardware such that radio communications can be clearly transmitted and received throughout the entire Work Area for the Project's duration.
3. If the Contractor plans to conduct Project communication using a private phone network, the Contractor shall provide the Construction Manager with four compatible communication devices that can be used with said private network. The Contractor shall be responsible for costs associated with acquisition, activation, maintenance, and monthly usage for the duration of the Work.

3.03 CREW BOAT

A. All crew transport vessels shall be equipped with working GPS navigational hardware and software.

B. The Contractor shall provide an operator who possesses an appropriate USCG operator's license for carrying passengers on board.

3.04 MAINTENANCE

A. Floating plant, scows, coamings, barges, and associated equipment shall be maintained to meet the requirements of the Work, including the prompt repair of leaks.

B. Preventive Maintenance Program: The Contractor shall have and implement a preventive maintenance program for all marine equipment. The minimum preventive maintenance requirements shall meet the manufacturer's guidelines.

3.05 ANCHORING

A. Installation and deployment of anchoring equipment shall adhere to USCG regulations.

B. The Contractor shall remove visible sediment and vegetation from anchors before leaving the location of anchoring.

C. No anchoring is permitted in areas where the caps have been placed and accepted as final by the Construction Manager. The Contractor may request an exception to this requirement on a case-by-case basis with a detailed rationale of why anchoring is required in such area after the completion of capping. Any exceptions shall require prior written approval by the Construction Manager and could require the Contractor to repair any damage to the previously installed and approved cap.

D. All anchoring systems for Work-related vessels must be kept in proper working order. All anchoring chains and winches shall be inspected prior to deployment each day to ensure proper working order. Repairs and preventive maintenance to equipment shall be made in a timely manner to minimize downtime and loss of production. Repairs shall also be made to ensure the safety of the operation, as well as continue the efficiency of all operating equipment. Inspections of equipment shall be allowed at any time.

E. The Contractor shall anchor vessels and equipment in a safe and secure manner during storm and high-flow conditions.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Section presents requirements for sediment and riverbank soil removal along Reach 5A of the Housatonic River. Sediment, debris, and adjacent riverbank soil removal performed from the river is collectively referred to in this Section as "dredging."

B. The Contractor shall be solely responsible for the selection and design of the type, size, processes, equipment, materials, and methods used to perform dredging, dredged material transport, capping, and associated restoration activities within the river channel. The Contractor shall select means and methods that fully integrate each step of the remediation process, while maintaining compliance with the Contract Documents, Performance Standards, and applicable regulatory requirements, including, but not limited to, pre-construction surveys; dredging, handling of debris and woody material, achievement of the specified post-construction river channel and riverbank elevations and grades, dredged material processing and dewatering, post-removal surveys, engineered cap construction, and installation of restoration features and structures.

C. In accordance with Section II.B.2.a.(2)(a) of the Revised Final Resource Conservation and Recovery Act Permit Modification (Revised Final Permit), sediment removal and capping in Reach 5A shall generally be performed using engineering methods employed from within the river channel, or other methods approved by the U.S. Environmental Protection Agency (EPA). Accordingly, the Contractor's selected means and methods will be subject to approval by both the Construction Manager and EPA.

D. Prior to initiating in-water remedial construction, the Contractor shall prepare and submit a detailed Operations Plan to the Construction Manager for review. The Contractor's Operations Plan will be incorporated into a Supplemental Information Package (SIP) to be prepared by General Electric Company (GE) and submitted to EPA for review and approval. The Operations Plan shall describe, at a minimum, the proposed construction sequencing; selected remediation methods; equipment types and operating limitations; access and staging approaches; sediment handling, dewatering, and transport procedures; debris and woody material management; turbidity, erosion, and hydraulic control measures; and methods for verifying compliance with design elevations, grades, and Performance Standards. The Contractor shall revise the Operations Plan as necessary to achieve approval by the Construction Manager prior to implementation. The Contractor shall also revise and resubmit the Operations Plan as necessary to address changing Site conditions, alternative sequencing, equipment modifications, or adaptive management adjustments identified during remediation activities. Review and approval of the Operations Plan by the Construction Manager shall not relieve the Contractor of its sole responsibility for the safety, adequacy,

constructability, or effectiveness of the selected equipment, means, methods, sequences, or procedures, nor from compliance with the Contract Documents, Performance Standards, or applicable regulatory requirements.

E. The Contractor shall furnish all labor, supervision, materials, tools, equipment, services, accessories, and appurtenances necessary for, or incidental to, performing all required removal of sediment, debris, and riverbank soil, and related Work. The dredging shall be conducted as described in the Specifications, as shown on the Design Drawings, and based on the electronic Dredge Prism Files. This includes, but is not limited to, removing sediment and riverbank soil to the Required Elevations and slopes shown in electronic Dredge Prism Files, placing the removed material into watertight material hauling equipment, and transporting the material to the applicable Temporary Staging Area.

F. The Contractor shall perform all sampling, testing, examination, investigation, and data collection as necessary to support the Contractor's plan for dredging, dredged material transport, and related Work.

G. The Contractor shall minimize the removal of nontarget sediments and riverbank soils from elevations below the targeted dredge cut lines.

H. Sediment removal and capping along the river channel shall be performed in the Cap Certification Units (CCUs) shown on the Design Drawings, and riverbank soil removal shall be performed in the Riverbank Certification Units (RCUs) shown on the Design Drawings. The CCUs and RCUs are portions of the Work Area that will be used to verify that sediment removal, riverbank soil removal, and capping are performed in accordance with the Specifications and Design Drawings. In some areas, CCUs encompass locations where riverbanks and floodplain areas are currently present, and where completion of the dredging Work will result in a realignment or lateral shift of the active river channel. Similarly, in certain areas, RCUs overlap with the existing alignment of the river channel.

I. Sediment and soil removal along the river channel is being performed within the CCUs to subgrade elevations needed to facilitate placement of an engineered cap. Within the CCUs, the specified removal elevations shown in the Dredge Prism Files were established based on the post-restoration elevations associated with the Natural Channel Design, minus the minimum thicknesses and assumed average placement tolerances for each cap layer.

J. Within the RCUs, the riverbank soil removal follows post-restoration elevations and slopes developed based on Natural Channel Design considerations, as indicated in the Dredge Prism Files. Where the Design Drawings specify additional riverbank soil removal not detailed in the Dredge Prism Files, the additional riverbank soil removal shall be performed in accordance with the Design Drawings.

K. This Section assumes that the Contractor's removal methods will be based on mechanical dredging techniques. The Contractor may propose alternate removal methods demonstrated to achieve equivalent or improved performance subject to review and approval by the Construction Manager.

L. The Contractor shall implement best management practices (BMPs), controls, and other measures necessary to maintain compliance with the Surface Water Action Levels and Quality of Life Standards described in Section 01571 – Operations, Environmental Restrictions, and Controls.

M. A third-party surveyor, operating under the supervision of the Construction Manager or GE, will conduct pre-construction and post-construction surveys to confirm adherence to the specified requirements for the sediment and soil removal activities within the river and along the riverbanks. Although the Contractor shall perform progress surveys in dredging and capping areas for operational planning and progress documentation and may elect to perform other independent surveys for operational or QC purposes, survey data and determinations made by GE's third-party surveyor shall govern final determinations regarding dredging completion, engineered cap completion, and related quantities.

1.02 RELATED SECTIONS

A. Section 01571 – Operations, Environmental Restrictions, and Controls

B. Section 02 21 00 – Surveys

C. Section 31 13 18 – Removal of In-River Debris and Shoreline Vegetation

1.03 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS (NOT USED)

1.04 SUBMITTALS

A. Pre-Construction

1. Dredge Plan: For each construction season, the Contractor shall submit an annual Dredge Plan to the Construction Manager for review and approval. The Dredge Plan shall be updated each year, or as requested by the Construction Manager, to include details for the Work planned. Details from the Contractor's Dredge Plan will be incorporated in the SIP that will be submitted to EPA. The Dredge Plan must be approved by the Construction Manager prior to initiating any Work related to dredging. At a minimum, each Dredge Plan shall include the following items:
   a. Proposed revisions (if any) to the size and layout of any of the CCUs or RCUs shown on the Design Drawings

1) The Construction Manager, in consultation with GE and the Engineer, will make final determination if any modifications to the size or layout of the CCUs or RCUs will be incorporated.

b. Figures showing the layout and extent for each CCU and RCU, along with tables summarizing the area (in square feet) and estimated removal volume (in cubic yards) associated with each CCU and RCU

c. A detailed description of startup and testing operations that will be implemented by the Contractor to verify proper operation of the dredging equipment, processes, controls, and procedures that shall include the following, at a minimum:
   1) The CCU and RCU where startup and testing operations will occur and the rationale for starting at this location
   2) Testing equipment, instrumentation, and methods during the startup period and a list of the equipment to be used
   3) A staffing plan, schedule, and shift rotations during the startup period
   4) A description of information to be collected and analyzed during the startup period, including, but not limited to, the following:
      a) Bucket positioning data
      b) Survey data, including bucket positioning validation
      c) Water quality monitoring
      d) Production rates, shallow water access, equipment movements, material hauling equipment loading and transfers, and other operational details
      e) Procedures for adjusting the Dredge Plan, as necessary, based on information collected and analyzed during the startup period

d. Proposed means and methods that will be utilized to perform the dredging, riverbank soil removal, on- and off-water transport, and related Work. This information shall include manufacturer, number, type, and size of any dredges, excavators, dredge/excavation buckets, material hauling equipment (e.g., haul trucks, scows, and tow/push boats), support vessels, containers, and other support equipment with pertinent details for each piece of equipment (e.g., dimension, horsepower, bucket size and type, and crew, as applicable)
   1) Ullage tables (i.e., displacement table) shall be provided for any scow or barge planned for use.

e. Descriptions, dimensions, capacity, drawings, and photographs of the dredge buckets, excavation buckets, or equivalent equipment
   1) Include a description of the dredge bucket real-time kinematic differential global positioning system (RTK-DGPS) and dredge cut visualization software to be utilized for removal, including manufacturer, make, and model. Describe measures to be used to minimize the entrainment of excess water and minimize resuspension during dredging conducted “in the wet.”

f. Procedures for verification of the Dredge Positioning System (DPS) described in Paragraph 2.01.C

g. Proposed approach for deployment of dredging and material hauling equipment and personnel to the Work Areas
h. Proposed means and methods for maintaining the required horizontal and vertical offsets from submerged utilities
i. Proposed means and methods for dredging in areas with hard subgrade, boulders, and cobbles
j. Proposed means and methods for dredging, handling, loading, transporting, and managing dredged materials designated for off-site disposal as segregated material streams separately and distinctly from materials designated for disposal in the Upland Disposal Facility (UDF)
k. Planned daily production rates for each operating dredge plant, including planned average cycle times and hours of operation
    1) Include the estimated average hourly in situ sediment and riverbank soil removal rate (in cubic yards per hour) for each dredge
        a) Identify assumptions for effective and noneffective time and identify anticipated sources of lost time associated with weather-related delays.
l. A detailed schedule and sequence in which the Work will be performed for each dredge plant by CCU and RCU
    1) Identify any required sequence that conflicts with the requirements contained herein.
m. Proposed means and methods for accessing the dredging areas
n. Proposed methods and equipment for transporting the removed materials to the applicable Temporary Staging Area
    1) Include a description and the number, type, and sizes of haul trucks, scows, and/or other hauling equipment for material transport, including debris.
o. Proposed approach for providing complete coverage of the areas to be dredged, including sufficient dredge bucket overlap
    1) Detail the amount of bucket overlap proposed for each bucket type. Provide example bucket footprint layouts showing the number, size, and orientation.
p. Proposed means and methods for removing riverbank soil and achieving the required bank elevations and grades
q. Proposed methods for minimizing the extent of over-dredging while achieving the Required Elevations
    1) Include procedures for dredging within dredge tolerances as specified herein. Include methods to provide quality control during dredging with a description of location control equipment.
r. Proposed methods, procedures, and equipment for debris removal during dredging, including the segregation and transport of debris that may be encountered during dredging
s. Proposed methods, procedures, and equipment for clearing vegetation and debris, including the segregation and transport of debris

t. Proposed erosion and sedimentation control measures for upland areas disturbed where dredge cuts extend into the adjacent upland areas
u. Proposed methods for avoiding, protecting, or removing and replacing public and private utilities, including setbacks
    1) Include the procedures for locating and protecting any utilities that could be encountered and impacted by the Work.
v. A description of contingent measures to address odors that may occur during dredging or transport of sediment or debris
w. A detailed description of means and methods, BMPs, and contingency response measures to be implemented to minimize sediment resuspension during dredging and debris removal to comply with water quality requirements and meet the requirements of Section 01571 – Operations, Environmental Restrictions, and Controls.
x. A detailed description of any turbidity control systems to be employed during all debris removal, dredging, capping, and backfilling operations
y. A description of how dredged material accumulation on the outside of a haul truck, scow, or other hauling equipment will be prevented and how all visible sediment and soil will be removed from the outside of the hauling equipment prior to leaving the dredge area and before return to the dredge area after offloading at the Temporary Staging Area

2. Proposed Offsets: The Contractor shall submit proposed offset locations and distances where the Contractor can demonstrate that dredging operations cannot be implemented safely or where the Contractor believes that dredging or sediment removal operations cannot be implemented without compromising the integrity of public or private structures or utilities in or along the banks of the river. The Contractor's submittal shall include a drawing(s) showing the proposed offset location and distance, along with a detailed description of the rationale for each proposed offset. The proposed setbacks will be subject to review and approval by the Construction Manager and may require consultation with EPA and the utility or structure owner as part of review.

3. Submit the locations and coordinates for the riprap/mudline interface and the riprap offset at each transect based on probing conducted in accordance with Paragraph 3.01.C. This information shall be submitted to the Construction Manager, in a form acceptable to the Construction Manager, at least 30 days prior to dredging in a CCU. The Construction Manager will use this information to make any adjustments to the Dredge Prism Files.

4. Submit the locations and coordinates for the mudline interface near in-river structures and the offset at each transect based on probing conducted in accordance with Subparagraph 3.01.D. This information shall be submitted to the Construction Manager, in a form acceptable to the Construction Manager, at least 30 days prior to dredging in a CCU. The Construction Manager will use this information to make any adjustments to the Dredge Prism Files.

B. During Construction

1. Daily Dredge Reports: The Contractor shall prepare and submit a Daily Dredge Report. The Daily Dredge Reports may be included as a component of the Daily Activities Report. These reports shall be submitted to the Construction Manager the day following the Work performed. At a minimum, the Daily Dredge Reports shall include the following:
   a. A description of general Work activities.
   b. A description and details of the daily quality control checks of all dredging equipment and positioning system sensors.
   c. The stop and start station for each day's dredging.
   d. Material Hauling Trip Logs, including the date, hauling equipment number and name, cumulative trip number, CCU or RCU where the material was loaded, dredge number/name, type of material loaded (e.g., sediment, riverbank soil, debris, water, and vegetation), estimated quantity of material, estimated volume of water, time of arrival at the Temporary Staging Area, Temporary Staging Area identification, and time of departure from the Temporary Staging Area.
   e. The location of dredging operations, hours of dredge time, total area dredged, actual daily production rate, and name of dredge operator(s).
   f. Daily and cumulative area and in situ volume dredged.
   g. Daily and cumulative estimated volume and weight and description of debris removed from the dredge area.
   h. Daily surveys to show the progress of dredging activities.
   i. Drawings or other visual presentation showing the dredge progress for the day.
   j. Equipment performance, maintenance, hours of downtime, and cause(s) of downtime.
   k. Delays encountered and relevant details of the delay, such as the cause, resolution, and measures implemented to avoid similar delays in the future and to make up lost time if necessary.
   l. Any loss of material, accidents, or other incidents that impacted normal operations.
   m. Any measures taken in response to exceedance of environmental monitoring compliance standards in accordance with Section 01571 – Operations, Environmental Restrictions, and Controls.
2. Utility Notification: Written documentation shall be submitted to the Construction Manager detailing the utility notification, including the time, date, and name of the utility contact in accordance with Paragraph 3.03.B.
3. Surveys
   a. Provide a pre-dredging surveys for approval by the Construction Manager in accordance with Section 02 21 00 – Surveys.
   b. Provide interim surveys to document dredge progress per Section 02 21 00 – Surveys.

1.05 GENERAL

A. Dredge Prism Files

1. Dredge Prism Files are electronic files that define the required limits and grades of dredging as shown on the Design Drawings. The Dredge Prism Files collectively include the following:
   a. Design Dredge Prism XYZ Files are electronic data point files that specify the horizontal (X and Y) and vertical (Z) extent of material to be removed as part of the dredging, including in-river sediment removal and adjacent riverbank soil removal.
   b. The electronic data files contain X, Y, and Z values on a 1- by 1-foot basis within the footprint of the targeted dredging area or riverbank soil removal area, plus adjoining side-slope areas. The Design Dredge Prism XYZ Files represent the Required Elevations for the design dredge cut.
2. The Dredge Prism Files may be revised to account for updated pre-construction bathymetric survey data, to incorporate setbacks approved in accordance with Subparagraphs 1.04.A.2, 3.01.C, or 3.01.D or to address other changes during final design. Revised Dredge Prism Files, if any, will be issued to the Contractor by the Construction Manager as the controlling basis for dredging limits prior to the start of dredging or sediment removal within a dredge area.
3. Where the elevation data shown in the Dredge Prism Files differ from the elevation contours shown on the Design Drawings, the Dredge Prism Files shall govern for the purposes of dredging limits, Required Elevations, and construction control.

B. Permits

1. The Contractor shall comply with all state, federal, and local permits obtained by or applied as outlined in Section 01110 – Summary of Work. The Contractor shall also comply with all permits obtained directly by the Contractor as required and necessary to complete the Work.

C. Site and Subsurface Conditions

1. Data and information from previous investigations are available in the Reference Documents provided to the Contractor.
2. The results of prior surveys and investigations are indicative of general conditions at their respective locations, considering the sampling and survey equipment employed. Variations in the properties of the materials are to be expected. Information regarding the physical and chemical properties of materials to be removed or otherwise associated with the Work is provided in the supplemental reference information identified in the Reference Documents. The information is based on field investigation and laboratory testing of the materials. The data and results of prior surveys and investigations reflect available information at the time

of data collection, are approximate, and may have changed since the time of data collection. Although the results of such investigations are considered generally representative of conditions at their respective locations at the time of the investigation, local variations in the materials are to be expected, and, if encountered, shall not be considered materially different within the purview of the Contract.

3. Vegetation and debris are present in the areas targeted for dredging. The Contractor shall examine the Work area and the reference materials and become thoroughly familiar with field conditions, types, and quantities of vegetation and debris that will be encountered during the Contractor's dredging operations. The Contractor's plan for dredging, dredged material transport, and dredged material dewatering/processing shall incorporate measures to manage vegetation and debris in a manner that does not adversely impact the dredging, dredged material transport, or dewatering/processing operations.
4. The Contractor shall field verify the locations of utilities within the Work Areas, including, but not limited to, those shown on the Design Drawings. The Contractor shall coordinate a utility locate service and coordinate utility identification and location with the owner of each utility to check all dredge areas.

1.06 NOTIFICATIONS

A. Notice of Readiness for Pre-Construction Survey: The Contractor shall provide at least 21 days of advance request to the Construction Manager for a pre-construction survey. The pre-construction survey will be conducted by GE's third-party surveyor under the direction of the Construction Manager. The results of this survey will be used to establish pre-dredge elevations in the dredge areas and will be used as the basis for calculating sediment removal volumes for the dredging.

B. Notice of Readiness for Survey During Construction: The Contractor shall provide at least 48 hours of advance request to the Construction Manager for a post-dredging survey to confirm the removal of sediment to the Required Elevations. The post-dredging survey will be conducted by the GE's third-party surveyor under the direction of the Construction Manager.

PART 2 – PRODUCTS

2.01 DREDGING PLANT AND EQUIPMENT

A. The Contractor shall be responsible for the selection of all types, sizes, processes, equipment, vessels, materials, appurtenances, and methods for dredging and dredged material transport. As applicable to the Contractor's selected dredging approach and equipment, equipment shall meet the minimum requirements described below, as specified in Section 35 02 00 – Marine Equipment and Transportation.

B. At a minimum, the dredging plant and equipment shall meet the following requirements:

1. The dredging and material hauling equipment shall be kept in satisfactory operating condition at all times and shall be capable of safely and effectively maintaining the production necessary to achieve the Project requirements.
2. The dredging equipment and methods shall minimize the amount of nontarget materials removed during dredging while achieving the Required Elevations.
3. The dredging equipment and methods shall minimize the release of resuspended sediments during dredging.
4. The dredging equipment shall be designed to minimize the amount of water contained in the dredge bucket and placed within the hauling equipment.
5. The dredging equipment shall be adequately sized and capable of removing sediment and soil to the full extent and Required Elevations identified in the Dredge Prism Files.
6. Any floating plants, barges, scows, coamings, barges, and associated equipment shall be maintained to meet the requirements of the Work, including the immediate repair of leaks, and comply with U.S. Coast Guard requirements.
7. Spare dredging equipment/materials shall be kept at the Project Site or nearby to minimize downtime or disruption to the dredging operations and to maintain compliance with the approved Project schedule.
8. Mechanical Dredges
    a. Where mechanical dredging equipment is used, an enclosed clamshell bucket shall be used as approved by the Construction Manager for all in-river contaminated sediment dredging unless the dredge area is located within an enclosed containment cell.
    b. Dredge buckets must be equipped with monitoring capabilities to inform the dredge operator if the bucket is not completely closed.
    c. Dredge buckets shall be designed to maintain enclosure of sediments when the bucket is being raised through the water column, and to minimize, to the maximum extent practical, the generation of suspended sediments during bucket lowering, closing, and raising in the water column.
    d. Dredge buckets may include features designed by the bucket's manufacturer that allow free water overlying the sediment in the bucket to drain once the dredge bucket has been raised above the water surface.
    e. The dredging equipment shall be capable of making a flat cut to minimize the amount of nontarget materials removed during dredging.
    f. The dredging equipment shall be designed to minimize the amount of water contained in the dredge bucket and placed within the material hauling equipment.

g. Dredge buckets of various sizes, types, and configurations shall be provided as necessary to maximize effectiveness based on the dredge cut thicknesses and different substrate conditions anticipated to be encountered.
h. Dredge buckets shall be adequately maintained during all dredging operations. This includes, but is not limited to, maintaining all bucket seals, vents, flaps, valves, and other design features at the original condition, if present, maintaining bucket lips such that they remain in alignment, maintaining the integrity of the bucket such that no cracks or holes exist, and maintaining the closing mechanism such that enough closing force is exerted to hold a full bucket of dredged sediment, including situations where vegetation and small debris may be present. Dredging buckets shall be inspected at least once per shift, and the bucket condition will be noted on the Daily Dredge Report.

C. Dredge Bucket Positioning System

1. The dredge shall be equipped with RTK-DGPS and the necessary sensors to enable accurate positioning of the dredge bucket and for the Contractor to continuously monitor the location of the dredge bucket.
2. The Contractor shall have qualified positioning equipment technical support personnel on the Site whenever dredging activities take place. Qualifications and experience of these individuals shall be supplied to the Construction Manager for approval.
3. The DPS shall be capable of the following:
   a. Inputting and presenting the Dredge Prism Files (an XYZ file on a gridded interval of 1 by 1 foot).
   b. Recording all excavator sensor information in a format approved by the Construction Manager so the position and movements of the excavator can be reviewed at a later date (playback capability).
   c. Producing plots showing the location where each dredge bucket closing (XYZ) was attempted and if the bucket was closed.
   d. Showing the dredge operator, in real time, the depth of material as the bucket takes a bite in relation to the Dredge Prism Files.
   e. Using a true 3D computational system to calculate the position of the bucket, considering the tilt and list of the dredge platform, as well as the standard positioning sensors.
   f. Showing the DPS's error budget demonstrates that the system can operate within the stated vertical and horizontal accuracies. The error budget should include all errors associated with measuring the positioning of the bucket.
4. HYPACK, Inc.'s DREDGEPACK System is an acceptable version of such a DPS. If the Contractor chooses to use an alternate positioning system, it must be approved by the Construction Manager.
5. The DPS for each dredge plant shall be verified in the field prior to the scheduled use of the equipment. The equipment verification can be completed on land or on

water and shall demonstrate the ability to achieve, monitor, and report these tolerances. The Construction Manager will be present for the operation and must approve the verification procedures. On-land verifications are considered contingent and shall be reverified once the equipment is on the water and before the equipment is used for dredging. The Contractor must verify its error budget (i.e., quality control check of all positioning sensors to verify that, individually and together, they operate within an error range that satisfies the error budget requirement) at least one time per day and include it in the Dredge Report.

PART 3 – EXECUTION

3.01 PREPARATION

A. The Contractor shall conduct field reconnaissance and survey activities as necessary to plan the Work, identify any potential obstacles, and facilitate development of proposed offsets. As part of this effort, the Contractor shall conduct probing, photographic/video surveys, reconnaissance surveys, or other survey means necessary to identify the presence and extent of foundations, submerged structures, or riprap protection around any in-river structures within or adjacent to dredge areas and establish the horizontal and vertical location where foundations, submerged structures, bridge piers, or riprap around in-river structures intersects the sediment surface. The Contractor shall submit all such survey information to the Construction Manager. Offsets shall not be implemented unless incorporated into Revised Dredge Prism Files issued by the Construction Manager. If approved, the Construction Manager will revise the Dredge Prism Files to account for approved offsets prior to dredging.

B. Prior to the start of dredging, the Contractor shall conduct required surveys as noted in this Section and Section 02 21 00 – Surveys.

C. Probing for Existing Riprap and Protection Measures along the Shoreline: The Contractor shall conduct survey and probing to identify the presence and extent of riprap and other bank protection measures along the shoreline and establish the horizontal and vertical location where riprap along the shoreline intersects the sediment surface (herein referred to as the “riprap-mudline interface”). This survey is not required where the Dredge Prism Files specify the soil removal and grading of riverbank soils. The probing shall be conducted using the following procedures:

1. Where riprap is present either above or below the waterline along the shoreline, establish probing transects at 25-foot intervals perpendicular to the shoreline.
2. Conduct probing along each transect using a steel rod (or other device approved by the Construction Manager) beginning at the location farthest from the shoreline where riprap is visible (either above or below the waterline).

3. If riprap is found, move to a point 5 feet farther from the shoreline along the transect and probe again.
4. If riprap is not encountered, move to a point closer to the shoreline along the transect and probe again in increments adequate to precisely locate the riprap-mudline interface.
5. Repeat this process until the riprap-mudline interface is located.
6. Once located, survey the location to identify the horizontal and vertical location of the riprap-mudline interface. The survey shall be conducted with equipment that has accuracy of within 3 inches horizontal and 2 inches vertical.
7. Document the location of the riprap-mudline interface at each transect, and establish the location of the riprap offset. Submit the coordinates for the riprap/mudline interface and the riprap offset at each transect. The Construction Manager will use this information during development of Revised Dredge Prism Files in accordance with Subparagraph 1.05.A.2.
8. This process shall be completed for all CCUs where dredging is planned for the upcoming construction season and may be conducted on a CCU-by-CCU basis.

D. Establish setbacks from bridge piers and other permanent in-river structures (herein referred to as "in-river structures"). The Contractor shall conduct survey and probing to identify the presence and extent of foundations, submerged structures or riprap protection around any in-river structures within dredge areas, and establish the horizontal and vertical location where foundations, submerged structures, or riprap around in-river structures intersects the sediment surface (herein referred to as the "mudline interface"). The probing shall be conducted using the following procedures

1. In areas where in-river structures are within a dredge area, establish an initial probing transect offset 10 feet from the structure and with probing intervals at 10-foot increments around the structure.
2. Conduct probing of each transect using a steel rod (or other device approved by the Construction Manager).
3. If hard bottom is found, move to a point 5 feet farther from the structure and probe again.
4. If hard bottom is not encountered, move to a point closer to the structure and probe again in increments adequate to precisely locate the mudline interface.
5. Repeat this process until the mudline interface is located.
6. Use an underwater camera or other means to assist with the observation/confirmation of the mudline interface, if necessary.
7. Once located, survey the location to identify the horizontal and vertical location of the mudline interface. The survey shall be conducted with equipment that has accuracy of within 3 inches horizontal and 2 inches vertical.

8. Document the locations of the mudline interface at each transect and establish the location of the in-river structure offset. Submit the coordinates for the mudline interface and offset at each transect. The Construction Manager will use this information during development of Revised Dredge Prism Files in accordance with Subparagraph 1.05.A.2.

3.02 WORK AREA

A. The Contractor shall conduct the Work in such a manner that no removed material (i.e., sediment or debris) is placed or otherwise deposited outside the dredging limits.

B. Work shall be conducted by the Contractor as presented in the Dredge Prism Files and as shown on the Design Drawings and such that shoreline materials adjacent to and upland of the dredge areas are not destabilized and do not enter the dredge areas. Sloughing or erosion of these shoreline areas into the dredge cut is not acceptable either during or immediately following dredging. Damaged Shoreline areas above the upper elevation of the dredge cut shall be repaired to pre-Work conditions or to conditions required by the Drawings and Specifications, as directed by the Construction Manager.

3.03 UTILITIES

A. The Contractor shall be responsible for identification, location, and protection of all utilities (including submarine cables, sewer lines, water lines, gas lines, overhead lines, private water intakes, and other utilities) prior to and during the Work.

B. The Contractor shall coordinate the Work with public utilities and private companies that have any sanitary sewer, water, electric, gas, or other utility lines at the Site and shall provide notice to the utility owner at least 7 days before Work within 300 feet of a utility or as requested by the utility owner. Written documentation shall be submitted to the Construction Manager documenting the utility notification including the time, date, and name of the utility contact person.

C. The Contractor shall take precautions against damages that might result from operations near utilities, including, but not limited to, dredge spuds or anchors into the channel bottom in the vicinity of underwater utility crossings. If any damage occurs, the Contractor shall suspend construction until the damage is repaired and approved by the utility owner and Construction Manager. The Contractor shall have sole responsibility for such repairs and any downtime of construction equipment and other related or consequential damages.

D. A preliminary review of utilities has been conducted and is shown on the Design Drawings. Utilities shown on the Design Drawings are approximate and do not represent exact locations or numbers of utilities and have not been verified with utility owners unless otherwise indicated.

3.04 EXECUTION OF THE DREDGING WORK

A. Prior to the start of dredging within a CCU or RCU, the Contractor shall conduct pruning of vegetation along the shorelines, as necessary, as described in Section 31 13 18 – Removal of In-River Debris and Shoreline Vegetation to complete the Work. Pruning operations shall be completed sufficiently in advance of the dredge such that it does not interfere with or conflict with dredging production.

B. Provide advance request to the Construction Manager for a pre-construction survey prior to the start of dredging in accordance with Paragraph 1.06.A.

C. Work shall be conducted in a manner to protect the stability of structures on or adjacent to the Contract Work Area.

D. The Contractor shall conduct dredging from upstream to downstream unless otherwise approved by the Construction Manager. Dredging may be performed concurrently in multiple CCUs at any given time where approved by the Construction Manager. However, dredging in a CCU will only be accepted by the Construction Manager once all dredging work in upstream CCUs has been accepted. This includes CCUs where the Construction Manager has allowed dredging to commence outside the normal upstream to downstream sequence.

E. The Contractor shall complete all dredging Work as described herein in accordance with the Contractor's approved Dredge Plan. Significant changes to operating procedures or equipment, such as proposed dredge production rates or changes to the sequence or duration of Work, must be reviewed and approved by the Construction Manager.

F. The Contractor shall implement procedures that minimize sediment resuspension during dredging and debris removal to meet water quality requirements and the requirements of Section 01571 – Operations, Environmental Restrictions, and Controls. The Contractor shall implement measures to address and control sheens to the extent practicable (if any) on the water surface.

G. Any delays resulting from the Contractor's operations and failure to meet these requirements shall not be cause for extension of the Project schedule.

3.05 DEBRIS REMOVAL

A. Prior to the start of dredging within a CCU, the Contractor shall perform a debris survey in accordance with Section 02 21 00 – Surveys. The Contractor shall use the debris survey findings to evaluate the locations, types, and sizes of debris and other obstructions and determine whether pre-dredging debris removal is needed to facilitate the dredging operation.

B. The Contractor's methods for removing debris and obstructions, once identified, shall be approved by Construction Manager prior to commencing removal.

C. The Contractor shall remove all debris that will interfere with dredging and capping operations, including full penetration or retrieval of the dredge bucket. The Contractor shall remove debris and obstructions as necessary to facilitate dredging to the Required Elevations. Debris removal may be conducted prior to dredging or as part of dredging. It is expected that large debris (where present) may require removal prior to dredging.

D. If debris cannot be removed using the dredge bucket, the Contractor shall be prepared to use and implement alternate procedures and equipment (e.g., grapplers) to remove debris as necessary to facilitate dredging to the Required Elevations.

E. The Contractor shall not rake the sediment bed during debris removal.

F. The Contractor shall notify the Construction Manager if debris encountered during debris removal or dredging extends into the riverbank beyond the removal limits. The Contractor shall not remove debris that extends into the riverbank beyond the removal limits unless approved by the Construction Manager.

G. Removal of debris or obstructions shall not occur outside established Work Areas unless approved in writing by Construction Manager.

H. The Contractor shall remove debris from the riverbed in a slow and steady manner to minimize resuspension of sediments.

I. Debris shall be transported to the applicable Temporary Staging Area within material hauling equipment approved for such use by Construction Manager. Debris may be transported to the Temporary Staging Area together with the dredged sediment, assuming the debris and sediment have the same disposal designation.

3.06 DREDGING

A. The Contractor shall excavate sediment to the Required Elevations presented in the Dredge Prism Files. In certain areas as shown on the Design Drawings, the Dredge Prism Files extend into the adjacent upland area where riverbank soil removal is specified.

B. The overdredge allowance within the dredge area shall not exceed an average of 6 inches within each 10-foot by 10-foot grid and shall not exceed an average of 4 inches across each CCU or RCU below the elevations presented in the Dredge Prism Files. The Contractor shall minimize over-dredging to the maximum extent possible. No payment shall be made for the removal, management, transportation, or disposal of material beyond the lateral limits of dredging or beyond the vertical overdredge allowance unless approved or directed in writing by the Construction Manager.

C. Where the riverbank soil removal is not specified, the Contractor shall protect and shall not remove shoreline riprap or other existing slope protection measures.

D. The Contractor shall select the dredging equipment and methods to minimize the release of resuspended sediments during dredging and minimize the entrainment of surface water in dredged material.

E. Where dredging is performed inside containment, the Contractor will be allowed to drain water from dredging buckets by suspending the dredge bucket over the excavation location prior to loading material directly into material hauling equipment, except if visible sheens that preclude the use of this drainage technique are observed. Where dredging is not performed inside containment, the Contractor shall not decant water from the dredge bucket into the Housatonic River before placing the material directly into material hauling equipment, and there should be no slowdown between the excavation of the material and deposition of the dredged material into the material hauling equipment.

F. The dredge bucket shall be placed in a manner as to provide complete horizontal coverage of the area targeted for sediment removal.

G. The Contractor shall not stockpile dredged material within the river or on the shoreline unless the dredging is performed under dry conditions or within containment.

H. The Contractor shall place dredged material in material hauling equipment after each dredge attempt, regardless of whether the bucket is fully loaded; multiple attempts to refill the dredge bucket are not permitted.

I. The Contractor shall conduct dredging at an appropriate rate and steadiness to minimize resuspension and minimize potential movement of sediment outside the dredge area.

J. The Contractor shall immediately notify the Construction Manager if areas of clay, rock, or high subgrade are encountered.

K. The Contractor shall be responsible for dredging stable internal and external side slopes and meet all internal and external side slope grades as presented in the Dredge Prism Files and shown on the Design Drawings. The Contractor shall maintain a stable slope outside of the CCU and RCU boundary at all times prior to acceptance such that materials from outside of the CCU and RCU do not enter the Work Area prior to the Construction Manager's acceptance of cap material placement.

L. The Contractor shall implement operational controls and BMPs to minimize sediment resuspension and maintain compliance with the water quality requirements. The operational controls and BMPs may include, but are not limited to, the following:

    1. Sequencing dredging operations in such a manner as to avoid sediment removal activities upstream of cap placement activities.

2. Performing dredging on sloped areas from the top of slope toward the toe of slope.
3. Using GPS-enabled positioning systems on dredging equipment to allow precise control of dredge bucket location and elevation.
4. Utilizing suitably experienced and qualified dredge operators.
5. Adjusting the rate of the Work to reduce suspended sediment
6. Optimizing the number of dredge bucket "bites" necessary to achieve the target dredge depth to maximize sediment capture efficiency.
7. Controlling the rate at which the dredge bucket is raised and lowered through the water column, particularly when operating near the riverbed.
8. Avoiding actions that can result in resuspension of sediments, such as dragging along the riverbed or reopening the bucket after initial closure.
9. Removing debris from the riverbed in a controlled and steady manner.
10. Completely closing (to the extent practicable) the dredge bucket prior to lifting it through the water column.
11. Moving buckets continuously and in the most efficient path to the hauling equipment once the bucket breaks the water surface.
12. Conducting equipment, vehicle, and vessel operations in a manner to minimize sediment disturbance and potential resuspension.

M. As shown on the Design Drawings, dredged material, including any debris, from portions of certain CCUs has been designated for off-site disposal rather than disposal within the UDF. The Contractor shall plan and implement dredging operations such that materials designated for off-site disposal are dredged, handled, loaded, transported, and managed as segregated material streams, separate and distinct from materials designated for disposal in the UDF. Segregation shall be maintained at all times during dredging and material handling operations. Separate handling shall include, at a minimum, segregation at the point of dredging, use of dedicated or clearly demarcated hauling equipment, separate material tracking and documentation, and delivery to the approved off-site disposal facility. Commingling of materials designated for off-site disposal with materials designated for disposal in the UDF is strictly prohibited.

3.07 DREDGING VERIFICATION

A. General

1. Pre- and post-dredge elevations will be surveyed by GE's third-party surveyor reporting to the Construction Manager. While the Contractor may choose to conduct its own measurements for the purposes of estimating quantities of sediments and riverbank soils removed and verifying cut lines, the measurements

conducted by the GE's third-party surveyor reporting to the Construction Manager shall form the basis for decisions regarding completion of dredging and quantity calculations.

2. Following dredging to the Required Elevations in a CCU and following any required additional dredging passes, the Contractor shall notify the Construction Manager. GE's third-party surveyor under direction of the Construction Manager will perform a post-dredging survey to confirm the removal of sediment to the Required Elevations. If directed by the Construction Manager, conduct additional dredging if the results of the post-dredging survey indicate that the Required Elevations are not achieved.

B. River Channel Dredging Verification

1. Within the CCUs, dredging shall achieve the Required Elevations in Dredge Prism Files in 95% or more of the total area dredged, excluding areas where hard-bottom/high-subgrade areas are accepted by the Construction Manager. The Construction Manager will determine if the Required Elevations have been met. This determination will be made by comparing the post-dredging survey elevations collected by others with the Required Elevations in the Dredge Prism Files. The dredge verification evaluation will be conducted by comparing the average value of each 10-by-10-foot grid cell from the post-dredge survey dataset with the average value of the Required Elevation dataset (based on the applicable Dredge Prism File) in each corresponding grid cell. Field-identified locations where hard bottom/high subgrade constrain the depth of dredging, as accepted by the Construction Manager, will be exempt from the dredge verification evaluation. Grid cells will be considered compliant with the design if the average post-dredge elevation is at or below the average dredge prism cutline elevation, within the applicable tolerances, within the 10-by-10-foot grid cell.

2. If more than 5% of the grid cells within a CCU are noncompliant, additional dredging shall be conducted in noncompliant cells to achieve the 95% requirement for the CCU. In addition, if the average elevation of a single 10-by-10-foot grid cell is more than 3 inches above the target elevation, that grid cell shall be re-dredged, except for areas where hard bottom/high subgrade have been encountered.

3. Field-identified hard bottom/high subgrade, as accepted by the Construction Manager, are considered to have achieved the Required Elevations.

4. The Contractor shall not purposefully avoid dredging any portion of the dredge areas to achieve the 95% tolerance requirement.

C. Riverbank Soil Removal Verification

1. Within the RCUs, surveys of riverbank soil removal and grading areas will be performed to verify that the Required Elevations and slope geometries have been achieved as shown on the Design Drawings and the Dredge Prism Files. The

riverbank verification evaluation will be conducted at the toe, midpoint, and top of riverbank slope at intervals of 25 feet along each riverbank segment.

2. Final elevations shall be verified by post-removal and post-grading topographic surveys conducted in accordance with Section 02 21 00 – Surveys. Finished riverbank elevations shall conform to the specified grades within a tolerance of plus or minus 0.2 foot unless more restrictive tolerances are shown on the Design Drawings or specified elsewhere in the Contract Documents. The riverbank verification evaluation will be conducted by comparing the post-dredge survey dataset with the corresponding values of the Required Elevation dataset (based on the applicable Dredge Prism File).
3. Survey data shall be used to confirm that Required Elevations, slope break locations, and tie-ins to adjacent channel and floodplain surfaces have been achieved.
4. Final riverbank slopes shall conform to the specified design slope within a tolerance of plus or minus 10% of the design slope ratio (e.g., a design slope of 3H:1V shall be acceptable between approximately 2.7H:1V and 3.3H:1V) unless otherwise specified. During active excavation and grading, the Contractor may use construction scale controls, such as slope templates, machine control systems, or other approved methods, to guide excavation and confirm that the target slope angle is being maintained. Use of such tools is intended to support construction accuracy and efficiency and does not replace the requirement for post-construction survey verification. Where slope templates are used, they shall be placed perpendicular to the riverbank at appropriate intervals to confirm conformance with the design slope.
5. Where the Design Drawings specify additional riverbank soil removal not detailed in the Dredge Prism Files, the additional riverbank soil removal shall be performed in accordance with the Design Drawings to remove at least 1 foot of soil measured normal to the finished slope face.
6. Final acceptance of riverbank removals and slopes shall be based on the results of post-construction surveys and comparison of as-built conditions to the Required Elevations and slope tolerances. If survey results indicate that Required Elevations or slope geometries fall outside the specified tolerances, the Contractor shall perform additional excavation, grading, or corrective measures, followed by resurveying, until compliance with the Contract Documents is demonstrated.

3.08 LOADING MATERIAL TRANSPORT HAULING EQUIPMENT

A. The Contractor shall load material into hauling equipment evenly, using methods that do not create an unsafe situation or a situation causing spillage or submergence (tipping).

B. The hauling equipment used for transport of dredged material shall be watertight. Any water pumped collected in the hauling equipment shall be removed and treated in the

on-site temporary water treatment system. Water shall not be pumped or discharged from the material hauling equipment directly into waterbodies under any circumstances.

C. The Contractor shall remove all visible sediment and debris from the outside surface of the material hauling equipment prior to moving it from the loading location.

D. The Contractor shall control the loading of material hauling equipment to prevent overflow.

E. Overflow of dredged material or water from material hauling equipment is strictly prohibited.

3.09 MISPLACED MATERIAL

A. Should the Contractor, during the execution of the Work, lose, dump, throw overboard, sink, or misplace any material, dredge, vessel, machinery, equipment, or appliance, the Contractor shall immediately notify the Construction Manager and then promptly recover and remove same to the satisfaction of the Construction Manager at no additional cost to GE.

B. Should the Contractor, during the execution of the Work, lose, dump, throw overboard, sink, or misplace any material or equipment, the Contractor shall promptly recover and remove the same to the satisfaction of the Construction Manager at no additional cost to GE. The Contractor shall give immediate verbal notice followed by written confirmation of the description, location, and quantity of such misplaced material or item. If the misplaced material or item causes an obstruction within the river, the Contractor shall mark and buoy such obstructions until the material or item is removed unless otherwise directed by the Construction Manager.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. The Contractor shall furnish all labor, supervision, materials, tools, equipment, services, accessories, and appurtenances necessary for, or incidental to, the construction of engineered caps in Reach 5A as shown on the Design Drawings and in accordance with this Section.

B. The Contractor shall be solely responsible for the selection and design of the equipment and methods used to construct the engineered caps. The Contractor shall select means and methods that fully integrate each step of the remediation process, while maintaining compliance with the Contract Documents, Performance Standards, and applicable regulatory requirements, including, but not limited to, pre-construction surveys, dredging, removal of debris, post-removal surveys, pre-placement surveys, engineered cap construction, post-placement surveys, and installation of restoration features and structures (e.g., single-arm vanes, cross vanes, sills, J-hooks, toewood, coir lifts, stone toes, and riprap bank protection).

C. In accordance with Section II.B.2.a.(2)(a) of the Revised Final Resource Conservation and Recovery Act Permit Modification (Revised Final Permit), sediment removal and capping in Reach 5A shall generally be performed using engineering methods employed from within the river channel, or other methods approved by the U.S. Environmental Protection Agency (EPA). Accordingly, the Contractor's selected means and methods will be subject to approval by both the Construction Manager and EPA.

D. The Contractor shall be responsible for sourcing and procuring the specified cap materials, transporting the cap materials to the applicable Temporary Staging Area or other approved location, unloading and staging the cap materials, blending and mixing the cap materials with amendments as necessary to achieve specified requirements, transporting cap materials to the locations of placement, and placing the cap materials in accordance with the Design Drawings and Specifications. The Contractor shall be responsible for all pre-placement sampling and testing of cap materials to verify compliance with the specified requirements.

E. The Contractor shall implement measures to ensure that the cap material placement complies with the specified cap layer thicknesses within the allowable tolerances and does not exceed the maximum allowable cap layer thicknesses and elevations and shall be responsible for corrective actions required to address any exceedances.

F. Placement of the engineered caps shall be performed in the Cap Certification Units (CCUs) shown on the Design Drawings. The CCUs are portions of the Work Area that will be used to verify that capping is performed in accordance with the Specifications

and Design Drawings. As described in Section 35 24 00 – Sediment and Riverbank Soil Removal, sediment and soil removal along the river channel is being performed within the CCUs to subgrade elevations needed to facilitate placement of an engineered cap. In some portions of the CCUs, no sediment removal is required prior to cap material placement.

G. After placing all cap layers, the top of the engineered caps shall achieve the required post-cap elevations and grades specified by the Natural Channel Design in accordance with the Design Drawings and Specifications. The Contractor shall place the Habitat Layer material above the cap Armor Layer (also referred to as the Erosion Protection Layer in design documents) to the thicknesses required to achieve the required post-cap elevations and grades. If cap materials are placed above or below the allowable tolerances, the Contractor shall be responsible for implementing corrective measures, including placement of additional material or removal of excess material as necessary to achieve the post-cap grades and elevations at no additional cost to General Electric Company (GE).

H. Where the difference between pre-capping subgrade elevations and required post-cap elevations are greater than the allowable total cap thickness, the Contractor shall place Grading Fill material to achieve suitable pre-capping subgrade elevations and slopes before placing the engineered cap as outlined in Paragraphs 1.01.H and 3.01.L.

I. The Contractor shall implement best management practices (BMPs), controls, and other measures necessary to maintain compliance with the Surface Water Action Levels and Quality of Life Standards described in Section 01571 – Operations, Environmental Restrictions, and Controls.

J. A third-party surveyor, operating under the supervision of the Construction Manager or GE, will conduct pre-construction and post-construction surveys to confirm adherence to the specified requirements for construction of the engineered caps. Although the Contractor shall perform progress surveys in dredging and capping areas for operational planning and progress documentation and may elect to perform other independent surveys for operational or QC purposes, survey data and determinations made by GE's third-party surveyor shall govern final determinations regarding dredging completion, engineered cap completion, and related quantities.

1.02 RELATED SECTIONS

1. Section 01571 – Operations, Environmental Restrictions, and Controls
2. Section 02 51 00 – Decontamination
3. Section 02 21 00 – Surveys
4. Section 31 05 13 – Soils and Aggregates
5. Section 35 02 00 – Marine Equipment and Transportation

6. Section 35 24 00 – Sediment and Riverbank Soil Removal

1.03 SUBMITTALS

A. Pre-Construction

1. Capping Plan: For each construction season, the Contractor shall submit an annual Capping Plan to the Construction Manager for review and approval. The Capping Plan shall be updated each year, or as requested by the Construction Manager, to include details for the Work planned. Details from the Contractor's Capping Plan will be incorporated in the Supplemental Information Package (SIP) that will be submitted for EPA review and approval. The Capping Plan must be approved by the Construction Manager prior to initiating any Work related to capping. At a minimum, each Capping Plan shall include the following items:
   a. Figures showing the layout and extent for each CCU, along with tables summarizing the engineered cap type, the CCU area (in square feet), and the estimated volumes (in cubic yards) for each cap material to be placed in each respective CCU.
   b. Figures showing the locations, arrangement, and layout of cap material stockpile areas, loading areas, equipment locations, and any other details pertinent to the cap material management operations.
   c. Identification and locations of all cap material sources, along with schedule for procurement, testing, and delivery.
   d. Written confirmation that the cap materials meet the required chemical and geotechnical testing criteria and material source quality criteria in accordance with Section 31 23 00 – Soils and Aggregates.
   e. Details for cap material transport and stockpiling, which shall include, at a minimum, transportation methods, material loading methods, schedules, and routing, and details for the equipment that will be used (e.g., trucks, cranes, conveyors, loaders, barges, scows, towboats, support vessels, and containers) to transport cap materials from the source locations to the Temporary Staging Areas and from the Temporary Staging Areas to the locations of cap placement.
   f. Procedures, means, and methods for preparing, blending, mixing, and staging of Chemical Isolation Layer material (sand and powdered activated carbon [PAC]), including measures to maintain the specified PAC dosage and prevent segregation during handling, transport, and placement. Provide the estimated volume and weight of each type of material to be blended and describe how the mix ratios will be optimized.
   g. A narrative description of the proposed means and methods for placing the Chemical Isolation Layer (sand and PAC) through the water column, including how controlled settling and uniform placement will be achieved to meet the Chemical Isolation Layer thickness and PAC content requirements, if placement is performed under submerged conditions. Describe measures to

minimize dispersion, lateral transport, resuspension, and loss of PAC during placement, particularly under anticipated flow and water depth conditions.

h. Identification and description of any specialized methods or temporary materials proposed to facilitate settling of PAC through the water column during Chemical Isolation Layer placement, such as binding agents, weighting agents, composite or aggregated formulations, or other placement aids. Provide documentation that demonstrates that any proposed methods or materials used to aid placement will not adversely affect PAC sorptive performance following placement.
i. Identification of quality control procedures to verify PAC dosage, layer thickness, and lateral uniformity of the Chemical Isolation Layer.
j. Identification of contingency measures or corrective actions that may be implemented if placement performance criteria (e.g., uniformity, material loss, or turbidity limits) are not achieved.
k. A description of how the Contractor will provide for Construction Manager access to inspect and randomly test cap materials for compliance with the Specifications prior to and during the Work.
l. Procedures, means, and methods for placement of the cap material, including details of the equipment to be used for material placement (e.g., excavators, cranes, conveyors, spreaders, or other equipment), means of positioning, sequencing, material placement techniques, and coordination with the surveying and dredging operations.
m. Procedures, means, and methods to control placement and achieve the specified thicknesses and elevations within the tolerances specified in this Section.
n. Quality control procedures, means, and methods that the Contractor will use to measure cap layer thickness and final grades.
o. Procedures to verify proper lateral extent of placement and methods of survey control, material volume, or weight monitoring. The use of electronic positioning and associated software, including data deliverables, shall be described.
p. Procedures, means, and methods for the Cap Placement Test to demonstrate the efficacy of material blending and placement methods in the first CCU as described in Article 3.05.
q. Proposed quality control measures (e.g., material volume tracking, physical measurements and sampling, surveys) to be employed by the Contractor throughout cap placement operations to provide feedback on equipment operations and as an additional line of evidence for cap layer placement.
r. Procedures, means, and methods, as well as BMPs that will be implemented to minimize sediment resuspension and turbidity during capping placement operations to comply with water quality requirements and meet the requirements of Section 01571 – Operations, Environmental Restrictions, and Controls.

s. Estimated cap material placement production rates, including the estimated area and volume of cap material planned for each week and the estimated average hourly placement rate (in-place cubic yards per hour) for the equipment used. Identify assumptions made for effective and noneffective time and lost time associated with weather-related and other delays.
t. A detailed schedule and description of the order in which the planned capping Work will be performed for each CCU accounting for survey verification and approval by the Construction Manager.
u. If used by the Contractor, a proposed approach for anchoring of all waterborne equipment and vessels in accordance with Section 35 02 00 – Marine Equipment and Transportation.
v. Proposed control measures to mitigate the potential for resuspension and downstream transport of contaminated sediment during cap placement operations.

2. Material specifications for the proposed PAC, as well as manufacturer's written instructions on material handling and staging.

3. Provide one 5-pound sample of the PAC material for inspection by the Construction Manager.

B. During-Construction

1. Daily Capping Reports: The Contractor shall prepare and submit a Daily Capping Report. The Daily Capping Reports may be included as a component of the Daily Activities Report. These reports shall be submitted to the Construction Manager the day following the Work performed. At a minimum, the Daily Capping Reports shall include the following:
   a. Description of the capping Work activities.
   b. Description and details of the daily quality control checks of all equipment and positioning system sensors.
   c. The start and stop time for each day's capping operations.
   d. Material Hauling Trip Logs, including the date, the hauling equipment number and name, the CCUs where the cap materials were placed, the types and estimated quantities of cap materials transported, and loading and unloading times.
   e. Estimated volume of stockpiled cap materials at each Temporary Staging Area.
   f. A description of cap Chemical Isolation Layer and amendment blending operations, including estimated quantities of amendment (PAC) used.
   g. The location of capping operations, hours of capping time, total area capped, and actual daily production rate for each capping plant.
   h. Daily and cumulative area covered by each cap material.
   i. Daily and cumulative estimated volume and weight of cap materials placed.
   j. Drawings or other visual presentation showing the capping progress for the day.

k. A summary of all capping-related surveys performed.
l. Equipment performance, maintenance, hours of downtime, and cause(s) of downtime.
m. Delays encountered and relevant details of the delay, such as the cause, resolution, and measures implemented to avoid similar delays in the future and to make up lost time if necessary.
n. Any loss of material, accidents, or other incidents that impacted normal operations.
o. Any measures taken in response to exceedance of environmental monitoring compliance standards in accordance with Section 01571 – Operations, Environmental Restrictions, and Controls.

2. Cap Material Weight Tickets: The Contractor shall provide copies of weight tickets for all cap materials transported to the Site. Weight tickets shall indicate the weight, time, and date of weighing for all truck loads.

3. Material Testing Results: The Contractor shall submit all cap material testing results as specified herein.

4. Quality Control Cap Placement Documentation: The Contractor shall submit the Contractor's quality control documentation related to cap placement (e.g., material volume tracking, physical measurements and sampling, and surveys).

5. Volumetric Placement Records: Where requested by the Construction Manager, the Contractor shall submit placement documentation summarizing the volume of material within each CCU, including figures showing the placement extent for each material type.

6. Activated Carbon Certifications: The Contractor shall submit vendor certifications indicating that the supplied activated carbon meets the criteria listed in Paragraph 2.02.C, at a frequency of one certification for every 40,000 pounds of activated carbon delivered.

7. Documentation to verify that the PAC content of the blended Chemical Isolation Layer materials meet the minimum requirements specified in Paragraph 2.02.A.

8. Column Test Summary: Submit a written report to document the results of the column bench-scale testing described in Paragraph 3.05.B.

PART 2 – PRODUCTS

2.01 CAP AGGREGATE MATERIALS

A. The Contractor shall comply with all source and material quality requirements in accordance with Section 31 05 13 – Soils and Aggregates.

B. The Contractor shall comply with all cap material testing requirements in accordance with Section 31 05 13 – Soils and Aggregates.

C. Cap aggregate materials shall meet the geotechnical and chemical testing criteria included in Section 31 05 13 – Soils and Aggregates.

2.02 CHEMICAL ISOLATION LAYER

A. The Chemical Isolation Layer shall consist of a blended mixture of sand and PAC to achieve a minimum in-place dry weight PAC content of 1.0%.

B. The sand component of the Chemical Isolation Layer shall meet the geotechnical and chemical testing criteria included in Section 31 05 13 – Soils and Aggregates.

C. The PAC component of the Chemical Isolation Layer shall meet the following criteria:

1. The material shall not have been previously used and subsequently reactivated or regenerated.
2. The base material shall be bituminous coal.
3. Steam shall be used as its activation method.
4. Minimum iodine number is 800 milligrams per gram.
5. Maximum moisture is 10% by weight.
6. There is no more than 1% by weight greater than 100 mesh (0.15 millimeter [mm]).
7. There is no more than 10% by weight greater than 200 mesh (0.075 mm).

D. The Contractor shall follow the manufacturer's specifications and instructions for storing PAC. PAC shall be suitably packaged during transportation and storage to isolate the material from the environment. The Contractor shall coordinate with the Construction Manager to allow the Construction Manager to conduct a visual inspection of PAC during unloading and staging to identify if any packaging has been damaged. Material in damaged packaging shall be marked and further inspected for product integrity. The Contractor shall handle PAC in accordance with the manufacturer's instructions.

E. PAC Testing Requirements:

1. The PAC shall be sampled and analyzed for iodine number (ASTM International D4607) at a minimum frequency of one sample per every 500 tons. Iodine number sample results must meet the minimum value specified in Subparagraph 2.02.C.4. The Contractor shall coordinate, collect, and submit the samples for laboratory analysis to verify conformance with the Contract Documents.

2. Pre-placement samples of the blended Chemical Isolation Layer material shall be submitted to the Construction Manager for dry-weight PAC content analysis at a frequency of one sample per 500 tons of Chemical Isolation Layer material placed or at a minimum of two samples per CCU. It is generally expected that the Construction Manager will provide results of this PAC testing to the Contractor within 5 calendar days after sample receipt.

F. When placement of the Chemical Isolation Layer is performed under submerged conditions, the Contractor shall incorporate specialized methods or materials, as necessary, to minimize dispersion, lateral transport, and loss of PAC during placement. Such methods may include, but are not limited to, temporary binding agents, weighting agents, composite or aggregated formulations, or other placement aids that increase the effective particle size or density of the PAC-amended material during installation. Use of such materials shall not relieve the Contractor of achieving all specified placement and performance requirements.

1. The selected methods and materials shall be demonstrated to allow the PAC-amended sand to settle predictably through the water column and achieve uniform distribution throughout the cap layer, while maintaining the sorptive performance of the PAC following placement.
2. The material must be capable of attaching the PAC material using inert binding agents for weighting.
3. The effective particle size of the material shall represent a range of particle sizes consistent with the general range of the sand component utilized.

2.03 CAPPING EQUIPMENT

A. The Contractor shall be responsible for the selection of all types, sizes, equipment, vessels, materials, and methods for transporting cap material to the point of placement and for placing the cap material in accordance with the requirements of this Section and the Design Drawings.

B. The capping equipment shall be capable of achieving the required limits, elevations, and grades, as well as the specified minimum thicknesses of the engineered cap layers.

C. The capping equipment shall be adequately sized for the intended purpose, maintained in good working condition, and meet all applicable navigational regulation requirements in accordance with Section 35 02 00 – Marine Equipment and Transportation.

D. Any equipment used for dredging or handling of contaminated material must be adequately decontaminated in accordance with Section 02 51 00 – Decontamination prior to handling cap materials.

E. Positioning Equipment

1. The Contractor's cap placement equipment shall utilize a positioning system, or other approved method, to place the cap material.
2. The Contractor shall have qualified positioning equipment technical support personnel at the Site whenever capping activities take place. Qualifications and experience of these individuals shall be supplied to the Construction Manager for approval.
3. Positioning equipment shall be capable of the following:
   a. Inputting and presenting a target placement file (an XYZ file on a gridded interval of 1 by 1 foot)
   b. Producing plots showing the location where cap material placement occurred.
   c. Using a true three-dimensional computational system to calculate the position of the equipment, considering the tilt and list of the platform, as applicable, as well as the standard positioning sensors.
   d. Showing that the positioning system's error budget allows it to work within the stated vertical and horizontal accuracies. The error budget should include all errors associated with measuring the positioning of the equipment.
4. The Contractor shall provide continuous power supply and necessary power and data backup means for instrumentation, primarily for positioning system equipment.
5. The positioning system for each capping plant shall be verified in the field prior to the scheduled use of the equipment. The equipment verification can be completed on land or on water and shall demonstrate the ability to achieve, monitor, and report these tolerances. The Construction Manager will be present for the operation and must approve the verification procedures. On-land verifications are considered contingent and shall be re-verified once the equipment is on the water and before the equipment is used for capping. The Contractor must verify its error budget at least one time per day (i.e., quality control check of all positioning sensors to verify that, individually and together, they operate within an error range that satisfies the error budget requirement).

PART 3 –EXECUTION

3.01 GENERAL

A. The Contractor shall not proceed with cap material placement in a CCU until the Construction Manager has provided the Contractor with written notification that the Work may commence.

B. The Contractor shall place cap materials in accordance with the thicknesses, elevations, and quality requirements specified herein and as shown on the Design Drawings.

C. The Contractor shall be responsible for sourcing and transporting the specified cap materials to the CCUs for placement.

D. The Contractor shall provide the Construction Manager with access at all times for inspection and testing of the cap materials at the sources, at stockpiles, and in loaded material hauling equipment.

E. Materials delivered to the Site shall be weighed on certified scales at the source location or at other approved locations prior to delivery. The Contractor shall provide copies of weight tickets for all cap materials transported to the Site.

F. The Contractor shall deliver and stockpile cap materials at the Site in sufficient quantities to meet schedule requirements.

G. Placement of cap material shall be accomplished such that material forms a uniform layer of required thickness within the tolerances specified in Articles 3.04 and 3.06 as verified by the Construction Manager.

H. The placement methods shall minimize resuspension of bottom sediments to prevent mixing of bottom sediments and cap material, shall minimize the downstream loss of cap materials during placement, and shall comply with the water quality requirements in Section 01571 – Operations, Environmental Restrictions, and Controls.

I. Single-point placement of cap material without leveling is not acceptable. The Chemical Isolation Layer material shall be placed in multiple thin layers (a minimum of two thin layers at each placement location) of comparable thickness; the placement of the multiple thin layers may occur during a single occupation of the area by the placement equipment provided uniformity and thickness requirements are achieved. The cap material shall be placed in a manner that provides a continuous uniform surface over the surface area to be filled. The Construction Manager may require additional material to be placed or additional leveling to be completed at the Contractor's sole expense to achieve this requirement.

J. The Contractor shall blend, mix, and handle materials as necessary to meet the material requirements specified herein and in Section 31 05 13 – Soils and Aggregates. The blending and mixing operation shall be performed in such a manner that each resulting material type is thoroughly homogenized. The Contractor shall implement means and methods to ensure proper mix ratios are achieved and to produce documentation daily, or as otherwise directed by the Construction Manager, demonstrating compliance with the specified requirements. The Contractor shall continuously monitor and test, as necessary as part of quality control, the blending operations to ensure full compliance with the material specifications and make any necessary adjustments to optimize operations. Blending and mixing operations shall be performed using a suitable mixing device and equipment to achieve the specified requirements. Mixing solely using

conventional earthmoving equipment (e.g., an excavator bucket) as the primary blending method shall not be allowed.

K. The Contractor shall place the Chemical Isolation Layer (sand with PAC) so that the PAC is uniformly distributed throughout the cap layer based on visual assessment of core samples. After the Chemical Isolation Layer has been placed and accepted by the Construction Manager, the Contractor shall utilize an appropriate capping method to place the subsequent layers, such that placement does not disturb the placed Chemical Isolation Layer.

L. Where the difference between pre-capping subgrade elevations and required post-cap elevations are greater than the allowable total cap thickness, the Contractor shall be responsible for placing Grading Fill material to achieve suitable pre-capping subgrade elevations and slopes before placing the engineered cap. Alternatively, subject to review and approval by the Construction Manager, the Contractor may place thicker cap layers or a thicker Habitat Layer as necessary to achieve the required post-cap elevations and grades. The determination of whether to place Grading Fill or thicker cap layers shall be made by the Contractor on a case-by-case basis with approval by the Construction Manager.

M. The Contractor shall implement operational controls and BMPs to minimize resuspension of bottom sediments and generation of turbidity during cap material placement to comply with water quality requirements specified in Section 01571 – Operations, Environmental Restrictions, and Controls. The operational controls and BMPs during cap material placement may include, but are not limited to, the following:

1. Using methods that minimize loss of fines and sediment agitation during cap placement operations
2. Reducing the fall height while placing material
3. Controlling the rate of material placement
4. Not performing excessive and rapid movement of the equipment
5. Conducting equipment movements and operations in a controlled manner to minimize potential resuspension

N. Underwater stockpiling and underwater dragging or rehandling of cap materials are prohibited.

3.02 CAPPING SEQUENCE REQUIREMENTS

A. Unless otherwise approved by the Construction Manager, capping in a CCU will only be allowed once all dredging in upstream CCUs has been accepted. This includes CCUs where the Construction Manager has allowed dredging to commence outside of the normal upstream to downstream sequence.

B. The Construction Manager must review and approve placement of the underlying cap layer prior to proceeding with placement of the next cap layer (e.g., the Chemical Isolation Layer placement shall be accepted by the Construction Manager prior to placing the Geotechnical Filter Layer or the Armor Layer, where no Geotechnical Filter Layer is specified).

C. The Contractor shall schedule the Work such that placement of all specified cap layers in a CCU (or subset of a CCU, if approved by the Construction Manager) can be completed and approved prior to winter shutdown in each season. No cap areas shall be left incomplete over a winter season.

D. If cap materials are placed in a downstream CCU prior to completing Chemical Isolation Layer placement in all upstream CCUs, the Contractor shall implement control measures to mitigate the potential for resuspension and downstream transport of contaminated sediment during subsequent upstream cap placement operations. The Contractor's proposed control measures to mitigate the potential for resuspension and downstream transport of contaminated sediment during subsequent upstream cap placement operations shall be submitted and approved by the Construction Manager prior to commencing cap placement following this sequence.

3.03 LAYOUT OF WORK

A. The Contractor shall establish an accurate method of horizontal and vertical control before capping Work commences.

B. The proposed method and maintenance of the horizontal control system shall be subject to approval by the Construction Manager. If at any time the method fails to provide accurate location for the capping operation, the Contractor may be required to suspend its capping operations.

C. The Contractor shall lay out its Work from horizontal and vertical control points indicated on the Design Drawings. All measurements shall be taken from these points. The Contractor shall furnish all stakes, templates, platforms, equipment, range markers, transponder stations, and labor as required to lay out the Work. The Contractor shall maintain all control points established for the Work until authorized by the Construction Manager to remove them. If such control points are destroyed by the Contractor or disturbed through their negligence prior to an authorized removal, they shall be replaced by the Contractor at no expense to GE.

3.04 ENGINEERED CAP TYPES

A. The engineered caps shall include the following:

1. Type A Cap: The Type A Cap shall consist of a Type A Gravel Armor Layer over a Chemical Isolation Layer (sand with PAC). Where shown on the Design

Drawings, either a Sand Habitat Layer or a Gravel Habitat Layer shall be placed above the completed Type A Gravel Armor Layer as described in Paragraph 3.04.D. The total design thickness for the Type A Cap is 22 inches.

2. Type B Cap: The Type B Cap shall consist of a Type B Coarse Gravel Armor Layer over a Chemical Isolation Layer (sand with PAC). Where shown on the Design Drawings, either a Sand Habitat Layer or a Gravel Habitat Layer shall be placed above the completed Type B Coarse Gravel Armor Layer as described in Paragraph 3.04.D. The total design thickness for the Type B Cap is 22 inches.

B. The Design Drawings show the extents of where each cap type shall be constructed.

C. The design layer thickness (i.e., minimum thickness), overplacement allowance, and maximum allowable material placement thicknesses for each cap layer are shown in Tables 1 and 2.

Table 1: Type A Cap Requirements

Material	Design Layer Thickness	Overplacement Allowance	Maximum Layer Thickness
Chemical Isolation Layer (Sand with PAC)	6 inches (minimum thickness)	3 inches	9 inches
Type A Gravel Armor Layer	6 inches (minimum thickness)	3 inches	9 inches
Habitat Layer (Sand or Gravel Habitat Layer)	The thickness of the Habitat Layer will vary as needed to achieve the final post-construction riverbed elevations as described in Paragraph 3.04.D.		

Table 2: Type B Cap Requirements

Material	Design Layer Thickness	Overplacement Allowance	Maximum Layer Thickness
Chemical Isolation Layer (Sand with PAC)	6 inches (minimum thickness)	3 inches	9 inches
Type B Coarse Gravel Armor Layer	6 inches (minimum thickness)	3 inches	9 inches
Habitat Layer (Sand or Gravel Habitat Layer)	The thickness of the Habitat Layer will vary as needed to achieve the final post-construction riverbed elevations as described in Paragraph 3.04.D.		

D. Habitat Layer material, either a Sand Habitat Layer or a Gravel Habitat Layer, shall be placed above the respective cap Armor Layer at variable thicknesses as necessary to achieve the final specified post-cap grades and elevations. The design thickness for the Habitat Layer is between 4 and 10 inches. The actual thickness of the Habitat Layer will

vary depending on the amount of over-dredging below the target design dredge prism and the actual placement thicknesses of the underlying cap layers.

3.05 CAP PLACEMENT TEST

A. At the start of cap placement each construction season, or at any time directed by the Construction Manager, the Contractor shall be required to demonstrate the efficacy of material blending and placement methods, referred to herein as a Cap Placement Test.

B. If the Contractor proposes to perform capping operations in submerged conditions, the Contractor shall first demonstrate through on-site bench-scale testing (or bench-scale testing at an off-site location approved by the Construction Manager) that the Chemical Isolation materials (including the PAC) have been adequately prepared and will uniformly settle through a column of water without visible segregation to the satisfaction of the Construction Manager. The Contractor shall provide at least 2 days advance notice to the Construction Manager prior to performing the bench-scale testing. The Contractor shall submit a written report with photographs to document that the bench-scale testing adequately demonstrates that the cap materials experience uniform settlement.

C. Following approval by the Construction Manager of the bench-scale testing (if applicable), the Contractor shall demonstrate placement of the Chemical Isolation Layer targeting one-third of the first CCU to be capped. The Contractor shall place the Chemical Isolation Layer material according to the following steps for the Cap Placement Test:

   1. Pre-placement surveys will be conducted by GE's third-party surveyor in accordance with Section 02 21 00 – Surveys.
   2. The Contractor shall submit information to the Construction Manager with the mix ratio of sand and PAC used to produce the Chemical Isolation Layer material along with corresponding pre-placement PAC content analytical data for the blended material stockpile.
   3. The Contractor shall place the Chemical Isolation Layer (sand with PAC) in the test area (i.e., targeting one-third of the CCU).
   4. Cap material placement as part of the Cap Placement Test shall be carefully tracked and monitored, with a focus on placement methods, operational controls, and water quality.
   5. Verification of compliance with the specified cap layer thickness requirements shall be based on a combination of physical measurements (i.e., core samples) and supplemented by survey data as described in Subparagraph 3.06.B.1.
      a. The Contractor shall prepare and submit documentation of volumetric placement and equipment positioning as an additional line of evidence to verify proper cap placement material quantities and extents.

b. In addition to the cap thickness measurements, the Contractor shall perform quality control checks throughout cap placement operations. These quality control checks shall include continual tracking of material volumes placed in a given area and other measures proposed by the Contractor to provide feedback on equipment operations. The Contractor shall submit these data to the Construction Manager for review to corroborate the compliance data and support decisions if any response actions are necessary.
c. Information gathered during the Cap Placement Test will be used to determine whether any adjustments to the thickness verification measurement techniques are warranted for full-scale cap placement operations.

6. The Construction Manager, or others under their direction, will collect core samples from the placed Chemical Isolation Layer and send the samples for laboratory analysis of PAC content. The PAC content test method will be determined once the PAC delivery approach is selected by the Contractor.
   a. If analytical results indicate the in situ PAC content satisfies the design requirements as specified in Paragraph 2.02.A, the Construction Manager will provide written approval of the Cap Placement Test, and the Contractor shall proceed with placement of the Chemical Isolation Layer (sand with PAC) using the same pre-placement mix ratio, pre-placement PAC content, placement methods, and placement rate over the remaining cap area shown on the Design Drawings.
   b. If the Construction Manager observes uneven distribution of the PAC in the core samples or if analytical results indicate in situ PAC content does not conform to the design requirements, the Contractor shall provide a corrective action plan for the Construction Manager's approval for the original Cap Placement Test Area, as well as the remainder of the cap area shown on the Design Drawings. Once the corrective action plan is approved by the Construction Manager and implemented by the Contractor, the Construction Manager will resample the placed Chemical Isolation Layer. The Contractor shall not continue with cap placement activities until receipt of written approval from the Construction Manager that the Chemical Isolation Layer is acceptable.
   c. If directed by the Construction Manager, the Contractor shall be required to conduct additional Cap Placement Tests if any of the following change: the pre-placement blending ratio; the pre-placement PAC content; or the placement means, methods, or rates. Any delays associated with additional PAC sampling verification due to changes in the Contractor's approach shall be at no additional cost to GE.
   d. The Construction Manager reserves the right to collect additional core samples from the placed Chemical Isolation Layer for PAC content verification at any time.

7. Following successful completion of the Cap Placement Test at the beginning of each construction season, ongoing testing of the PAC content of the Chemical

Isolation Layer will be performed on at least two pre-placement samples per CCU to verify that the PAC content in the pre-placement samples are consistent with the pre-placement data for samples collected as part of the Cap Placement Test. This sampling frequency may be adjusted as the Work progresses and sufficient data are generated to verify adequate placement, with approval from EPA.

3.06 ENGINEERED CAP THICKNESS VERIFICATION

A. General

1. Pre- and post-cap elevations will be surveyed by the GE's third-party surveyor reporting to the Construction Manager. While the Contractor may choose to conduct its own measurements for the purposes of estimating the thicknesses and elevations of the cap layers and the quantities of cap materials placed, the measurements conducted by GE's third-party surveyor reporting to the Construction Manager shall form the basis for decisions regarding completion of capping and quantity calculations.
2. Following cap layer placement to the required thicknesses and elevations in a CCU, the Contractor shall notify the Construction Manager. Others under direction of the Construction Manager will perform post-capping physical measurements and surveys to confirm the cap layer thicknesses and elevations achieve the specification requirements. After assessing the results of the verification surveys, the Construction Manager will notify the Contractor if the cap layer is complete or if additional Work is needed to achieve the specification requirements.

B. Verification of compliance with the specified engineered cap layer thickness requirements for each CCU will be based on a combination of physical measurements (i.e., core samples) and bathymetric or topographic surveys as warranted by Site conditions (i.e., the presence and depth of water). Each cap layer shall meet the applicable compliance criteria described herein.

1. Physical measurements (i.e., core samples) will be the primary method used to verify compliance with the specified cap layer thickness requirements for the Chemical Isolation Layer, and bathymetric or topographic surveys will be used to supplement the data as outlined below.
   a. The Construction Manager or a third-party contractor under the direction of the Construction Manager will collect and document physical measurements (i.e., core samples) to verify cap layer thickness.
      1) A minimum of 20 in situ measurements will be collected from the Chemical Isolation Layer for each CCU to provide thickness verification; the measurement locations will be spaced to provide relatively uniform spatial distribution throughout the CCU.

2) The location and measured thickness of each core sample will be documented, and photographs will be collected to show the thickness of each core sample.
3) The Contractor shall coordinate with the Construction Manager and third-party sampling contractor prior to collection of cores.
4) Where coring devices are used as the standard to measure applied cap for the Chemical Isolation Layer thickness, the applied thickness will be determined from visual observation of the clean (unmixed) sand thickness, plus 50% of the mixing zone thickness where the sand comprises at least half of the matrix, as determined through visual observations or physical characterization by the sampling personnel in the field.
5) The Construction Manager will summarize the results of the physical thickness measurements for verification of placed layer thickness. The physical measurements will be summarized in a tabulated format that, at a minimum, identifies the sample ID, sample location, CCU, sample type, cap layer, sampled material description, measured thickness, and relevant observations or notes.

b. To supplement the physical measurement data, GE's third-party surveyor will conduct post-placement bathymetric surveys or topographic surveys (based on Site conditions) after placement of each cap layer in the CCU in accordance with Section 02 21 00 – Surveys. For the Chemical Isolation Layer, the bathymetric or topographic surveys will be used to verify uniform material placement across the placement area. The bathymetric surveys and topographic surveys will be processed on a 10-by-10-foot grid. Where hydrographic (bathymetric) survey methods are used, the survey data within each 10-by-10-foot grid cell (or a portion thereof when constrained by the remedial boundaries) will be averaged to produce a single average elevation value for each cell. Where topographic survey methods are used, up to three field survey measurements will be made within each 10-by-10-foot grid cell and the data will be averaged to produce a single average elevation value for each cell or the data will be compared with the corresponding pre-placement elevation, at the discretion of the Construction Manager.
c. Isopach (i.e., thickness) maps will be prepared by GE's third-party surveyor or others under direction of the Construction Manager based on pre- and post-placement bathymetric surveys or topographic surveys to verify cap placement is uniform and to verify placement across the required extent of placement.
d. After assessing the results of the verification physical measurements and surveys, the Construction Manager will notify the Contractor if the cap layer is complete or if additional Work is needed to achieve the specification requirements.

2. Bathymetric surveys or topographic surveys (based on Site conditions) will be the primary method used to verify compliance with the specified cap layer thickness

requirements for cap layers consisting of gravel or coarser materials (i.e., the Armor Layers).

a. The Contractor shall notify the Construction Manager following cap layer placement to the required thicknesses in a CCU.
b. GE's third-party surveyor under direction of the Construction Manager will perform post-capping surveys to confirm the cap layer thicknesses achieve the specification requirements.
c. GE's third-party surveyor will conduct post-placement bathymetric surveys or topographic surveys (based on Site conditions) after placement of each cap layer in the CCU in accordance with Section 02 21 00 – Surveys.
d. The bathymetric surveys and topographic surveys will be processed on a 10-by-10-foot grid. Where hydrographic (bathymetric) survey methods are used, the survey data within each 10-by-10-foot grid cell (or a portion thereof when constrained by the remedial boundaries) will be averaged to produce a single average elevation value for each cell. Where topographic survey methods are used, up to three field survey measurements will be made within each 10-by-10-foot grid cell and the data will be averaged to produce a single average elevation value for each cell or the data will be compared with the corresponding pre-placement elevation, at the discretion of the Construction Manager.
e. Isopach (i.e., thickness) maps will be prepared by GE's third-party surveyor or others under direction of the Construction Manager based on the pre-placement and post-placement bathymetric surveys or topographic surveys.
f. After assessing the results of the verification surveys, the Construction Manager will notify the Contractor if the cap layer is complete or if additional Work is needed to achieve the specification requirements.

3. Bathymetric surveys or topographic surveys (based on Site conditions) will be the primary method used to verify compliance with the specified final elevations of the Habitat Layers and any Grading Fill.
   a. The Contractor shall notify the Construction Manager following Habitat Layer and Grading Fill placement in a CCU.
   b. Others under direction of the Construction Manager will perform post-capping surveys to confirm that the Habitat Layer and Grading Fill placement elevations achieve the specification requirements.
   c. GE's third-party surveyor will conduct post-placement bathymetric surveys or topographic surveys (based on Site conditions) after placement of the Habitat Layer and Grading Fill in accordance with Section 02 21 00 – Surveys.
   d. The bathymetric surveys and topographic surveys for the Habitat Layer and Grading Fill will be processed on a 20-by-20-foot grid. Where hydrographic (bathymetric) survey methods are used, the survey data within each 20-by-20-foot grid cell (or a portion thereof when constrained by the remedial boundaries) will be averaged to produce a single average elevation value for each cell. Where topographic survey methods are used, up to three field

survey measurements will be made within each 20-by-20-foot grid cell and the data will be averaged to produce a single average elevation value for each cell or the data will be compared with the corresponding pre-placement elevation, at the discretion of the Construction Manager.

e. Maps will be prepared by GE's third-party surveyor or others under direction of the Construction Manager to compare the survey results with the required post-capping elevations and grades for the Habitat Layer or the required engineered cap subgrade elevations for Grading Fill, as applicable.
f. After assessing the results of the verification surveys, the Construction Manager will notify the Contractor if the cap layer is complete or if additional Work is needed to achieve the specification requirements.

4. For each cap layer, the Contractor shall prepare and submit documentation of volumetric placement and equipment positioning as an additional line of evidence to verify proper cap to the extents required by the design.

5. The Contractor shall perform quality control checks throughout cap placement operations. These quality control checks shall include continual tracking of material volumes placed in a given area. The Contractor shall collect QC physical samples (i.e., core samples), where feasible, to provide feedback on equipment operations. These field measurements shall be documented in log books, field forms, or an electronic database. The Contractor shall submit these data to the Construction Manager for review to corroborate the compliance data and support decisions if any response actions are necessary.

6. If the cap thickness verification measurements or verification surveys show deviations from the specified requirements in any cap layer, the Contractor shall implement corrective action to conform to the Design Drawings and Specifications, including, but not limited to, additional material placement or removal of excess material.

C. Chemical Isolation Layer: Placement of the Chemical Isolation Layer will be considered complete in a CCU if the minimum required design thickness has been achieved in at least 95% of the thickness measurements in that CCU, and any remaining measurements are 90% or greater of the minimum design thickness. The Contractor shall place additional cap material if more than 5% of the thickness measurements in the CCU do not meet the required thickness or if any thickness measurement is more than 10% below the required thickness.

D. Armor Layer: Placement of the Armor Layer will be considered complete in a CCU based on the following survey comparisons depending on the type of survey.

1. For single-beam bathymetric survey data, the bathymetric survey data will be collected using track lines spaced a maximum of 10 feet apart. The bathymetric survey data will be processed on a 10-by-10-foot grid. Placement of the Armor Layer will be considered complete within a CCU if the minimum required

design thickness has been achieved in at least 95% of the 10-by-10-foot grid cells in that CCU, and any remaining 10-by-10-foot grid cells are 90% or greater of the minimum design thickness. The Contractor shall place additional cap material if more than 5% of the 10-by-10-foot grid cells in the CCU do not meet the required thickness or if any 10-by-10-foot grid is more than 10% below the required thickness.

2. For topographic survey data, which may be required in nearshore, shallow-water, and dry areas inaccessible to bathymetric survey equipment, GE's third-party surveyor will collect pre- and post-placement topographic survey measurements from the same coordinates at up to three located for each 10-by-10-foot grid cell. Additional measurements will be collected as needed to characterize sloped areas or grade breaks. The pre- and post-placement survey measurement will be directly compared to each other to determine the cap layer thickness at each survey location. Placement of the cap layer will be considered complete within a CCU if the minimum required design thickness has been achieved in at least 95% of the topographic survey measurements (or the average values for the 10-by10-foot grid cells, subject to discretion by the Construction Manager) and any remaining measurements are at least 90% of the minimum design thickness. The Contractor shall place additional cap material if more than 5% of the survey measurements in the CCU do not meet the required thickness or if any survey measurement is more than 10% below the required thickness.

E. For all caps, the maximum allowable thickness is two times the specified thickness for a given layer in any location. If any cap layer exceeds the overplacement allowance in more than 10% of the CCU and if directed by the Construction Manager, the Contractor shall remove or grade material to achieve compliance with specified overplacement thicknesses. Reuse of removed excess placement material will not be permitted, and the removed excess placement material shall require disposal at the Contractor's expense.

F. Habitat Layer Verification: Placement of the Habitat Layer will be considered complete in a CCU if all the following are achieved:

1. If at least 90% of the 20-by-20-foot grid cells are within a tolerance of plus or minus 0.2 foot from the final specified post-cap grades and elevations
2. If the Construction Manager's review of Habitat Layer volumetric placement records prepared by the Contractor verifies that Habitat Layer material was placed across the required area.
3. If visual observations by the Construction Manager of the placement operations and field conditions determine that the Habitat Layer was placed in a manner that provides distribution of the Habitat Layer material across the placement area.
4. If placement requirements are not met, the Contractor shall conduct additional Habitat Layer placement operations as directed by the Construction Manager.

G. Grading Fill: Placement of the Grading Fill will be considered complete in a CCU if at least 90% of the 20-by-20-foot grid cells are at or below the required engineered cap subgrade elevations and any remaining 20-by-20-foot grid cells are no more than 3 inches above the required engineered cap subgrade elevations.

3.07 MISPLACED MATERIALS

A. The Contractor shall implement measures to prevent cap materials from being misplaced outside the intended placement areas associated with CCUs.

B. The Contractor may be required by the Construction Manager to remove any or all cap material not placed in accordance with the Design Drawings, including material placed outside the design extents or thickness tolerances.

C. Should the Contractor, during the execution of the Work, lose, dump, throw overboard, sink, or misplace any material or equipment, the Contractor shall promptly recover and remove the same to the satisfaction of the Construction Manager at no additional cost to GE. The Contractor shall give immediate verbal notice, followed by written confirmation of the description, location, and quantity of such misplaced material or item. If the misplaced material or item causes an obstruction within the river, the Contractor shall mark and buoy such obstructions until the material or item is removed, unless otherwise directed by the Construction Manager.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Section presents requirements for temporary stream diversion and containment areas in the Housatonic River when and if the Contractor's means and methods call for such methods to facilitate the completion of in-river remediation and restoration Work.

B. The Contractor shall be solely responsible for the selection, design, and siting of any temporary stream diversion structures or containment areas.

C. The Contractor shall perform all sampling, testing, examination, investigation, and data collection deemed necessary by the Contractor to support the Contractor's design for temporary stream diversion or containment areas.

D. The Contractor's means and methods for dredging, dredged material transport, capping, and restoration shall be fully integrated with the design, construction, operation, and removal of any stream diversion or containment areas.

E. Construction of temporary stream diversion structures and containment areas shall be performed, to the extent practicable, using methods employed from within the river channel or from shoreline areas where riverbank soil removal and grading are specified, or using other methods approved by the U.S. Environmental Protection Agency (EPA). Accordingly, the Contractor's selected means and methods will be subject to approval by both the Construction Manager and EPA.

F. The Contractor's Operations Plan incorporated into a Supplemental Information Package (SIP) shall include a Temporary Stream Diversion Plan as described in Subparagraph 1.04.A.1. The Contractor shall revise the Operations Plan and Temporary Stream Diversion Plan, as necessary, to achieve approval by the Construction Manager and EPA prior to implementation. The Contractor shall also revise and resubmit for Construction Manager approval the Operations Plan and Temporary Stream Diversion Plan, as necessary, to address changing Site conditions, alternative sequencing, equipment modifications, or lessons learned during remediation activities. Review and approval of the Operations Plan and Temporary Stream Diversion Plan by the Construction Manager shall not relieve the Contractor of its sole responsibility for the safety, adequacy, constructability, or effectiveness of the selected equipment, means, methods, sequences, or procedures, nor for compliance with the Contract Documents, Performance Standards, or applicable regulatory requirements.

G. The Contractor shall furnish all labor, supervision, materials, tools, equipment, services, accessories, testing, and appurtenances necessary for, or incidental to, construction,

operation, maintenance, and removal of any temporary stream diversion structures and containment areas.

H. The Contractor shall construct, maintain, monitor, and remove temporary stream diversion structures and containment areas to support the safe and efficient activities necessary for the performance of the Work.

I. The Contractor shall design, construct, and maintain temporary stream diversion structures and containment areas in a manner that prevents disturbance or damage to submerged or shoreline structures, bridges, and utilities. Appropriate protective measures (e.g., horizontal offsets or setbacks) shall be taken, where necessary, to protect utilities and structures, in consultation with the utility owner and Construction Manager.

J. The Contractor shall construct temporary stream diversion structures and containment areas to minimize impacts to the in-river Work Areas, including previously completed or restored Work.

K. The Contractor shall be responsible for sourcing and procuring all construction materials associated with temporary stream diversion structures and containment areas, transporting the materials to a Temporary Staging Area or other approved location, unloading and staging the materials, loading and transporting materials to the locations of installation, and construction of the temporary stream diversion structures and containment areas in accordance with this Section.

L. The Contractor shall furnish all labor, equipment, materials, power, and appurtenances necessary to pump river water from within temporary stream diversion structures and containment areas where the Contractor's approved methods call for the Work to be performed under dewatered conditions.

M. The Contractor shall implement best management practices (BMPs), controls, and other measures necessary to maintain compliance with the Surface Water Action Levels and Quality of Life Standards described in Section 01571 – Operations, Environmental Restrictions, and Controls.

1.02 RELATED SECTIONS

1. Section 01570 – Operations, Environmental Restrictions, and Controls
2. Section 02 72 00 – Water Management and Treatment
3. Section 31 05 13 – Soils and Aggregates

1.03 SUBMITTALS

A. Pre-Construction

1. The Contractor shall prepare and submit a Temporary Stream Diversion Plan as part of the Contractor's Operations Plan for review and approval by the Construction Manager. The Temporary Stream Diversion Plan shall include, at a minimum, the following:
   a. Drawings showing the proposed design, layout, and extents of each proposed temporary stream diversion structure and containment area
   b. Details regarding each proposed temporary stream diversion structure and containment areas within the river, including, but not limited to, the proposed layout and location; proposed construction methods, equipment, and materials; design details; construction sequencing; turbidity, erosion, and hydraulic control measures; and measures to comply with the quality-of-life (QOL) standards
   c. Identification of any proposed aggregate materials and sources, along with a procurement schedule and means and methods for testing, delivery, transport, staging, and placement
   d. Procedures, means, methods, equipment, and materials for constructing and installing any structural members for each proposed temporary stream diversion structure and containment area
   e. A description of specific procedures to be used by the Contractor to verify and monitor proper construction and maintenance of each proposed temporary stream diversion structure and containment area
   f. Design calculations demonstrating the adequacy of the proposed structures, including identification of design flow rates and recurrence intervals
   g. Procedures, means, and methods, as well as BMPs that will be implemented to minimize sediment resuspension and turbidity during the construction, operation, and maintenance of each proposed temporary stream diversion and containment area to comply with the water quality and QOL requirements in Section 01570 – Operations, Environmental Restrictions, and Controls
   h. Proposed approach and locations for equipment and personnel access to each proposed temporary stream diversion structure and containment area during performance of the Work
   i. A description of any water management components and associated equipment, including the types, sizes, quantities, arrangements, power sources, and capacities of each component
   j. Shop Drawings showing proposed layout and details of the system to remove and convey river water from within any dewatered containment areas, including details for any equipment, pumps, piping, valves, gauges, instrumentation, connections, materials, supports, controls, appurtenances, and any other necessary items required
   k. A description of the procedures to be followed during installation, location and provision of primary power source (if required), operation, and

maintenance and removal of water in relation to the proposed sequence of the Work

l. Design calculations demonstrating the adequacy of the proposed water management systems and equipment
m. A description of inspection and monitoring frequency, including checks during active Work, inactivity, and anticipated storm events
n. Contingency measures to handle additional water volume associated with storm events and overtopping
o. Contingency plans and response actions for impending storms, including steps to secure and evacuate personnel, Site facilities, equipment, and materials

B. During Construction

1. The Contractor's Daily Reports, which shall, at a minimum, include the following:
   a. A description of the Work activities associated with construction, monitoring, maintenance, and removal of each temporary stream diversion structure and containment area
   b. A description and details of the daily quality control checks of all equipment
   c. The estimated volume of any aggregate materials used to construct or maintain temporary stream diversion structures and containment areas
   d. The estimated volume of aggregate materials and estimated quantity of steel, wood, and other materials that were removed, and stockpile locations related to the deconstruction of any temporary stream diversion structures
   e. The estimated volume of water pumped from temporary stream diversion structures and containment areas
   f. A description of contingency response measures implemented by the Contractor

1.04 SITE AND SUBSURFACE CONDITIONS

A. Data and information from previous investigations are available in the Reference Documents provided by GE to the Contractor.

B. The results of prior surveys and investigations are indicative of general conditions at their respective locations considering the sampling and survey equipment employed. Variations in the properties of the materials are to be expected. Information regarding the physical and chemical properties of materials to be removed or otherwise associated with the Work is provided in the supplemental reference information identified in the Reference Documents. The information is based on field investigation and laboratory testing of the materials. The data and results of prior surveys and investigations reflect available information at the time of data collection, are approximate, and may have changed since the time of data collection. Although the results of such investigations are considered generally representative of conditions at their respective locations at the time of the investigation, local variations in the materials are to be expected and, if

encountered, shall not be considered materially different within the purview of the Contract.

C. Vegetation and debris are present in the areas targeted for dredging, capping, and restoration. The Contractor shall examine the Work Area and the reference materials and become thoroughly familiar with field conditions, types, and the quantities of vegetation and debris that will be encountered during the Contractor's dredging operations. The Contractor's means and methods shall incorporate measures to manage vegetation and debris in a manner that does not adversely impact the Work.

D. The Contractor shall field verify the locations of utilities within the Work Areas, including, but not limited to, those shown on the Design Drawings. The Contractor shall coordinate a utility locate service and coordinate utility identification and location with the owner of each utility to check all dredge areas.

PART 2 – MATERIALS

2.01 GENERAL

A. The Contractor shall be responsible for selecting all material and equipment types, sizes, and applications for the construction, maintenance, and operation of temporary stream diversion structures and containment areas.

PART 3 –EXECUTION

3.01 GENERAL

A. The Contractor shall exercise care during the execution of the Work activities specified herein to minimize any disturbance to existing property and to the landscape and waters in the areas surrounding the Work Areas.

B. Any temporary stream diversion and containment structures shall be designed to withstand location-specific hydrostatic and hydrodynamic forces associated with the river channel under anticipated normal and elevated flow conditions.

C. Water pumped from containment areas may be diverted directly to the adjacent river when the river water depth is more than 1 foot above the riverbed within the containment area. Any water pumped from elevations within 1 foot of the riverbed in the containment area shall be routed to the Temporary Water Treatment System for treatment in accordance with Section 02 72 00 – Water Management and Treatment and the Contractor's approved Operations Plan.

D. The Contractor shall be responsible for selecting the top elevations for temporary stream diversion and containment structures. The elevation of the diversion and containment

structures for a given removal area shall be selected based on the time of the year when the water diversion/containment structure will be in place and the hydraulic effects associated with diverting the river through a reduced cross-sectional flow area (i.e., the restricted channel/width). The diversion/containment structures may be designed to allow controlled overtopping during higher-flow events. The top-of-structure design elevations shall be selected to provide a balance between reducing the potential for, or frequency of, overtopping and reducing the potential for scour or erosion due to increased velocities within the restricted portion of the river channel. Selection of an appropriate design elevation for the top of the diversion/containment structure to provide a reasonable protection against overtopping during the construction period will depend, in part, on the acceptable risk of flood occurrence. The Contractor's Temporary Stream Diversion Plan shall provide details regarding the design parameters used to select the top elevation of the structures, including design flow conditions.

E. The diversion/containment structures shall be designed to provide a sufficient cross sectional river area for the surface water to bypass the structure without significantly increasing surface water velocity (i.e., scour potential) or elevation (i.e., flood potential).

F. Diversion/containment structures that are planned to be operated under dewatered conditions shall provide a sufficient surface water/groundwater infiltration barrier to allow dewatering of the Work Area prior to and during excavation performed under "dry" conditions.

G. The diversion/containment structures shall be designed to be structurally stable during removal of sediment to the designated depths, while minimizing the potential for adjacent sediments to migrate or slough into the removal area.

H. The Contractor shall monitor temporary stream diversion structures and containment areas on a continuous basis during active Work and at appropriate intervals during periods of inactivity (e.g., when weather forecasts predict major storm events) and shall develop contingency response measures in the event that a temporary stream diversion structure or containment area shows signs of imminent failure. The Contractor shall, at a minimum, have the capability, personnel, and equipment immediately available to rapidly remove construction equipment from within enclosed Work Areas in the event of imminent failure.

I. The Contractor shall actively monitor weather forecasts, river stage, and anticipated flow conditions while temporary stream diversion structures and containment areas are being constructed and for the duration that they remain in place.

J. Work within areas enclosed by temporary stream diversion structures and containment areas shall be halted during major storm events or river flow events that could compromise the stability of the diversion structures or the Contractor's ability to maintain safe or controlled working conditions.

K. In the event that overtopping of a diversion/containment structure occurs, the Contractor shall take immediate actions to stabilize the Work Area and diversion/containment structure, as appropriate, and to protect personnel, equipment, and in-river Work prior to and during overtopping conditions.

END OF SECTION

SECTION 35 43 37 – RIPRAP AND STONE PROTECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. Riprap and Stone Protection consists of the placement of angular rock to stabilize bank slopes or provide utility protection.

1.02 RELATED SECTIONS

1. Section 02 21 00 – Surveys
2. Section 31 05 13 – Soils and Aggregates
3. Section 31 32 19 – Geotextiles

PART 2 –PRODUCTS

2.01 MATERIALS

A. Riprap Bank Protection Stone shall conform to the requirements of Massachusetts Department of Transportation (MassDOT) Standard Specifications for Highways and Bridges, Division III, Section M2.02.0 – Riprap, except as modified herein.

1. Riprap shall be sound, durable rock that is angular in shape and free from seams, cracks, shale, or other defects that would adversely affect strength. Rounded stones, boulders, sandstone, or similar soft stone or relatively flat, elongated, or slab-shaped stones are not acceptable.
2. Riprap Bank Protection Stone shall consist of large armor stone generally ranging from approximately 18 to 30 inches in nominal diameter and a median stone size (D_{50}) of approximately 20 inches. The material gradation shall be suitable for interlocking and stability under design hydraulic conditions.
3. Stone shall consist of appropriate color (e.g., green/gray, brown/gray, and tan/brown in color) obtained from an approved source. Rock shall not be harvested from off-site streams or rivers outside a commercial quarry operation. All rock shall be free from laminations and weak cleavages and shall not disintegrate due to exposure to air, water, or handling and placement. Granular sedimentary (sandstone) rock will generally be unacceptable. White rock is not acceptable.
4. The Contractor shall locate potential sources for the stone. The Contractor will not be granted an extension of time or extra compensation due to delay caused by sampling, testing, approval, or disapproval of stone material under the requirements of these Specifications. The Contractor shall obtain from the quarry and submit to the Engineer a certificate verifying the following:
   a. Stone classification.

b. Weight per cubic foot.
c. Weight of stone being supplied.
d. Stone quality shall meet all the above specifications.

5. The Contractor's shall make all necessary arrangements with the source of supply in a timely fashion so that the Contractor shall maintain an adequate supply of stone material and that work shall not be unnecessarily delayed due to insufficient supply.

B. Nonwoven Geotextile per Section 31 32 19 – Geotextiles.

PART 3 –EXECUTION

3.01 CONSTRUCTION

A. The Contractor shall stakeout the extents of each Riprap and Stone Protection area and review with the Construction Manager prior to construction. No construction is to begin until the extents are approved by the Construction Manager.

B. Excavate the bed and banks as required to construct the Riprap and Stone Protection based on the Drawings, including the plan sheets and details to provide sufficient room for placement of the Nonwoven Geotextile, Riprap, and any additional bank treatments specified in the Drawings. Bank slopes shall conform to the Natural Channel Design Grading Plan shown on the Drawings, with slopes not exceeding 2 horizontal to 1 vertical.

C. The Contractor shall acknowledge that the Dredge Prism Files, which are based on the engineered cap subgrade, do not include or account for any additional excavation required for construction of in-stream structures.

D. Nonwoven Geotextile shall be keyed into the existing ground in accordance with the Drawings. Riprap shall be placed at a minimum thickness of 2 X D_{50}. Rock depth shall extend below the stream bed material at the toe of the bank to prevent failure due to long-term bed degradation and scour.

E. Finished elevations and slopes shall conform to the proposed design grading as specified in the Natural Channel Design Grading Plan shown on the Drawings. Tolerances of the Riprap and Stone Protection areas are as follows:
   a. Surface elevation: ±0.2 foot
   b. Slope: ±0.1%

F. Placed material not conforming to the specified limits shall be removed and replaced as directed by the Construction Manager at no additional cost to GE.

END OF SECTION

SECTION 35 44 10 – LOG IN-STREAM STRUCTURE

PART 1 – GENERAL

1.01 DESCRIPTION

A. The Work shall consist of constructing a Log In-Stream Structure as shown on the Drawings and as specified herein. The following structures are classified as Log In-Stream Structures:

1. Log Cross Vane
2. Single Arm Log Vane
3. Log J Hook

B. The purpose of this structure is to redirect flow away from the outside meander bend, reduce near-bank stress, provide grade control through energy dissipation, and develop local scour of the stream channel for improved aquatic habitat. The structure shall be installed into the stream channel and banks at the location specified on the Drawings. Installation of the structure shall be conducted under the supervision of the Construction Manager at all times.

1.02 RELATED SECTIONS

1. Section 02 21 00 – Surveys
2. Section 31 32 19 – Geotextiles
3. Section 35 28 00 – Engineered Cap

PART 2 – PRODUCTS

2.01 MATERIALS

A. Hardwood logs used for the construction of the structures shall be at least 12 feet longer than the finished visible portion of the vane arm and have a minimum diameter of 9 inches. at the narrowest part of the trunk and a maximum diameter of 15 inches at the widest. Every attempt should be made to utilize suitable trees removed due to the required construction activities. If suitable trees cannot be salvaged from on-site activities, the Contractor shall obtain materials from off-site sources. Logs should be free of splits, cracks, and disease. Lateral branches will be trimmed flush with the trunk of the log. The root mass and crown branches shall be blunt cut at both ends of the log.

1. The Construction Manager reserves the right to reject any logs delivered to the Site that do not meet the Contract Specifications. The Contractor will not be eligible for any claims or compensatory payments for logs rejected as not meeting the project requirements.

2. Prior to the start of Work on this item, the Contractor shall submit a schedule for sourcing and delivery of logs to the Construction Manager for review. No Work shall be performed until the Construction Manager has approved this schedule. The Contractor shall locate the source(s) for the trees. The Contractor and the Construction Manager will jointly visit the Site to determine whether the trees meet the specified requirements. Contractor will not be granted an extension of time or extra compensation due to delay caused by sampling, testing, approval, or disapproval of cross vane materials under the requirements of these specifications.

B. Nonwoven geotextile per Section 31 32 19 – Geotextiles.

C. 1-1/2-inch buttoncap nails.

D. Duckbill anchors (Model 138).

PART 3 –EXECUTION

3.01 CONSTRUCTION

A. General

1. The construction of the log in-stream structure shall be as specified on the Drawings and as noted herein. However, the Construction Manager may direct the Contractor to adjust the angle, orientation, and elevation of the proposed structure based on the stream conditions at the time of construction.
2. The Contractor shall review the Design Drawings and Specifications with the Construction Manager prior to construction.
3. The Contractor shall stakeout the extents of each log in-stream structure and review them with the Construction Manager prior to construction. No construction is to begin until the extents are approved by the Construction Manager.
4. Log in-stream structure components are as follows:
   a. The log cross vane is comprised of four vane arm logs (two on either side of the structure), two throat logs, and four sill logs (two on either side of the structure).
   b. The log bendway weir is comprised of two vane arm logs and two sill logs.
   c. The log J hook is comprised of two vane arm logs, two throat logs, and two sill logs.
5. Excavation of bed and banks shall occur as described in the Design Drawings accounting for the proper subgrade excavation necessary for placement of the structure. Wherever possible, over-excavation should be avoided, and trenches should be excavated for the placement of the vane arms to ensure a secure key in. No excavation shall remain open or unstabilized during nonwork hours.

6. The Contractor shall acknowledge that the Dredge Prism Files, which are based on the engineered cap subgrade, do not include or account for any additional excavation required for construction of in-stream structures.
7. The trench shall be excavated in such a manner that will permit the logs to have a minimum of 5 feet bedded beneath the channel and to have a length of 7 feet extending into the bank. Place the base throat logs, followed by the vane arm logs as illustrated on the Drawings. The Contractor shall check the placement dimensions and elevations and seek approval of the Construction Manager prior to backfilling. At no point should the slope of the vane arms exceed 4%. Throat logs and sill logs shall be notched to accommodate arm logs. The structure shall be secured with stainless-steel cable and anchored with duckbill anchors.
8. In the area between the log vane arm and the near streambank, approximately 1.5 feet of material shall be excavated. Nonwoven geotextile should be placed in the excavation between the log vane arm and the streambank to secure the streambank edge by keying it in. Secure the geotextile to the upstream side of the vane arm log using a minimum of 2-inch-long galvanized barbed roofing nails at 4 inches on center. The secured edge of the geotextile shall be no higher than the longitudinal axis of the vane arm. The area shall then be backfilled with the engineered cap materials to the thicknesses specified in Section 35 28 00 – Engineered Cap and as shown on the Drawings to cover the geotextile. Exposed edges should not be visible upon completion of construction.
9. Surface elevations, widths, slopes, and dimensions shall conform to those specified on the Drawings and as specified herein. Tolerances of the finished structure are as follows:
   a. Stations and Offsets: ± 1.0 foot
   b. Surface Elevations: ± 0.1 foot
10. Placed logs not conforming to these specifications shall be removed and replaced as directed by Construction Manager at no additional cost to the Owner.

END OF SECTION

SECTION 35 44 20 - BOULDER IN-STREAM STRUCTURE

PART 1 – GENERAL

1.01 DESCRIPTION

A. The Work shall consist of constructing a Boulder In-Stream Structure as shown on the Drawings and as specified herein. The following structures are classified as Boulder In-Stream Structures:

1. Boulder Cross Vane
2. Single Arm Boulder Vane
3. Boulder J Hook
4. Boulder Sill

B. The purpose of the Boulder Cross Vane, Boulder Bendway Weir, and Boulder J Hook is to redirect flow away from the outside meander bend, reduce near bank stress, provide grade control through energy dissipation, and develop local scour of the stream channel for improved aquatic habitat. The purpose of the Boulder Sill is to provide grade control, reduce erosion, and provide aquatic habitat. The structure shall be installed into the stream channel and banks at the location specified in the Contract Documents. Installation of the structure shall be conducted under the supervision of the Engineer at all times.

1.02 RELATED SECTIONS

1. Section 01 21 00 – Surveys
2. Section 31 05 13 – Soils and Aggregates
3. Section 31 32 19 – Geotextiles
4. Section 35 28 00 – Engineered Cap

PART 2 – PRODUCTS

2.01 MATERIALS

A. Boulder Material

1. Boulders to be used for construction shall consist of angular, flat rock that is rectangular in shape and of appropriate color (e.g., green, gray, brown/gray, dark gray, and/or dark brown). No white stone shall be allowed. All stone shall be free from laminations and weak cleavages. The stone shall not disintegrate from the action of air, water, or in handling and placement. Granular sedimentary stone will generally be unacceptable. Concrete will not be considered as an alternative

for stone. The boulders shall have a density greater than 150 pounds per cubic foot and a minimum weight of 0.6 tons. Boulders must be approved by the Construction Manager and must be obtained from an approved source. Boulders shall conform to the dimensions specified on the Drawings.

2. The Contractor shall obtain from the quarry and submit to the Construction Manager a certificate verifying the following for boulders:
   a. Boulder classification
   b. Weight per cubic foot
   c. Type of rock
   d. Weight of boulders being supplied
3. The Construction Manager reserves the right to reject any boulders delivered to the site that do not meet the Contract Specifications. The Contractor will not be eligible for any claims or compensatory payments for boulders rejected as not meeting the project requirements.
4. Prior to the start of work on this item, the Contractor shall submit a schedule for sourcing and delivery of boulders to the Construction Manager for review. No Work shall be performed until the Construction Manager has approved this schedule. The Contractor shall locate the source(s) for the boulders. The Contractor and the Construction Manager will jointly visit the site to determine whether the boulders meet the specified requirements. The Contractor will not be granted an extension of time or extra compensation due to delay caused by sampling, testing, approval, or disapproval of cross vane materials under the requirements of these Specifications.

B. Footer Rock

1. Footer rock shall meet the specifications for “Boulder Material.” Footer rock consists of rock placed below the invert of the proposed channel to provide support for the top rock and prevent downstream scour.

C. Top Rock (Header)

1. Top rock (header rock) shall meet the specifications for “Boulder Material.” Top rock consists of rock placed upon the footer rock.

D. Nonwoven Geotextile per Section 31 32 19 – Geotextiles.

PART 3 –EXECUTION

3.01 CONSTRUCTION

A. A trench shall be dug in such a manner that the footer boulders can be correctly installed. Refer to the construction plans for the installation guide and locations of the boulder in-stream structure to be installed.

B. The Contractor shall acknowledge that the Dredge Prism Files, which are based on the engineered cap subgrade, do not include or account for any additional excavation required for construction of in-stream structures.

C. Prior to the installation of boulders, nonwoven geotextile shall be placed in the sill excavations prior to setting the footer and sill rocks. Geotextile torn or damaged shall be replaced at the Contractor's expense in a manner acceptable to the Construction Manager. Geotextile shall be keyed in, placed, and trimmed to avoid exposed edges upon completion of construction. Following construction of the sill, flow-diversity stones shall be placed on the upstream side of the sill according to the Drawings. Flow-diversity stones shall be exposed 0.4 foot above the finished grade.

D. Nonwoven geotextile fabric shall be placed on the upstream side of structure to prevent the washout of sediment through boulder gaps. Fabric shall extend from bottom of the footer boulder to finished grade elevation on the upstream side of the structure. Fabric shall be placed the entire length of the structure.

E. An excavator, with a bucket that includes a hydraulic thumb, shall be used to place boulders. Footer boulders shall be placed first, with header boulders placed on top prior to any backfilling of the trench. Boulders shall be selected and positioned such that they butt tightly together and that there are multiple contact points between all boulders.

F. Gaps between boulders shall be filled with engineered cap material (see Section 35 28 00 – Engineered Cap) until plugged.

G. In the center, or cross portion of the channel, the header boulder shall be placed such that the top of the header boulder is at an elevation equal to the bed elevation. The header boulders in the side, or wing, portion shall be placed in such a manner as they slope up from bed elevation until it ties into the outside bank at a point that is in the plan details or as directed by the Construction Manager. The header boulders shall tie into the outside bank at an elevation below bank-full and shall allow for the establishment of vegetation on the channel stream bank. Header and footer boulders at both banks (if applicable) shall be tied in securely to the bank in such a way that eliminates the possibility of water diverting around them.

H. A rock sill shall be utilized to further prevent water from cutting around the structure.

I. The area between the streambank and both vane arms (if applicable) on the upstream side of the structure will be backfilled with stream substrate.

END OF SECTION

SECTION 35 44 30 – BRUSH MATTRESS

PART 1 – GENERAL

1.01 SCOPE

A. The Work covered by this section consists of collection or furnishing all materials, excavating and backfilling, storage, preparation, and installation, and maintenance of all material required to construct a fully functional, living brush mattress. The Contractor shall perform the operations provided for in these Specifications in a careful, workmanlike manner that will promote the continued life and healthy growth of all plants in their final location.

B. The brush mattress is a system of living branches, live stakes, hardwood stakes, woven wire fabric, and wire that form a cover over the streambank, providing immediate protection from erosion. The woven wire fabric, wire, and stakes are used to secure the mattress to the slope. This method roots and grows into a riparian habitat zone.

1.02 RELATED SECTIONS

1. Section 02 21 00 – Surveys
2. Section 31 05 13 – Soils and Aggregates
3. Section 35 43 37 – Riprap and Stone Protection

PART 2 – PRODUCTS

2.01 MATERIALS

A. Stakes shall be hardwood with a minimum length of 36 inches. Stakes shall have a notch cut 2 inches from the top of the stake. The notch must be able to sufficiently grab and retain wire and/or wire fabric when installed. Upon request, the Construction Manager may allow a nail to be driven in the stake at an angle of approximately 45° and pointed toward the ground in lieu of the notch. The nail must be embedded into the stake a minimum of 1 inch and must have a minimum of 2 inches extending out from the stake. Stakes shall be of sufficient thickness for soil penetration without cracking or breakage.

B. Biodegradable 32-ounce coir/jute twine.

C. Live stakes shall meet the requirements of the Planting Plan in the Design Drawings.

D. Live branches for the brush mattress shall consist of a mix of flood-tolerant, woody species that root rapidly from vegetative cuttings. Live branches shall be 3/8 to 2 inches in diameter and 3 to 9 feet in length. The basal ends of the live branches shall be cleanly

cut. Large lateral branches shall be removed, avoiding damage to the bark ridge and branch collar.

E. Live fascines for brush mattress shall consist of a mix of flood-tolerant, woody species that root rapidly from vegetative cuttings. Live fascines shall be 6 to 8 inches in diameter. The individual branches making up the live fascines shall be 3/8 to 2 inches in diameter and 6 to 9 feet in length. The branches shall be staggered throughout the entire fascine length and will be secured tightly with twine. The basal ends of the live branches shall be cleanly cut. Large lateral branches shall be removed, avoiding damage to the bark ridge and branch collar. Live branches used to construct fascines shall have all lateral side branches removed.

F. The Planting Schedule in the Plans identifies the particular species to be used in brush mattresses. All plant material shall be harvested locally (within the same physiographic province and plant hardiness zone) and shall be living, as noted by the presence of leafy vegetation, young buds, and/or green bark. Live materials shall be installed the same day as prepared or stored in cold, moist conditions (40°F to 50°F at >50% humidity) for no longer than 2 weeks prior to use. Plant material shall remain wet until planted. Outside storage locations shall be continually shaded and protected from wind, direct sunlight, and freezing conditions. The Contractor shall provide detailed information, including, but not limited to, date harvested and location of source material. The Construction Manager must approve live material quality prior to planting.

PART 3 –EXECUTION

3.01 CONSTRUCTION

A. The brush mattress shall be installed according to the Drawings and as directed by the Construction Manager. The slope receiving the brush mattress shall be excavated sufficiently so that the final grade of the brush mattress meets the dimensions indicated in the Drawings. After grading operations are performed, excavate a horizontal trench 8 to 12 inches deep at the toe of the slope to be treated that is wide enough to accommodate a live fascine bundle and the basal ends of the live branches. Install the fascine, securing it with hardwood dead stout stakes driven directly through the fascine into the soil below at a spacing of 3 feet along its entire length.

B. Place live branches vertically in a layer one to two branches thick on the prepared slope. The basal ends shall be placed into the fascine trench and shall be supported by the fascine. Branches are to be placed as close together as possible. Place woven wire fabric over the live branches. Install hardwood stakes over the face of the graded area in accordance with the Plans. Dead stakes shall be embedded 2 feet into the existing soil substrate and live branch mattress. The dead stakes shall be set into the ground vertically. Wire shall be used to securely tie the woven wire fabric to each hardwood (dead) stake.

C. Place loose topsoil over the live branches and around the live fascine, filling all voids. The top surface of the brush mattress and live fascine shall be left slightly exposed. Care is to be taken to ensure that the basal ends of the live branches adjacent to the fascine are completely covered. Tamp and drive the hardwood dead stout stakes into the ground until live branches are tightly secured to the slope. Install live stakes over the face of the graded area in accordance with the Plans. Species shall be randomly distributed. Live stakes may be tamped perpendicularly into the finished bank slope with a dead blow hammer, with buds oriented upward. Any stakes split or damaged during installation shall be removed and replaced. The Construction Manager may require adjustments in the trenching or staking requirements to fit individual site conditions.

D. The brush mattress shall be seeded and mulched.

E. The stone toe shall be constructed per the Drawings and details and the following Specifications. The Contractor shall arrange and construct the stone toe under the direction and approval of the Construction Manager. The stone toe shall be constructed using riprap along the toe of the bank up to base flow elevation, per the details.

3.02 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall notify the Construction Manager at least 2 days in advance concerning delivery of plant materials.

B. During all Work, including plant transport, on-site storage and on-site plant handling, the plant material shall be handled carefully to prevent injuries and desiccation. The materials shall be kept from freezing and kept covered, moist, cool, and out of the wind and sun.

C. Plant materials shall be prepared for shipment in a manner that shall not cause serious damage to branches, shape and/or future development of the plant. No plant shall at any time be bound with wire or rope so as to damage the bark or break branches. Particular care shall be exercised in the binding and temporary wrapping during transplant of all plant materials to ensure safe loading, shipment and handling for the transfer the source to the Site. Plant material deliveries made on open trucks shall have the entire load completely covered with a well-secured tarp.

D. It will be the responsibility of the Contractor to inspect the plant materials prior to removal from the source where they have been harvested to make sure that the plant materials meet these requirements. The Contractor shall be responsible for obtaining and paying fees for certificates of inspection of plant materials that may be required by federal, state, county, or other authorities to accompany shipments of plants. On arrival, certificates shall be filed with the Construction Manager.

E. Live branches and live stakes shall be installed the same day as prepared or stored in cold, moist conditions (40°F to 50°F at >50% humidity) for no longer than 2 weeks until

use. live branches and live stakes shall remain wet until they are planted. Outside storage locations shall be continually shaded and protected from wind and direct sunlight.

END OF SECTION

SECTION 35 44 40 – SOIL COIR LIFT

PART 1 – GENERAL

1.01 DESCRIPTION

A. Soil coir lifts consist of layers of compacted soil (Type 1 Backfill) wrapped in natural biodegradable organic (e.g., coconut fiber) fabric. During the implementation of this Project, soil fabric lifts will be installed to construct the lower section of reconstructed banks.

B. The Contractor shall furnish all labor, material, and equipment required to install the soil fabric lifts, as shown on the plans and described in these Specifications. This Work shall consist of transporting, installing, and maintaining the soil fabric lifts materials within the stream channel as specified on the plans and as directed by the Construction Manager.

1.02 RELATED SECTIONS

1. Section 02 21 00 – Surveys
2. Section 31 05 13 – Soils and Aggregates

PART 2 –PRODUCTS

2.01 MATERIALS

A. The stream banks will be constructed of soil lifts that are varying widths and 1 foot (maximum) thick.

B. Coir Wrap shall consist of Type D Soil Stabilization Matting meeting the following minimum mechanical properties:

1. Thickness (ASTM International [ASTM] D5199): 0.35 inch
2. Mass per unit area (ASTM D5261): 20.6 ounces per square yard
3. Width tensile strength dry (ASTM D4595): 1512 X 1032 pounds per foot
4. Width tensile strength wet (ASTM D4595): 924 X 684 pounds per foot
5. Maximum elongation dry (ASTM D4595): 40% X 33% pounds per foot
6. Maximum elongation wet (ASTM D4595): 69% X 35% pounds per foot
7. Sheer stress: 4.5 pounds per square foot
8. Velocity: 12 feet per second
9. Open area: 50%

C. Livestakes shall be installed throughout the soil lifts on a triangular grid and separated by 2 feet, center to center.

D. Type 1 Backfill per Section 31 05 13 – Soils and Aggregates.

PART 3 – EXECUTION

3.01 CONSTRUCTION

A. Soil coir lifts shall be installed according to the sequence of construction, the plans and details, the following Paragraphs, and as directed by the Construction Manager.

B. Soil coir lifts shall be constructed so that successive lifts overlap one another beyond the exposed face a minimum of 18 inches or as shown on the plans. To minimize the amount of vertical lift face, the thickness of the lifts will be limited to 1 foot from top of lift to top of lift. Each lift, except for the exposed faces of the lifts, will be filled with the specified backfill.

C. The select backfill in each lift shall be compacted and smoothed over the full width of the backfill areas by the use of an approved, smooth-faced steel-wheeled roller or by mechanical tampers and vibratory compactors if rolling is not feasible.

D. The fabric on each lift will be stretched, smoothed, and secured in place with 48-inch wooden stakes. The wooden stakes will be driven through the entire depth of the soil lift and secure each successive lift to the preceding lift.

E. Livestakes shall be planted into the exposed face of each lift as directed on the plans. The coir mat shall not be cut for placement of the livestakes.

END OF SECTION

SECTION 35 44 50 – COIR MATTING

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Work shall consist of furnishing, transporting, maintaining, stockpiling, and properly installing coir fiber matting (secured with biodegradable stakes) on all streambank slopes that will not receive additional stabilization techniques at other locations designated in the Drawings.

1.02 RELATED SECTIONS

1. Section 02 21 00 – Surveys
2. Section 31 05 13 – Soils and Aggregates

PART 2 –PRODUCTS

2.01 MATERIALS

A. Coir fiber matting shall be Type D Soil Stabilization Matting, a woven fabric of high-strength coir twine made from well-cleaned, freshwater-cured coconut fiber meeting the following minimum mechanical properties:

1. Thickness (ASTM International [ASTM] D5199): 0.35 inch
2. Mass per unit area (ASTM D5261): 20.6 ounces per square yard
3. Width tensile strength dry (ASTM D4595): 1512 X 1032 pounds per foot
4. Width tensile strength wet (ASTM D4595): 924 X 684 pounds per foot
5. Maximum elongation dry (ASTM D4595): 40% X 33% pounds per foot
6. Maximum elongation wet (ASTM D4595): 69% X 35% pounds per foot
7. Sheer stress: 4.5 pounds per square foot
8. Velocity: 12 feet per second
9. Open area: 50%

B. Biodegradable stakes used to secure coir matting shall be made of native hardwood species.

C. The source of coir fiber matting and stake shall be submitted to the Construction Manager for review and approval prior to beginning construction. Installation shall be in accordance with the Construction Drawings or as directed by the Construction Manager.

PART 3 –EXECUTION

3.01 CONSTRUCTION

A. The Contractor shall place coir fiber matting along the stream edge as shown on the Drawings or as directed by the Construction Manager. The coir fiber matting shall be unrolled along the top of the bank and across the full width of any bankfull or low-flow benches, if present. Matting shall be placed in full contact with the soil. All exterior edges (those not overlapping with an adjacent coir fiber matting roll) shall be keyed into the ground at least 1 foot beyond bankfull with a 1-by-1-by-1-foot trench in such a way that a seamless grade is created. (No humps or bulges in fabric will be permitted.)

B. Coir fiber matting edges (matting installed side by side at any given elevation) shall be overlapped a minimum of 6 inches and staked using biodegradable stakes at 2 feet on center.

C. Coir fiber matting ends (where upstream roll abuts downstream roll) shall be placed such that the upstream roll overlaps the downstream roll a minimum of 6 inches and staked down using biodegradable stakes at 2 feet on center.

D. Coir fiber matting ends (matting installed where ends of matting abut in-stream structures) shall be keyed in a minimum of 2 feet in such a way that a seamless grade or transition is created. (No humps or bulges will be accepted.) These edge areas shall be staked as specified on the Drawings.

END OF SECTION

SECTION 35 44 60 – TOEWOOD

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Work shall consist of furnishing, stockpiling, transporting, installing, and maintaining toewood structures within the river channel as specified in the Contract Documents or as directed by the Construction Manager.

1.02 RELATED SECTIONS

1. Section 02 21 00 – Surveys
2. Section 31 05 13 – Soils and Aggregates
3. Section 31 32 19 – Geotextiles
4. Section 35 24 00 – Sediment and Riverbank Soil Removal
5. Section 35 44 40 – Soil Coir Lift

PART 2 – PRODUCTS

2.01 MATERIALS

A. Log Source

1. Logs shall consist of on-site hardwood trees harvested during the clearing and grubbing process. The Contractor shall take care during clearing and grubbing to preserve the integrity of suitable logs to avoid delays associated with inadequate supply. It shall be the Contractor's sole responsibility to ensure these materials are properly harvested and stockpiled. The full burden of any additional costs associated with the need for import of logs to the Project site shall be borne by the Contractor.

B. Suitable Trees and Condition

1. Toewood shall meet the specifications contained in the Contract Documents. Branchless, hardwood logs left over from site clearing shall be used.

C. Nonwoven geotextile per Section 31 32 19 – Geotextiles.

D. Soil coir lifts per Section 35 44 40 – Soil Coir Lift.

E. Slope grading fill per Section 31 05 13 – Soils and Aggregates.

PART 3 – EXECUTION

3.01 CONSTRUCTION

A. Toewood Installation

1. Step-by-step installation is shown on the Drawings.
2. The Contractor shall ensure adequate compaction when backfilling behind the structure to reduce potential for long-term piping as much as is practicable.

B. Cleanup:

1. Upon completion of work, reshape slopes and stream bottom to elevations specified in the Contract Documents.
2. Remove unsuitable and surplus branches, reinforced streambed material, salvaged streambed material, and excavated materials to fill areas or approved off-site locations.

END OF SECTION

PART 1 –GENERAL

1.01 DESCRIPTION

A. The Work shall consist of constructing a Log Sill as shown on the Drawings and as specified herein. The purpose of the Log Sill is to provide grade control and develop local scour of the stream channel for improved aquatic habitat. The structure shall be installed into the stream channel and banks at the locations specified on the Drawings. Installation of the structure shall be conducted under the supervision of the Construction Manager at all times.

1.02 RELATED SECTIONS

1. Section 02 21 00 – Surveys
2. Section 31 05 13 – Soils and Aggregates
3. Section 31 32 19 – Geotextiles

PART 2 –PRODUCTS

2.01 MATERIALS

A. Hardwood logs used for the construction of the structures shall be at least 12 feet longer than the finished visible portion of the vane arm and have a minimum diameter of 9 inches at the narrowest part of the trunk and a maximum diameter of 15 inches at the widest. Every attempt should be made to utilize suitable trees removed due to the required construction activities. If suitable trees cannot be salvaged from on-site activities, Contractor shall obtain materials from offsite sources. Logs should be free of splits, cracks, and disease. Lateral branches will be trimmed flush with the trunk of the log. The root mass and crown branches shall be blunt cut at both ends of the log.

1. The Construction Manager reserves the right to reject any logs delivered to the site that do not meet the Specifications. The Contractor will not be eligible for any claims or compensatory payments for logs rejected as not meeting the project requirements.
2. Prior to the start of Work on this item, the Contractor shall submit a schedule for sourcing and delivery of logs to the Construction Manager for review. No Work shall be performed until the Construction Manager has approved this schedule. The Contractor shall locate the source(s) for the trees. The Contractor and the Construction Manager will jointly visit the site to determine whether the trees meet the specified requirements. The Contractor will not be granted an extension of time or extra compensation due to delay caused by sampling, testing, approval,

or disapproval of cross-vane materials under the requirements of these Specifications.

B. Nonwoven Geotextile per Section 31 32 19 – Geotextiles.

C. 1-1/2-inch buttoncap nails.

D. Duckbill anchors (Model 138).

E. Engineered cap per Section 35 28 00 – Engineered Cap.

PART 3 –EXECUTION

3.01 CONSTRUCTION

A. General

1. The construction of the log sill shall be as specified on the Drawings and as noted herein. However, the Construction Manager may direct the Contractor to adjust the angle, orientation, and elevation of the proposed structure based on the stream conditions at the time of construction.
2. The Contractor shall review the Drawings and Specifications with the Construction Manager prior to construction.
3. The Contractor shall stake out the extents of each log sill and review with the Construction Manager prior to construction. No construction is to begin until the extents are approved by the Construction Manager.
4. The log sill shall consist of a header log and footer log. The header log shall be placed above the footer log.
5. Excavation of bed and banks shall occur as described on the Drawings accounting for the proper subgrade excavation necessary for placement of the structure. Wherever possible, over-excavation should be avoided, and trenches should be excavated for the placement of the sills to ensure a secure key in. No excavation shall remain open or un-stabilized during nonwork hours.
6. The Contractor shall acknowledge that the Dredge Prism Files, which are based on the engineered cap subgrade, do not include or account for any additional excavation required for construction of in-stream structures.
7. The trench shall be excavated in such a manner that will permit the logs to have a length of 4 feet extending into the bank on both sides. Place the footer logs, followed by the header logs as illustrated in the Drawings. The Contractor shall check the placement dimensions and elevations and seek approval of the Construction Manager prior to backfilling.

8. At the upstream end of the logs, material shall be excavated to the depth of the bottom of the footer log. Nonwoven geotextile should be placed in the excavation around the upstream side of the header and footer logs and on the bottom of the excavated trench. Secure the geotextile to the upstream side of the logs using a minimum of 2-inch-long galvanized barbed roofing nails at 4 inches on center. The area shall then be backfilled with the engineered cap materials to the thicknesses specified in Section 35 28 00 – Engineered Cap and as shown on the Drawings to cover the geotextile. Exposed edges should not be visible upon completion of construction.
9. Surface elevations, widths, slopes, and dimensions shall conform to those specified on the Drawings and as specified herein. Tolerances of the finished structure are as follows:
   a. Stations and offsets: ±1.0 foot
   b. Surface elevations: ±0.1 foot
10. Placed logs not conforming to these specifications shall be removed and replaced as directed by the Construction Manager at no additional cost to the Owner.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Section establishes requirements for controlling resuspension and downstream transport of sediment and polychlorinated biphenyls (PCBs) during in-water operations associated with the Work, including, but not limited to, sediment removal, riverbank soil removal, debris removal, dredged material handling and transport, cap material placement, vessel and equipment movement, and other in-water construction activities.

B. The Contractor shall furnish all labor, supervision, materials, tools, equipment, services, accessories, and appurtenances necessary to implement best management practices (BMPs), resuspension controls, and any corrective or mitigative actions necessary to maintain compliance with the Surface Water Action Levels and related response requirements specified in Section 01571 – Operations, Environmental Restrictions, and Controls.

C. The Contractor shall implement required Resuspension Control BMPs (as described in Paragraph 1.04.A), as applicable, during all in-water operations.

D. The Contractor shall implement Supplemental Resuspension Control BMPs at the direction of the Construction Manager (as described in Paragraph 1.04.B).

E. The Contractor shall be responsible for selecting, designing, implementing, maintaining, and adjusting appropriate BMPs and resuspension control measures based on the Contractor's means and methods and site-specific conditions to achieve compliance with the Surface Water Action Levels.

F. The Contractor shall assist the Construction Manager in evaluations of water monitoring data collected by the Construction Manager, together with project operations implemented by the Contractor. These joint evaluations will be performed to assess the need for modifying project operations or conducting other corrective or mitigative actions to meet the Surface Water Action Levels specified in Section 01571 – Operations, Environmental Restrictions, and Controls.

1.02 PERFORMANCE REQUIREMENTS (ACTION LEVELS)

A. Compliance will be evaluated based on the Surface Water Action Levels and assessment/response process defined in Section 01571 – Operations, Environmental Restrictions, and Controls, including (as applicable) water quality monitoring results, follow-up evaluations, and corrective actions initiated when action levels are exceeded or are trending toward exceedance.

B. Monitoring to determine compliance with Surface Water Action Levels will be performed by the Construction Manager or its designee as described in Section 01571 – Operations, Environmental Restrictions, and Controls. The Contractor may conduct additional monitoring at its discretion; however, monitoring performed under the direction of the Construction Manager will be used as the basis for compliance determinations and required operational modifications or corrective actions.

1.03 DEFINITIONS

A. Required Resuspension Control BMPs: The minimum set of BMPs and operational controls that shall be implemented at all times during in-water Work, as applicable to the Contractor's selected means and methods.

B. Supplemental Resuspension Control BMPs: Additional BMPs and operational controls that shall be implemented when directed by the Construction Manager based on monitoring results, observed conditions, or exceedances/trends toward exceedance of Surface Water Action Levels.

C. Contractor-Proposed Additional Controls: Additional BMPs, engineering controls, sequencing changes, or equipment modifications proposed by the Contractor to maintain compliance with the Surface Water Action Levels.

1.04 RESUSPENSION CONTROL BEST MANAGEMENT PRACTICES

A. Required Resuspension Control BMPs

1. As applicable to the Contractor's selected means and methods, the Contractor shall implement BMPs and operational controls intended to minimize disturbance and release of sediment during in-water Work. At a minimum, required Resuspension Control BMPs that shall be implemented by the Contractor include, but are not limited to, the following:
   a. Minimize sediment disturbance and rehandling, including avoiding unnecessary reworking of sediments and minimizing disturbance outside of designated removal/placement limits.
   b. Control equipment movements and operations to minimize resuspension (e.g., limiting propwash effects, avoiding grounding of vessels, and minimizing aggressive maneuvering in shallow areas).
   c. Debris and vegetation handling practices that minimize repeated disturbance of the bed and avoid unnecessary agitation during debris removal.
   d. Placement practices for cap materials that minimize loss of fines and sediment agitation during placement operations.
   e. Other BMPs identified in the U.S. Environmental Protection Agency (EPA)-approved Supplemental Information Package (SIP).

B. Supplemental Resuspension Control BMPs. When directed by the Construction Manager based on monitoring results and the response process in Section 01571 – Operations, Environmental Restrictions, and Controls, the Contractor shall implement additional measures that may include, but are not limited to, the following:

1. Reducing production rate to reduce resuspension (e.g., slower excavation or placement cycles).
2. Modifying sequencing to avoid performing the highest-risk activities during periods of elevated flows or sensitive conditions.
3. Equipment modifications or substitutions to reduce disturbance (e.g., different equipment in shallow areas and alternative placement approaches).
4. Temporarily suspending Work during periods and locations of high river flow.
5. Temporarily suspending Work until additional controls are in place.
6. Implementing turbidity control measures or flow control measures to restrict water flow in areas where practicable and consistent with the Contractor's approved Resuspension Control Plan and where such measures are suitable for site-specific hydraulic conditions.

C. Contractor-Proposed Additional BMPs and Controls

1. The Contractor shall identify and include in their Resuspension Control Plan all additional BMPs and control measures the Contractor proposes to implement to maintain compliance with Surface Water Action Levels based on the Contractor's selected means and methods, site-specific conditions, water depths, and flow conditions. Controls may include operational, sequencing, equipment, turbidity control barriers, or temporary hydraulic management measures, provided they are consistent with the Contract Documents and the Contractor's approved Resuspension Control Plan.

1.05 RELATED SECTIONS

1. Section 01571 – Operations, Environmental Restrictions, and Controls
2. Section 02 61 15 – Handling and Disposal of Impacted Materials
3. Section 31 13 18 – Removal of In-River Debris and Shoreline Vegetation
4. Section 35 02 00 – Marine Equipment and Transportation
5. Section 35 24 00 – Sediment and Riverbank Soil Removal
6. Section 35 28 00 – Engineered Cap

1.06 SUBMITTALS

A. The Contractor shall submit a Resuspension Control Plan, as part of the Contractor's Operations Plan, for review by the Construction Manager and incorporation into the SIP that will be submitted to EPA for review and approval. The Resuspension Control Plan must be approved by the Construction Manager prior to initiating any in-water construction, debris removal, or dredging. At a minimum, the Resuspension Control Plan shall include the following items:

1. A detailed description of the BMPs and control measures to be implemented during each major in-water construction activity to minimize sediment resuspension and comply with the water quality requirements.
2. Figures showing the locations of any proposed turbidity control barriers or other resuspension systems (if applicable).
3. A decision pathway describing how the Contractor will modify operations when the Construction Manager identifies an exceedance or trend toward exceedance of Surface Water Action Levels.
4. Coordination procedures for working with Construction Manager monitoring personnel and implementing directed Supplemental BMPs.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

A. The Contractor shall implement Required Resuspension Control BMPs at all times during in-water Work, as applicable to the Contractor's selected means and methods.

B. If the Construction Manager notifies the Contractor of an exceedance of a Surface Water Action Level or determines that a water quality impact could persist or recur and is related to construction activities, the Contractor shall modify operations and/or implement additional controls as directed by the Construction Manager, consistent with Section 01571 – Operations, Environmental Restrictions, and Controls.

C. The Contractor shall implement Supplemental Resuspension Control BMPs when directed by the Construction Manager based on monitoring data, consistent with the response process in Section 01571 – Operations, Environmental Restrictions, and Controls.

D. The Contractor shall update and adapt resuspension controls as necessary based on field conditions, monitoring results, and lessons learned throughout the duration of the Work to maintain compliance with the Surface Water Action Levels.

E. If the Contractor elects to use turbidity barriers or other resuspension control system (or such measures are required as a corrective action; collectively referred to herein as the resuspension control systems), the resuspension control systems shall be designed to accommodate location-specific water depths and velocities, and the resuspension control systems shall be adequately anchored. The use of any resuspension control system does not relieve the Contractor of responsibility for compliance with the Surface Water Action Levels.

F. The Contractor shall maintain resuspension control systems in proper working order so that they continuously function as intended for the duration of deployment.

G. The Contractor shall visually inspect installed resuspension control systems and associated components during installation and during deployment at a minimum of twice per day. Additional inspections shall be conducted as appropriate and, as necessary, to ensure continued performance at the Contractor's discretion or at the request of the Construction Manager following storm periods, noticeable turbidity increases outside the system(s), unexpected position or behavior of the system(s), contact with the curtain by equipment or debris, or other abnormal events.

H. Prior to moving or removing a resuspension control system, the Contractor shall ensure all sheens and turbidity within the contained area are at a level such that downstream water quality performance criteria are not exceeded as a result of repositioning or removal activities.

I. Materials used during the Work described herein shall be disposed of in accordance with Section 02 61 15 – Handling and Disposal of Impacted Materials.

END OF SECTION

Appendix C
Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6



April 2026
Housatonic River – Rest of River

ANCHOR QEA

Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6

Prepared for General Electric Company
Pittsfield, Massachusetts

April 2026
Housatonic River – Rest of River

Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6

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ABBREVIATIONS

1% AEP	1% annual exceedance probability
ADCP	acoustic Doppler current profiler
amsl	above mean sea level
cfs	cubic foot per second
Conceptual RD/RA Work Plan	*Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A*
Final RD/RA Work Plan	*Final Remedial Design/Remediation Action Work Plan for Reach 5A*
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
Final Revised SOW	Final Revised Rest of River Statement of Work
FIS	Flood Insurance Study
GE	General Electric Company
H&H	hydrologic and hydraulic
HEC-RAS	Hydrologic Engineering Center – River Analysis System
HEC-SSP	Hydrologic Engineering Center's Statistical Software Package
HSPF	Hydrologic Simulation Program – FORTRAN
LCLU	Land Cover and Land Use
LiDAR	Light Detection and Ranging
LWD	large woody debris
NA	not applicable
NAVD88	North American Vertical Datum of 1988
PDI	pre-design investigation
SDC	supplemental data collection
Revised Final Permit	Revised Final Resource Conservation and Recovery Act Permit Modification
ROR	Rest of River
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WSE	water surface elevation

1 Introduction

1.1 Background

The Revised Final Resource Conservation and Recovery Act Corrective Action Permit Modification (Revised Final Permit) issued by the U.S. Environmental Protection Agency (EPA) to the General Electric Company (GE) for the Housatonic Rest of River (ROR; EPA 2020) required GE to develop and submit a Statement of Work specifying the deliverables and activities that GE will conduct to design and implement the ROR Remedial Action. In accordance with that requirement, after receipt of EPA's comments on an earlier version, GE submitted a *Final Revised Rest of River Statement of Work* on September 14, 2021 (Final Revised SOW; Anchor QEA et al. 2021), and EPA approved it on September 16, 2021. Section 4.3.3.1 of the Final Revised SOW stated that the Conceptual Remedial Design/Remediation Action Work Plan for each remediation area would include the results of an in-river hydraulic analysis conducted in support of design. Accordingly, Appendix G to GE's September 28, 2023, *Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A* (Conceptual RD/RA Work Plan; Anchor QEA et al. 2023) provided a description of GE's hydrologic and hydraulic (H&H) analysis and modeling of Reaches 5 and 6. EPA conditionally approved the Conceptual RD/RA Work Plan on December 3, 2024. That conditional approval contained numerous conditions related to the H&H analysis and modeling (i.e., Conditions 127 through 158).

This report, which is submitted as an appendix to the *Final Remedial Design/Remediation Action Work Plan for Reach 5A* (Final RD/RA Work Plan), provides documentation of the updated H&H analysis and modeling performed since that time. As described in Section 5.7 of the Final RD/RA Work Plan, the hydraulic modeling performed previously to support the conceptual design was a one-dimensional hydraulic model developed to evaluate flow conditions in Reaches 5 and 6 using the U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center – River Analysis System (HEC-RAS) version 6.3.1 modeling software (USACE 2022). That model provided valuable information related to water surface elevations and stream velocities used to support the conceptual design. However, because of the complex geometry of the stream channel and floodplain throughout Reaches 5 and 6, the one-dimensional model was expanded to a two-dimensional model to support final design for Reach 5A.

In addition to describing the updated modeling, this report also addresses the various EPA conditions related to the conceptual H&H analysis and modeling to the extent practicable; however, because the model was expanded from a one-dimensional model to a two-dimensional model, some of those conditions are no longer relevant. Therefore, not every condition is addressed explicitly herein.[1]

[1] GE and EPA have had several meetings to review and discuss development of the two-dimensional model, which included providing in-progress draft model files to EPA. These discussions included a meeting with EPA on February 18, 2025, in which GE facilitated a point-by-point discussion of the various EPA conditions.

1.2 Hydrologic/Hydraulic Analysis and Modeling Objectives and Scope

Reach 5A is the most upstream reach in the ROR, as shown on Figure 1-1. The Final RD/RA Work Plan provides an overall summary of the project setting and overview of the ROR Remedial Action as well as specific details associated with the remediation to be conducted in Reach 5A. In summary, the Reach 5A remediation includes removal and capping of sediments in the riverbed and remediation of associated backwaters, riverbank soils, and floodplain soils (including those at residential properties, non-residential floodplain areas, and vernal pools) to the extent required by the applicable Performance Standards included in the Revised Final Permit.

The Federal Emergency Management Agency (FEMA) studied the Housatonic River previously and issued Flood Insurance Study (FIS) reports in 1987 for Pittsfield and in 1982 for Lenox (located along the Housatonic River) covering Reaches 5 and 6. Those studies were based on hydrologic analyses that are nearly 40 years old, and they do not provide a sufficient level of detail needed to support the remedial design of Reach 5A. As a result, it was determined to be necessary to perform an H&H analysis of the relevant reaches to provide updated information and more detailed hydraulic outputs than those currently available publicly. Specifically, hydraulic analysis and modeling are needed to support several elements of the remedial design for Reach 5A, including the following:

- Design of the erosion protection layer for engineered caps;
- Evaluation of potential changes in flood storage capacity that may result from remediation;
- Support for the Natural Channel Design;
- Water depth mapping; and
- Estimation of water surface elevation profiles for various flow conditions.

To meet these objectives, a hydrologic analysis of the watershed for Reaches 5 and 6 was first performed to evaluate the statistical characteristics of flows within the ROR. These stream flows were then used to support development of the hydraulic model of the river that will be used to evaluate the objectives above. This document describes the hydrologic analysis and development and calibration of the hydraulic model. While the current remedial design work is being performed for Reach 5A, the first hydraulic control point (i.e., Woods Pond Dam) is located a few miles downstream of Reach 5A; therefore, the hydrologic analysis and hydraulic modeling included all of Reaches 5 and 6. The hydraulic model used for this project was the USACE HEC-RAS version 6.6 modeling software (USACE 2024).

2 Hydrologic Analysis

The first step in an H&H analysis is a hydrologic assessment. This process is used to determine the recurrence intervals of various flow events. A common goal of this analysis is to specify the 1% annual exceedance probability (1% AEP) discharge (flow), commonly referred to as the 100-year event or base flood. This event has a 1% chance of occurring in any given year and is the standard regulatory event used by FEMA. This is also commonly used as a design flow for sediment cap designs (Palermo et al. 1998; EPA 2005). Water surface elevations (WSEs) predicted by the 1% AEP flow are referred to as the base flood elevation and are used to define the regulatory floodplain. The hydrologic analysis also provides information on smaller events that may be of interest to stream evaluations. The local hydrology was evaluated as part of the H&H analysis; that evaluation is described in the following subsections.

2.1 Data Sources

Data were gathered from various sources for the purpose of assessing hydrology. The data sources included the following:

- **U.S. Geological Survey (USGS) gage stations:** USGS maintains two flow monitoring stations (gages) along the Housatonic River that are close to the study area (Figure 1-1). The first gage is located along the East Branch of the Housatonic River in Coltsville, Massachusetts (Station 01197000—East Branch Housatonic River at Coltsville, Massachusetts; USGS 2023a); this gage is located approximately 5.5 miles upstream of the confluence of the East and West Branches of the Housatonic River (the Confluence). The dataset for the USGS Coltsville gage includes the daily stream flows from 1936 to present. Analyses for the purpose of model development used station records through March 2023. A second gage was installed by USGS in September 2022 (in coordination with GE) along the Housatonic River in the vicinity of Woods Pond Dam (Station 01197145—Housatonic River at Lenoxdale, Massachusetts; USGS 2023b). The short period of record at this location precludes use for frequency curve evaluations. The Coltsville and Lenoxdale USGS gage locations are shown on Figure 1-1.
- **Flow monitoring stations:** Flow monitoring was performed in the East and West Branches of the Housatonic River near the Confluence as part of GE's interim baseline surface water monitoring program, as described in GE's report on that program (Anchor QEA and Arcadis 2023). Specifically, staff gages were installed at the South Street Bridge in the West Branch and at the Pomeroy Avenue Bridge in the East Branch (Figure 1-1). In March through November 2022, field personnel recorded the WSE indicated by the staff gages coincident with monthly surface water sampling being performed at these locations. The results of the staff gage measurements and calculated flows are listed in Table 2-1.

- **Final Basis of Design, 1.5-Mile Reach Removal Action: Phase 1 (Weston 2002):** This report, prepared for EPA, provides a hydrologic analysis and flow estimates for a range of return periods within Reaches 5 and 6 of the Housatonic River. In this report, flow increment ratios (also referred to as drainage area ratios) were developed to relate measured flow at the USGS Coltsville gage to other downstream locations within Reaches 5 and 6. Weston (2002) notes that the ratios calculated based on drainage area alone (listed in the third column of Table 2-2) were adjusted to account for differences in land use and soil types in the subwatersheds (as shown in the fourth column of Table 2-2). The adjustments made to the flow increment ratios in the Weston (2002) study did not include consideration of differences in subwatershed slopes. These adjusted flow increment ratios were used to develop updated hydrology estimates at various points throughout Reaches 5 and 6 based on a more contemporary USGS flow record.
- **Final Model Documentation Report: Modeling Study of PCB Contamination in the Housatonic River (Weston 2006):** This report, prepared for EPA, documents EPA's modeling study conducted in support of the Rest of River Corrective Measures Study. One component of that model was a watershed model (developed using the Hydrologic Simulation Program – FORTRAN [HSPF]) that was used to develop estimates of flows at various locations in Reaches 5 and 6 between 1979 to 2024. For comparison to the Weston (2002) study, the resulting flow increment ratios from the HSPF model are shown in Table 2-2. Outputs from the EPA modeling study were also used for comparison of the hydraulic model (described in Section 3.3). It was also used to provide estimates of flow for the 1990 Hurricane Bertha.
- **Detailed topography data:** The web application Model My Watershed (Stroud Water Research Center 2023) was used to delineate rough extents of the drainage areas to locations of interest along the study reaches. The generated areas were validated (with minor adjustments as needed) based on more detailed topographic data from the Mass.gov GIS portal (MassGIS 2021; Quantum Spatial 2016) to delineate watersheds for the study area.[2]

[2] As described in Section 5.3.5 of the Final RD/RA Work Plan, more detailed topography data were collected proximal to the Housatonic River to support the remedial design and hydraulic modeling. These surveys were not used to support the larger-scale watershed delineation as they did not include the entire drainage area and would have only resulted in minor adjustments to the drainage area delineation.

Table 2-1
Staff Gage Measurements, Water Surface Elevations, and Calculated Flows

Measurement Date	Pomeroy Avenue Bridge (East Branch)			South Street Bridge (West Branch)[1]			Flow Ratios (West Branch/ East Branch)
	Elevation (feet amsl)	Staff Gage Reading (feet)	Total Flow (cfs)	Elevation (feet amsl)	Staff Gage Reading (feet)	Total Flow (cfs)	
3/30/2022	959.52	15.48	154.6	960.33	0.85	101.7	0.66
5/25/2022	958.93	16.07	79.3	960.54	1.06	138.0	1.74
6/29/2022	958.30	16.70	44.3	959.86	0.38	30.1	0.68
7/27/2022	958.09	16.91	25.3	959.62	0.14	23.1	0.91
8/30/2022	957.93	17.07	22.7	959.29	-0.19	9.1	0.40
9/27/2022	958.14	16.86	32.6	959.71	0.23	31.2	0.96
10/26/2022	958.95	16.05	86.0	960.68	1.20	108.2	1.26
11/30/2022	959.05	15.95	94.1	960.53	1.05	100.5	1.07

Note:

1. In an email dated May 26, 2022, EPA noted that trees caught behind a concrete abutment under the South Street Bridge might be affecting flow at this location. As a result, a GE contractor cut up and moved the trees to the edge of the river during the week of July 25, 2022, prior to the July sampling event. The cut-up logs were later relocated from under the bridge to a location downstream prior to the August sampling event.

Table 2-2
Drainage Area and Flow Increment Ratio Relative to the USGS Coltsville Gage for the East Branch of the Housatonic River

Contributing Drainage Areas	Drainage Area (square miles)[1]	Flow Increment Ratio[2]	Adjusted Flow Increment Ratio (Weston 2002)[3]	Flow Increment Ratio in EPA HSPF Model[4]
USGS Coltsville gage	57.60	1.00	NA	1.00
Confluence	130.16	2.26	1.81	1.76
Wampenum Brook	132.98	2.31	1.81	1.78
Sackett/Sykes Brook	143.84	2.50	2.02	1.93
Mill/Roaring Brook	156.17	2.71	2.23	2.24
Yokun Brook	163.02	2.83	2.36	2.33
Woods Pond Headwaters	169.42	2.94	2.48	2.39

Notes:

1. The presented Drainage Areas are based on the GIS delineation analysis, with only minor differences to the web application Model My Watershed.
2. Flow increment ratios based on drainage area.
3. Values are adjusted for stations downstream of the West Branch Confluence by accounting for differing land use and soil types within the subwatersheds and their impacts on runoff and streamflow rather than scaling by watershed area only.
4. Flow increment ratios calculated using output from EPA's HSPF watershed model (Weston 2006).

2.2 Methods of Analysis

The hydrologic analysis was based on the data sources cited in Section 2.1. First, flow ratios between the East and West Branches were calculated using flows measured during GE's interim baseline surface water monitoring program in 2022 (Anchor QEA and Arcadis 2023), as shown in Table 2-1. During each of the eight sampling events performed in 2022, field personnel recorded the water surface elevation indicated by the staff gages and current velocities were measured across a transect at both locations using a flow meter. These flow ratios (which averaged approximately 0.85[3]) were used to support estimation of flow volumes at the Confluence relative to the flows recorded at the USGS Coltsville gage.

The long-term time series of flow data at the USGS Coltsville gage was used to compute flow frequency curves from 1936 to 2022 using USACE Hydrologic Engineering Center's Statistical Software Package (HEC-SSP; Bartles et al. 2022; England et al. 2019). A full-record frequency curve was calculated, as well as a trend analysis of the discharges to determine whether the full-record 100-year flow was meaningfully different from a trend-adjusted 100-year flow. Bulletin 17B methodology with a 20-year rolling analysis window was used to determine flows at specific recurrence intervals (IACWD 1982).

Flow increases from tributary input along the river were estimated using the approach described in Weston (2002). Flow increment ratios and drainage areas were determined for six inflow locations along the Housatonic River between the Confluence and Woods Pond Headwaters. First, the drainage areas were determined by using the Model My Watershed tool. The flow increment ratios were estimated by comparing drainage areas to the drainage area of the USGS Coltsville gage.

To validate the empirical relationship between the East and West Branches (previously described in Anchor QEA and Arcadis 2023), the drainage areas of the river at the South Street Bridge and Pomeroy Avenue Bridge were compared based on Table 2-2. The drainage area of the river at the South Street Bridge is 59.38 square miles, and the drainage area at the Pomeroy Avenue Bridge is 70.62 square miles. The flow increment factor (ratio of drainage area at the South Street Bridge to the Pomeroy Avenue Bridge) is 0.84, consistent with the ratio in flows observed in the empirical flow measurements made at these two locations during the interim baseline program (0.85 on average as stated above).

2.3 Hydrology Results

Frequency curves were constructed based on data from the USGS Coltsville gage from 1936 to 2022 using HEC-SSP (Bartles et al. 2022; England et al. 2019). Using these curves, the recurrence intervals

[3] This was calculated by averaging the flow ratios from all events in Table 2-1 with one exception. The May 2022 event was excluded from averaging because the flow measurement at the South Street Bridge may have been affected by the trees caught behind a concrete abutment under the South Street Bridge.

of various flow events were determined for the USGS Coltsville gage (approximately 5.5 miles upstream of the Confluence) with 57.6 square miles drainage area. Results are presented in Table 2-3.

Table 2-3
River Discharge (Flow) Values for Selected Return Periods

% Annual Exceedance Probability	Return Period (years)	USGS Coltsville Gage (cfs)
0.2	500	10,934
0.5	200	8,721
1	100	7,277
2	50	6,003
5	25	4,547
10	10	3,591
20	5	2,734
50	2	1,688
99	1	575

The result of the Bulletin 17B 20-year rolling window analysis determined that in recent years there was a notable increase in the 1% AEP flows as compared to the full record analysis (Figure 2-1). The trend-adjusted 1% AEP (100-year) flow at the USGS Coltsville gage increased from 7,277 cfs to 10,350 cfs. This increase may be due to climate change and increased rainfall events. Given this increase, the trend-adjusted 100-year flow was used as the upper bound in the hydraulic modeling.

Table 2-4 summarizes the estimated flows within the main channel of the Housatonic River at each flow input location for various recurrence intervals. To calculate these values, the Weston (2002) flow increment ratios presented in Table 2-2 were multiplied by the flow values in Table 2-3, then rounded. Additionally, the flows for the trend-adjusted 100-year flow were included in Table 2-4, along with the flows for a bankfull condition (AECOM 2023) and Hurricane Bertha (Weston 2006).

Table 2-4
Estimated Flow Values for Specified Recurrence Intervals in Housatonic River Reaches 5 and 6

% Annual Exceedance Probability	Return Period (years)	Flow in Housatonic River (cfs) at Various Flow Input Locations						
		USGS Coltsville Gage	Confluence	Wampenum Brook	Sackett/ Sykes Brook	Mill/ Roaring Brook	Yokun Brook	Woods Pond Headwaters
0.2%	500	10,900	19,800	19,800	22,100	24,400	25,800	27,100
Trend Adjusted 100-year[1]		10,300	18,700	18,700	20,900	23,100	24,400	25,700
0.5%	200	8,700	15,800	15,800	17,600	19,400	20,600	21,600
1%	100	7,300	13,200	13,200	14,700	16,200	17,200	18,000
2%	50	6,000	10,900	10,900	12,100	13,400	14,200	14,900

% Annual Exceedance Probability	Return Period (years)	Flow in Housatonic River (cfs) at Various Flow Input Locations						
		USGS Coltsville Gage	Confluence	Wampenum Brook	Sackett/ Sykes Brook	Mill/ Roaring Brook	Yokun Brook	Woods Pond Headwaters
5%	25	4,500	8,200	8,200	9,200	10,100	10,700	11,300
N/A	Hurricane Bertha[2]	3,800	7,000	7,000	7,800	8,600	9,100	9,500
10%	10	3,600	6,500	6,500	7,300	8,000	8,500	8,900
20%	5	2,700	4,900	4,900	5,500	6,100	6,500	6,800
50%	2	1,700	3,100	3,100	3,400	3,800	4,000	4,200
N/A	Bankfull	900[3]	1,700	1,700	1,900	2,100	2,200	2,400
99%	1	600	1,000	1,000	1,200	1,300	1,400	1,400

Notes:

1. The Trend Adjusted 100-year flows are based on the Bulletin 17B 20-year rolling window analysis.
2. Hurricane Bertha's USGS Coltsville gage flow was found to be 3,847 cfs (Weston 2006); similar to the other scenarios, the additional flow input values for Hurricane Bertha were calculated using the adjusted Weston (2002) flow ratios presented in Table 2-2.
3. Bankfull flow at the Coltsville gage is 949 cfs (AECOM 2023). Similar to the other flow scenarios, the additional flow input values for the bankfull scenario were calculated using the adjusted Weston (2002) flow ratios presented in Table 2-2.

3 Hydraulic Model

Using the hydrologic analyses described above, a two-dimensional hydraulic model was developed to evaluate flow conditions in Reaches 5 and 6.[4] Hydrologic inputs were used to simulate steady-state flow conditions and output WSEs, flow depths, and inundation boundaries associated with various recurrence interval flows.[5] The remainder of this section describes the data utilized to develop the two-dimensional model, calibration of that model, model sensitivity analysis that was performed, and application of the model to support remedial design.

3.1 Data Sources

3.1.1 Hydrology

The results of the hydrologic analysis (Section 2) were used to define flow change locations in the hydraulic model along Reaches 5 and 6. Table 2-4 shows the flows specified in the model for each design flow event.

3.1.2 Topography, Bathymetry, and Bridge Surveys

Detailed topographic Light Detection and Ranging (LiDAR) surveys of the riverbanks and floodplain, bathymetric surveys of the river channel, and survey data for bridge crossings were obtained during the Reach 5A pre-design investigation (PDI; see *Pre-Design Investigation Summary Report for Reach 5A Sediment and Riverbanks* [Anchor QEA and AECOM 2023]) and during supplemental data collection (SDC) activities performed in Reach 5A (see *Supplemental Data Collection Summary Report for Reach 5A* [Anchor QEA et al. 2026]). Specific survey data used in the model include the following:

- Upland topography collected by Spicer in 2022 as part of the Reach 5A PDI;
- Bridge survey data collected by Spicer in 2022 as part of the Reach 5A PDI;
- Single-beam bathymetry data collected by Spicer in Reaches 5B, 5C, and 6 during 2022 as part of the Reach 5A PDI;
- Topobathymetric LiDAR survey data collected by Whiteout Solutions for the Reach 5A river channel and riverbanks during 2025 as part of the Reach 5A SDC program; and
- Survey data of Woods Pond Dam and surrounding area as presented in the *Operation, Monitoring, and Maintenance Plan, Woods Pond Dam* (GZA 2025).

[4] As noted in Section 1.1, a one-dimensional hydraulic model was developed originally to support the conceptual design for Reach 5A (as described in Appendix G to the Conceptual RD/RA Work Plan). That one-dimensional model was converted to a two-dimensional model to support the final design.

[5] All modeling performed were simulations of steady-state flow conditions over a wide range of flows. No unsteady flow modeling was performed.

For the portion of study area further away from the river (beyond the extent of the PDI and SDC surveys listed above), topographic data from a LiDAR survey performed in 2015 (Quantum Spatial 2016) was used. All of these datasets were used to create a raster file of the model terrain for the model domain, which is shown in Figure 3-1.

3.1.3 Roughness Data

The Massachusetts 2016 Land Cover and Land Use (LCLU) geodatabase (MassGIS 2019) was used to define surface roughness coefficients within the model domain, including in-river and floodplain areas. Manning's roughness coefficient (often referred to as Manning's n) was used to define roughness parameters in the hydraulic model. USACE guidance (USACE 2023) was used to define Manning's roughness coefficient values based on the land cover.

In-stream roughness values assumed a meandering channel with sandy to gravelly bed as an initial estimate. This value was adjusted during calibration to account for the fact that all empirical flow data available for calibration were obtained during periods when flows were contained within the channel. Because no empirical flow data were collected during periods of overbank flow conditions (i.e., during floods), further adjustment of roughness coefficients were made in floodplain areas as part of the evaluation of model performance under flow conditions experienced during Hurricane Bertha (that adjustment is described in Section 3.2.2.4.) Figure 3-2 provides a summary of the LCLU data used to assign Manning's n values over the full model domain.

3.2 Model Development

As stated in Section 1.1, the hydraulic modeling performed previously to support the conceptual design was a one-dimensional hydraulic model developed to evaluate flow conditions in Reaches 5 and 6. However, because of the complex geometry of the stream channel and floodplain throughout Reaches 5 and 6, the one-dimensional model was converted to a two-dimensional model for final design. The two-dimensional model can better simulate the geometry and meanders, bathymetry and topography can be represented more fully, and cross-channel variation in velocity can be simulated.[6]

The two-dimensional model was developed in the USACE HEC-RAS version 6.6 modeling software (USACE 2024). It built upon the prior one-dimensional modeling effort, starting with the same terrain, hydraulic roughness, and structure geometries. The model computational mesh was overlaid on the

[6] The prior one-dimensional model was represented by a series of cross-sectional transects that were specified along the river to capture both the in-river and overbank (floodplain) geometry. As discussed in the Appendix G to the Conceptual RD/RA Work Plan, the one-dimensional model was very sensitive to cross-section placement, as it interpolates between neighboring cross-section geometries to create a flow path. This sensitivity was eliminated by converting to a two-dimensional model because the entire model domain is simulated using a two-dimensional model grid.

existing terrain information, and bridges were included as two-dimensional connections. Additional details related to model setup and development are provided in the remainder of this section.

3.2.1 Model Mesh

The model mesh computational domain covers the same general area as the one-dimensional model, extending from the Confluence to a location approximately 1,100 feet downstream of Woods Pond Dam (see Figure 3-1). The model mesh includes approximately 320,000 computational cells (see Figures 3-3 through 3-5). Grid cell size is variable throughout the model domain. The smallest grid cells (5-foot square) were used to represent the Reach 5A river channel and immediate bank areas from the Confluence to approximately 500 feet downstream of the New Lenox Road bridge (see Figures 3-3 and 3-4). Downstream of that point, model grid cell size was increased to 10-foot square for the channel and immediate bank areas (see Figures 3-4 and 3-5). In the floodplain areas beyond the riverbank cells, the model grid cell size increases to approximately 35-foot square, with the regions beyond the typical floodplain having cell sizes as large as 150-foot square.

3.2.2 Bridges and Woods Pond Dam

Within the computational domain of the hydraulic model, there are four locations containing bridge crossings. These bridge crossings are located at Pomeroy Avenue (Station 49+00), Holmes Road (Station 56+85 [Figure 3-3]), New Lenox Road (Station 307+20 [Figure 3-4]), and Housatonic Street (Station 573+40 [Figure 3-5]); all were included in the model. The Pomeroy Avenue, Holmes Road, and New Lenox Road crossings are roadways open to motor vehicle traffic, and the crossing at Housatonic Street is a footbridge and is limited to pedestrians.

The Woods Pond Dam was also included in the model, approximately 1,100 feet upstream of the model's downstream boundary (Figure 3-5). The Woods Pond Dam spillway is an uncontrolled, ogee-shaped concrete weir approximately 140 feet long.

HEC-RAS two-dimensional connections are used within the two-dimensional model mesh to represent the four bridges and the Woods Pond Dam weir (Figure 3-5). The geometries of the bridges were measured as part of the survey conducted during the PDI (see Section 3.1.2), and the geometry of Woods Pond Dam was surveyed in 2025 by GZA GeoEnvironmental, Inc. The two-dimensional connections also act as breaklines for the model geometry to ensure cells align with the structures. In addition to aligning the cells, the Woods Pond Dam connection was represented by relatively small grid cells (four-foot-square) to capture the weir terrain (Figure 3-5).

Within HEC-RAS two-dimensional hydraulic model, there are two methods available for calculating flow over a weir. The first applies the standard two-dimensional shallow water equations used throughout the computational mesh, while the second uses a one-dimensional weir equation computed externally to the two-dimensional solution. HEC-RAS guidance recommends using the

one-dimensional weir equation when flow over the weir is below critical depth, producing a plunging or waterfall condition that cannot be accurately represented by the two-dimensional equations. Conversely, the two-dimensional equations are appropriate when flow is above critical depth and remains in contact with the weir surface.

Given the range of flows evaluated in this study, both conditions occur. Sensitivity testing was performed for flows near critical depth, indicating that the transition between regimes occurs between the Hurricane Bertha storm event and the 50-year event (see Table 2-4). Accordingly, the one-dimensional weir equation was applied for the Bertha storm and smaller events, while the two-dimensional equations were used for the 50-year event and larger flows.

3.2.3 Boundary Conditions

The HEC-RAS model requires specification of boundary conditions at locations where water is entering or leaving the simulated model domain. The model evaluated flows for the 1-, 5-, 10-, 25-, 50-, 100-, 200-year, and the trend-adjusted 100-year return periods (as determined by the hydrologic analysis; see Section 2) in addition to a bankfull event (AECOM 2023).

The two-dimensional model includes two external boundaries and four internal boundaries. The external boundaries are the upstream and downstream boundary conditions. The downstream boundary is located approximately 1,100 feet downstream of Woods Pond Dam (see Figure 3-5) and used a normal depth boundary condition with a slope of 0.0035 feet per feet for all scenarios. The upstream boundary is located just above the Confluence (see Figure 3-3) and uses a flow hydrograph for each scenario based on the flows outlined in Table 2-4 for the Confluence.

The four internal boundaries represent flow increases due to tributaries, but do not represent individual tributaries (i.e., some tributary inputs are combined because flow increases are based on the flow increment ratios described in Section 2). The input location for the internal boundaries is within the main channel. Figures 3-4 and 3-5 show the four internal boundaries locations: Sackett/Sykes Brook (Station 125+70), Mill/Roaring Brook (Station 311+00), Yokun Brook (Station 382+30), and Woods Pond Headwaters (Station 512+00). Similar to the upstream boundary, the four internal boundaries use flow hydrographs for each scenario based on the flows outlined in Table 2-4. Each internal boundary adds to the flow upstream of it for each respective scenario (e.g., for the 1% AEP scenario, the upstream boundary [the Confluence] was input as 13,200 cfs and the Sackett/Sykes Brook boundary was input as 1,500 cfs for a total flow of 14,700 cfs at the Sackett/Sykes Brook location).

Flow hydrographs were applied at upstream and internal boundaries because HEC-RAS two-dimensional model does not support simulation of steady-state conditions. To represent steady-state conditions, constant flow hydrographs were specified based on the flow values provided

in Table 2-4. No unsteady flow scenarios with variable hydrographs were evaluated with the two-dimensional model.

3.2.4 Roughness Characteristics

Table 3-1 shows the land uses defined within the Massachusetts LCLU database (see Figure 3-2) and the Manning's roughness coefficient assigned to each land use type. For the hydraulic modeling analysis, each cell within the model mesh is assigned the associated Manning's roughness coefficient. The default Manning's roughness coefficient values are listed in Table 3-1; however, some of these values were adjusted in certain areas of the model during model calibration. The final Manning's n values, following model calibration, are described in Section 3.3.2.

Table 3-1
Massachusetts LCLU Default Manning's Roughness Coefficients

LCLU Class	Manning's Roughness Coefficient
No Data	1
Developed – High Intensity	0.16
Developed – Open Space	0.04
Cultivated Crops	0.035
Pasture-Hay[1]	0.033
Grassland-Herbaceous	0.033
Deciduous Forest	0.15
Evergreen Forest	0.12
Scrub-Shrub[1]	0.12
Palustrine Forested Wetland	0.10
Palustrine Scrub-Shrub Wetland	0.12
Palustrine Emergent Wetland	0.073
Barren Land	0.027
Open Water[2]	0.027
Palustrine Aquatic Bed	0.05

Notes:

1. The default "Pasture-Hay" and "Scrub-Shrub" Manning's n values were erroneously swapped in the LCLU dataset; this was updated within the two-dimensional model, and Table 3-1 shows the correct Mannings n values for these two classes.
2. The default "Open Water" Manning's n value (0.027) does not reflect channel conditions; therefore, this value was used as a primary calibration variable (see Section 3.3.2).

3.3 Model Calibration

After model terrain and roughness parameters were developed, the model was calibrated to field measurements. The following subsection describes the datasets that were used for calibration and model inputs/parameters that were adjusted to achieve calibration. In addition, this section also describes a comparison that was made to verify HEC-RAS model performance under higher flow

conditions for which no data were available for calibration, that included a comparison to flood inundation extents experienced during Hurricane Bertha.[7]

3.3.1 Calibration Datasets

The model was primarily calibrated to the measured velocities and WSEs collected during the Reach 5A PDI. Specifically, current velocities and WSEs were measured at six cross-sections throughout Reach 5 using an acoustic Doppler current profiler (ADCP). These six cross-sections consisted of three locations in Reach 5A (Holmes Road Bridge, adjacent to Joseph Drive, and near the Pittsfield Wastewater Treatment Plant, designated as Sites 1, 2, and 3, respectively), one location in Reach 5B (New Lenox Road Bridge, Site 4), and two locations in Reach 5C (south of Roaring Brook and Woods Pond Headwaters near Woodland Road, Sites 5 and 6, respectively); see Figure 1-1. Three rounds of WSE and current velocity measurements were collected under different flow conditions—low, moderate, and high flow. Table 3-2 summarizes the survey dates corresponding to each of the target flow ranges and the average daily flow observed during each event at the USGS Coltsville and Lenoxdale gages.

Table 3-2
Dates of ADCP Survey Events and Corresponding Flows at Nearby USGS Gages

Event	Target Flow Range at Coltsville Gage (cfs)	Survey Start Date	Survey End Date	Observed Daily Average Flow (cfs)[1]	
				Coltsville Gage (01197000)	Lenoxdale Gage (01197145)
Low	<100	10/25/2022	10/27/2022	63	232
Moderate	100–300	4/11/2023	4/12/2023	169	504
High	>300	5/1/2023	5/2/2023	420	759

Note:
1. Values represent average flows over the survey dates.

Table 3-3 summarizes the data collected during the ADCP surveys for each measurement site and flow condition.

[7] An additional comparison was provided previously in the Conceptual RD/RA Work Plan (Appendix G) to verify the one-dimensional HEC-RAS model performance under higher flow conditions. That evaluation compared the HEC-RAS model predictions to FEMA's FIS base flood profiles. That comparison was not conducted as part of the two-dimensional HEC-RAS modeling effort. The 1987 FEMA study utilized a one-dimensional hydraulic model, and the associated 100-year flow values were not documented. Consequently, reproducing the 1987 results would require estimating flow inputs along the river at individual cross-sections, which introduces a level of uncertainty that limits the reliability of any direct comparison to the two-dimensional HEC-RAS model results.

Table 3-3
ADCP Survey Data for Calibration

Site	Mean Discharge (cfs)	WSE (feet NAVD88)	Top Width (feet)	Wetted Area (square feet)	Mean Velocity (feet/s)	Max Velocity (feet/s)
Low Discharge – October 25–27, 2022						
Site 1	198	955.38	64	168	1.18	1.89
Site 2	207	951.82	60	159	1.30	1.75
Site 3	194	949.80	68	304	0.64	1.30
Site 4	224	949.05	76	516	0.43	0.83
Site 5	218	948.45	77	485	0.45	0.70
Site 6	247	N/A	91	749	0.33	0.44
Medium Discharge – April 11–12, 2023						
Site 1	366	956.80	45	265	1.38	2.65
Site 2	412	953.16	72	245	1.68	2.09
Site 3	424	950.99	79	392	1.08	1.66
Site 4	431	949.87	110	310	1.39	1.68
Site 5	449	949.33	83	487	0.92	1.47
Site 6	516	948.96	89	819	0.63	0.98
High Discharge – May 1–2, 2023						
Site 1	670	958.41	63	321	2.09	3.14
Site 2	689	954.54	85	384	1.79	2.46
Site 3	854	952.76	92	789	1.08	2.70
Site 4	751	951.53	98	434	1.73	2.17
Site 5	N/A	N/A	N/A	N/A	N/A	N/A
Site 6	843	949.62	84	709	1.19	1.77

Mean discharge (flow) values and flow profiles were then developed from the ADCP data using the Velocity Mapping Toolbox developed by USGS (Parsons et al. 2013). Table 3-4 lists the boundary condition flows used for the various calibration scenarios. It should be noted that the internal model boundaries (described in Section 3.2.2.3 and shown in Figures 3-4 and 3-5) do not align precisely with the ADCP survey site locations. The differences between those locations are as follows:

- Upstream (Confluence) boundary is approximately 5,850 feet upstream of ADCP Site 1 at Holmes Road Bridge.
- Sackett/Sykes Brook boundary is approximately 3,050 feet upstream of ADCP Site 2.
- Mill/Roaring Brook boundary is in the same location as ADCP Site 4, just downstream of New Lenox Road Bridge.
- Yokun Brook boundary is approximately 140 feet upstream of ADCP Site 5.

- Woods Pond Headwaters boundary is approximately 950 feet upstream of ADCP Site 6.

Table 3-4
Modeled Calibration Flows

Model Boundary	Total Flow at Boundary Location (cfs)			Boundary Input Flow[1] (cfs)		
	Low Flow	Moderate Flow	High Flow	Low Flow	Moderate Flow	High Flow
Upstream	198	366.4	669.5	198	366.4	669.5
Sackett/Sykes Brook	206.5	412.4	689.5	8.5	46	20
Mill/Roaring Brook	223.7	431.3	752.1	17.2	18.9	62.6
Yokun Brook	223.8	448.8	752.2	0.1	17.5	0.1
Woods Pond Headwaters	246.5	516	843.6	22.7	67.2	91.4

Note:

1. The Boundary Input Flows are only the change in flow from upstream to their location; e.g., for the Low Flow scenario, the upstream boundary was input as 198 cfs and the Sackett/Sykes Brook boundary was input as 8.5 cfs for a total flow of 206.5 cfs at the Sackett/Sykes Brook location.

These flows were used as the basis for adjustment of the model parameters. The modeled WSEs were compared to the measured WSEs (Table 3-3) to evaluate model accuracy. A description of the model calibration results is provided in Section 3.3.2.

As previously noted, all calibration datasets were collected during periods when flow was confined to the river channel (i.e., no calibration data are available during periods when the river is overbank); thus, calibration adjustments were made, primarily to the in-stream roughness parameters.

3.3.2 Calibration Results

To calibrate the model, the main channel roughness coefficient was first increased from the default "Open Water" value of 0.027 (Table 3-1). Various coefficient values were evaluated during the calibration process, but a final base value of 0.034 was selected for the main channel. Subsequent to that global adjustment of the main channel roughness coefficient, four "calibration areas" were selected for further adjustment of that coefficient to improve agreement between the modeled WSE and the measured data. Figure 3-6 shows the locations of these calibration areas relative to the six ADCP measurement locations.

In addition, the roughness coefficient was increased to a value of 0.07 in eight discrete portions of the river channel where significant accumulation of large woody debris (LWD) was identified. These areas are located between Stations 102+00 and 145+00 and were specified in the model as discrete areas approximately 100 to 130 feet long and extending approximately half of the channel width.

Finally, roughness coefficients in portions of the model domain in the vicinity of Woods Pond were changed from the default land use (i.e., Open Water) to better capture wetlands in this area.

Table 3-5 shows the range of roughness coefficients evaluated for the various areas, and the Manning's n values specified for the final calibration.

Table 3-5
Calibrated Manning's n Values

Area	Range Tested	Final Manning's n Value
Main Channel	0.027–0.034	0.034
LWD areas	0.07	0.07
Calibration Area 1	0.038–0.05	0.045
Calibration Area 2	0.035–0.04	0.036
Calibration Area 3	0.032–0.037	0.032
Calibration Area 4	0.023–0.027	0.023
Woods Pond Wetlands	0.05	0.05

The high-flow calibration scenario (Table 3-4) was the primary focus of the model calibration because this was the highest measured flow available (which makes it the closest measured flow to the considerably higher design flows [Table 2-4]). In addition, model calibration focused on the first three measurement sites as they are located within Reach 5A. Part of Calibration Area 3 and all of Calibration Area 4 are located within Reach 5B.

Figure 3-7 shows the WSE profiles along the river centerline for the three calibration runs compared to the ADCP-measured WSEs. Figure 3-8 shows the difference between measured and model-predicted WSEs at each of the six ADCP monitoring locations during each event. The differences between modeled and measured WSEs were as follows:

- For the high-calibration event, less than 0.3 foot, with the first three measurement sites being less than 0.15 foot;
- For the moderate-calibration event, less than 0.5 foot, with the first three measurement sites being less than 0.3 foot; and
- For the low-calibration event, less than 0.4 foot.

Figure 3-9 shows velocity transects for the high flow calibration scenario modeled versus ADCP-measured velocities at Sites 1 through 3.

A tabular summary of the ADCP-measured and modeled water surface elevations and maximum depth-averaged velocities for the high-flow calibration scenario (shown graphically on Figures 3-8 and 3-9) is provided in Table 3-6.

Table 3-6
ADCP-Measured vs. Modeled WSEs and Velocities: High-Flow Calibration Scenario

Site	ADCP Measured	Modeled
Water Surface Elevation (feet, NAVD88)		
Site 1	958.41	958.29
Site 2	954.54	954.55
Site 3	952.76	952.81
Maximum Depth-Averaged Velocity (feet per second)		
Site 1	2.82	2.26
Site 2	2.35	1.86
Site 3	2.33	1.81

These comparisons show that the model-predicted velocities are slightly lower than the measured velocities. To account for this slight under-prediction, elements of the remedial design that utilize these velocities such as the erosion protection layer of the engineered cap utilize a conservative factor of safety.

3.3.3 Model Verification

Because the flows available for model calibration were less than a one-year event,[8] the simulated water surface elevations and velocities were for periods when flow was confined to the river channel. In the absence of direct measurements during higher flow conditions, HEC-RAS model predictions of flood inundation area under flow conditions experienced during Hurricane Bertha were qualitatively compared to flood inundation area delineated by EPA as part of its prior modeling study (Weston 2006). Specifically, Figure 3-10 shows a comparison between the two-dimensional HEC-RAS model flood inundation extent and a figure from the EPA model report comparing EPA model-simulated flood inundation extents with extents delineated based on aerial photography collected subsequent to Hurricane Bertha. While there are some differences in inundation extents, those differences are relatively small and can be explained by certain model assumptions. For example, the EPA hydrodynamic model was run using a time-variable hydrograph; by comparison, the two-dimensional HEC-RAS model simulation of Hurricane Bertha is a steady-state simulation of peak flow conditions (i.e., 7,000 cfs at the Confluence). Therefore, the two-dimensional HEC-RAS model likely overestimates the flood extents.

3.4 Sensitivity Analysis

A sensitivity analysis was performed to evaluate the model's response to certain inputs. In addition to the evaluation of a range of Manning's n coefficients during model calibration (described in

[8] It was not possible to collect ADCP data during higher-flow and flood events because no such events occurred during the PDI.

Section 3.3), sensitivity analysis was performed for flow inputs and for the location of the model downstream boundary as described in the following sections.

3.4.1 Flows

As expected, flows input to the model have a direct impact on the predicted WSEs and velocities. However, to evaluate sensitivity of the model-predicted WSEs to relatively small changes in flow, the high calibration flow scenario was run two additional times, one with the input flows increased 5% and one with the flows decreased 5%. Figure 3-11 shows the WSEs for the three simulations, as well as the difference between the ±5% scenarios compared to the normal high calibration flow scenario. Differences in WSE are relatively small and are generally less than ±0.2 feet. The largest differences tend to occur toward the upstream end of the model domain, with smaller differences occurring further downstream.

3.4.2 Downstream Boundary

The downstream boundary is located 1,100 feet downstream of Woods Pond Dam. To ensure that it is located far enough downstream from the weir that any boundary errors are not impacting the upstream results in the areas of interest (Reaches 5 and 6), a sensitivity simulation was conducted whereby the model domain was extended an additional 5,300 feet downstream. The high-flow calibration scenario was used in this sensitivity analysis.

Figure 3-12 shows the extended model boundary location compared to the existing location, and Figure 3-13 shows a comparison of the predicted WSE between the two geometries. The difference in the WSE between the extended downstream boundary geometry and the original geometry is less than 0.004 foot for Reaches 5 and 6, up to the location of the Woods Pond Dam (i.e., weir) where there is a larger predicted difference—0.04 foot lower than the WSE using the original model geometry.

Because most of the model domain shows a negligible difference in predicted WSE upstream of the dam (i.e., less than 0.004 foot), it was determined that the downstream boundary of the original model geometry is set far enough downstream to avoid any significant impact on upstream model predictions.

3.5 Model Simulations of Post-Remediation Conditions

Model simulations of post-remediation conditions were performed by updating the two-dimensional HEC-RAS model terrain to reflect the final proposed Natural Channel Design grading plan for the river channel and riverbanks (described in Section 8 and 9 of the Final RD/RA Work Plan) to evaluate how changes in bathymetry/topography would affect hydraulic characteristics in the river. In addition to changes in model terrain, the roughness coefficients were also adjusted to represent post-remediation conditions. For example, there are numerous areas where riverbanks were subject to grading that extended those banks further into the floodplain; the roughness coefficient in those

areas was set to 0.07. In the main channel, the post-remediation Manning's n was set to 0.029 (i.e., 0.05 below the existing conditions).[9]

Outputs from these post-remediation simulations were used to support several aspects of the final design. Specifically, the post-remediation water depths and the depth-averaged current velocities output from the model were used in the sizing of armor material for the erosion protection layer of the engineered cap as described in Appendix H of the Final RD/RA Work Plan.

In addition, the existing and post-remediation WSEs were compared to ensure that the proposed changes in the river and riverbank bathymetry/topography would not result in any significant increase in WSE. For this assessment, the model examined the Natural Channel Design grading plan across Stations 0+00 through 48+00, which is presented in the Final RD/RA Work Plan as a final design.[10] Simulations were performed under 100-year flow conditions for two scenarios: (1) existing conditions (i.e., current bathymetry); and (2) post-remediation terrain for Stations 0+00 through 48+00 (including fill placement within the Intermittent Side Channel as described in Section 8.3.2 of the Final RD/RA Work Plan) along with the existing bathymetry downstream of Station 48+00.

Comparative analysis of the resulting WSEs along the river channel for these scenarios confirmed that the post-remediation configuration for Stations 0+00 through 48+00 does not lead to an increase in flood stage elevation. Figure 3-14 shows longitudinal profiles of predicted WSEs under pre- and post-remediation conditions, and the calculated difference between these two scenarios. To calculate the difference, the WSEs along the river centerline for both scenarios were averaged every 300 linear feet. This figure shows that post-remediation water surface elevations are lower than the existing water surface elevations, thereby satisfying FEMA's no-rise requirement of 0.00 feet. Additionally, the inundation boundaries for the 100-year flood event under both existing and post-remediation conditions show negligible difference (see Figure 3-15).

[9] Calibration Areas 1, 2, and part of 3 were also reduced by 0.05 for the proposed conditions.

[10] Evaluations of any changes in WSE for areas downstream of Station 48+00 will be performed once the Natural Channel Design grading design and cap design evaluations are completed in a revision of or addendum to the Final RD/RA Work Plan.

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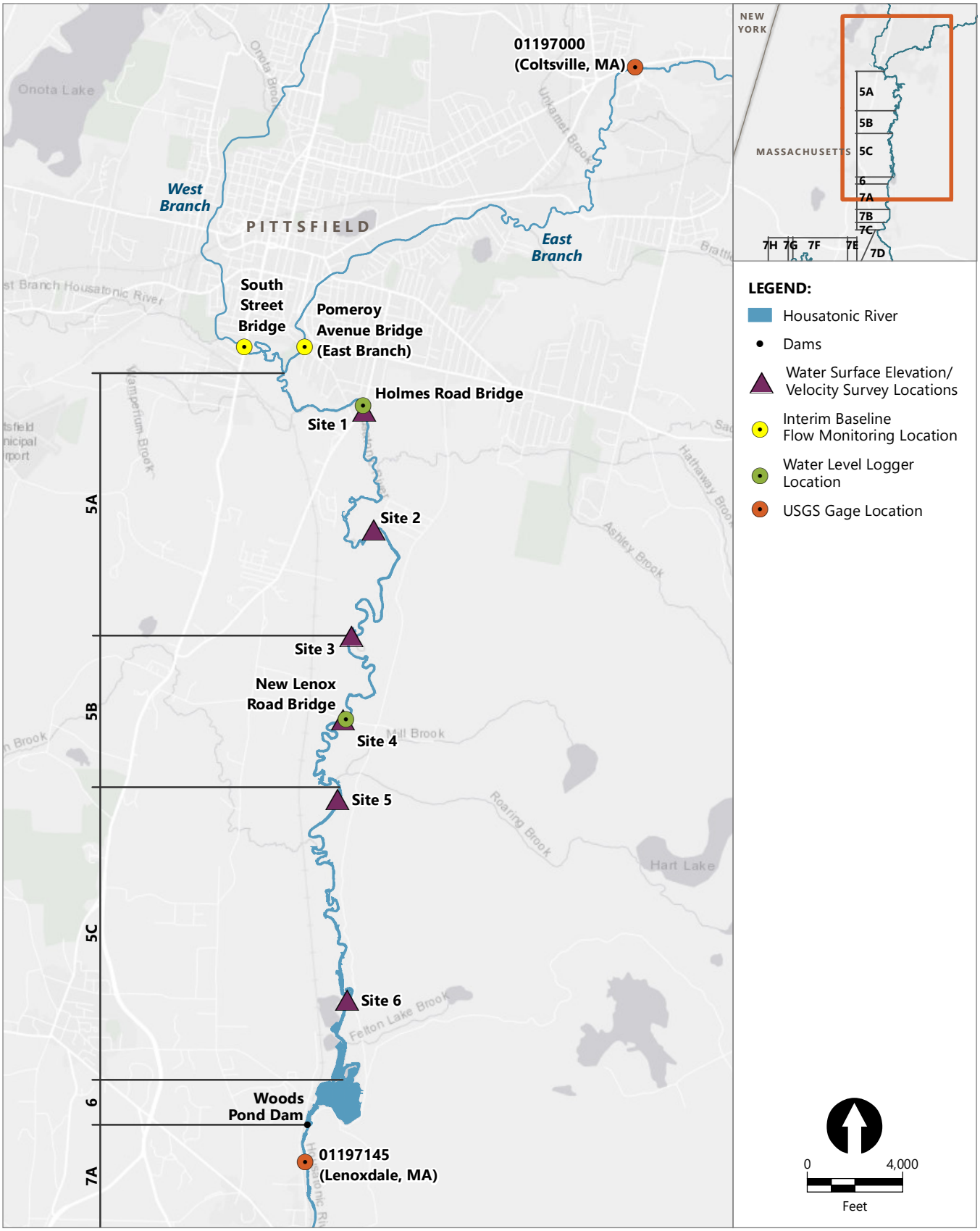

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Figure 1-1
Water Surface Elevation and Velocity Survey Locations
Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6
Housatonic River – Rest of River

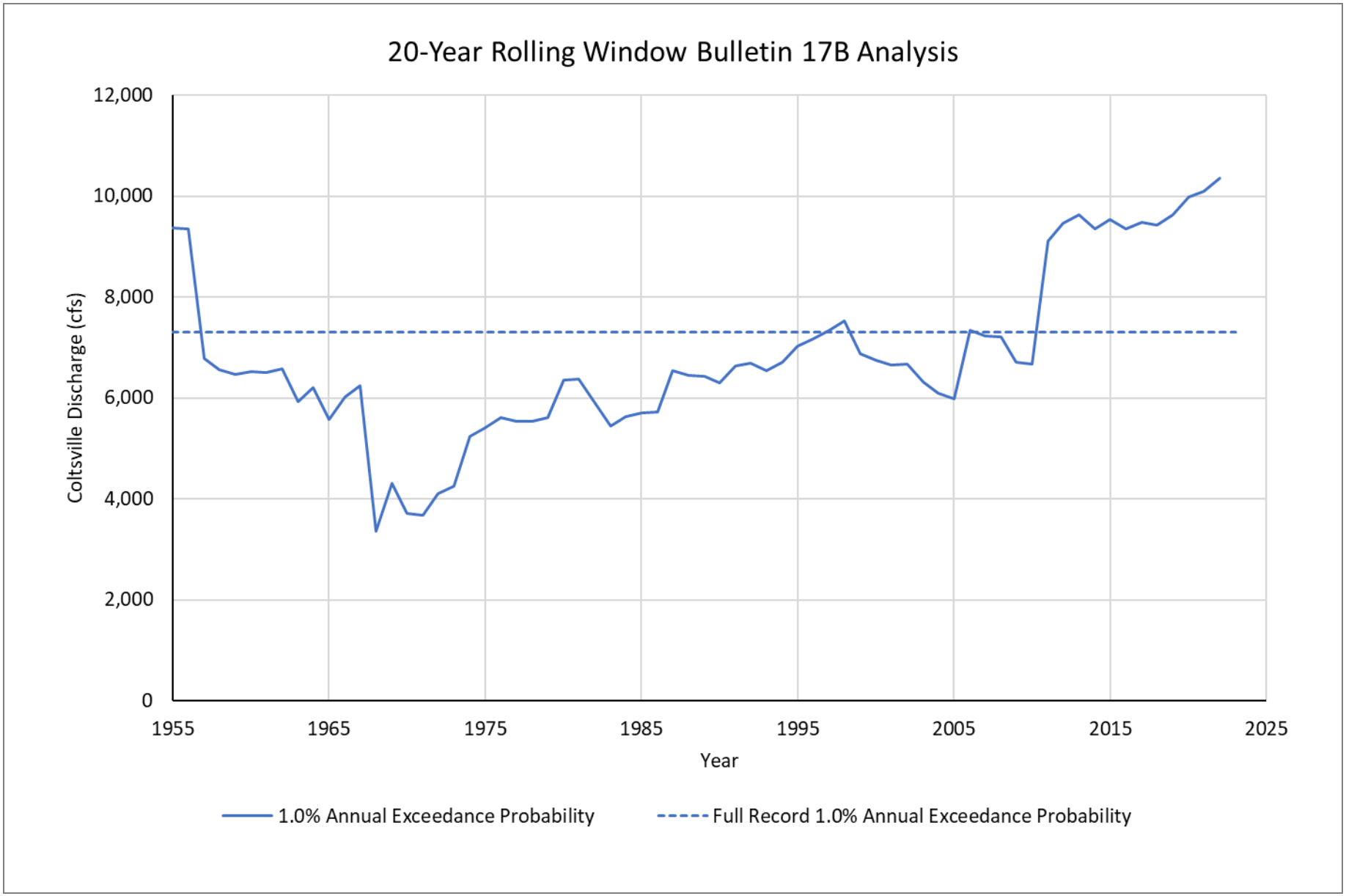

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Figure 2-1
Bulletin 17B Analysis Results
Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6
Housatonic River – Rest of River

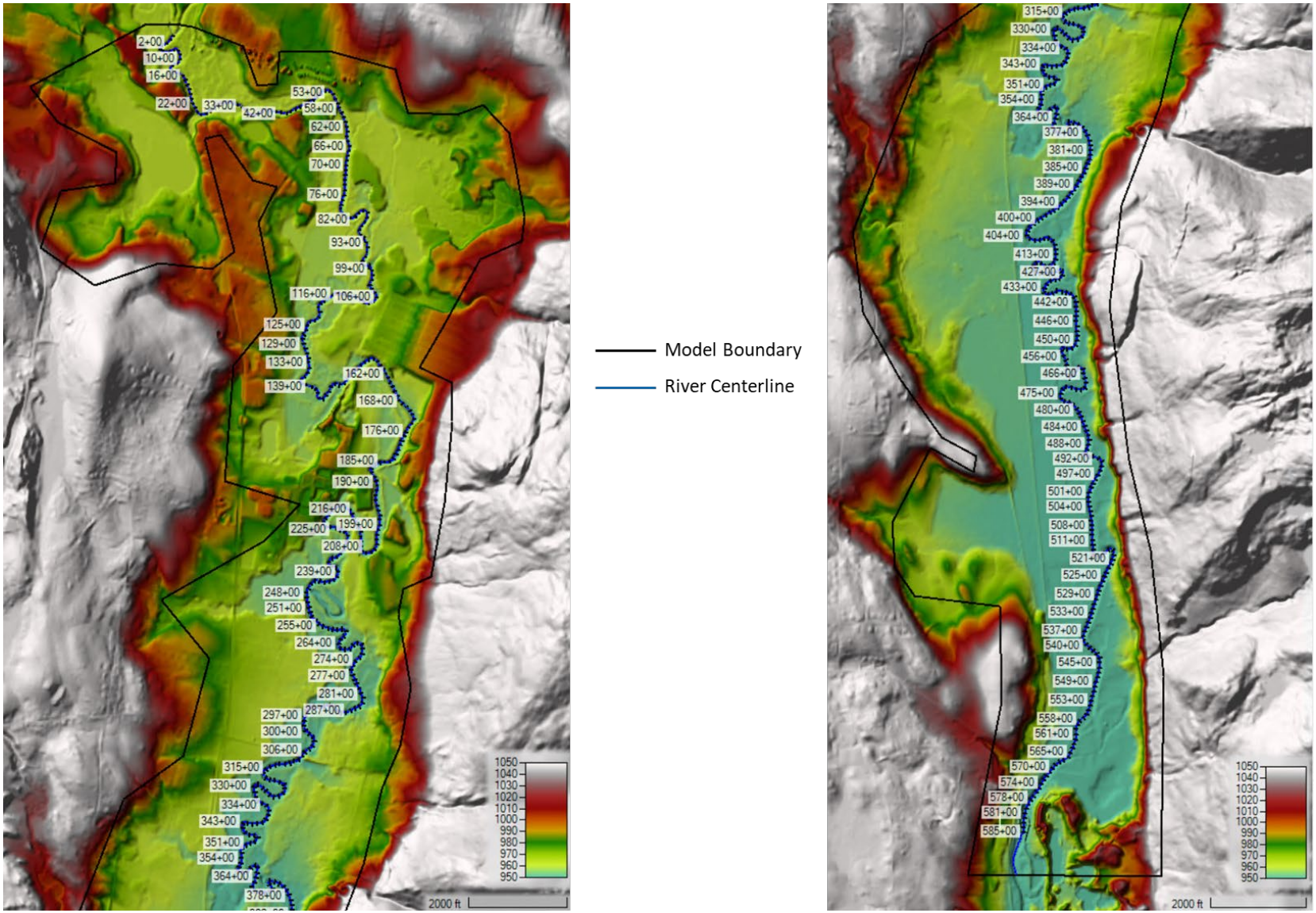

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Figure 3-1

Terrain Data, River Path, and Model Extent from Two-Dimensional HEC-RAS Model

Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6

Housatonic River – Rest of River

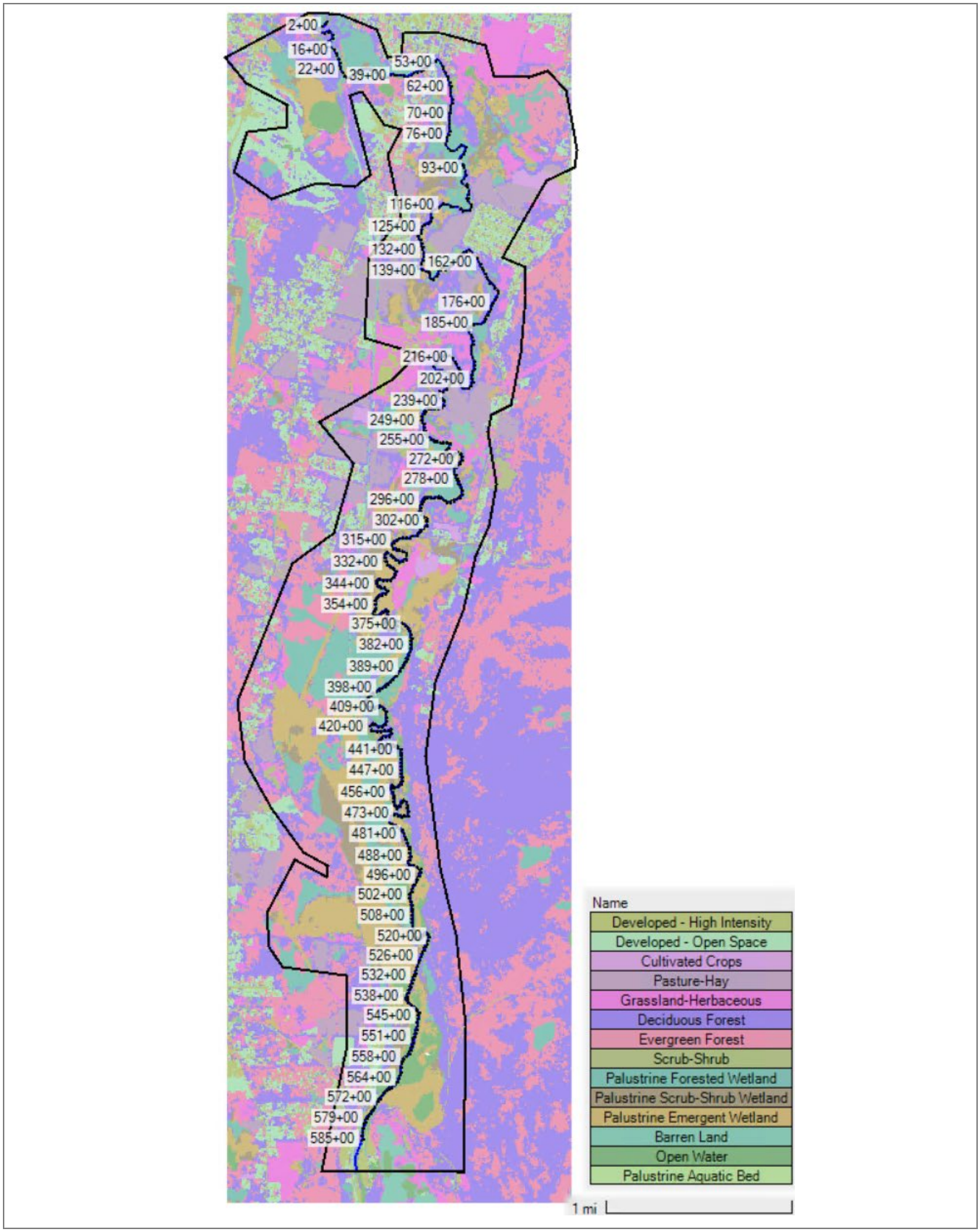

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Figure 3-2
Massachusetts 2016 Land Cover and Land Use
Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6
Housatonic River – Rest of River

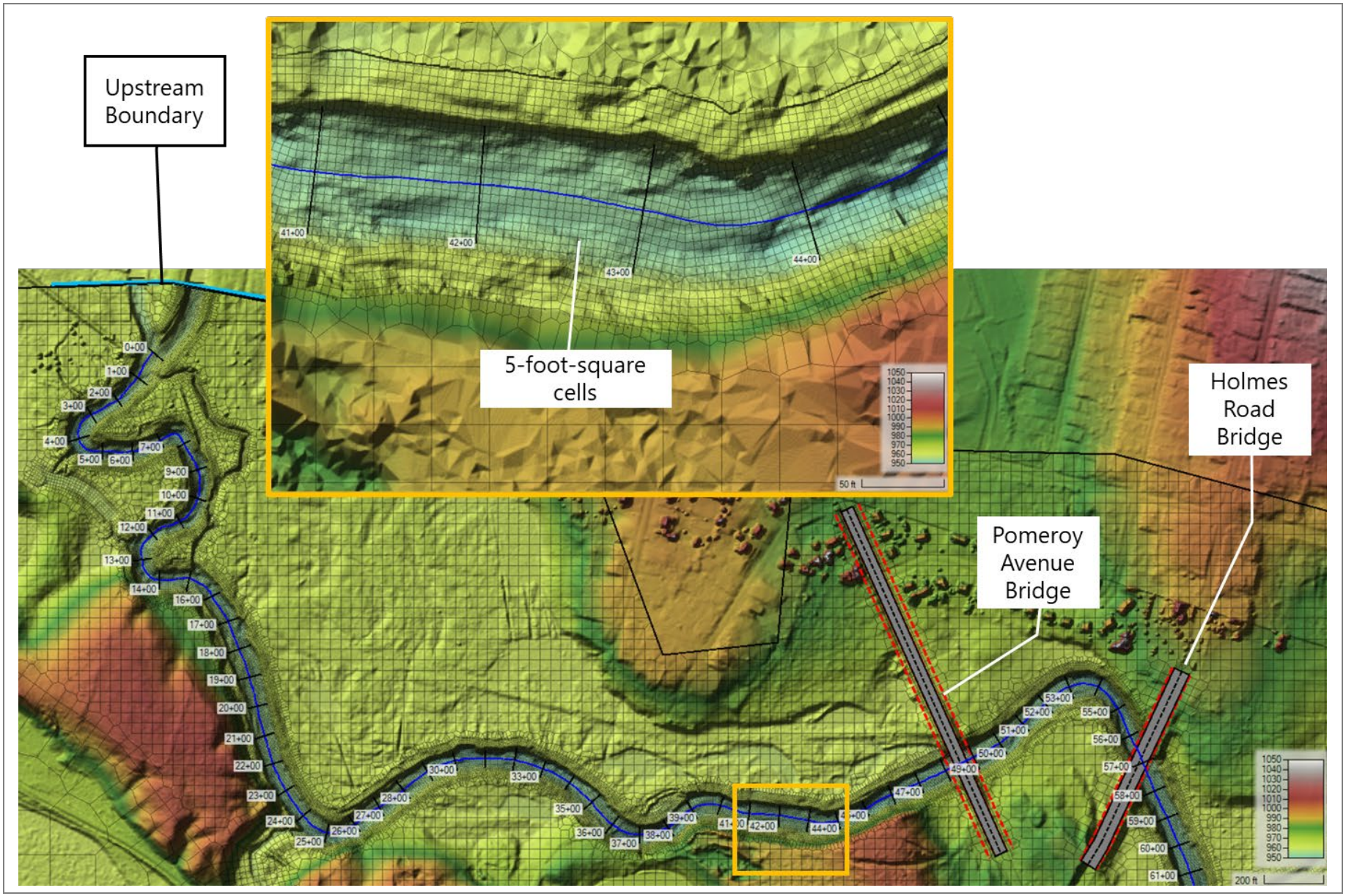

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Figure 3-3

Model Mesh, Two-Dimensional Connections, and Boundary Conditions (Stations 00+00 to 61+00)

Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6
Housatonic River – Rest of River

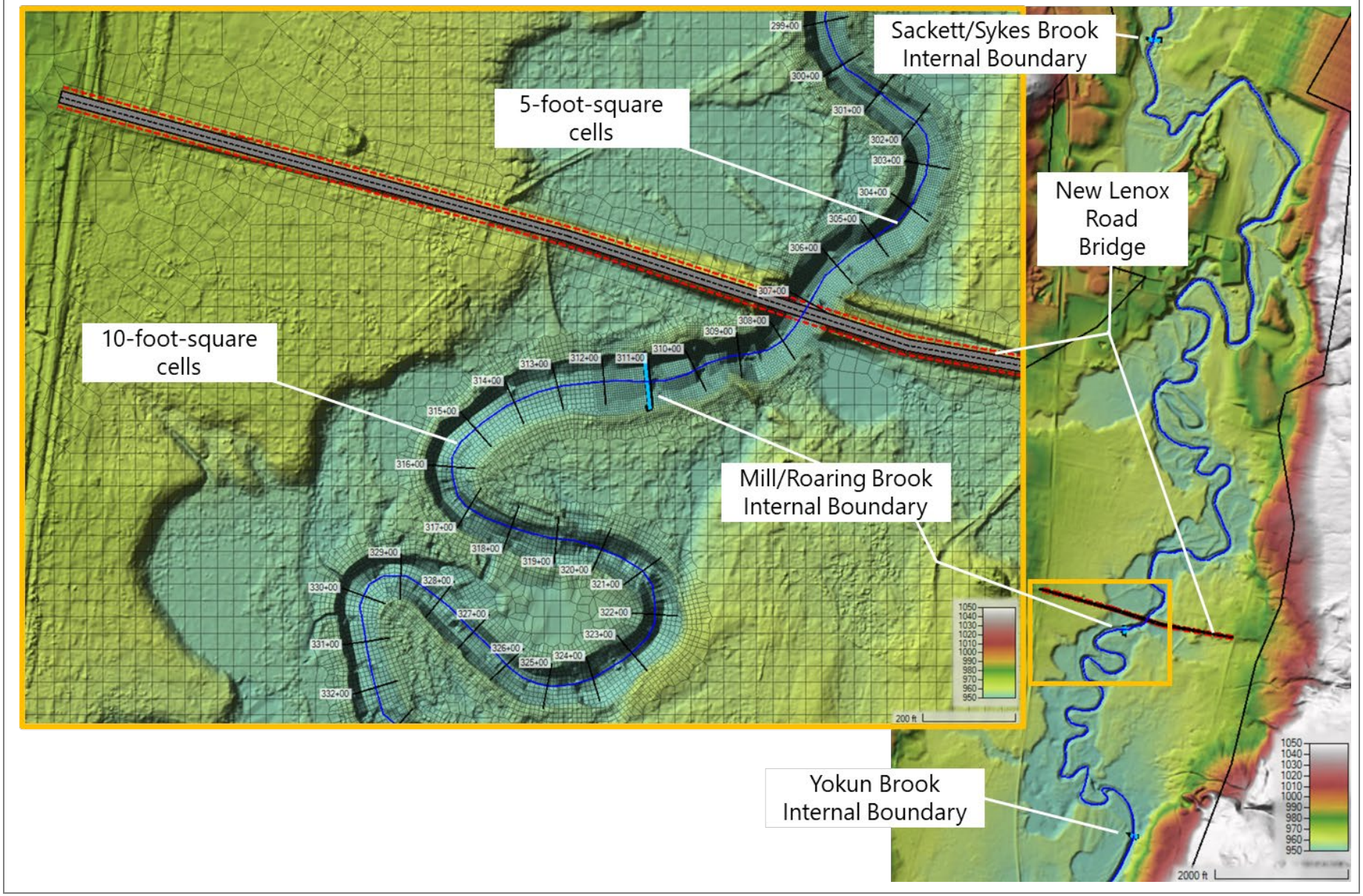

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Figure 3-4

Model Mesh, Two-Dimensional Connections, and Boundary Conditions (Stations 102+00 to 388+00)

Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6
Housatonic River – Rest of River

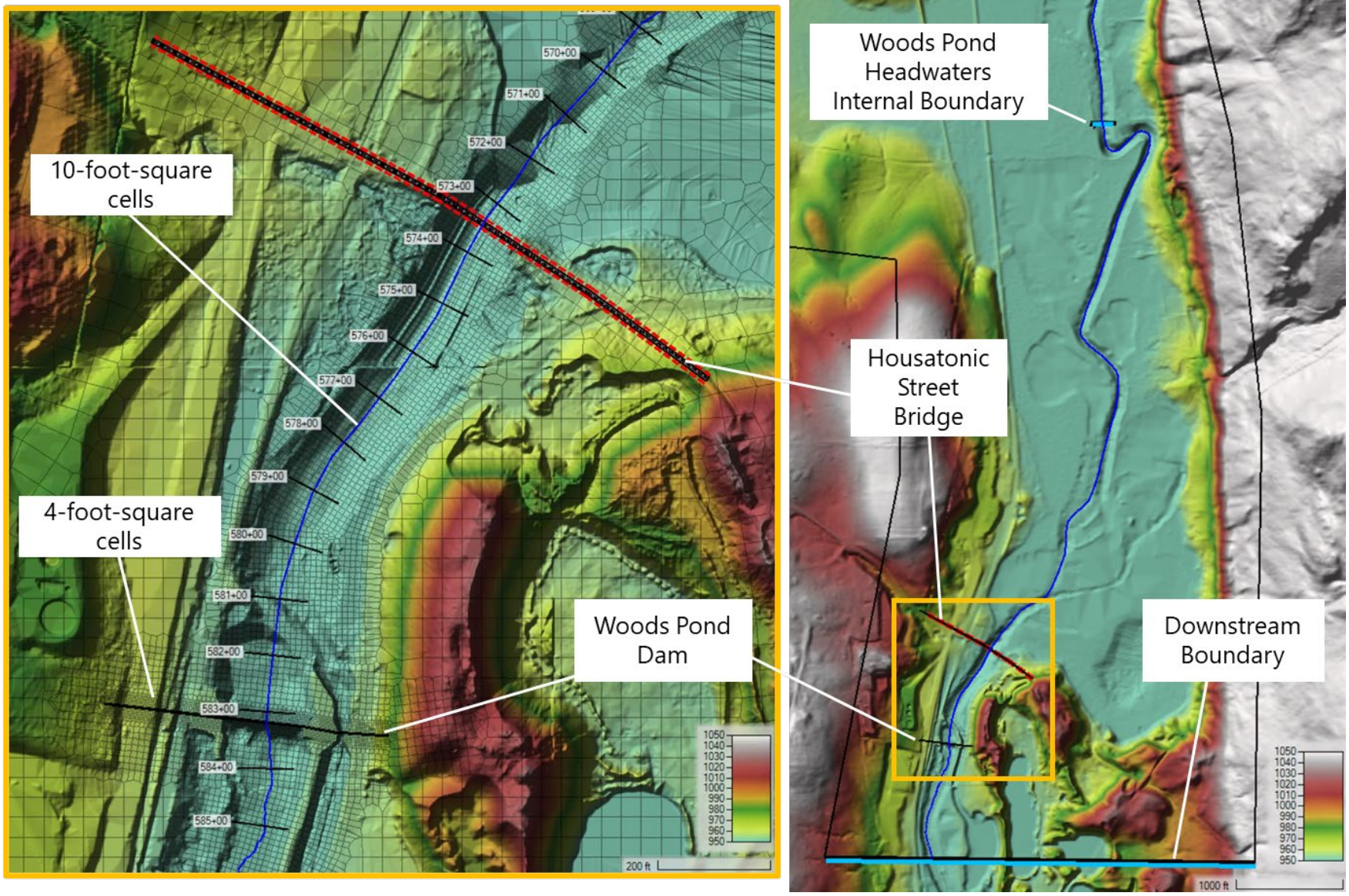

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Figure 3-5

Model Mesh, Two-Dimensional Connections, and Boundary Conditions (Stations 500+00 to 595+00)

Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6
Housatonic River – Rest of River

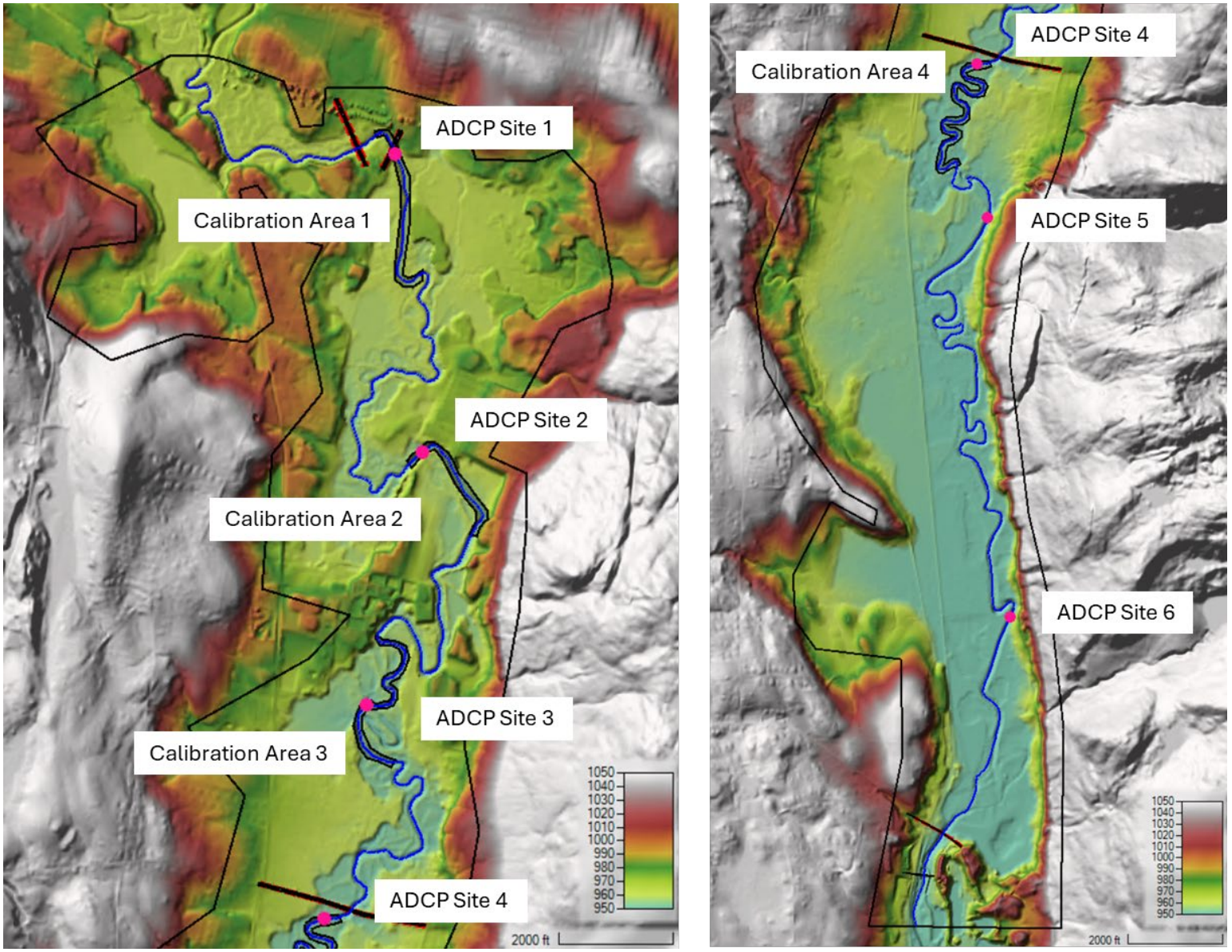

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Figure 3-6
HEC-RAS Model Calibration Areas
Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6
Housatonic River – Rest of River

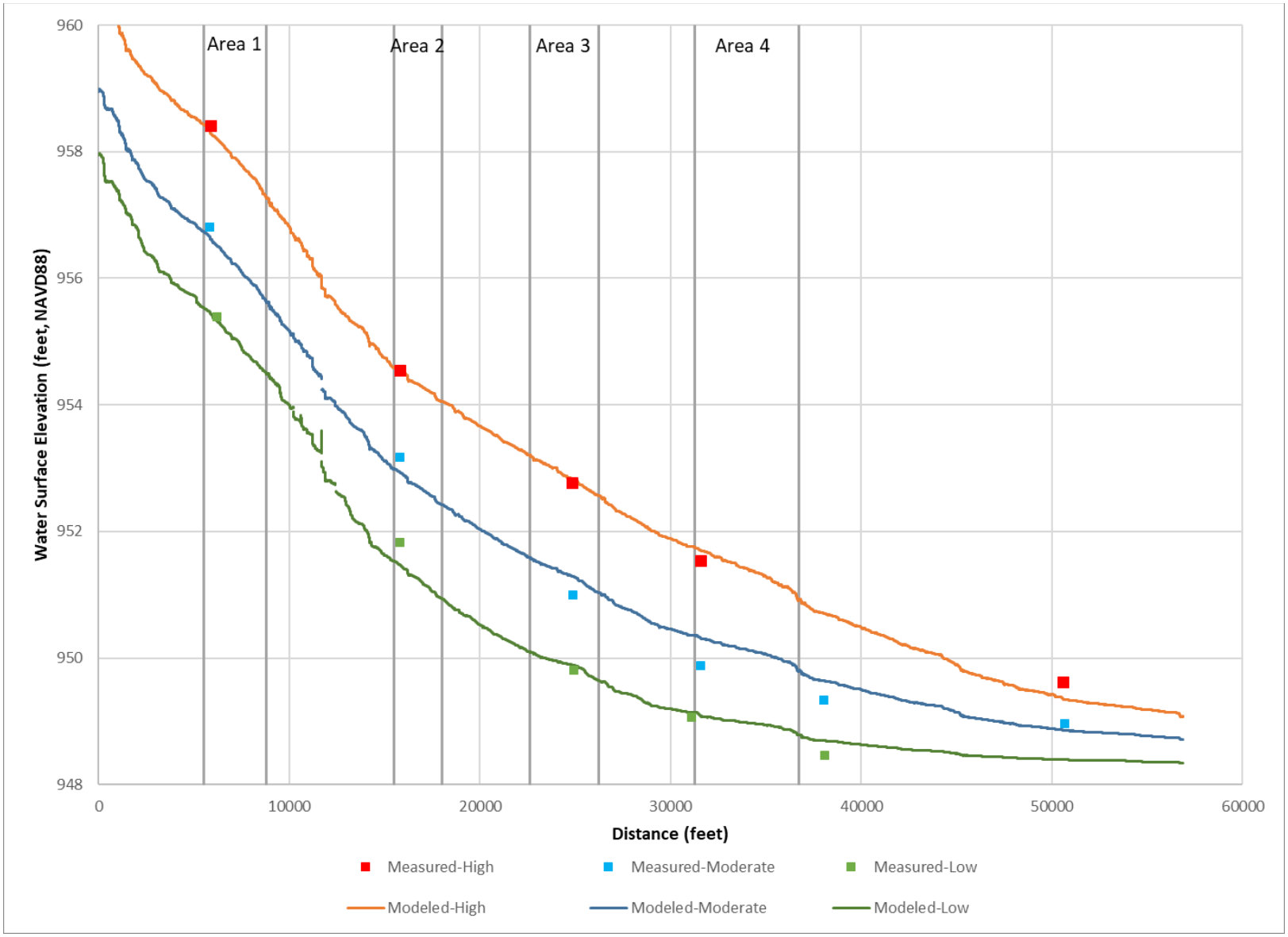

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Figure 3-7
HEC-RAS Model Calibration Water Surface Elevations
Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6
Housatonic River – Rest of River

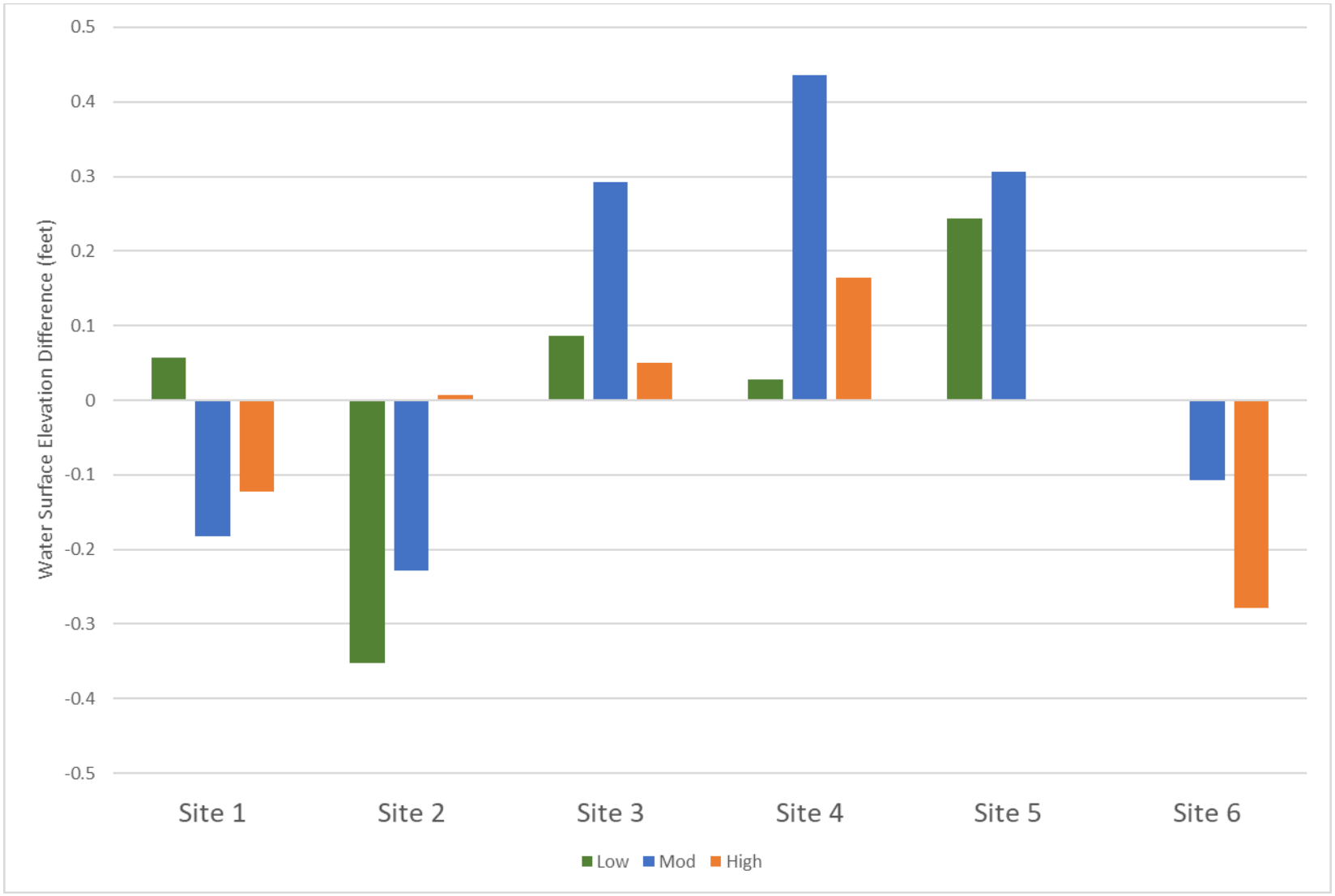

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Figure 3-8
HEC-RAS Model Calibration-Model vs. ADCP Water Surface Elevations
Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6
Housatonic River – Rest of River

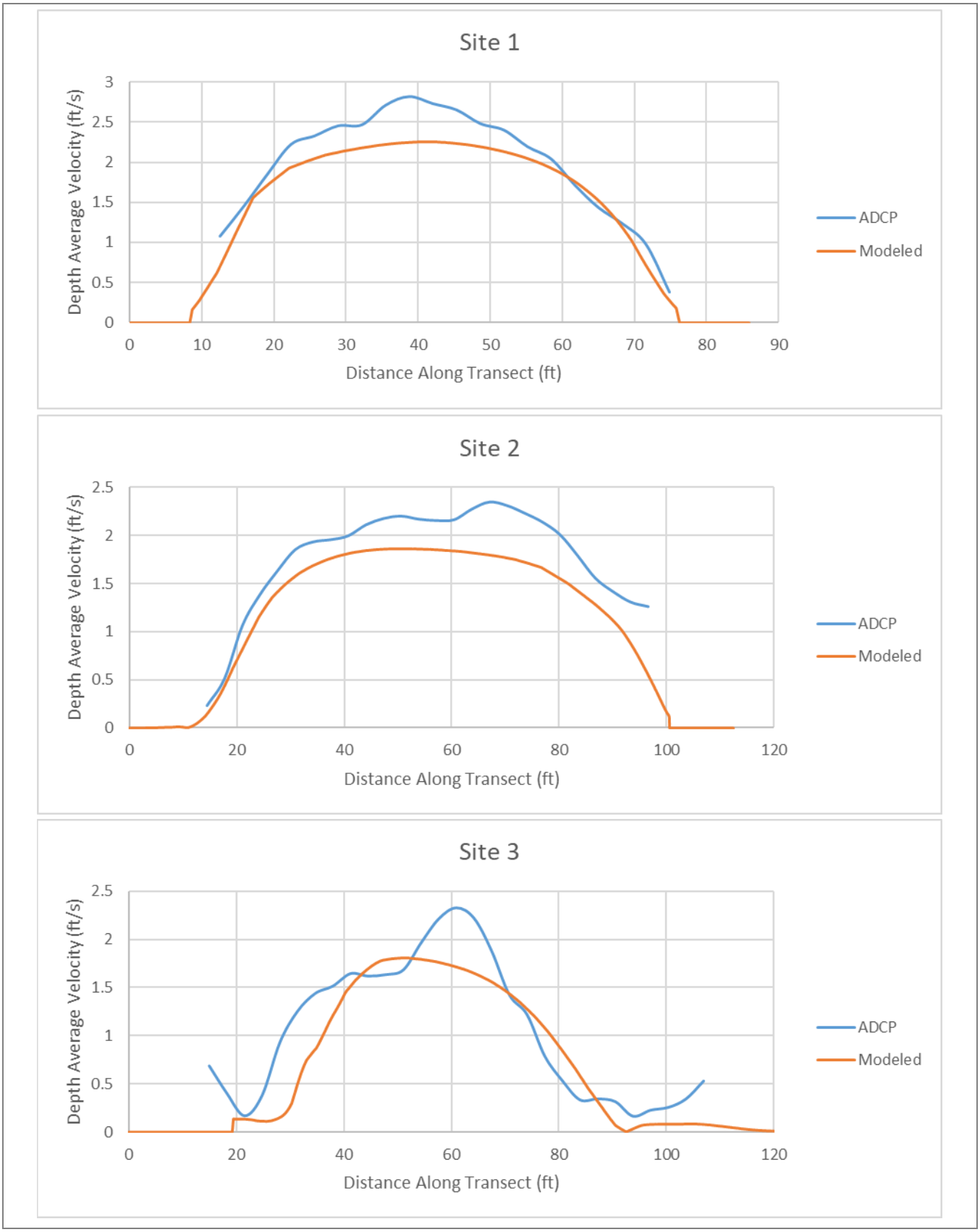

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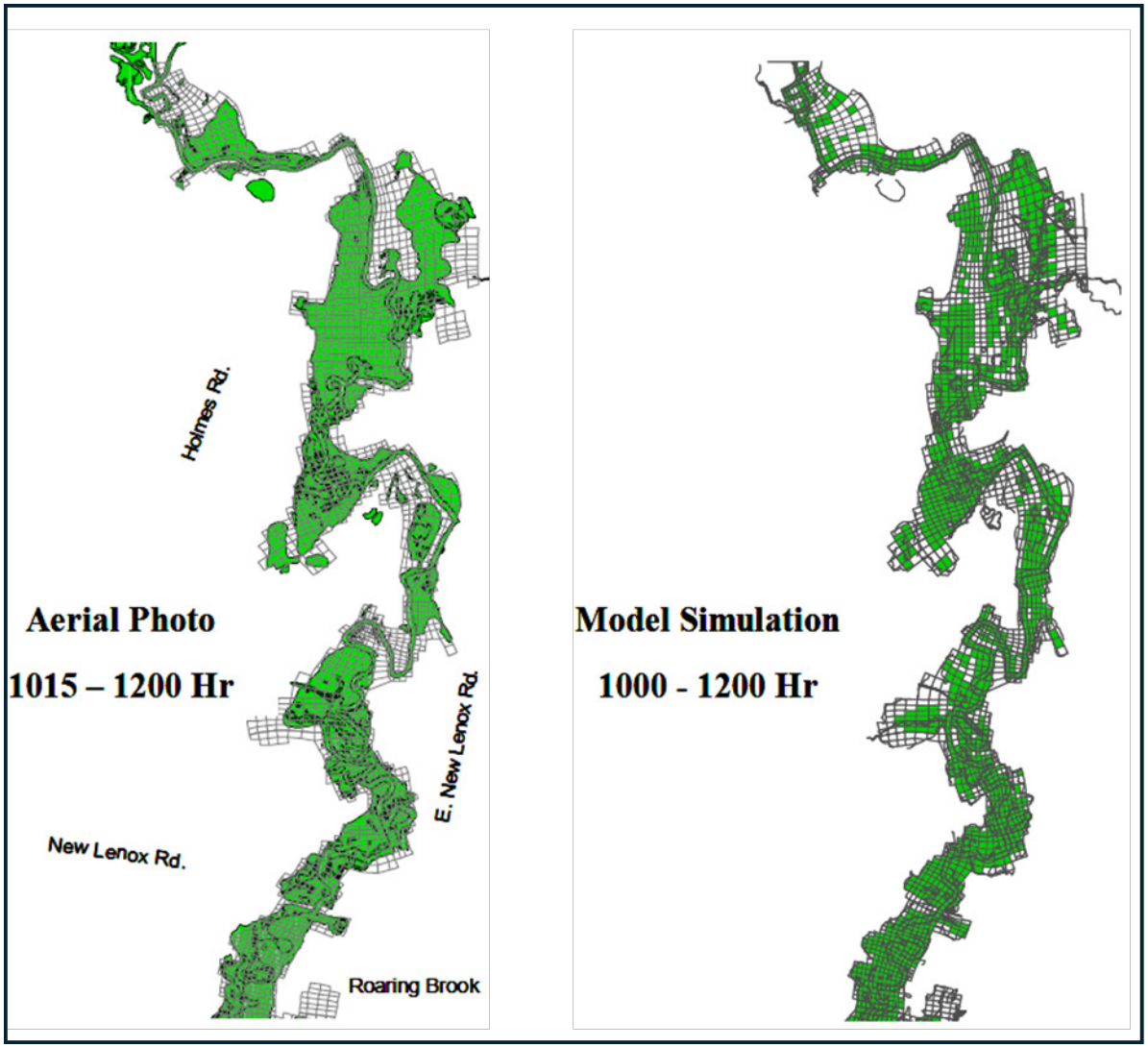
Figure 3-9
HEC-RAS Model Calibration – Model vs. ADCP High-Flow Velocity Transects
Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6
Housatonic River – Rest of River

Images from EPA Final Model Documentation Report (Weston 2006)



Two-Dimensional HEC-RAS Model Results

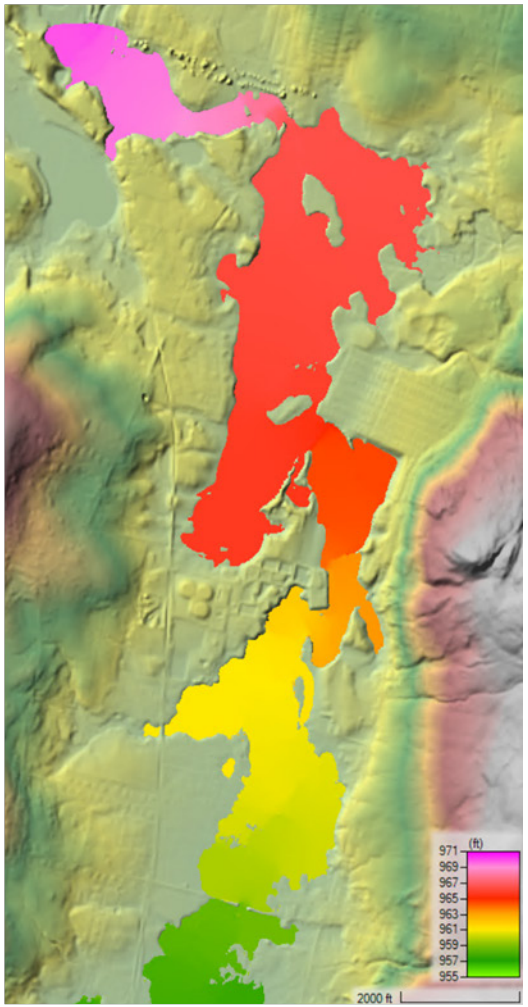


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Figure 3-10

HEC-RAS Model Compared to EPA Model of Hurricane Bertha Flood Extents

Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6

Housatonic River – Rest of River

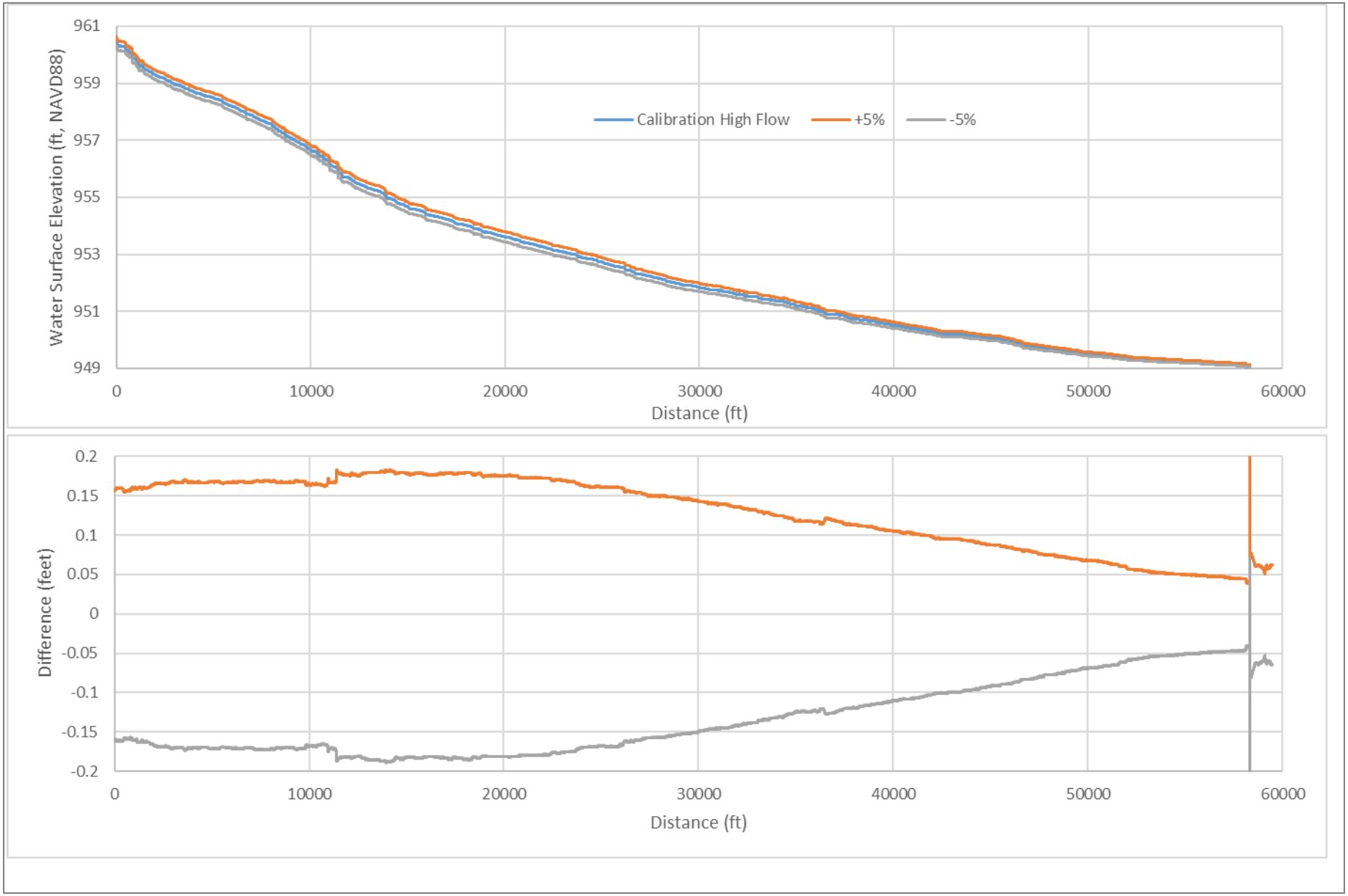

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Figure 3-11
HEC-RAS Model Sensitivity – Flow
Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6
Housatonic River – Rest of River

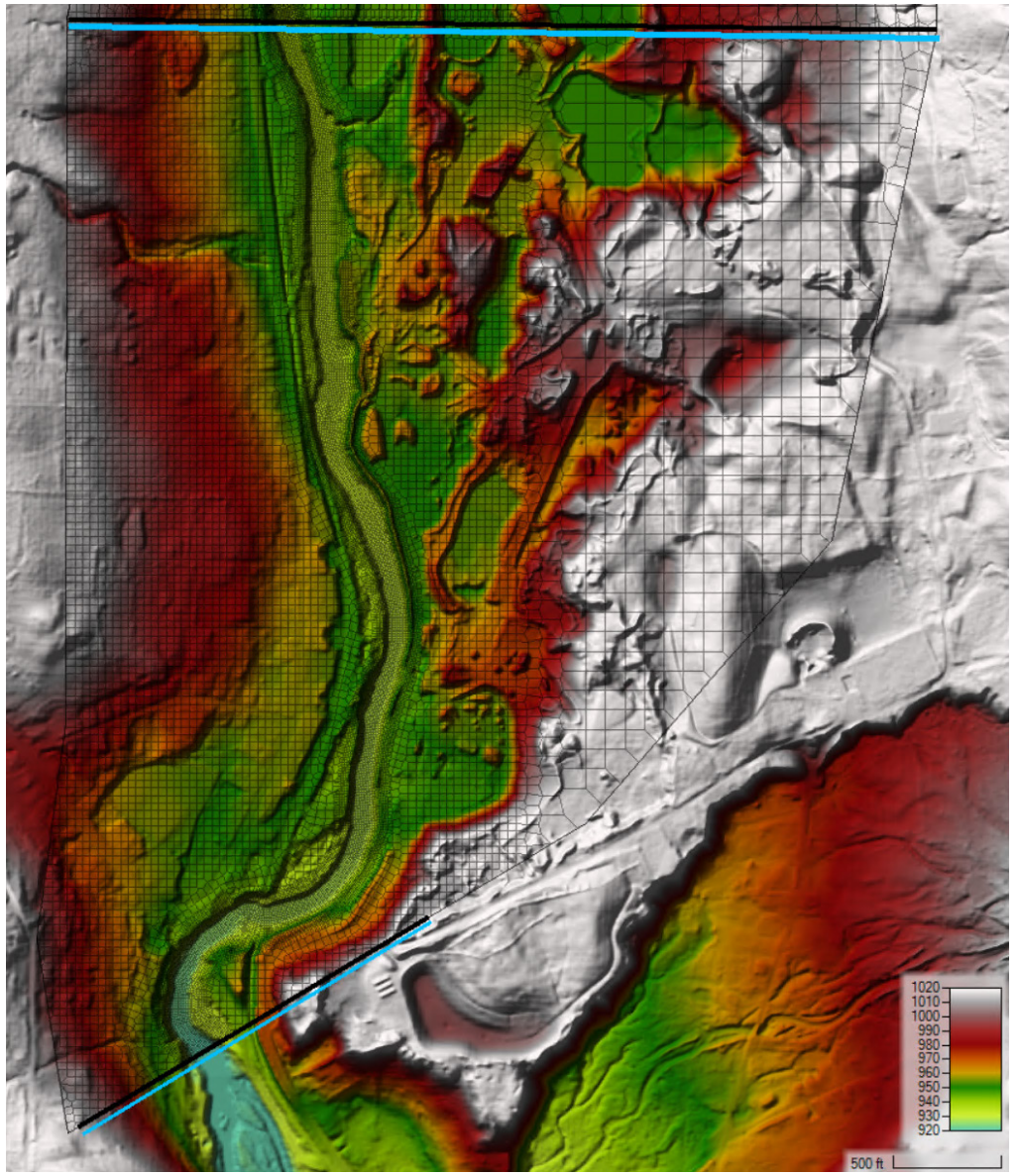

Figure 3-12

HEC-RAS Model Sensitivity – Extended Downstream Boundary Location

Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6
Housatonic River – Rest of River

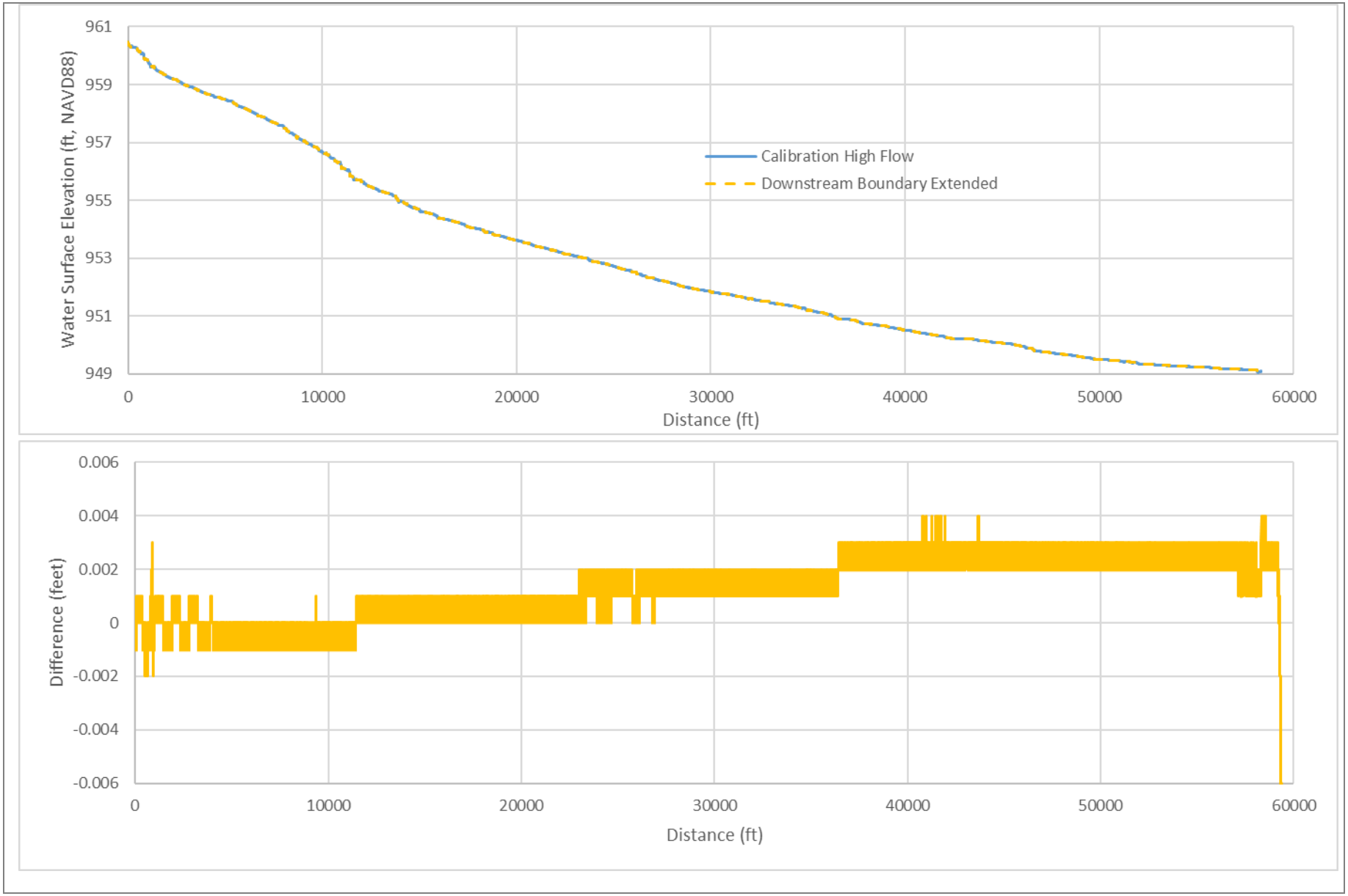

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Figure 3-13

HEC-RAS Model Sensitivity – Extended Downstream Boundary

Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6

Housatonic River – Rest of River

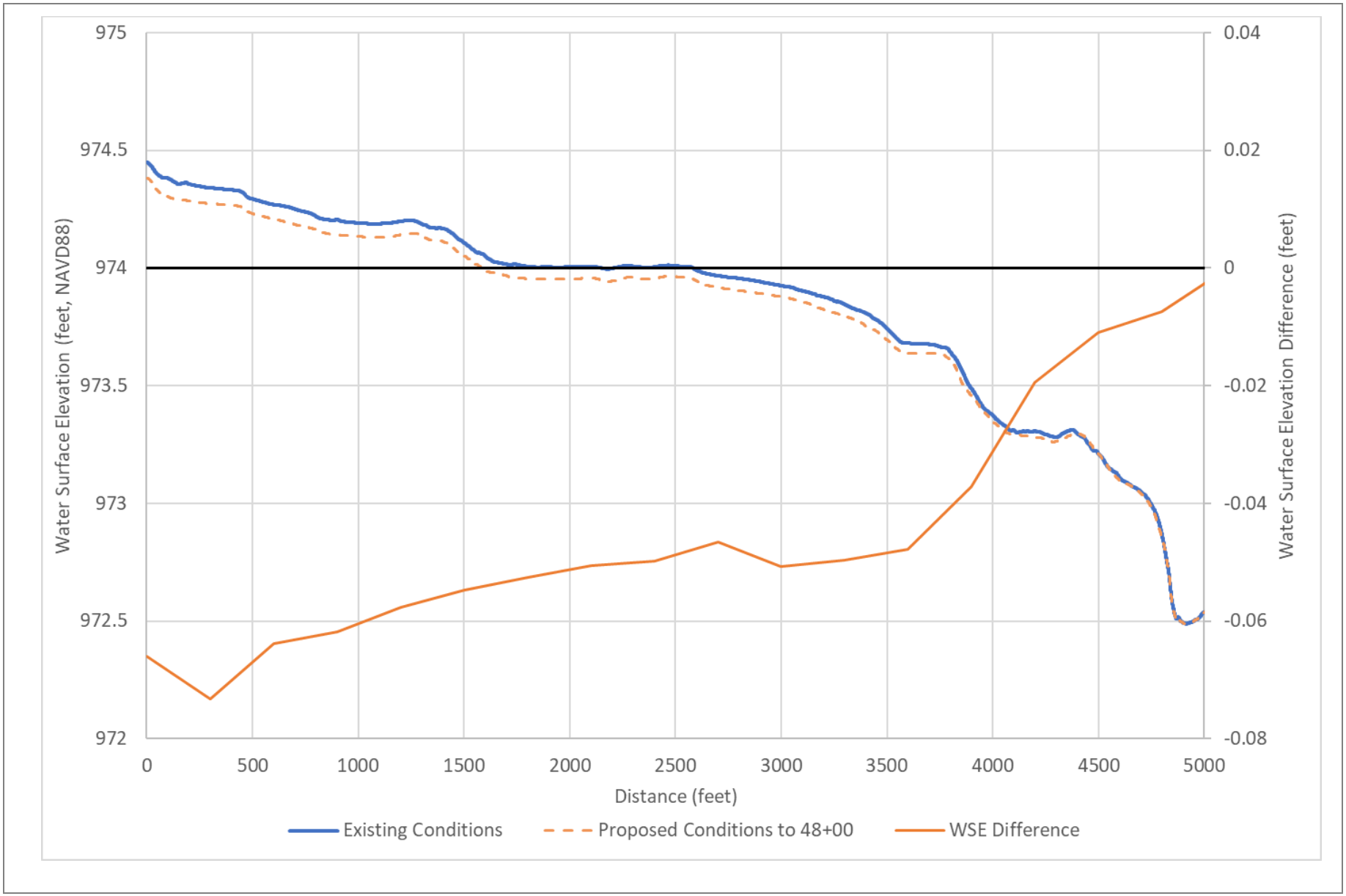
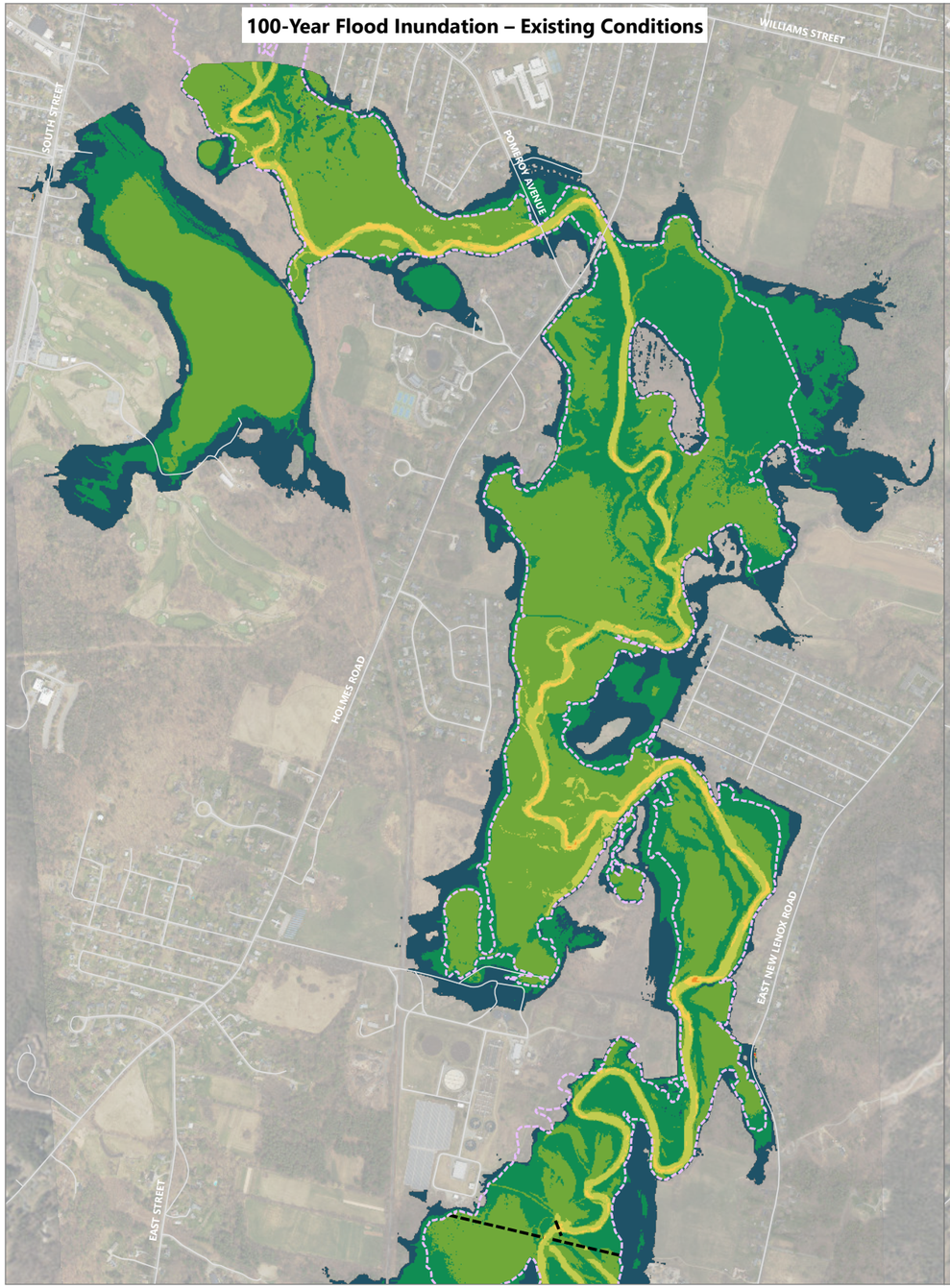


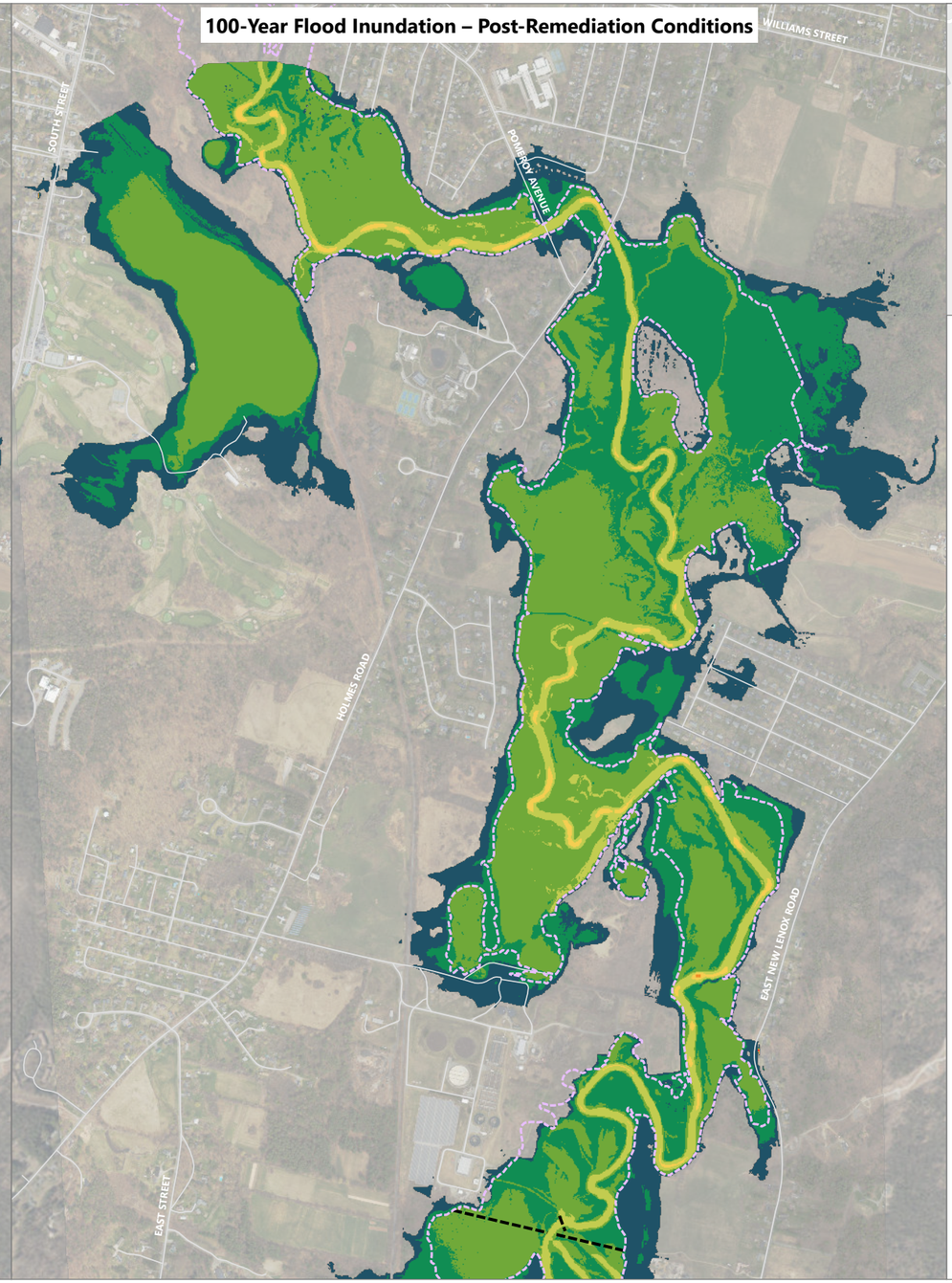
Figure 3-14

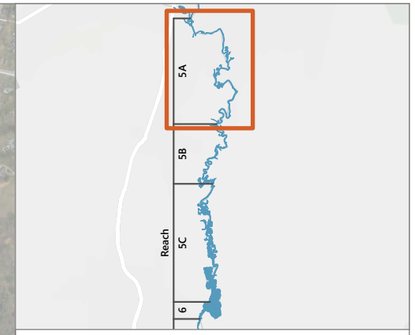
100-Year Water Surface Elevations and Difference: Existing Conditions vs. Post-Remediation Conditions

Hydrologic/Hydraulic Analysis and Modeling of Reaches 5 and 6

Housatonic River – Rest of River







LEGEND:

- Reach Boundaries
- 1 mg/kg PCB Isopleth
- Roads

100 Year Flood Water Depth (feet)

- 0.1 - 5
- 5.1 - 10
- 10.1 - 15
- 15.1 - 20
- 20.1 - 25
- 25.1 - 30
- >30

NOTE:
1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023.

0 1,000
Feet

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Figure 3-15
100-Year Flood Inundation Area: Existing Conditions and Post-Remediation Conditions
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

Appendix D
Cultural Resources Unanticipated Discoveries Plan

Cultural Resources Unanticipated Discoveries Plan

Housatonic River – Rest of River
Pittsfield, Massachusetts

Prepared for
General Electric Company
1 Plastics Avenue
Pittsfield, Massachusetts 01201

Prepared by
AECOM
500 Enterprise Drive
Rocky Hill, Connecticut 06067

April 2026

Cultural Resources Unanticipated Discoveries Plan

This *Unanticipated Discoveries Plan* (UDP) has been prepared by AECOM on behalf of the General Electric Company (GE) to address the handling of any human remains or other cultural resources that were not previously identified during archaeological surveys and that are encountered during the remediation, support activities, or related construction activities in the Housatonic Rest of River area or associated areas such as the Upland Disposal Facility (UDF), rail transload areas, other staging areas, and access roads. This UDP has been developed to protect any such resources, taking into account the applicable federal regulations embodied in "Protection of Historic Properties." 36 C.F.R. §§ 800.2 through 800.7, 800.12, and 800.13. This plan will be implemented by GE if previously undiscovered archaeological resources and/or human remains are identified. A list of contacts is provided at the end of this plan.

In the case of an unanticipated discovery, GE will follow all relevant federal and state laws and regulations regarding treatment of human remains and other items of cultural patrimony. Potentially relevant laws include the following:

- Native American Graves Repatriation Act (NAGPRA) (Public Law 101-601; 25 U.S.C. 3001-3031);
- Massachusetts General Laws (M.G.L.) Chapter 38, §6, as amended, Discovery of Unmarked Skeletal Remains;
- M.G.L. Chapter 9, §26A – State Archaeologist's duties;
- M.G.L. Chapter 9, §27C – Cessation of Activities;
- M.G.L. Chapter 7, §38A – Preservation, Excavation and Analysis of Native American Human Remains;
- M.G.L. Chapter 114, §17 – Preservation of Ancient Burial Places;
- M.G.L. Chapter 272, §71 – Crimes and Punishment: Disinterring Bodies;
- M.G.L. Chapter 272, §73, as amended – Crimes and Punishment: Injuring or Removal of Burial Markers; and
- M.G.L. Chapter 91, §63 – Salvage, Recovery, etc. of Underwater Archaeological Resources; Permits.

1. Human Remains

In the case of an unanticipated discovery of human remains during remediation activities, GE will follow all relevant federal and state laws and recommendations regarding treatment of human remains. GE and its consultants recognize the importance of providing careful and respectful treatment for human remains recovered as an unanticipated discovery or as part of remediation or

support activities. In the event of an unanticipated discovery of human remains, the following protocols will be followed:

(1) Stop Work and Protect the Site. Should human remains or evidence of possible burials be encountered, work in the general area of the discovery will stop immediately and the location will be immediately secured and protected from damage and disturbance. GE's on-site representative or Construction Manager will have the authority and responsibility to stop activities in the area of the discovery.

(2) Leave Remains in Place. Human remains and associated artifacts will be left in place and not disturbed. No skeletal remains or materials associated with the remains will be collected or removed until appropriate consultation has taken place and a plan of action has been developed.

(3) Notify Project Manager and Cultural Resources Contractor. GE's on-site representative or Construction Manager at the time when the discovery is made will notify the GE Project Manager and the AECOM cultural resource professional immediately. The applicable GE Project Manager is currently Kevin Mooney for Reach 5A, Matthew Calacone for the UDF and rail transload areas; and Rachel Leary for Reaches 5B, 5C, and 6. If the applicable GE Project Manager is unavailable, then GE's on-site representative or Construction Manager will notify GE's Operations Manager, Andrew Inglis. The AECOM cultural resource professional is currently Elisabeth LaVigne. Contact information for these individuals is attached.

(4) Notify Local Authorities. GE's on-site representative or Construction Manager at the time when the discovery is made will notify the county coroner/medical examiner and local law enforcement immediately. The coroner and local law enforcement will make the official ruling on the nature of the remains, being either forensic or archaeological. If the remains are determined to be human, forensic, and not archaeological, GE's on-site representative or Construction Manager will consult with law enforcement authorities to resolve the situation, and action by those authorities will be necessary before work may resume in the secured area.

(5) Notify EPA and Its Archaeologist. If the human remains are identified as archaeological, the GE Project Manager (or, if he/she is not available, the GE Operations Manager) will notify EPA, and AECOM's cultural resource professional will notify the archaeologist serving as EPA's Archaeologist.

(6) Further Steps for Native American Burials. If the human remains are determined to be archaeological and are identified as Native American, the remains will be left in place and protected from further disturbance until a plan for their avoidance or removal can be generated. AECOM's cultural resource professional will notify and consult with the Massachusetts Historical Commission (MHC) and appropriate federally recognized Native American tribes and nations to develop a plan of action that is consistent with the Preservation,

Excavation, and Analysis of Native American Human Remains (M.G.L. Chapter 7, §38A), the Native American Graves Protection and Repatriation Act (25 U.S.C. Ch. 32), and regulations thereunder (43 CFR Part 10). The Native Americal tribes and nations to be notified will include the Stockbridge Munsee Band of Mohican Indians, the Wampanoag Tribe of Gay Head (Aquinnah), the Schaghticoke Tribal Nation, the Schaghticoke Indian Tribe, and the Narragansett Indian Tribe. In addition the procedures outlined in the *Stockbridge Munsee Community Treatment and Disposition Of Human Remains and Cultural Items/Inadvertent Discovery Protocol* smc-inadvertent-discovery-policy.pdf (Stockbridge Munsee Community Band of Mohican Indians, 2025) will be followed.

(7) Further Steps for Historic Non-Native American Burials. If the human remains are determined to be archaeological and identified as non-Native American, the remains will be left in place and protected from further disturbance until a plan for their avoidance or removal can be generated in accordance with MHC's "Policy and Guidelines for Non-Native Human Remains Which are Over 100 Years Old or Older" and in a manner consistent with the Advisory Council on Historic Preservation (ACHP) Policy Statement Regarding Treatment of Burial Sites, Human Remains and Funerary Objects (ACHP 2007). AECOM's cultural resource professional will notify and consult with the Massachusetts Historical Commission (MHC) and EPA's Archaeologist to determine a plan of action.

(8) Continue Temporary Cessation of Work. Remediation activities will remain stopped until EPA advises GE to proceed in the area of the specific unanticipated discovery of human remains.

(9) Documentation. The unanticipated discovery of human remains and the actions taken to address it will be documented in a written report that will be submitted to EPA.

2. Other Archaeological Resources

The following steps will be taken in the event that any archaeological resources other than human remains are encountered by a GE employee, a contractor, or subcontractor during remediation, support, or other construction activities. These resources may include, but are not limited to, foundations, walls, stone piles, timber structures, sunken vessels, pits, shafts, and artifact clusters.

(1) Stop Work. Remediation or other invasive activities within the immediate area of the archaeological resource will be stopped; "immediate area" is a context-specific measure, but roughly 50 feet away from the find is generally adequate, although the need for an extension of this area beyond this buffer zone should be considered. The discovery will be immediately protected from further disturbance. GE's on-site representative or Construction Manager will have the authority and responsibility to stop remediation or other invasive activities in the immediate area of the find.

(2) Notify Project Manager and Cultural Resources Contractor. GE's on-site representative or Construction Manager at the time when the discovery is made will notify the applicable GE Project Manager (or, if he/she is not available, the GE Operations Manager) and the AECOM cultural resource professional, identified above.

(3) Notify EPA. The GE Project Manager (or, if he/she is not available, the GE Operations Manager) will notify EPA.

(4) Protect the Site. The GE Project Manager (or, if he/she is not available, the GE Operations Manager) and GE's on-site representative or Construction Manager will arrange for protection of the find from further disturbance or vandalism.

(5) Notify EPA's Archaeologist. The AECOM cultural resource professional will notify EPA's Archaeologist.

(6) Engage in Archaeological Consultation. GE, through its cultural resources consultant, will engage in consultation with EPA's Archaeologist to determine whether the find could potentially meet the criteria for listing on the National Register of Historic Places (NRHP). Sufficient archaeological work will be performed at the unanticipated discovery location to stabilize deposits, protect deposits from scavengers or looters, and collect readily available samples (e.g., radiocarbon dating) that may help pinpoint the age of deposits. If the find is determined to be potentially eligible for listing on the NRHP, additional data recovery work will be performed as required by EPA or determined by GE with EPA approval.

(7) Notify Indian Tribes If Appropriate. If the find is determined to be indigenous, the AECOM cultural resource professional will notify the Stockbridge-Munsee Band of Mohican Indians, the Wampanoag Tribe of Gay Head (Aquinnah), the Schaghticoke Tribal Nation, the Schaghticoke Indian Tribe, and the Narragansett Indian Tribe.

(8) Continue Temporary Cessation of Work. Remediation activities will remain stopped until EPA advises GE to proceed in the area of the specific unanticipated discovery.

(9) Report. The unanticipated discovery and the actions taken to address it will be documented in a written report that will be submitted to EPA. The report format will be determined by the level of effort required.

3. Implementation and Training

GE will implement the measures outlined in this UDP following EPA approval of it.

GE will conduct a short archaeological resource identification training program for remediation and construction field activity staff in advance of the work in a given river reach or area. This training

program will be presented by the AECOM cultural resource professional and is intended to help remediation/construction staff identify unanticipated discoveries in the field and report them to GE's on-site representative or Construction Manager.

4. References

Advisory Council on Historic Preservation (ACHP), 2007. *Policy Statement Regarding Treatment of Burial Sites, Human Remains and Funerary Objects*. February 23, 2007.

Stockbridge Munsee Community Band of Mohican Indians, 2025. *Treatment and Disposition Of Human Remains and Cultural Items/Inadvertent Discovery Protocol*. smc-inadvertent-discovery-policy.pdf.

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Appendix E
Reach 5A Dredge Slope Stability and Sheet Pile Wall Evaluation



April 2026
Housatonic River – Rest of River

Reach 5A Dredge Slope Stability and Sheet Pile Wall Evaluation

Prepared for General Electric Company
Pittsfield, Massachusetts

April 2026
Housatonic River – Rest of River

Reach 5A Dredge Slope Stability and Sheet Pile Wall Evaluation

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ABBREVIATIONS

ASTM	ASTM International
bgs	below ground surface
Conceptual RD/RA Work Plan	*Conceptual Remedial Design/Remediation Action Work Plan for Reach 5A*
DCP	dynamic cone penetrometer
EPA	U.S. Environmental Protection Agency
Final RD/RA Work Plan	*Final Remedial Design/Remedial Action Work Plan for Reach 5A*
FOS	factor of safety
GE	General Electric Company
ML	inorganic silts
ML-CL	inorganic silts and low-plasticity clayey silts
psf	pound per square foot
RCRA	Recovery Act Corrective Action
SDC	Supplemental Data Collection
SM	silty sands
SP	poorly graded sand
SP-SM	poorly graded sand with silt
SW	well-graded sand
SW-SM	well-graded sand with silt
USACE	U.S. Army Corps of Engineers
USCS	Unified Soil Classification System

1 Introduction

1.1 Background

The Revised Final Permit Modification of the Resource Conservation and Recovery Act Corrective Action (RCRA) Permit (EPA 2020) issued by the U.S. Environmental Protection Agency (EPA) to the General Electric Company (GE) for the Housatonic Rest of River requires, and sets forth Performance Standards for, sediment removal and installation of an engineered cap as part of the Reach 5A remediation. This appendix documents the dredge slope stability analysis and conceptual sheet pile wall evaluation for Reach 5A in support of the in-river dredging and capping design.

1.2 Evaluation Objectives and Scope

This appendix describes the evaluations conducted to assess the dredge slope stability and to identify dredge slope configurations and mitigation recommendations to be used as part of the dredge design along the riverbanks within Reach 5A. It also summarizes analyses conducted to assess the stability and feasibility of sheet pile retention systems as well as a review of geotechnical cap stability and placement considerations. The evaluations presented herein were performed to support the final design stage.

This report is being submitted as an appendix to the *Final Remedial Design/Remedial Action Work Plan for Reach 5A* (Final RD/RA Work Plan) in support of the remedial design. As described in the Final RD/RA Work Plan, the final design for the dredging design and engineered capping design have been developed for Stations 0+00 through 48+00. Preliminary evaluations for the dredging design and engineered capping design are underway for the river channel downstream of Station 48+00. As the dredge and cap designs advance for Stations 48+00 through 245+00 in Reach 5A, the analysis presented in this appendix will need to be updated where deeper dredge cuts are specified.

The slope stability results presented in this appendix were focused on segments of Reach 5A where existing slopes are steep and tall and appear to be marginally stable or potentially unstable in their existing condition. In these areas, slope failures or surface slides could be triggered during the excavation of existing sediment prior to cap material placement. The objective of the slope analysis is to identify areas where stability is a significant concern during and after construction and evaluate options to mitigate the risk of slope instability or surface slides.

The following mitigation options have been considered:

- **Option 1:** Offsetting the excavation limits from the channel bank and performing minimal slope grading where possible;

- **Option 2:** Regrading the entire channel bank with or without offsetting the excavation limits to a stable slope inclination; and
- **Option 3:** Installing a temporary structural sheet pile toe wall to facilitate the short-term construction activities.

Options 1 and 3 are intended to support construction operations only and do not address long-term stability of the channel bank. Option 2 would support construction operations and also provide long-term stabilization of the channel bank. Option 2 would include installation of channel bank armoring, such as riprap, to provide scour and long-term erosion protection.

The sheet pile analysis presented herein evaluates the internal (rotational) stability and feasibility of the potential retention systems. Where designs were deemed feasible, a minimum embedment depth was determined to achieve an acceptable factor of safety against rotational failure. The primary objective of this analysis was to determine the minimum and maximum required embedment depths and to identify suitable sheet pile sections that satisfy the established design criteria.

This appendix summarizes the interpreted site conditions used to inform slope stability and sheet pile modeling, the modeling methodology and key assumptions, the modeling results, and the design recommendations for each.

2 Geotechnical Conditions

2.1 Bathymetry and Topography

Reach 5A is a segment of the Housatonic River in Berkshire County, Massachusetts. The river channel in Reach 5A is free-flowing, contains many meanders, and has riverbanks that are subject to erosion in places. The river also has several associated backwaters, floodplains, and vernal pools. The width of the river in Reach 5A ranges from approximately 40 to 120 feet, and riverbank heights in Reach 5A generally range from three to seven feet, with some higher banks of 10 feet or more in several areas.

2.2 Geology

The site is located within a historically glaciated alluvial channel and floodplain environment, with deposits characteristic of glacial advance and retreat, channel migration, and episodic flooding. Geologic mapping efforts completed by Holmes (1968) and later updated by Stone and DiGiacomo-Cohen (2018) were reviewed to identify regionally mapped geologic units present at the site as well as origin and description data to compare with geotechnical investigation data collected as part of the Supplemental Data Collection (SDC) for Reach 5A (Section 2.3). Geologic units mapped at the site and immediately surrounding vicinity listed and described as follows (descriptions per Stone and DiGiacomo-Cohen [2018], unless otherwise noted).

- **Swamp deposits [*Qs*]:** Swamp deposits are characterized as organic muck and peat with trace amounts of sand, silt, and clay. They may be present in poorly drained depressions overlying glacial till and are typically less than 10 feet thick. These are mapped primarily in floodplain areas along Reach 5A.
- **Alluvium [*Qal*]:** Alluvial deposits, including floodplain alluvium (Stone and DiGiacomo-Cohen 2018), are characterized as consisting of sand, gravel, silt, and trace organics and are extensively present along the Housatonic River. This unit typically overlies glacially stratified deposits and often includes reworked or transported glacial deposits. This unit is mapped throughout Reach 5A.
- **Alluvial-fan deposits [*Qaf*]:** Alluvial-fan deposits locally consist of coarse gravel and sand deposited at the base of steep slopes where high-energy streams enter relatively flat valleys. These deposits are mapped at the base of steep slopes east of the river at the downstream end of Reach 5A.
- **Ice-contact deposits [*Qcd*]:** Stagnant ice-contact deposits consist primarily of gravel and sand and contain scattered large surface boulders and interlayered beds of silt and clay. Historical mapping by Holmes (1968) indicates a quarry sourcing material from this unit was present about 500 feet west of the Pomeroy Bridge (south of the river). Ice-contact deposits

are extensively mapped within the valley west of the river in Reach 5A and only locally in a few locations east of the river at the downstream end of Reach 5A.

- **Delta deposits [*Qd*] (Holmes 1968):** Delta deposits consist of gravel and sand, with topset and forest bedding. Deltas represent two lake levels: at Dalton (1,160 feet) and in the main valley of the Housatonic River (1,000 feet). These deposits are mapped as locally abutting the south side of the river near the upstream end of Reach 5A as well as near the wastewater treatment plant downstream, with multiple quarries sourcing sandy material from this mapped unit.
- **Till [*Qt*]:** Glacial till, locally differentiated by thickness in geologic maps, is broadly present around and beneath Reach 5A. Till is regionally characterized as consisting of non-sorted, non-stratified sand with trace silt and clay and may contain pebble, cobble, and boulder clasts near the surface of the unit. Lower till typically consists of more fine-grained materials (e.g., silt) and is very compact.

2.3 Geotechnical Data Collection

As part of the SDC program, geotechnical investigation field work included an in-river geophysical survey, upland and in-river geotechnical borings, installation and monitoring of piezometers, and dynamic cone penetrometer (DCP) testing at undeveloped areas where temporary staging areas or access roads are proposed. This work was conducted using a phased approach beginning with collection of geotechnical borings in upland and riverbank areas, DCP testing, and installation of upland and in-river piezometers in 2024, followed by the in-river geophysical survey in early 2025 and subsequent collection of in-river geotechnical borings. The geotechnical borings included sampling (i.e., split-spoon, California Modified split-spoon, and Shelby tube samples) and laboratory testing (index and strength testing). Brief summaries of the SDC geotechnical field and laboratory testing procedures and their respective results are provided in the following subsections. A detailed summary of SDC activities and results are presented in the *Supplemental Data Collection Summary Report for Reach 5A* (Anchor QEA et al. 2026).

2.3.1 Supplemental Data Collection Geotechnical Field Data

Field data collected as part of the SDC phase included visual characterization of soil and sediment samples collected from Reach 5A. A map displaying the upland and in-river testing locations for sample collection can be found in Figures 1-a through 1-d. Field sample collection logs were prepared for all sampling locations and included visual observations and data, such as sample collection date, boring depth, Standard Penetration Test blow counts (if applicable), sample recovery, and sample description.

2.3.2 Supplemental Data Collection Geotechnical Analytical Results

A total of 282 samples from 38 different boring locations distributed throughout the Reach 5A study area were submitted for laboratory testing of index properties. Samples submitted were tested for a variety of indexing parameters, including moisture content (by ASTM International [ASTM] D2216), organic content (by ASTM D2974), specific gravity (by ASTM D854), Atterberg limits (by ASTM D4318), particle size (by ASTM D6913), and dry bulk density (by ASTM D7263). These results were then used to develop a preliminary interpretation of the subsurface units encountered, as described in Section 2.4.

In addition to index testing, geotechnical strength and bulk testing were conducted on 17 undisturbed and bulk samples. Undisturbed samples were tested for a variety of strength parameters, including consolidated undrained triaxial (by ASTM D4767), unconsolidated undrained triaxial (by ASTM D2850), direct shear (by ASTM D3080), one-dimensional consolidation (by ASTM D2435), fixed wall permeability (by ASTM D4767), and flexible wall permeability (by ASTM D5084) testing. Four bulk samples were submitted for modified proctor (by ASTM D1557) testing. In addition to strength data recorded, physical properties of the tested soils were also included, such as moisture content and unit weight.

2.4 Primary Geotechnical Units

The following subsections describe the primary geotechnical units in Reach 5A that are relevant to the slope stability and sheet pile evaluations. These units were identified as primary given their prevalence and their importance in both understanding the site geological conditions as well as the engineering characteristics for dredging and capping. Descriptions are provided for each geotechnical unit's interpreted site distribution, physical characteristics, and engineering behavior.

2.4.1 Upper Granular Unit: Sands and Silty Sands

The sands encountered at the site are typically brown or gray, occasionally with significant silt content. The typical Unified Soil Classification System (USCS) classifications for this layer are primarily SP (poorly graded sand), SW (well-graded sand), SM (silty sands), SP-SM (poorly graded sand with silt), and SW-SM (well-graded sand with silt). These soils are granular and non-plastic.

This unit is found throughout the Reach 5A site, typically among the shallower layers of soil, close to the surface, with thicknesses ranging to five feet or more. In other areas of Reach 5A, this layer is generally thicker, typically 10 feet or more. Relative density ranges from loose to medium dense, with shallower deposits generally exhibiting loose conditions.

These soils exhibit relatively typical granular soil behavior and thus may exhibit instability or sloughing when subjected to certain dredge configurations. Where sheet pile installation is planned

in thicker granular layers, impact or vibratory driving methods may be more effective and should be considered to facilitate successful installation.

2.4.2 Upper Fine-Grained Unit: Silt

The fine alluvium layer is characterized by a mix of gray and light brown to brown, with trace amounts of clay and organics. The USCS classifications for samples in this layer included ML and ML-CL (inorganic silts and low-plasticity clayey silts).

Laboratory tests indicate that this layer will typically behave as a drained unit under loading associated with cap placement. However, its behavior during dredging and under capping loads will be influenced by drainage conditions and the rate of loading where fines content is greater within the unit (e.g., ML-CL). Additionally, the relatively low-to-absent cohesion within this unit may lead to transport of the unit, even on very flat slopes. If sheet pile installation occurs in thicker silt layers, certain driving methods, such as vibratory or press-in, may be more effective and should be considered to ensure successful installation.

2.4.3 Glacial Till

Glacial till is characterized regionally and is mapped at the site. Till generally consists of sand, trace silt, and trace clay and may contain pebble, cobble, and boulder clasts at the shallower subsurface, as described in Section 2.2. Across the site, this unit was generally encountered at depths ranging from approximately seven to 32 feet below ground surface (bgs), depending on location along the river.

Due to the density or consistency of the unit, glacial till demonstrates high strength and will provide for stable slopes upon excavation; however, the unit would be much more difficult to excavate or dredge than the other geotechnical units encountered at the site. In addition, sheet pile embedment into this layer is infeasible and should be avoided during installation, especially when this unit appears at shallower depths.

2.5 Secondary Geotechnical Units

2.5.1 Clay and Silty Clay

A clay to silty clay unit is intermittently encountered at depths of approximately 22 to 32 feet bgs, with thicknesses ranging from eight to 28 feet. Laboratory testing, including Atterberg limits and triaxial analyses, indicates the material exhibits low to medium plasticity and low to moderate cohesion.

Given its limited lateral extent and depth, this unit is not anticipated to significantly affect the proposed dredging and sheet pile activities.

2.6 Water Level

For the purposes of the stability analyses, the water surface elevation in the river varies throughout Reach 5A and was assumed to be at the normal flow level corresponding to a flow rate on the order of 150 cubic feet per second for each respective section of the reach analyzed. The water level behind the slope and beyond was also estimated to be at the same elevation as the river level since the soil is predominantly granular in composition.

Sheet pile cofferdam analyses were performed for both minimum and maximum water levels, based on results from a one-year recurrence flow based on the 1-D HEC-RAS model presented in the *Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A* (Conceptual RD/RA Work Plan; Anchor QEA et al. 2023). The maximum water level was assumed to be 10.5 feet above mudline, and the minimum water level was assumed to be five feet above mudline.

3 Slope Stability Analysis

3.1 Slope Stability Analysis Approach

A slope stability analysis was completed for Reach 5A to support the design of dredge slopes within Reach 5A. As discussed in Section 1.1, sediment will be removed throughout the river in select, remediated segments.

As described in the Final RD/RA Work Plan, the dredge design includes dredging as needed to install an approximately 22-inch-thick cap (including habitat layer) between Stations 0+00 and 48+00. Similarly, preliminary cap evaluations indicate that approximately 90% of the overall Reach 5A river channel would include sediment removal to accommodate installation of a 22-inch-thick cap. Therefore, this slope stability analysis assumes dredging extends bank to bank with a two-foot vertical cut and the upland-to-bank slope must be designed to achieve the steepest practicable inclination while maintaining stability and minimizing erosion or sloughing. As the dredge design advances for Stations 48+00 through 245+00 in Reach 5A, this analysis will need to be updated where deeper dredge cuts are specified.

To assess a potential range of dredge slope configurations extending through the primary geotechnical units described in Section 2.4, slope stability analysis was performed using both limit-equilibrium methods (i.e., using geotechnical modeling software Slide2 [Rocscience 2026]) and an infinite slope method (i.e., simplified, closed-form, equation-based methods in a spreadsheet). Descriptions of the modeling approach taken for each of these two methods are provided in the following subsections.

The primary objective of the riverbank remediation component is to remove contaminated soil at erodible banks, not to stabilize all existing riverbank slopes. As described in the Final RD/RA Work Plan, about 16,800 feet of riverbank (33% of Reach 5A) will be remediated to meet Performance Standards. Many of the remediation banks and some nearby non-remediation banks will be graded as required by the Natural Channel Design to reduce erosion and ensure stability after remediation. Riverbanks that are being graded to a more stable slope based on the Natural Channel Design described in the Final RD/RA Work Plan were not included in this analysis.

3.1.1 Limit-Equilibrium Methods

All slope stability modeling was performed with Rocscience Slide2 version 9.041 software, which uses limit-equilibrium methods of analysis to calculate the factor of safety (FOS) for the evaluated slip surface. For each of the cross-sections utilized, two models were generated of the existing slope at each end (totaling 44 scenarios), and three section slopes were selected for further instability mitigation and dredge scenario analysis (totaling seven scenarios).

The target FOS values for these models consider the site's intended use, consequences of slope failure, and any limitations surrounding knowledge of the subsurface lithology. While standard engineering practice typically applies a minimum global FOS of 1.5, a value of 1.4 was considered appropriate given site conditions and precedent from nearby analyses. A 2006 slope stability evaluation for the 1.5-Mile Reach Removal Action Project selected a FOS of 1.4, which is considered more conservative for riverbanks (Weston Solutions 2006). As discussed in Section 3.3.1, adoption of a higher target FOS could necessitate over-excavation of the bank to satisfy stability requirements.

3.1.2 Conditions Evaluated

Geologic cross-sections for analysis were developed based upon topographic and bathymetric survey data in tandem with data collected from the geotechnical field investigation and subsequent laboratory analysis. Critical sections were identified based upon multiple environmental characteristics, including the following:

- Sections near available geotechnical data;
- Sections with the greatest apparent slope angle and/or greatest slope height;
- Sections intersecting with selected floodplain and/or riverbank remediation areas;
- Sections with soft or loose ground conditions, as indicated by previous geotechnical investigations;
- Sections where large vegetation removal is necessary; and
- Sections near existing, intersecting structures, such as bridges.

In total, 22 representative cross-sections were generated for analysis. Table 3-1 summarizes the selected locations and the reasoning for their selection.

Table 3-1
Selected Cross-Section Locations

Cross-Section Location	Reasoning
Station 2+00	Typical section through floodplain remediation area
Station 13+75	Primarily loose or soft ground conditions intersecting a steep slope
Station 15+25	Primarily loose or soft ground conditions intersecting a steep slope
Station 23+00	Primarily loose or soft ground conditions intersecting a steep slope
Station 25+50	Primarily loose or soft ground conditions intersecting a steep slope
Station 37+50	Primarily loose or soft ground conditions intersecting a steep slope, potential for vegetation removal
Station 39+50	Primarily loose or soft ground conditions intersecting a steep slope, potential for vegetation removal

Cross-Section Location	Reasoning
Station 45+25	Primarily loose or soft ground conditions intersecting a steep slope, potential for vegetation removal
Station 49+50	Typical section through floodplain area, close proximity to Holmes Road Bridge
Station 54+50	Typical section through floodplain area, close proximity to Holmes Road Bridge
Station 68+00	Primarily loose or soft ground conditions intersecting a steep slope
Station 70+00	Typical section in proximity to floodplain remediation area
Station 100+00	Section in proximity to floodplain remediation area, primarily loose or soft ground conditions intersecting a steep slope
Station 106+50	Section in proximity to floodplain remediation area, primarily loose or soft ground conditions intersecting a steep slope
Station 135+00	Typical section in proximity to available geotechnical data
Station 158+50	Section in proximity to soil removal area, primarily loose or soft ground conditions intersecting a steep slope
Station 163+00	Primarily loose or soft ground conditions intersecting a steep slope
Station 174+00	Section in proximity to remediation area, steep slope conditions
Station 182+50	Primarily loose or soft ground conditions intersecting a steep slope, potential for vegetation removal
Station 189+00	Typical section in proximity to available geotechnical data
Station 194+25	Primarily loose or soft ground conditions intersecting a steep slope, potential for vegetation removal
Station 205+50	Section in proximity to floodplain remediation area, primarily loose or soft ground conditions intersecting a steep slope

Note:
This analysis assumes a removal depth of two feet at the shoreline. Additional sections will require analysis where pending dredge designs indicate a removal depth of greater than two feet.

Results of the existing conditions modeling and corresponding FOS values are provided in Attachment 2.

3.2 Assumptions

3.2.1 Dredge Approach

Based on preliminary cap evaluations, approximately 90% of the overall Reach 5A river channel would include sediment removal to accommodate installation of a 22-inch cap. Therefore, the target dredge depth was assumed to be two feet below the existing mudline. Modeling assumed that the dredge extent would end at the designated shoreline boundary along each riverbank. As the dredge design advances for Stations 48+00 through 245+00 in Reach 5A, this analysis will need to be updated and additional sections analyzed, particularly in areas requiring dredging depths greater than two feet.

3.2.2 Subsurface Stratigraphy

Subsurface stratigraphy profiles were developed using SDC data. Boring logs and geotechnical laboratory test data provided insights into the depositional sequences, physical properties, and classification of soil layers. Strength data from triaxial compression and direct shear tests were used to further characterize these layers based on their geotechnical properties. Stratigraphy for each section varied based on their proximity to available data.

Based on the above framework, four geotechnical soil units were identified, as described in Sections 2.4 and 2.5, and represented within the slope stability models. The stratigraphic interpretations for each of the evaluated locations are provided in the slope stability analysis outputs in Attachment 2.

3.2.3 Material Properties

Material properties for primary and secondary soil units were generally determined with reference to in situ test and laboratory test results. A minimal cohesive strength was applied to granular surface soils to account for the influence of root cohesion/adhesion in surficial soils and to allow for the presence of fines within these materials. Material properties varied slightly depending on each cross-section's proximity to available data and associated laboratory results.

The FOS values for all scenarios analyzed were then assessed and compared with target dredge configurations. Attachment 1 summarizes the material properties of relevant soil units for each cross-section.

3.3 Results and Recommendations

3.3.1 Method of Interpretation and Model Results

The results of all existing condition scenarios were reviewed with reference to the associated target minimum FOS values. Slopes at each cross-section were organized into categories based on their current stability and existing condition analysis results. A total of three categories were developed, and the conditions for each are described as follows:

- **Low:** FOS ≥1.4, relatively stable, shallow slopes
- **Moderate:** 1≤ FOS ≤1.4, moderately unstable, steeper slopes
- **High:** FOS <1, steep slope, active failure and erosion at bank

A map displaying the risk categories at each bank for the Reach 5A extent is presented in Figures 2-a through 2-d. A risk analysis was conducted to estimate the total extent of high-risk areas within Reach 5A and is discussed further in Section 3.3.2.

One representative cross-section from each risk category was selected for modeling of dredging and mitigation alternatives. This approach was used to develop appropriate recommendations for "Low," "Moderate," and "High" risk slopes along each bank. The range of dredge scenarios was assessed to identify practicable mitigation measures capable of meeting minimum FOS requirements.

Table 3-2 summarizes the three cross-sections that were selected for the dredging and instability mitigation analyses.

Table 3-2
Selected Cross-Sections for Dredging Scenario Analysis

River Station	Bank Location	Existing Conditions FOS	Risk Category
2+00	Left	1.42	Low
37+50	Right	1.14	Medium
45+25	Right	0.70	High

Slope conditions at the evaluated cross-sections are shown in Photographs 1 through 3.

Photograph 1



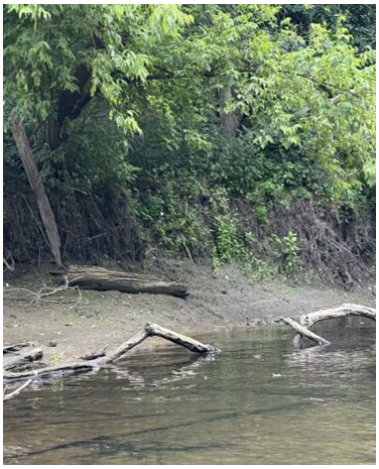
Near Station 2+00, classified as a "low" risk slope

Photograph 2



Near Station 37+50, classified as a "moderate" risk slope

Photograph 3



Near Station 45+25, classified as a "high" risk slope

The following primary mitigation alternatives were evaluated: (1) a five-foot dredging offset with slope regrading; and (2) installation of a sheet pile wall at the toe of slope. Regrading without offsetting excavation limits was initially considered an option but was determined to require removal of a substantial portion of the slope at the three analyzed cross-sections due to existing bank geometry. This limitation was also observed even with a five-foot offset, as demonstrated by the 2:1 regrade scenario at Section 45+25 (Attachment 3). In these cases, sheet pile wall installation was identified as a more practicable and less intrusive solution. However, where slope geometry permits,

limited regrading without an offset could be feasible. Table 3-3 summarizes the dredging and mitigation scenarios analyzed and their resulting FOS values.

Table 3-3
Dredging and Mitigation Scenario Results

River Section	Bank Location	Scenario	FOS
2+00	Left	5-foot Offset with 1:1 Regrade	1.13
		5-foot Offset with 2:1 Regrade	1.44
		Sheet Pile Wall	1.40
37+50	Right	5-foot Offset with 1.75:1 Regrade	1.42
		Sheet Pile Wall	1.41
45+25	Right	5-foot Offset with 2:1 Regrade	1.42
		Sheet Pile Wall	1.39

The mitigation scenario analysis outputs are provided in Attachment 3.

3.3.2 Risk Analysis

High-risk areas were further refined based on several criteria:

- Locations with low FOSs identified from nearby cross-section slope stability analyses;
- Areas with bank heights of 10 feet or greater based on available slope data;
- Proximity to nearby residential properties, utilities, or structures where slope failure could pose a risk of damage; and
- Slopes where sheet pile wall stabilization is considered a viable and likely mitigation measure.

In total, six separate high-risk locations were identified on both the left (east) and right (west) banks. Table 3-4 summarizes the high-risk locations.

Table 3-4
Identified High-Risk Areas

Approximate River Mile Stationing	Bank	Slope Height (feet)	Nearby Structures, Property, or Utilities?
13+00 to 15+50	Right	15	No
25+50 to 26+50	Right	20	No
44+75 to 48+75	Right	6 to 7	Yes
54+50 to 56+50	Left	6 to 7	Yes
106+00 to 108+50	Left	10 to 19.5	Yes
195+75 to 196+50	Right	8 to 10	Yes

Most of these locations have a slope height of 10 feet or higher, with the few exceptions being near structures and residential properties. Selected cross-sections at each high-risk location were also analyzed in Slide2 to understand the existing global stability in addition to the stability of a sheet pile stabilization scenario. All cross-sections were found to have increased and relatively stable factors of safety following the modeled sheet pile installation scenario (exceeding the specified target value of 1.4). Model results for each of these scenarios are provided in Attachment 4.

The total length of high-risk areas along each bank was estimated using approximate river mile stationing. A summary of these estimates is provided in Table 3-5.

Table 3-5
High-Risk Footage

Bank	High-Risk Footage (feet)	
	Stations 0+00 to 48+00	**Station 48+00 to 245+00**
Right	750	175
Left	0	450
Total	**750**	**625**

3.3.3 Design Recommendations

Overall, considering the results of analyses, four potential options for bank stabilization were identified:

1. **No Action:** Allow the bank to slough into the channel when the area is dredged. Certain areas would exhibit a higher potential for sloughing.
2. **Limited Grading with Excavation Offset:** Offset excavation limits from the channel bank and perform minimal slope grading where feasible to reduce disturbance while improving stability.
3. **Full Bank Regrading:** Regrade the entire channel bank, with or without offsetting excavation limits, to achieve a stable slope inclination.
4. **Temporary Structural Toe Wall:** Install a temporary sheet pile toe wall to facilitate construction activities and provide interim bank support.

Slopes classified as "Low" or "Moderate" risk are not expected to require engineered shoreline stabilization solutions. These areas could be managed through construction means and methods and measures could be incorporated into the project specifications requiring the contractor to use discretion to address these areas when conducting dredging operations. Engineered shoreline stabilization measures should be employed for slopes classified as "High" risk, particularly where slope instability could present safety risk to construction personnel or the general public or where property damage is of concern. Multiple temporary sheet pile stabilization scenarios were modeled

in Slide2 across the identified high-risk areas (Attachment 4). These were utilized to identify appropriate embedment depths necessary for an acceptable factor of safety (greater than or equal to 1.4). Sheet pile lengths for each identified high-risk area are shown in Table 3-6.

Table 3-6
Identified High-Risk Areas

Approximate River Mile Stationing	Bank	Total Sheet Pile Wall Height (feet)
13+00 to 15+50	Right	8
25+50 to 26+50	Right	14
44+75 to 48+75	Right	13
54+50 to 56+50	Left	15
106+00 to 108+50	Left	7
195+75 to 196+50	Right	8

4 Cofferdam Sheet Pile Wall Evaluation

4.1 Conceptual Evaluation Approach

Temporary sheet pile sections may be installed in portions of Reach 5A to function as a cofferdam during remedial dredging operations like the approach that was used for the Upper ½-Mile Reach and 1.5-Mile Reach Removal Actions. The determination of whether to use sheet pile cofferdams will be made in consultation with the selected remediation contractor, and details on any proposed temporary sheet pile cofferdams will be provided in the applicable Supplemental Information Package.

This section summarizes an analysis that was performed to evaluate the internal (rotational) stability and feasibility of using sheet pile retention designs. When the use of sheet pile was considered feasible, a minimum allowable embedment depth was determined, which would result in an acceptable factor of safety against rotational stability.

Two scenarios were analyzed to determine the minimum and maximum embedment depths of a potential sheet pile system. The first scenario (Scenario 1) modeled the sheet pile at the average minimum water level, and the second scenario (Scenario 2) modeled it at the average maximum water level.

The design sheet pile wall configurations used for each scenario are shown in Figures 3a and 3b.

4.1.1 Rotational Stability

Rotational stability analyses of the proposed sheet pile orientations were performed using the computer program CWALSHT developed by U.S. Army Corps of Engineers (USACE) at the Engineering Research & Development Center in Vicksburg, Mississippi. CWALSHT (Dawkins 1990) uses classical methods of sheet pile analysis based on limit equilibrium in accordance with USACE EM 1110-2-2504 (Design of Sheet Pile Walls).

Scenarios 1 and 2 were analyzed using the CWALSHT program to determine minimum embedment depth and maximum bending moment. Representative, conservative values for soil properties and stratigraphy were selected from prior slope stability analyses. No surcharge loading was included. Factors of safety on soil strength for both active and passive earth pressure calculations were set to 1.0 for each scenario.

4.2 Assumptions

4.2.1 Water Levels

Selected water levels were determined based on data provided from a one-year recurrence flow based on the 1-D HEC-RAS model presented in the Conceptual RD/RA Work Plan. Assumed water levels were 10.5 feet for Scenario 1 and five feet for Scenario 2.

4.2.2 Till/Rock Penetration

As discussed in Section 2.4.3, the glacial till unit exhibits high strength and is significantly more difficult to penetrate than other geotechnical units encountered at the site. Consequently, areas with shallow till may present challenges for sheet pile cofferdam installation.

These areas have been identified through data collected during the Reach 5A SDC program, including in-river borings and a geophysical survey, which provide insight into the distribution of shallow till and rock along the river alignment. The geophysical survey used a combination of subbottom profiling and ground penetrating radar data to identify different reflectors potentially associated with subsurface unit contacts. Subsurface reflector patterns were compared with observed subsurface unit contacts within the in-river borings to calibrate the interpolation of the geophysical profile between borings. The shallowest interpreted till or rock depths are located between approximately river Station 45+25 and 70+00. Table 4-1 provides approximate till depths encountered at identified in-river borings within this stretch of river. Given the shallow till depths noted, alternative or supplemental ground support and groundwater control measures may be required in these locations (see Section 4.3.1 for a further discussion).

Table 4-1
Shallow Till Identification

River Station	Nearby In-River Boring	Approximate Till Depth Below Mudline (feet)
45+25	IR-BU-11	9.5
50+00	IR-BU-12	16.9
54+50	IR-BU-13	3.4
58+25	IR-BU-14a	4.9
58+75	IR-BU-14b	5.1
59+75	IR-BU-14.5	12.9
61+00	IR-BU-15	13.1
65+75	IR-BU-16a	8.7
66+25	IR-BU-16b	0
70+00	IR-BU-17	8.6

4.3 Analysis Results and Recommendations

Scenarios 1 and 2 were calculated in CWALSHT, and the output results for each model are provided in Attachment 5. The resulting values for minimum embedment depth and maximum bending moment are summarized in Table 4-2.

Table 4-2
CWALSHT Analysis Results

Scenario	Minimum Embedment Depth (feet)	Maximum Bending Moment (lb-feet)	Maximum Bending Moment (kip-in)
Scenario 1: Maximum Water Height	15.35	48,896	587
Scenario 2: Minimum Water Height	7.88	7,375	88.5

The required sheet pile section modulus can be estimated by dividing the maximum bending moment by allowable bending stress of the sheet pile material. The bending moment was divided by 25 kips per square inch, the assumed allowable bending stress. These values were then compared to data sheet values for Nucor Steel PZ shapes (Nucor-Yamato Steel Company 2023). The required section modulus should be greater than the actual section modulus of the selected sheet pile section. Table 4-3 summarizes the calculated elastic section modulus and selected section groups for each scenario.

Table 4-3
Sheet Pile Design Parameters

Scenario	Calculated Elastic Section Modulus (in^3)	Selected Section Size (in x lbs/ft)	Selected Section Modulus (in^3/feet)
Maximum Water Height (Scenario 1)	23.5	PZ 27	30.2
Minimum Water Height (Scenario 2)	3.5	PZ 22	18.1

To accommodate potential high-water levels, it is recommended that the selected section size for a sheet pile cofferdam wall should be PZ 27.

Shallow till is present in portions of Reach 5A, as described in Section 4.2.2. Due to the density of this material, sheet pile installation may be difficult or infeasible. In these areas, alternative or supplemental approaches may be required. These approaches may include supplemental bracing to reduce sheet pile embedment requirements, pre-excavation at the sheet pile line to facilitate sheet pile embedment into the dense till layer, or installation of soldier piles as primary elements spanning between them with sheet pile, lagging, or other infill panels.

5 Cap Stability and Placement Considerations

In addition to dredge slope stability and sheet pile installation feasibility, engineering considerations for cap placement on the post-dredge surface were reviewed, including allowable bearing, potential for consolidation settlement, and placement sequencing (e.g., thin lifts). In general, dredge programs in which very soft, fine-grained sediments underlie the proposed cap may require geotextiles to prevent mixing of the cap within the underlying sediments, placement of thin lifts of sediment to prevent bearing capacity failure, and overplacement allowance to account for post-cap consolidation settlement.

Throughout Reach 5A, the dredge prism is generally confined to the dominant surficial sediment unit, which is a sandy alluvium (see Section 2.4.1). The design cap upstream of STA 48+00 includes six to nine inches of a sand layer, six to nine inches of a gravel or coarse gravel layer (D50s ranging from 1.5 to 3 inches), and approximately on average four inches of gravelly sand or coarse gravel habitat layer, resulting in a total cap thickness of approximately 22 inches (+/- construction tolerances). The dredge depth and cap thickness are designed to be generally equal, such that the existing surface and the post-cap surface are at the same elevation. According to this design approach, the effective stresses acting on the dredge surface (at 22 inches depth, +/-) before dredging and after cap placement are anticipated to be similar and slightly higher after cap placement.

To evaluate cap placement suitability, allowable bearing pressure versus the existing and post-cap bearing pressures were assessed. Using a drained friction angle ranging from 28 to 30 degrees, consistent with the slope stability modeling, the allowable bearing pressure was calculated as ranging from about 1,000 pounds per square foot (psf) to 1,500 psf. Conservatively assuming a two-foot cap thickness, the effective stress acting on the dredge surface with a full cap placed in the dry would be on the order of 240 psf (assuming an average cap unit of 120 pcf), which is significantly less than the allowable bearing pressure and indicates that the dredge surface can accommodate cap placement without risk of bearing failure or thin lift placement restrictions.

Consolidation settlement and substrate-cap mixing are concerns primarily where underlying materials are soft, fine-grained soils that are being capped with coarse-grained materials. As noted herein, upstream of STA 48+00 the dredge prism will be within sandy alluvium, and the cap will consist of coarse-grained soils. The sandy alluvium is coarse-grained and not considered susceptible to consolidation settlement, and by design the cap includes a lower layer (to be placed directly on the dredge surface) that is similar in grain size to the sandy alluvium to prevent mixing and/or native material migration through the cap.

Analysis of allowable bearing and cap placement considerations downstream of STA 48+00 will be completed at a later date once the cap design is finalized for this portion of Reach 5A.

6 Uncertainties and Data Gaps

Geotechnical analyses inherently involve uncertainty related to subsurface characterization and modeling assumptions; this uncertainty should decrease as design advances. For Reach 5A, assumptions were applied where data limitations existed, including material properties, potential design configurations, and existing infrastructure constraints. Identified data gaps will be addressed as the design progresses. Identified data gaps are as follows:

- A general two-foot vertical dredge assumption was made for all models throughout Reach 5A, which is suitable for the Year 1 design (i.e., between Stations 0+00 and 48+00) and for most of Reach 5A. Preliminary cap evaluations indicate that approximately 10% of the overall Reach 5A river channel will likely have dredging depths deeper than two feet. Once those deeper dredging depths and locations are known, future analyses should be performed to assess the dredge slope stability and any mitigation measures.
- Evaluation of cap-related stability conditions will be needed once the cap design is finalized for areas downstream of Station 48+00.
- Existing structures were not incorporated into the modeling scenarios. No structures are presented in the current scope of the Year 1 design (i.e., between Stations 0+00 and 48+00). As the dredging and capping design advances downstream of Station 48+00, future analyses should evaluate these structures to assess the potential effects of dredging on their stability.

7 References

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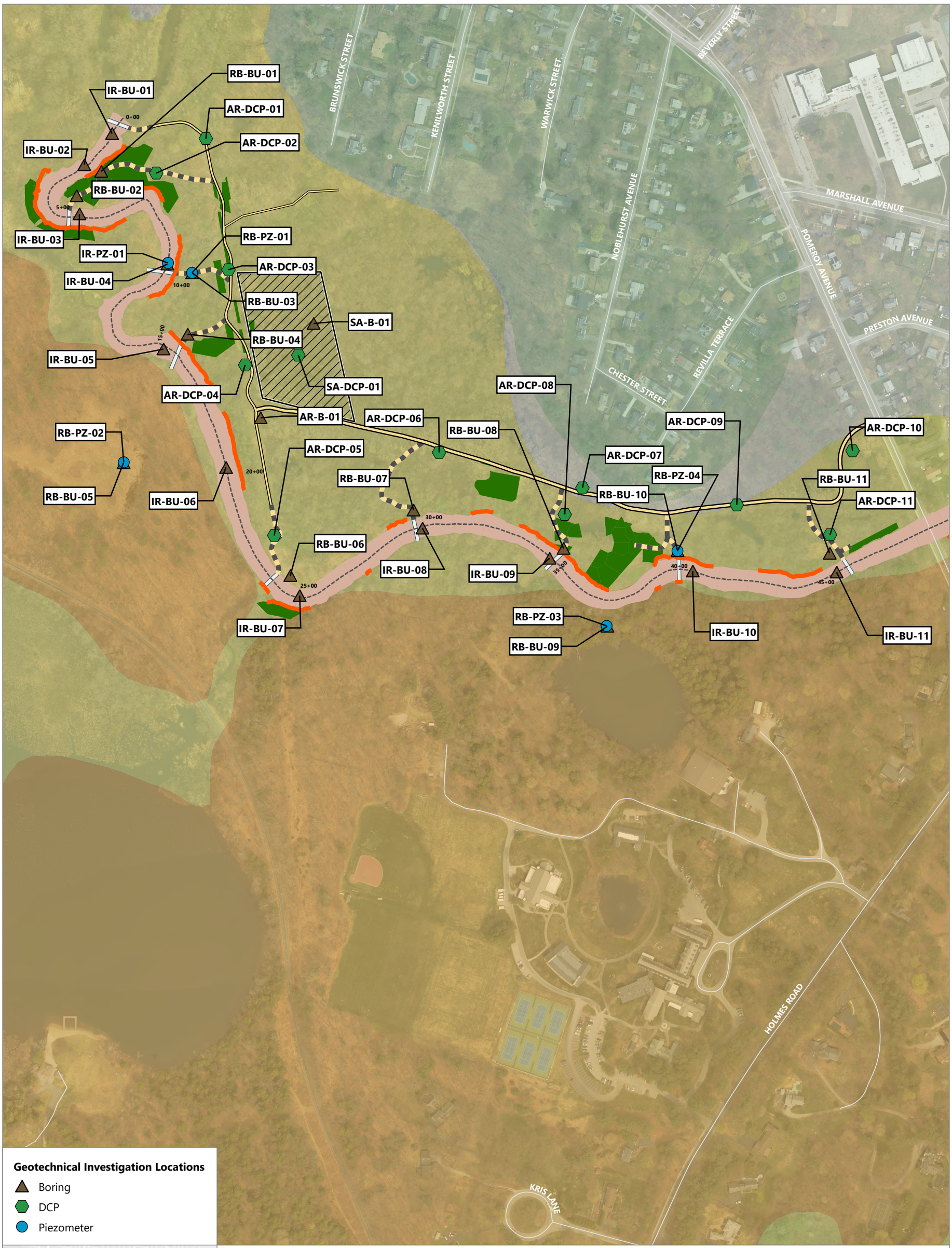
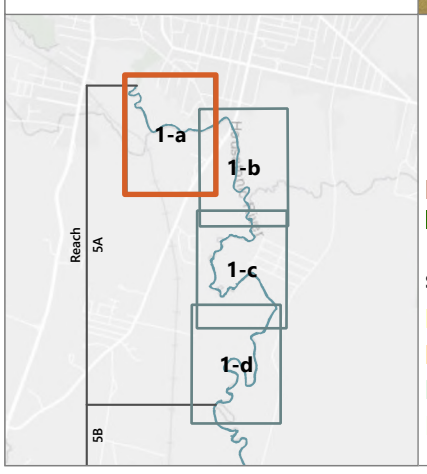
Figures



Geotechnical Investigation Locations

- Boring
- DCP
- Piezometer



LEGEND:

- River Centerline
- Final Design Access Road - Primary
- Final Design Access Road - Secondary
- Final Design River Access Point
- In-River Sediment Remediation Area
- Floodplain Remediation
- Riverbank Remediation

Surficial Geology Overlay

- Floodplain alluvium
- Glacial stratified deposits, coarse
- Thick till
- Thin till

NOTE:
1. Aerial Imagery from Bluesky 2025.
2. The remediation areas are preliminary and may be subject to revision as part of final design.

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Feet

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Figure 1a
Geotechnical Investigation Maps
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

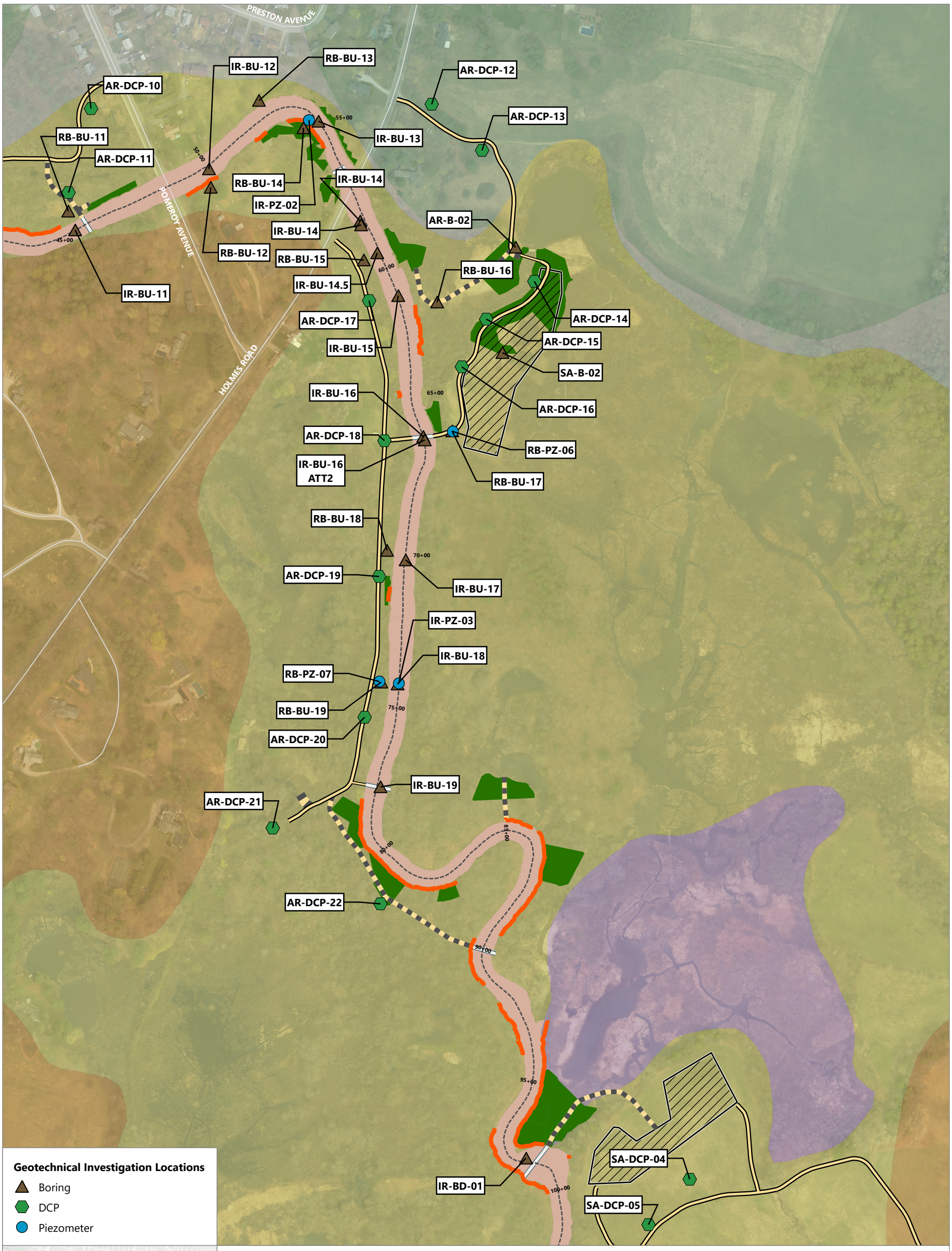

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Figure 1b
Geotechnical Investigation Maps
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

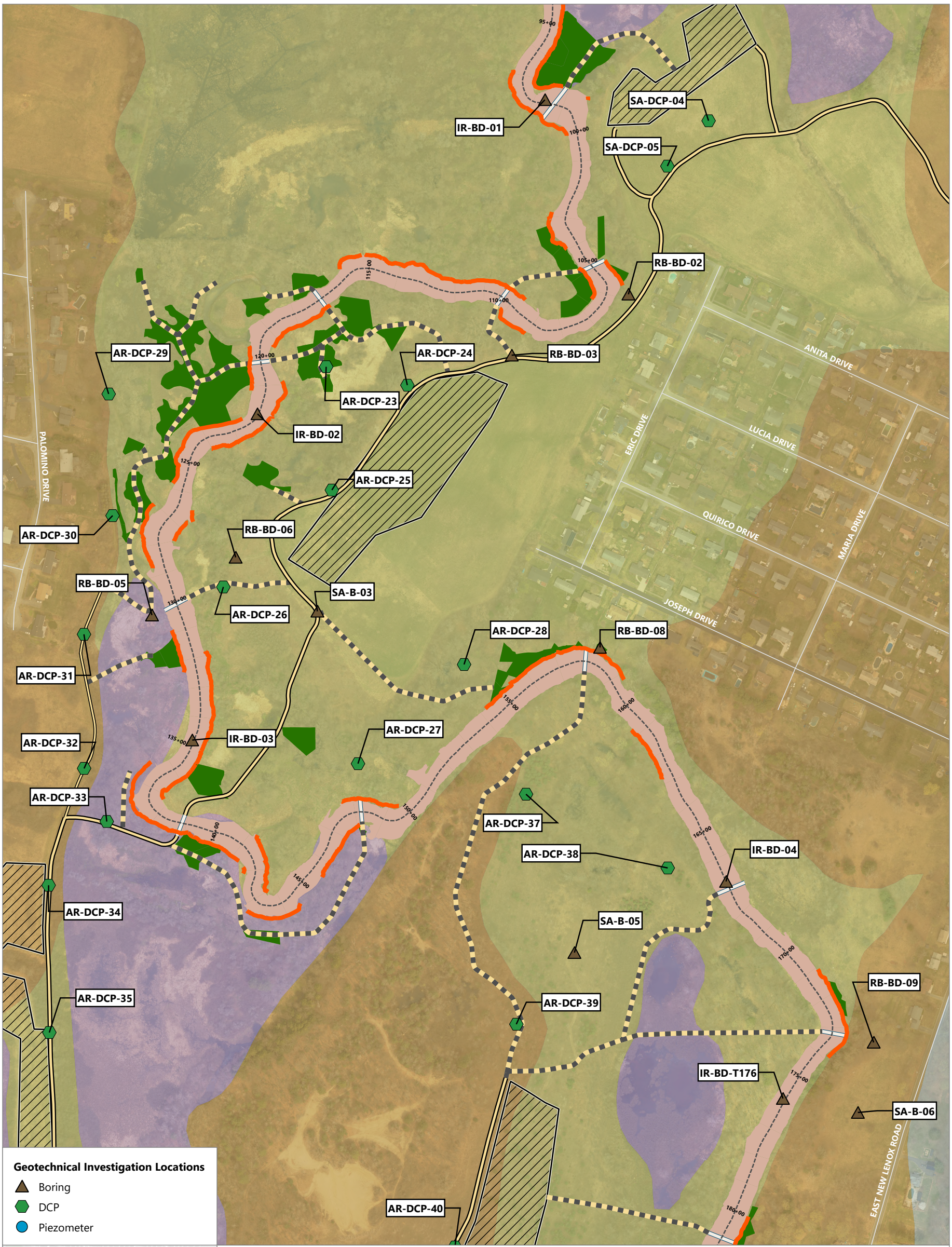

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Figure 1c
Geotechnical Investigation Maps
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

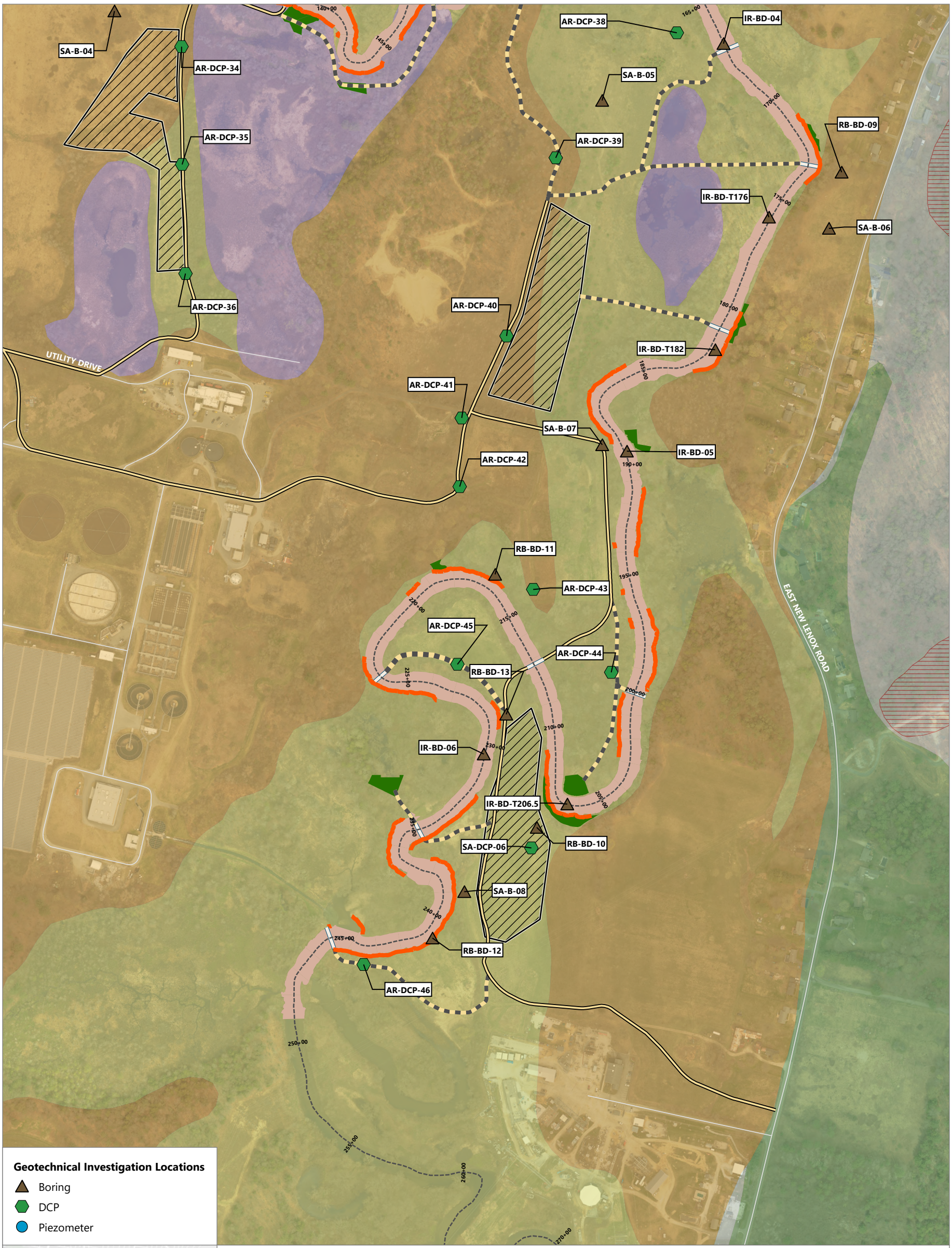

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Figure 1d
Geotechnical Investigation Maps
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

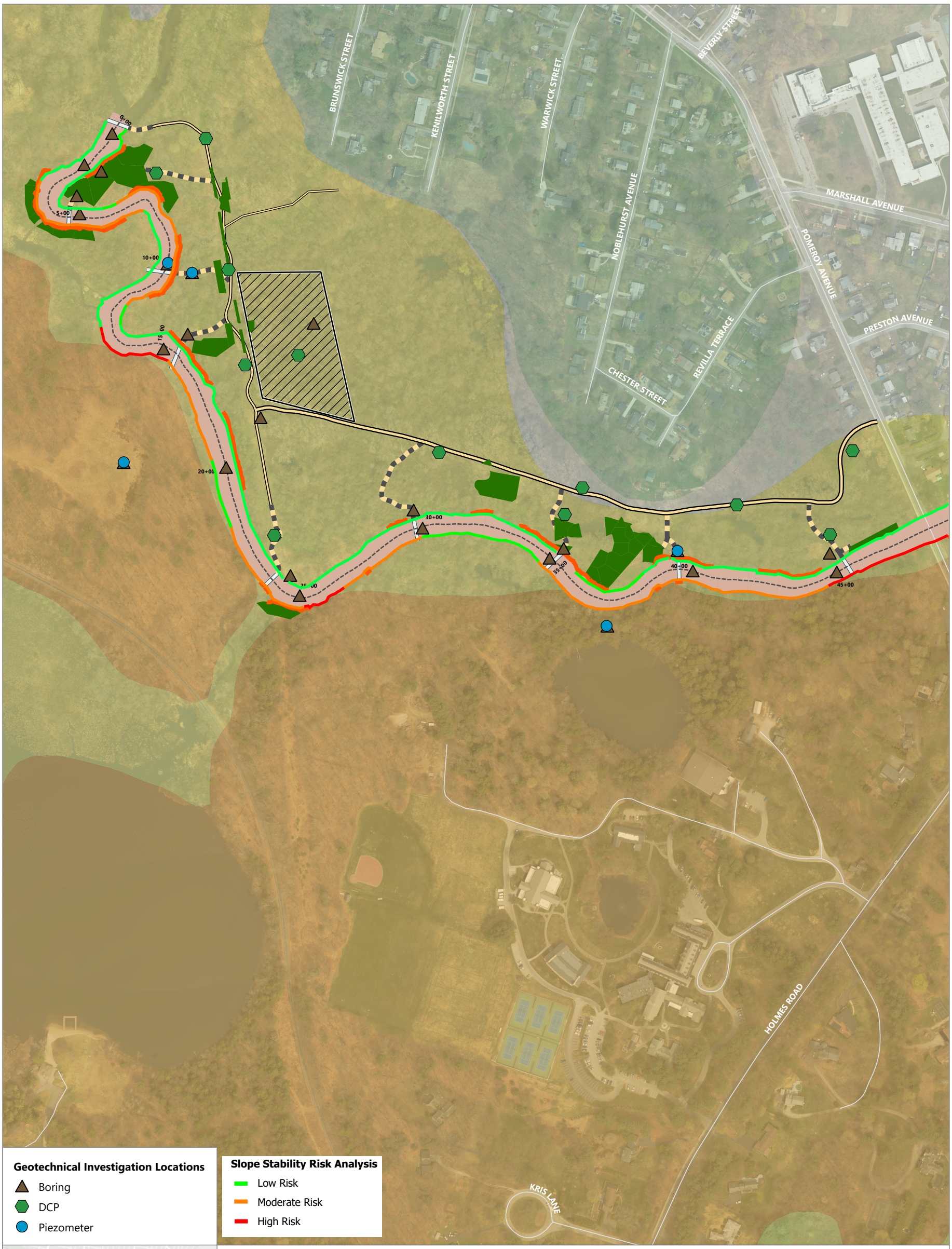

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Figure 2a
Slope Risk Category Maps
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

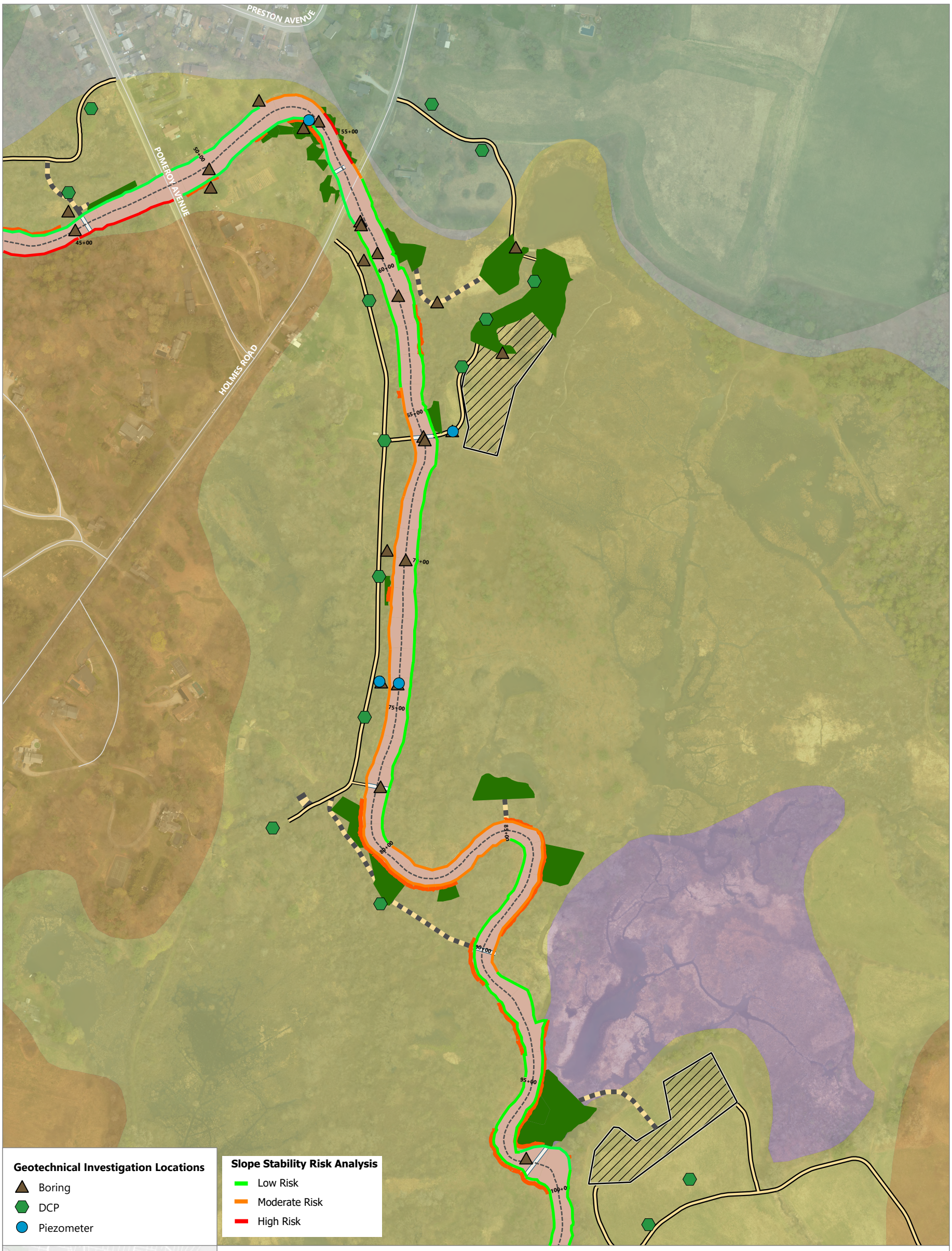

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Figure 2b
Slope Risk Category Maps
Final Remedial Design/Remedial Action Work Plan for Reach 5A
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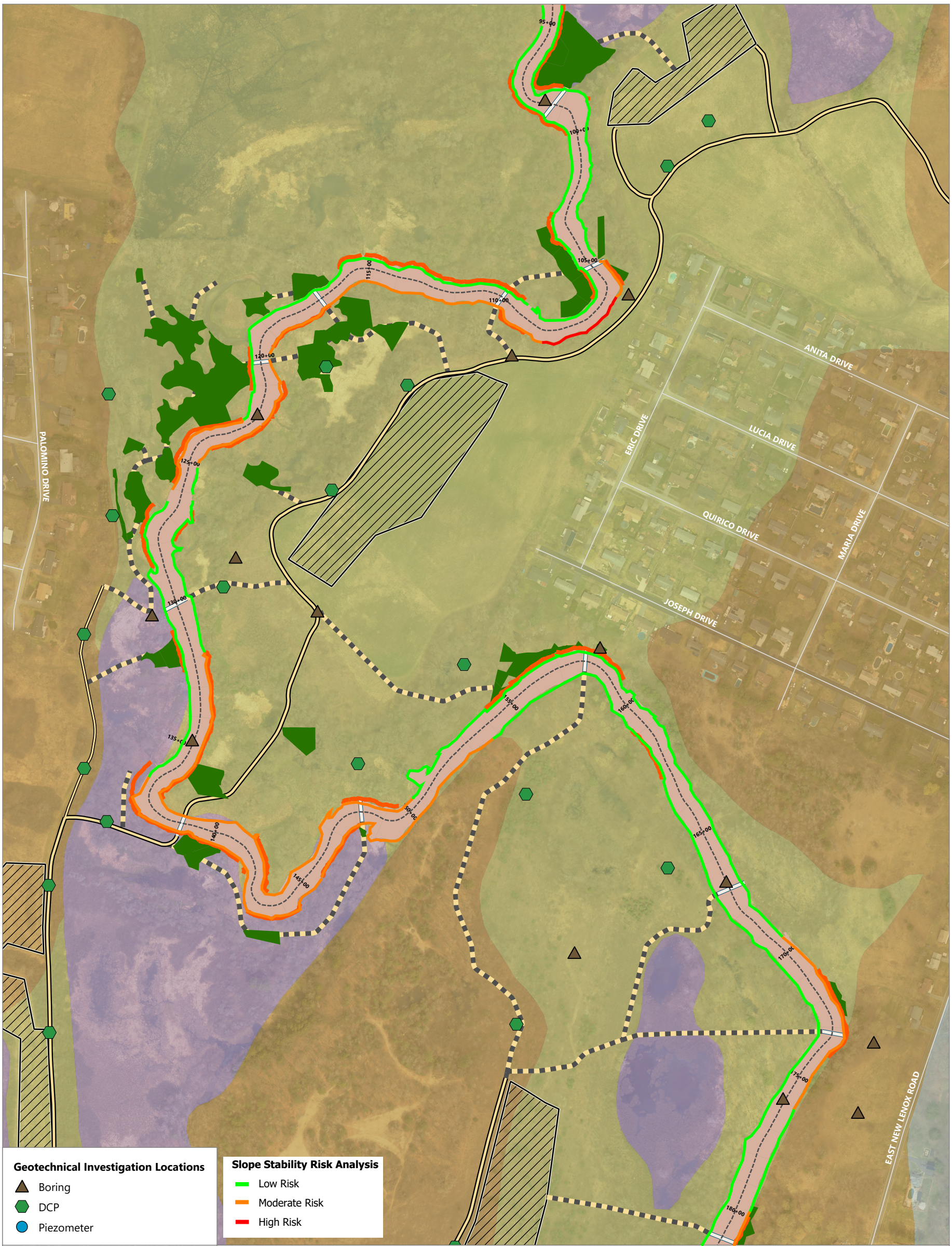

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Figure 2c
Slope Risk Category Maps
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

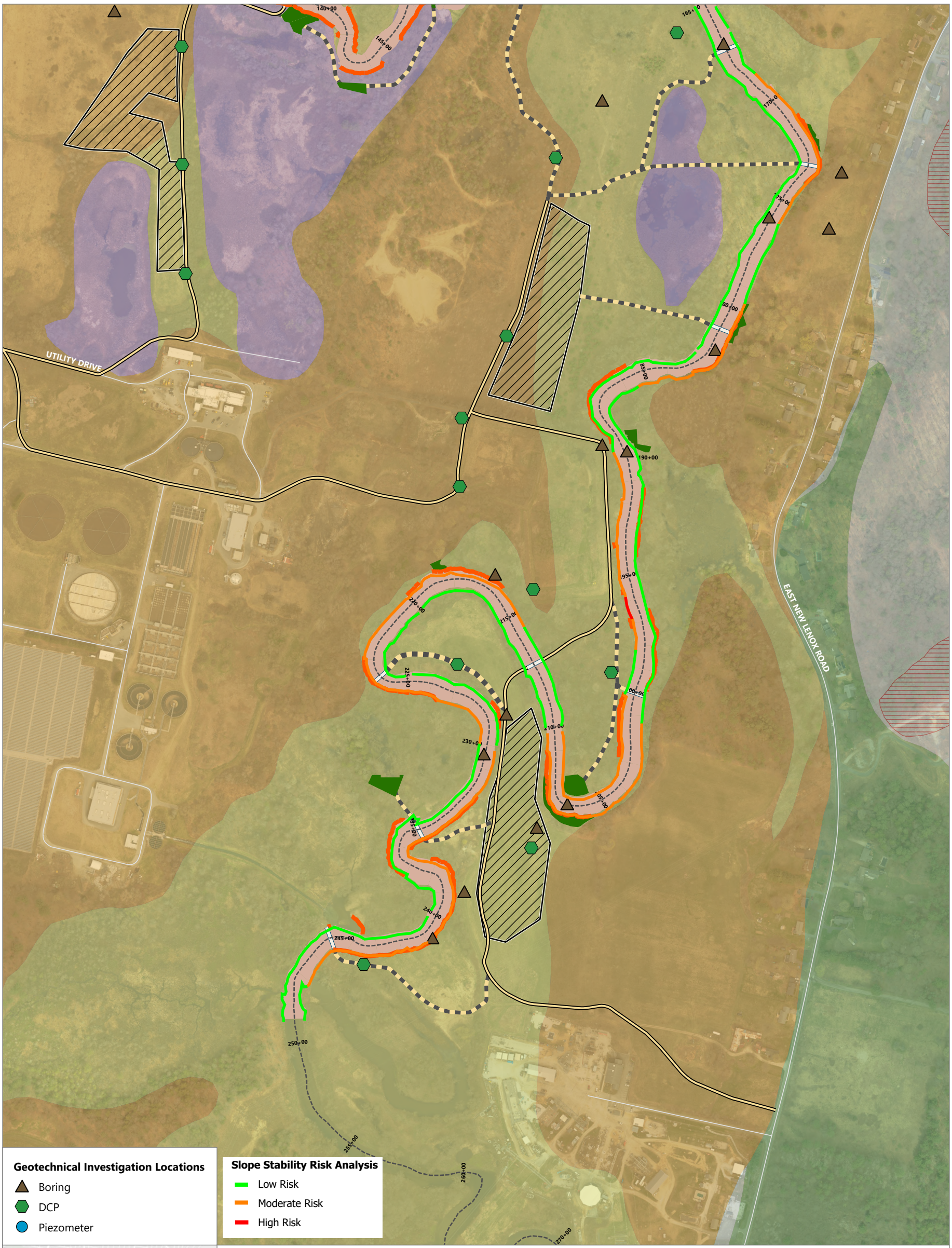

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Figure 2d
Slope Risk Category Maps
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

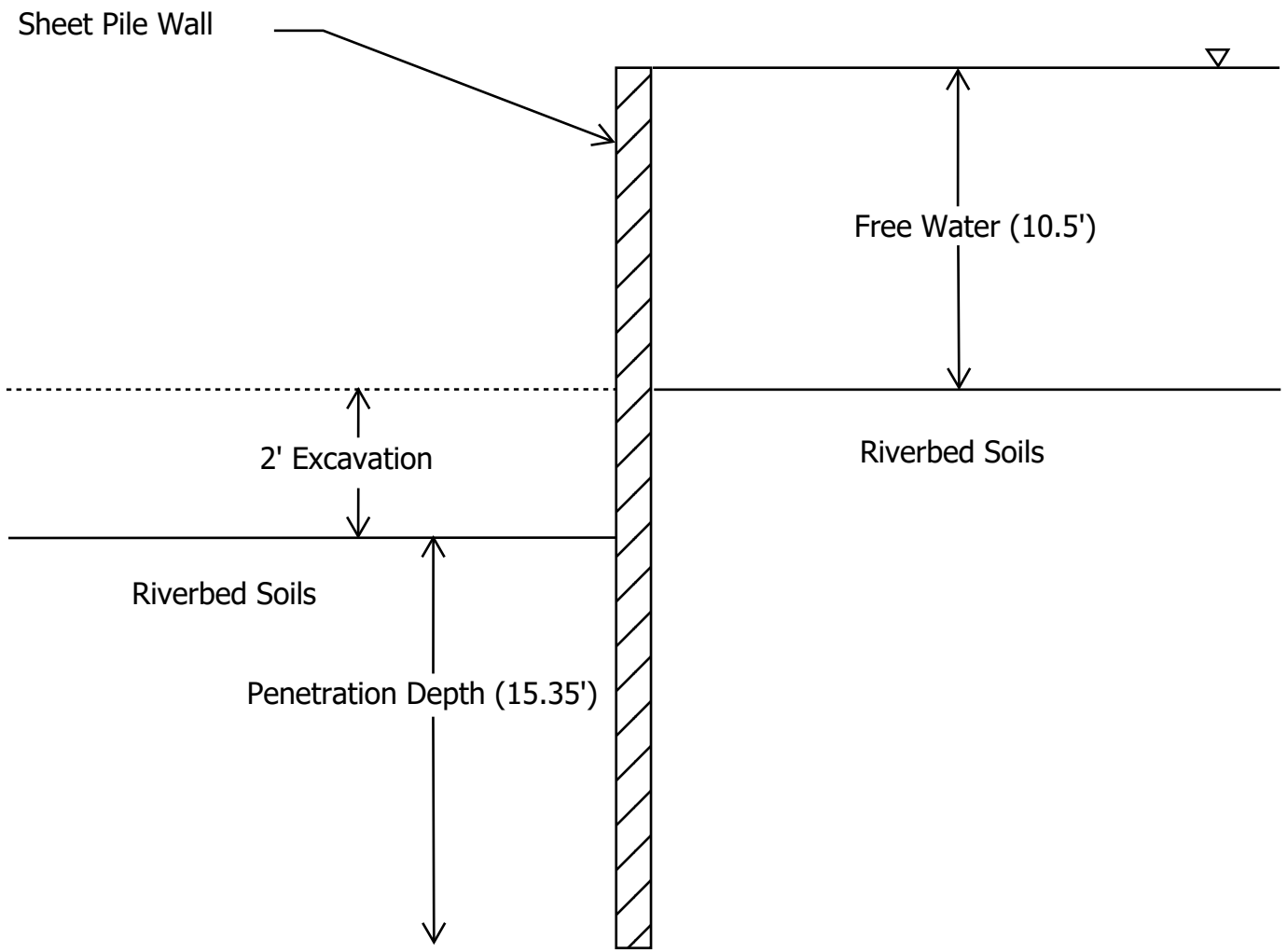

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Figure 3a
Sheet Pile Cofferdam Analysis - Scenario 1
Reach 5A Dredge Slope Stability and Sheet Pile Wall Evaluation
Housatonic River - Rest of River

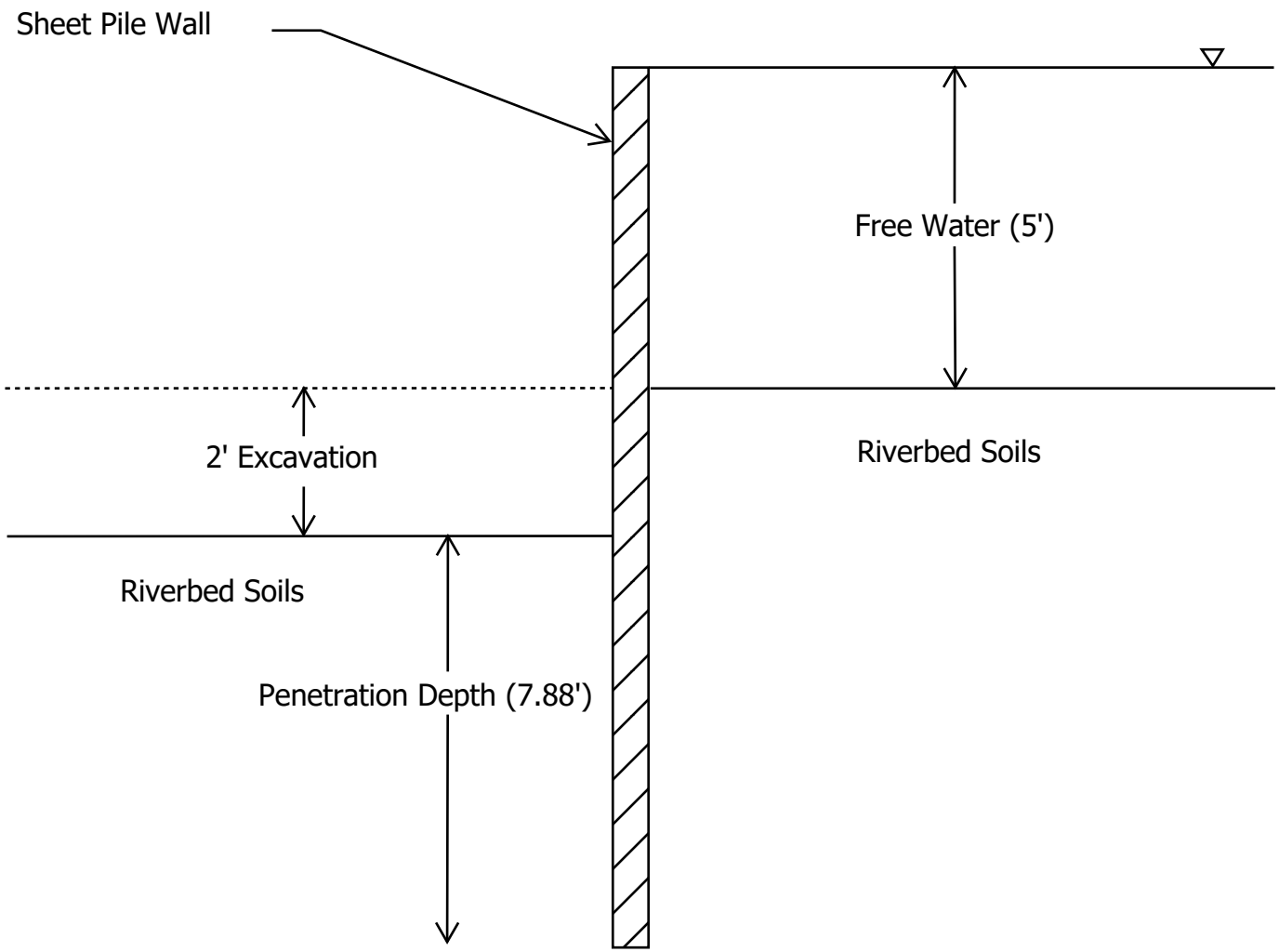

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Figure 3b
Sheet Pile Cofferdam Analysis - Scenario 2
Reach 5A Dredge Slope Stability and Sheet Pile Wall Evaluation
Housatonic River - Rest of River

Attachment 1
Cross-Section Material Properties

Cross Section Material Properties

Cross Section	Depth bgs (ft)	USCS Symbol Classification	Unit Weight (lbs/ft^3)	Phi angle (deg.)	Cohesion (psf)
2+00	0-10	SP/SM	105	28	40
	10-35	ML	95	22	30
	35 -50	SP/SM	120	32	0
13+75, 15+25	0-5	SW-SM/SM	100	28	40
	5-42	ML	100	25	500
	42-50	SW-SM/SM	115	32	0
23+00, 25+50	0-15	SM	110	30	50
	15-25	ML	95	25	300
	25-45	SM	115	32	0
	45-50	ML	100	28	750
37+50, 39+50	0-32	SP/SW/SM/SC	110	30	50
	32-40	CL	120	30	1000
	40-50	SP-SM/SM	115	32	0
45+25	0-9	SP/SM	110	28	50
	9-32	ML	100	32	300
	32-50	SM/GP	130	36	0
49+50	0-17	SW/SM/SW-SM	110	30	50
	17-37	ML	115	32	750
54+50	0-7	SP/SM	110	28	50
	7-30	ML/SM/GP	130	32	0
68+00, 70+00	0-12	SP/SP-SM	110	29	50
	12-27	ML	115	32	500
	27- 37	GC	130	36	0
100+00	0-32	SM	110	30	50
	32-50	Rock*	125	34	0
106+25	0-32	SM	115	32	60
	32-50	SM	125	32	0
135+00	0-22	SW-SM/SM/SW	110	29	50
	22-50	CL-ML/SC	105	23	1000
158+50, 163+00	0-5	ML	95	25	150
	5-50	SW/SM/SW-SM	110	30	50
174+00	0-17	SM/SP-SM	105	29	50
	17-50	Rock*	125	32	0
182+50	0-17	SW-SM/SM/SW	105	29	50
	17-27	GM	125	32	0
189+00, 194+25	0-30	SW-SM/SM/SW	115	32	60
	30-50	GM	125	35	0
205+50	0-7	SW	105	29	40
	15-37	ML	95	25	300
	37- 50	SP-SM	110	30	0

*Rock or rock fragment layer encounted. USCS not applicable.

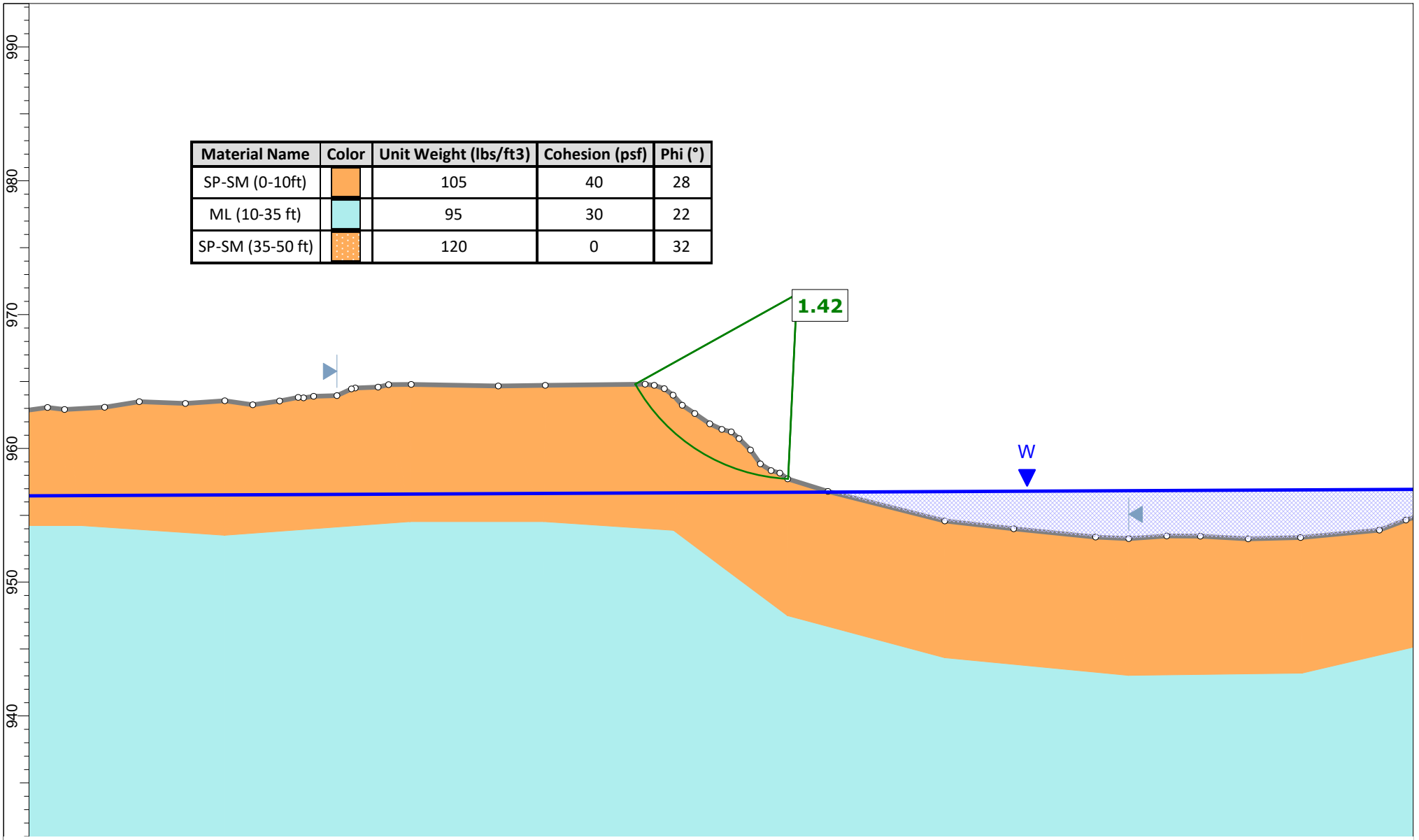
Attachment 2
Slope Stability Results | Existing Conditions

Existing Conditions Factor of Safety Results

Station	Slope	Factor of Safety
2+00	L	1.42
	R	1.42
13+75	L	2.30
	R	0.93
15+25	L	1.75
	R	0.94
23+00	L	1.97
	R	0.94
25+50	L	2.56
	R	0.91
37+50	L	1.82
	R	1.14
39+50	L	1.47
	R	1.06
45+25	L	2.14
	R	0.70
49+50	L	1.73
	R	1.45
54+50	L	1.17
	R	2.28
68+00	L	1.50
	R	1.32
70+00	L	1.50
	R	1.22
100+00	L	1.43
	R	1.88
106+25	L	1.21
	R	1.81
135+00	L	1.36
	R	1.90
158+50	L	1.41
	R	1.91
163+00	L	1.43
	R	2.24
174+00	L	0.89
	R	1.69

182+50	L	1.05
	R	1.51
189+00	L	1.42
	R	1.61
194+25	L	2.80
	R	1.36
205+50	L	1.11
	R	1.15

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)
SP-SM (0-10ft)		105	40	28
ML (10-35 ft)		95	30	22
SP-SM (35-50 ft)		120	0	32



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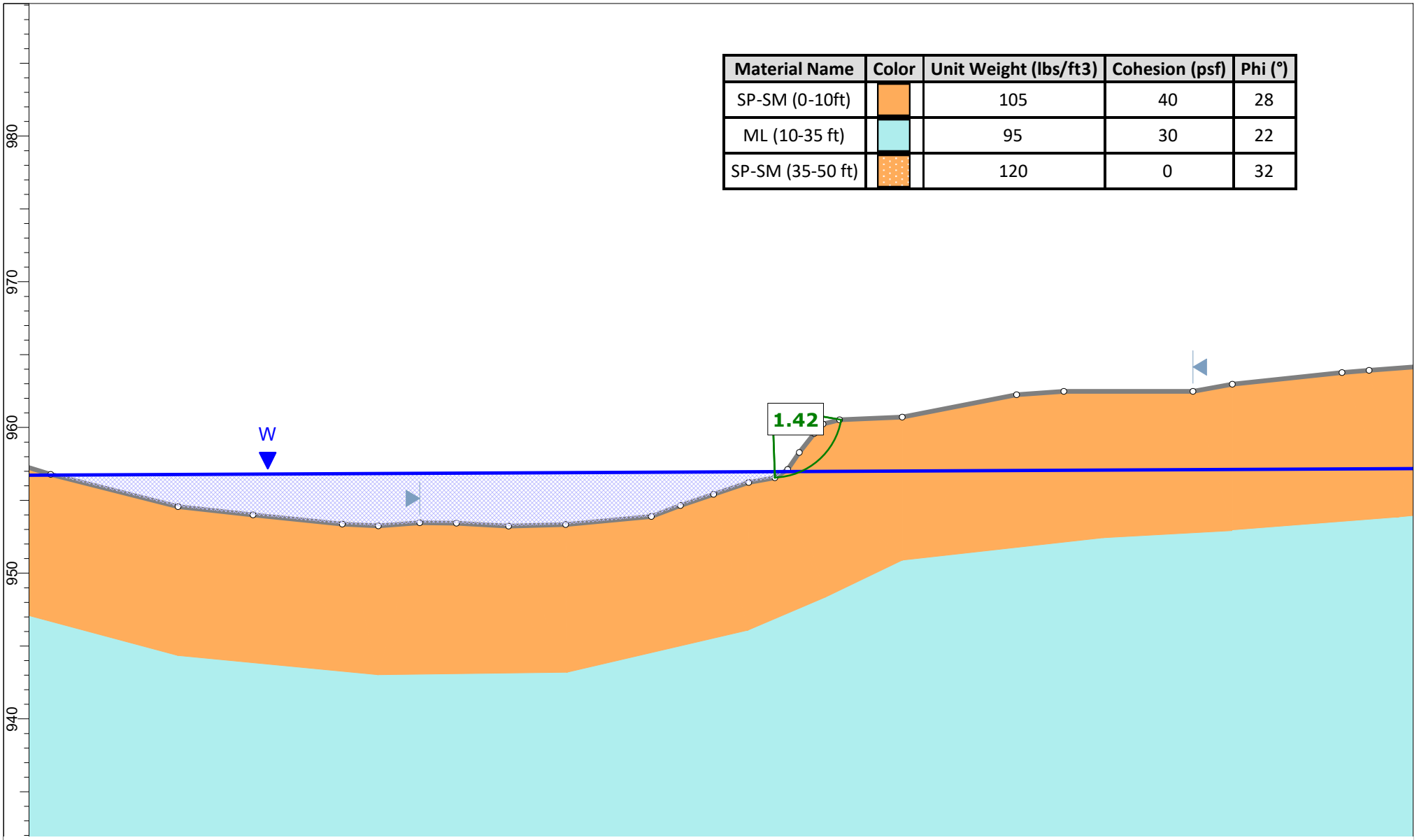
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 2+00 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/19/2026	Figure Number	Figure 1

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)
SP-SM (0-10ft)		105	40	28
ML (10-35 ft)		95	30	22
SP-SM (35-50 ft)		120	0	32



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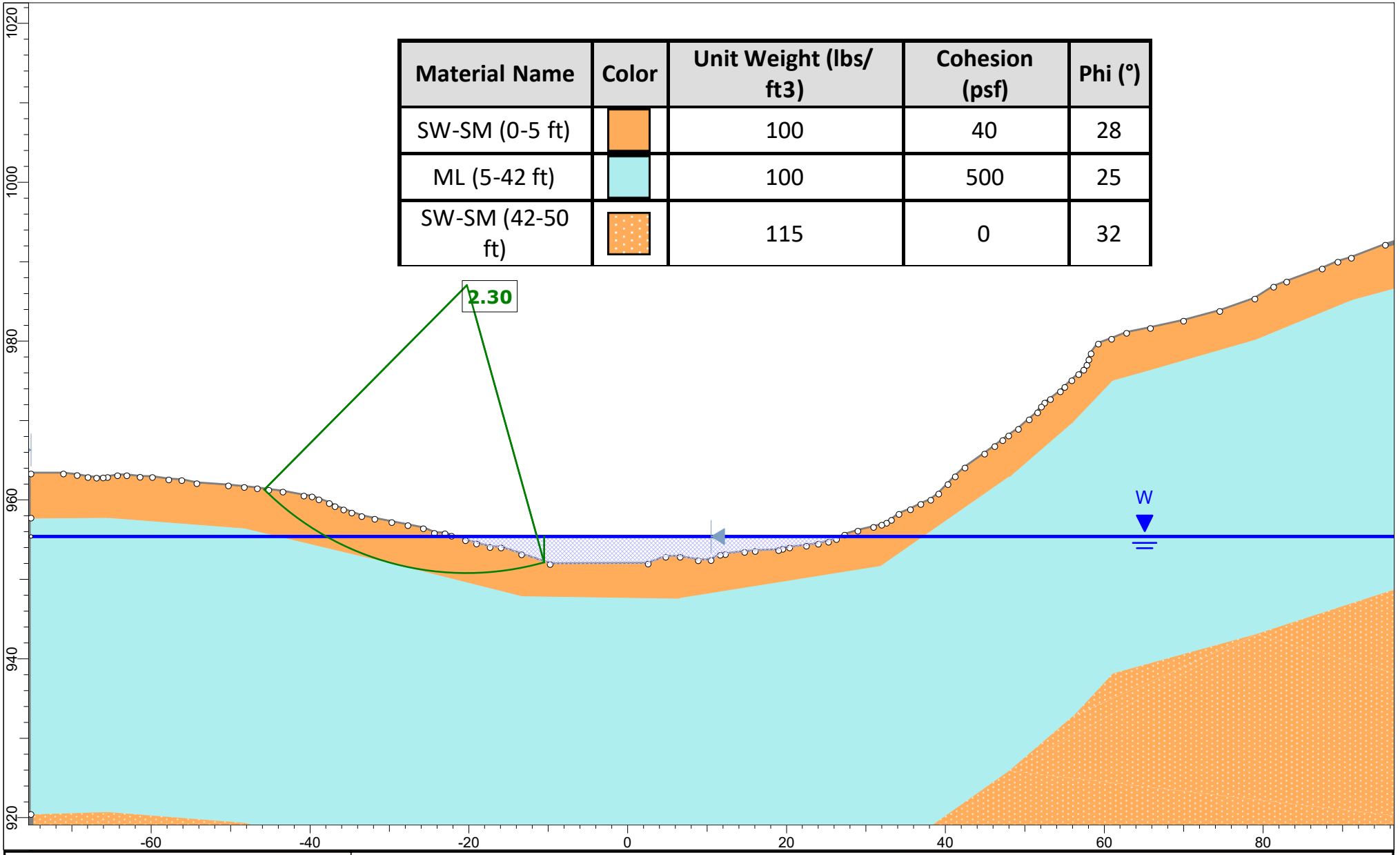
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 2+00 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/19/2026	Figure Number	Figure 2

Material Name	Color	Unit Weight (lbs/ ft3)	Cohesion (psf)	Phi (°)
SW-SM (0-5 ft)		100	40	28
ML (5-42 ft)		100	500	25
SW-SM (42-50 ft)		115	0	32



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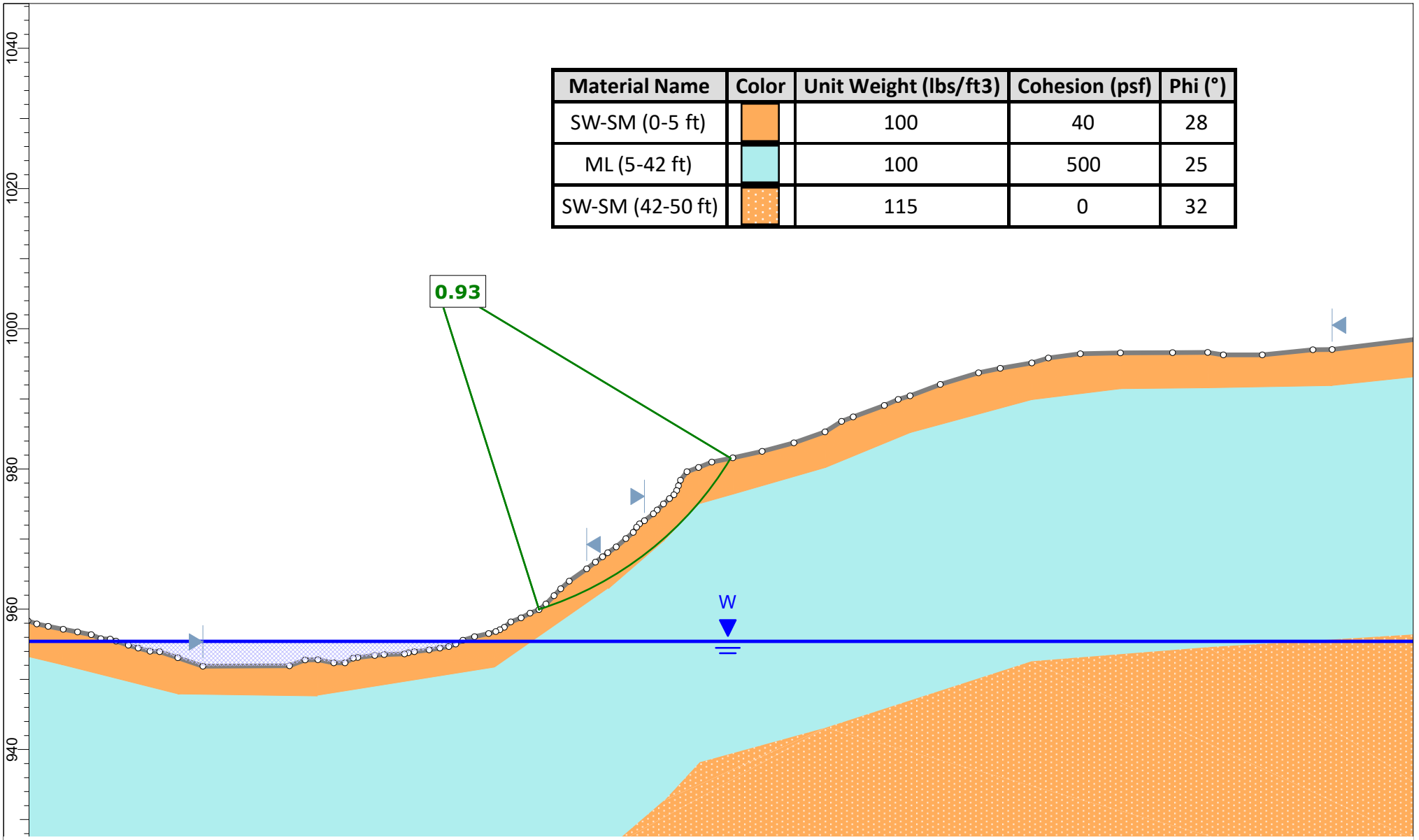
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 13+75 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/19/2026	Figure Number	Figure 3

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)
SW-SM (0-5 ft)		100	40	28
ML (5-42 ft)		100	500	25
SW-SM (42-50 ft)		115	0	32



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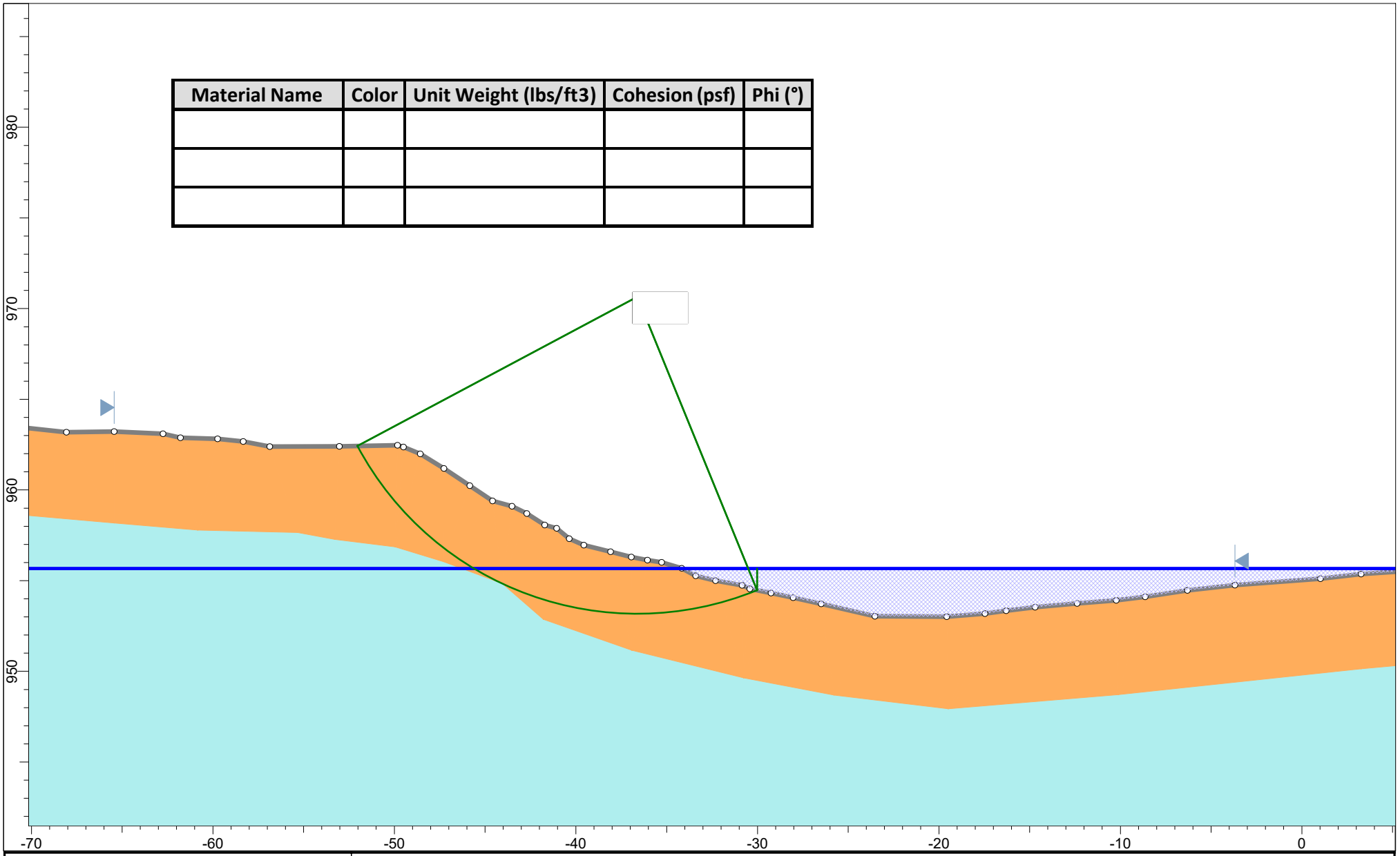
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 13+75 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/19/2026	Figure Number	Figure 4

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

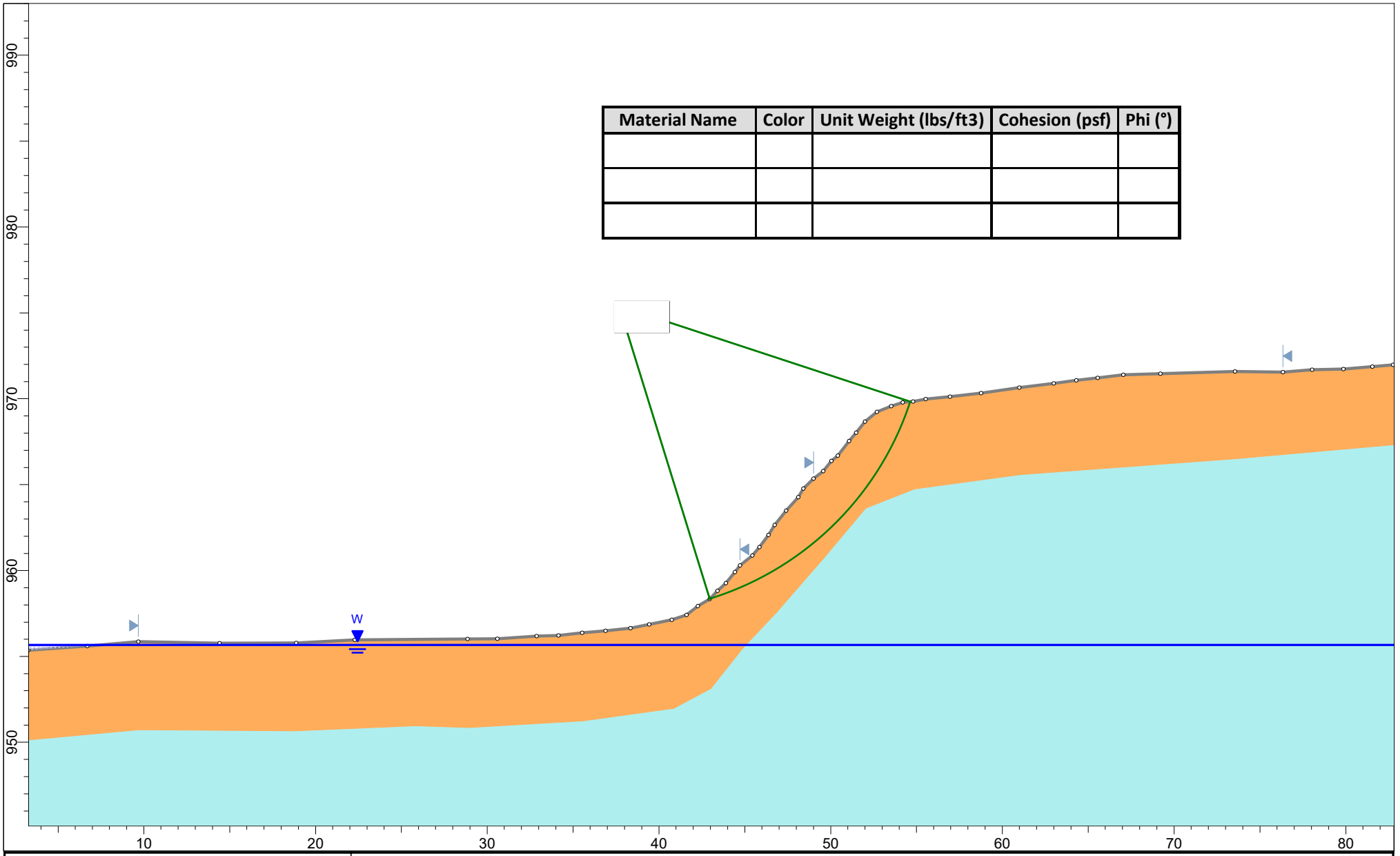


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 15+25 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 5

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)



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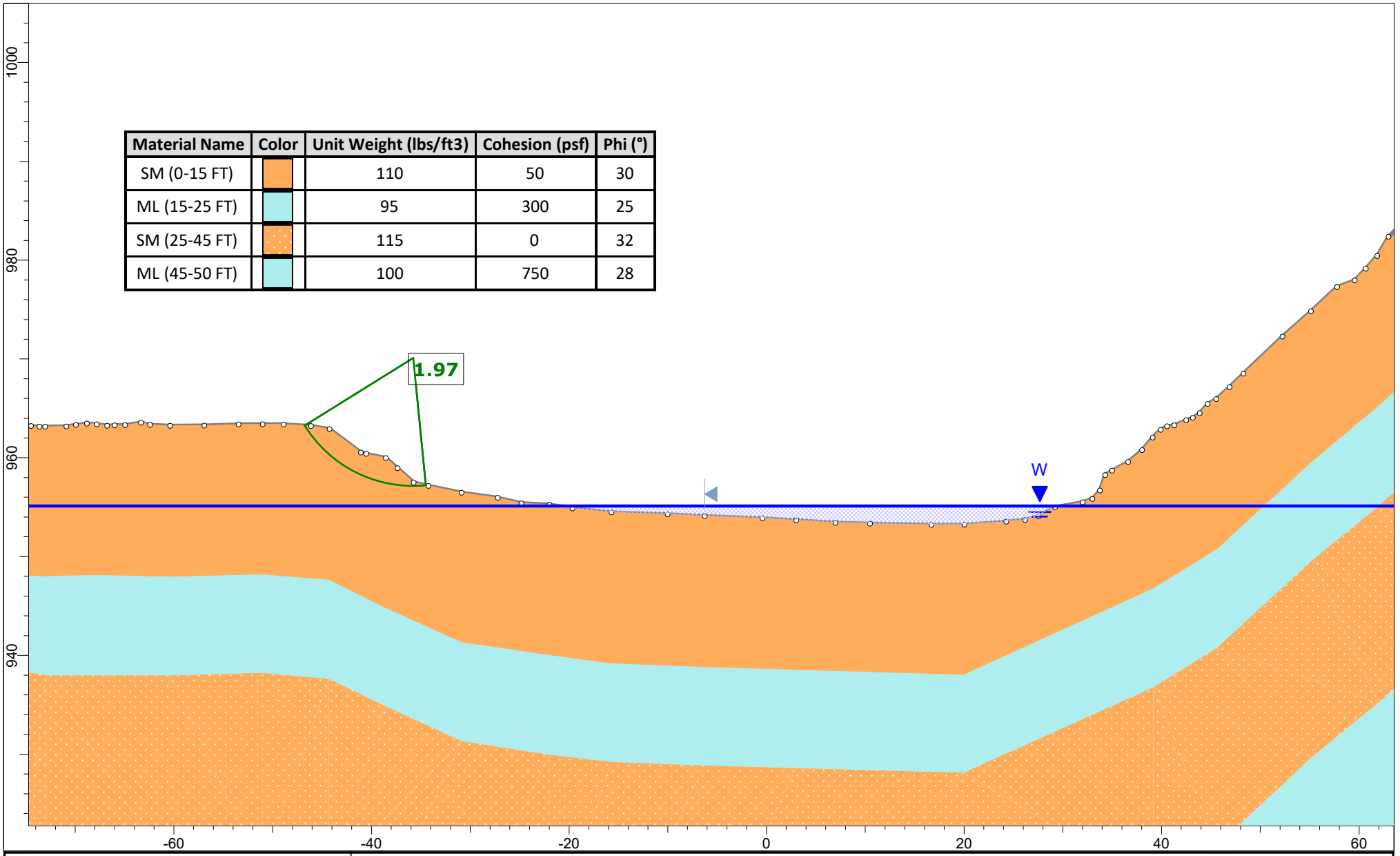
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 15+25 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 6

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)
SM (0-15 FT)		110	50	30
ML (15-25 FT)		95	300	25
SM (25-45 FT)		115	0	32
ML (45-50 FT)		100	750	28



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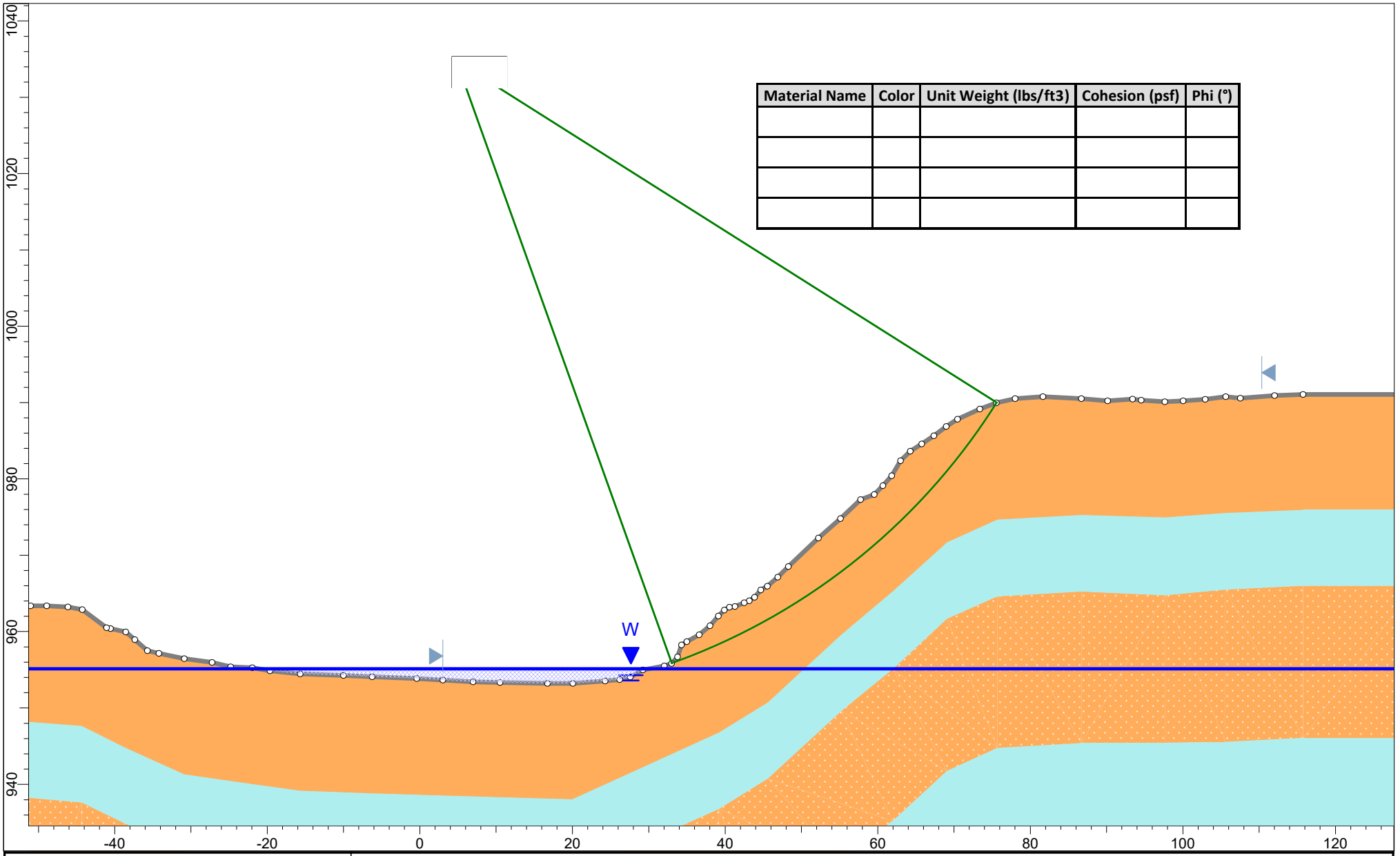
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 23+00 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 7



Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

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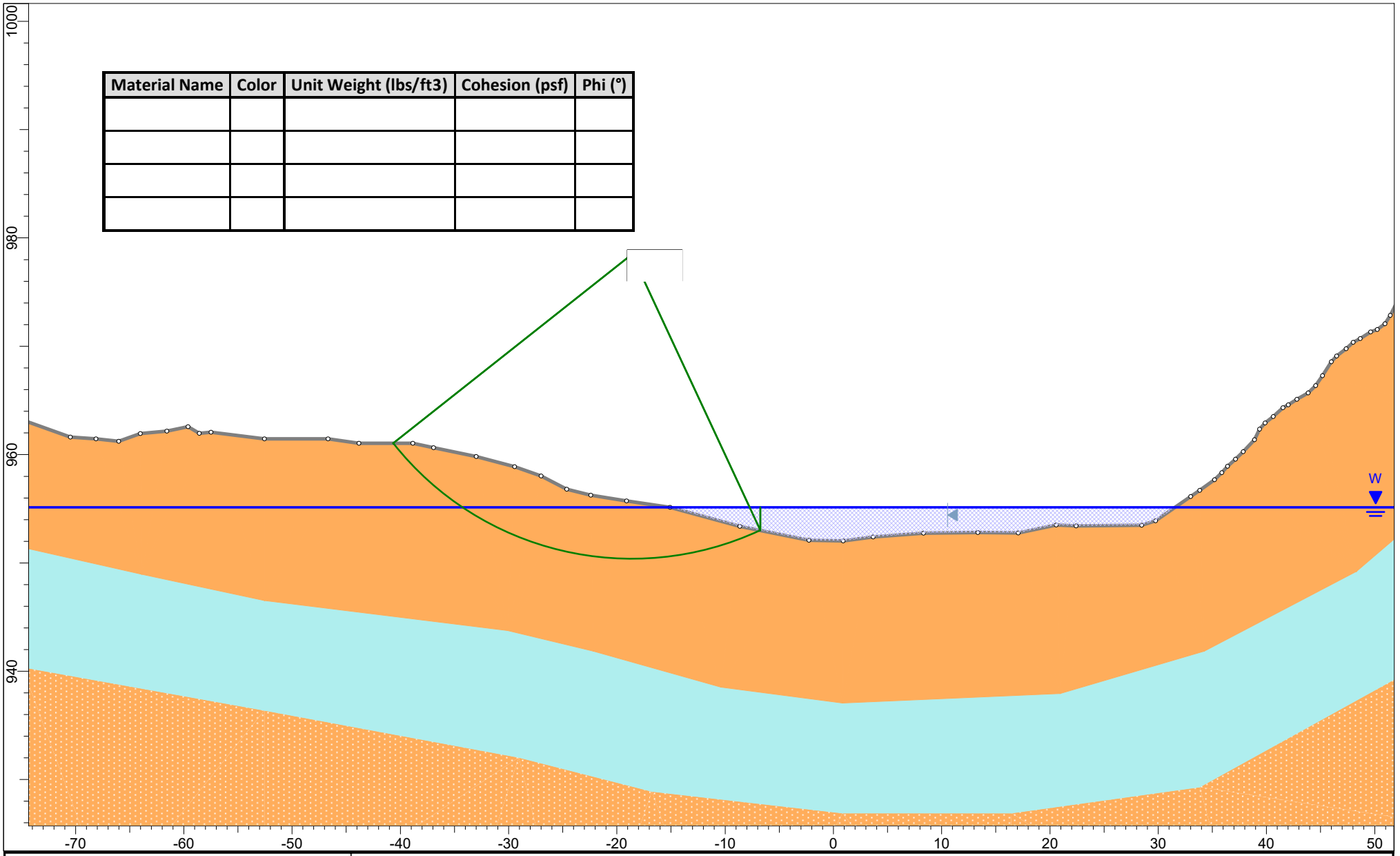
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 23+00 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 8

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

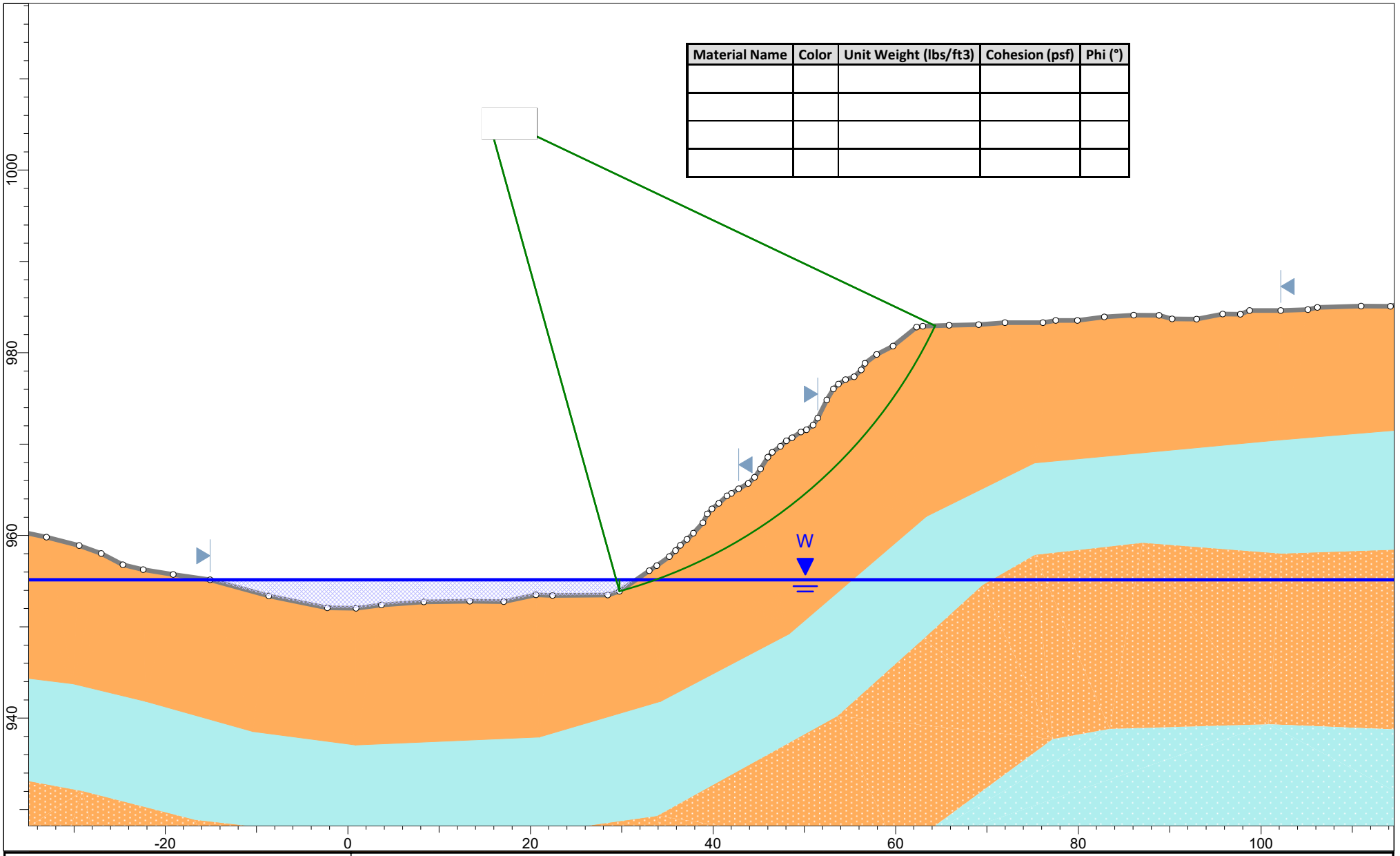


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 25+50 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 9

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)



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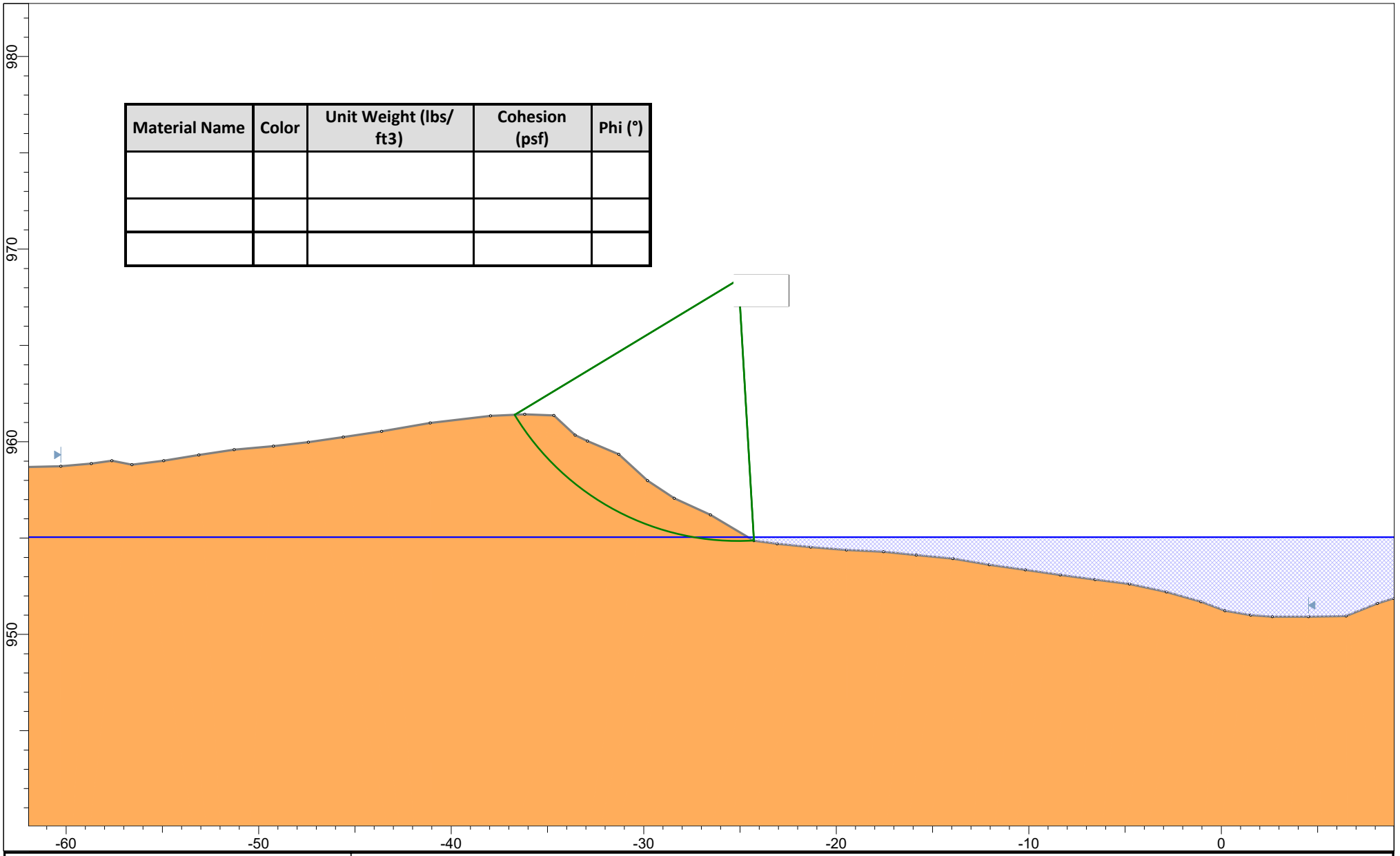
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 25+50 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 10

Material Name	Color	Unit Weight (lbs/ ft3)	Cohesion (psf)	Phi (°)



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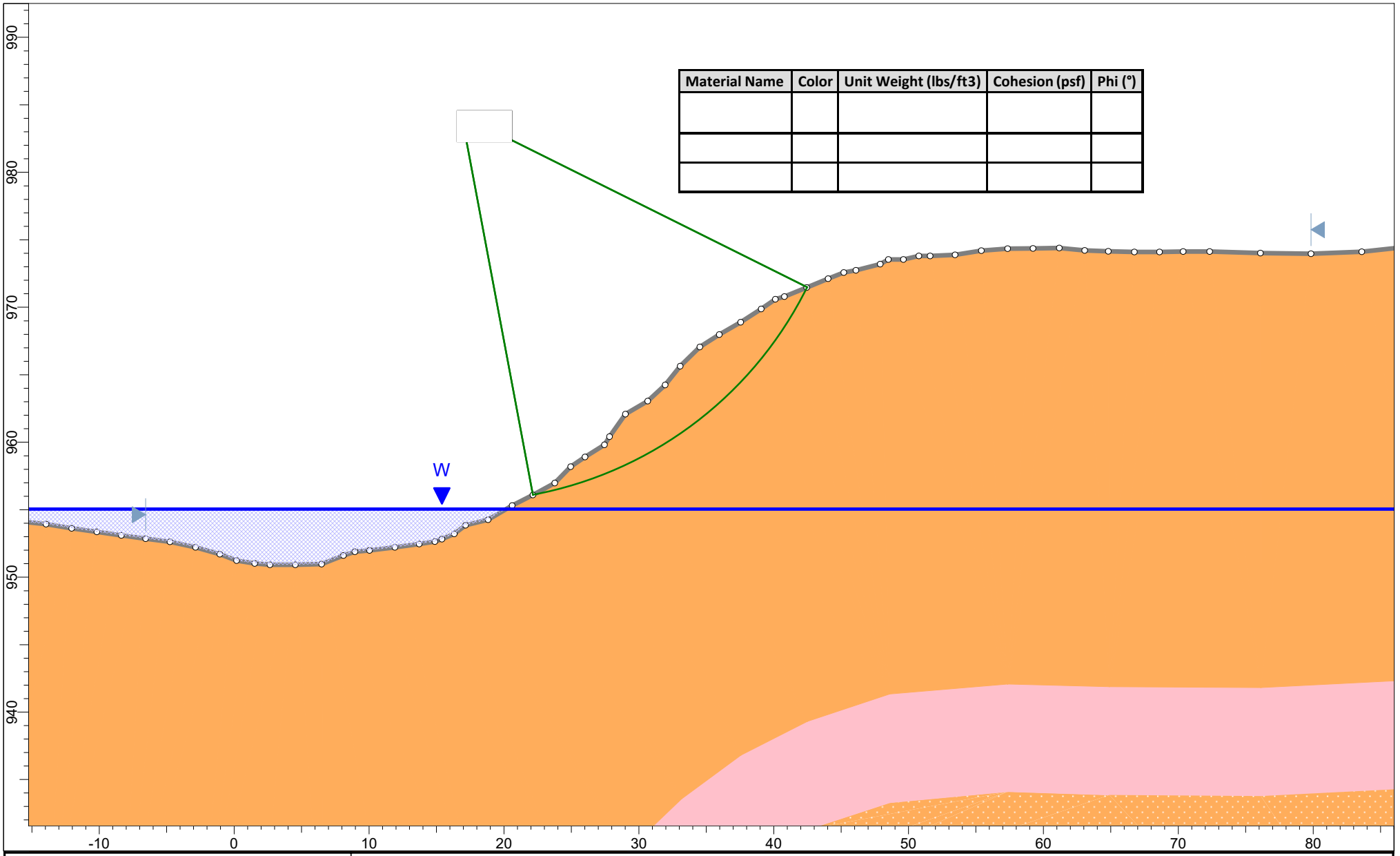
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 37+50 - Existing Conditions - Left	*Scenario*	Master Scenario
Drawn By	Leah Dorris	*Company*	Anchor QEA, Inc.
Date	1/20/2026	*Figure Number*	Figure 11

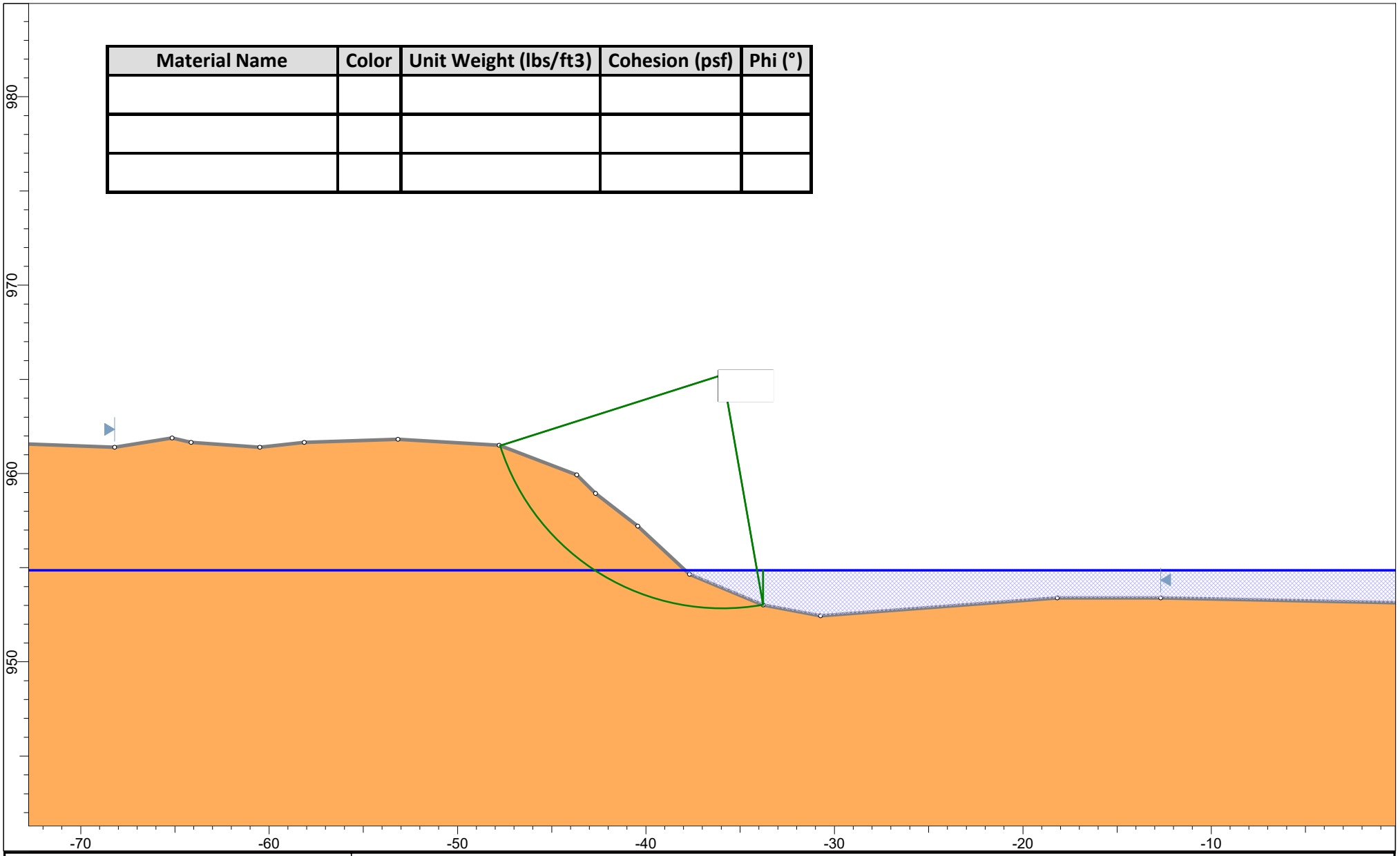


ANCHOR QEA

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 37+50 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 12

SLIDEINTERPRET 9.041

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)



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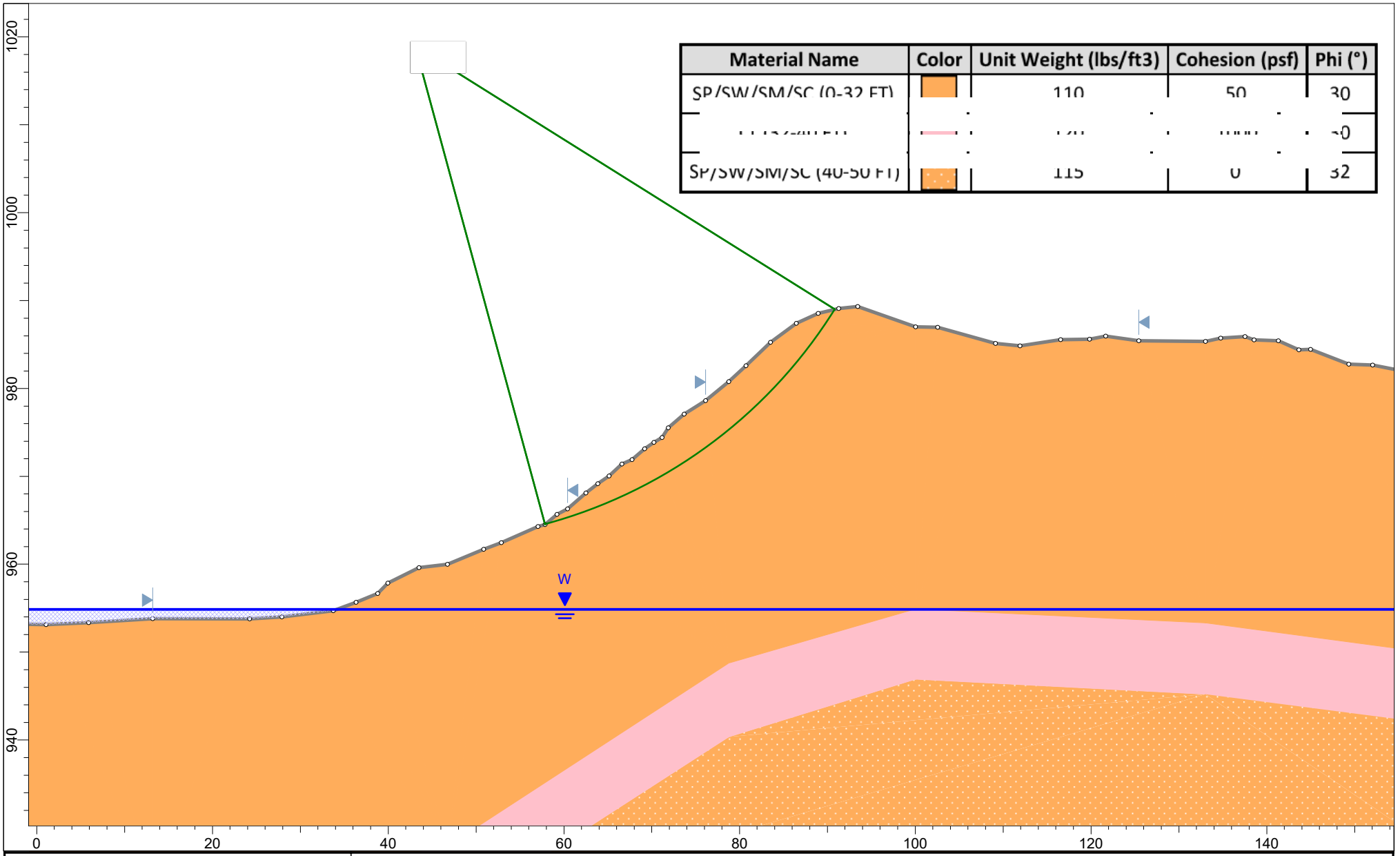
SLIDEINTERPRET 9.041

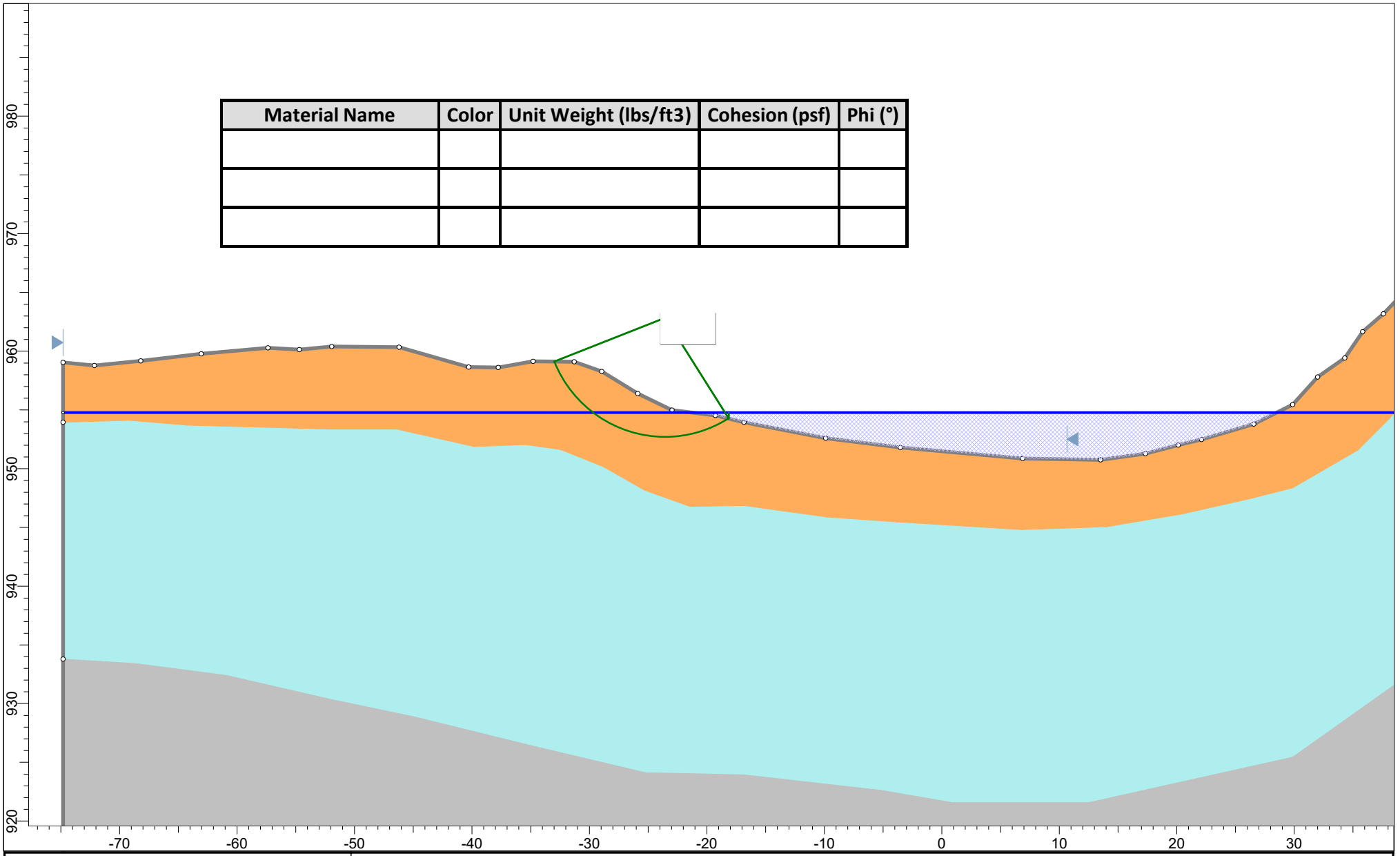
Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 39+50 - Existing Condtions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 13



ANCHOR QEA	Project	Housatonic Reach 5A Slope Stability Analysis	
	Group	STA. 39+50 - Existing Condtions - Right	Scenario: Master Scenario
	Drawn By	Leah Dorris	Company: Anchor QEA, Inc.
	Date	1/20/2026	Figure Number: Figure 14

SLIDEINTERPRET 9.041

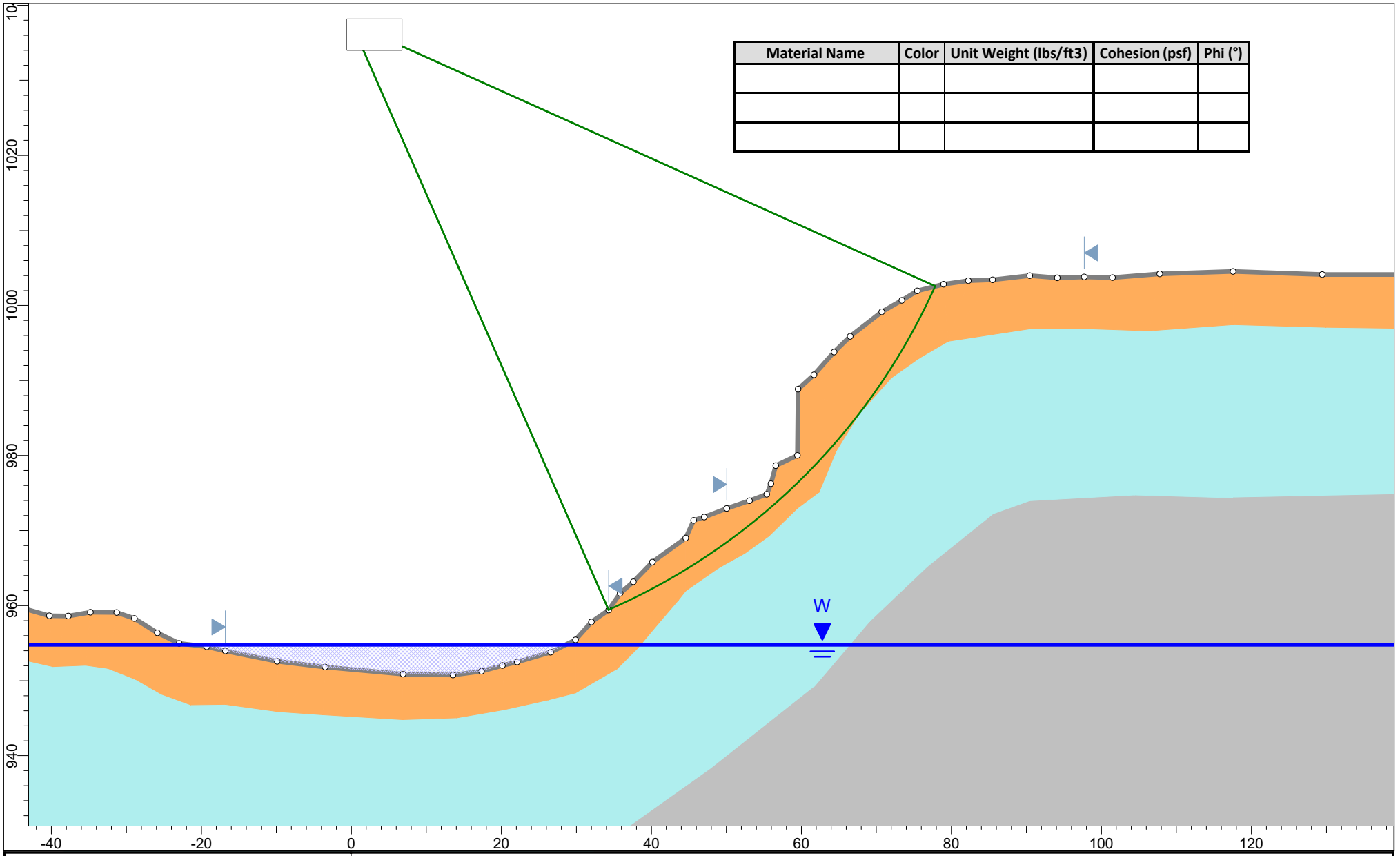
Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)



ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 45+25 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 15

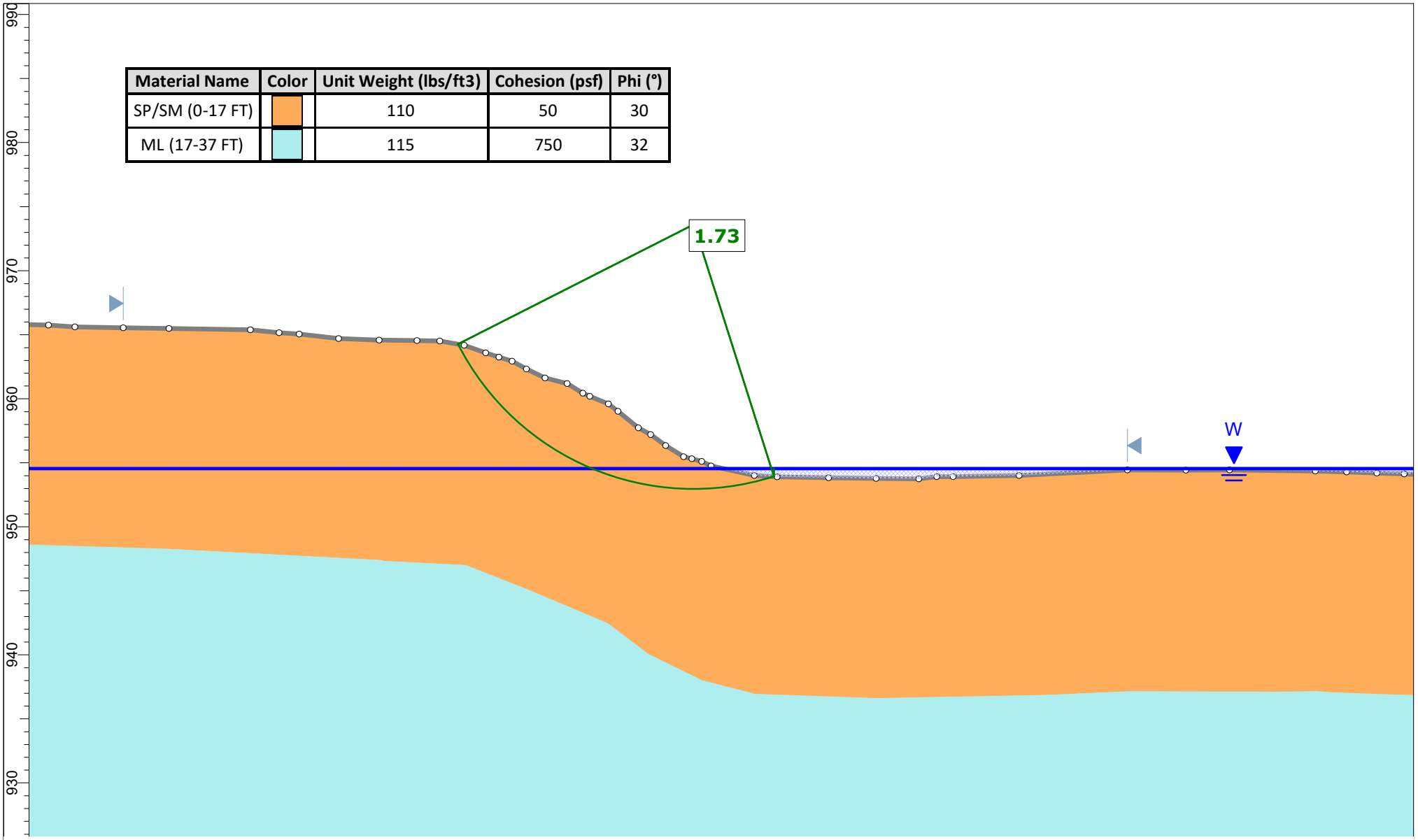


ANCHOR QEA

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 45+25 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 16

SLIDEINTERPRET 9.041

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)
SP/SM (0-17 FT)		110	50	30
ML (17-37 FT)		115	750	32

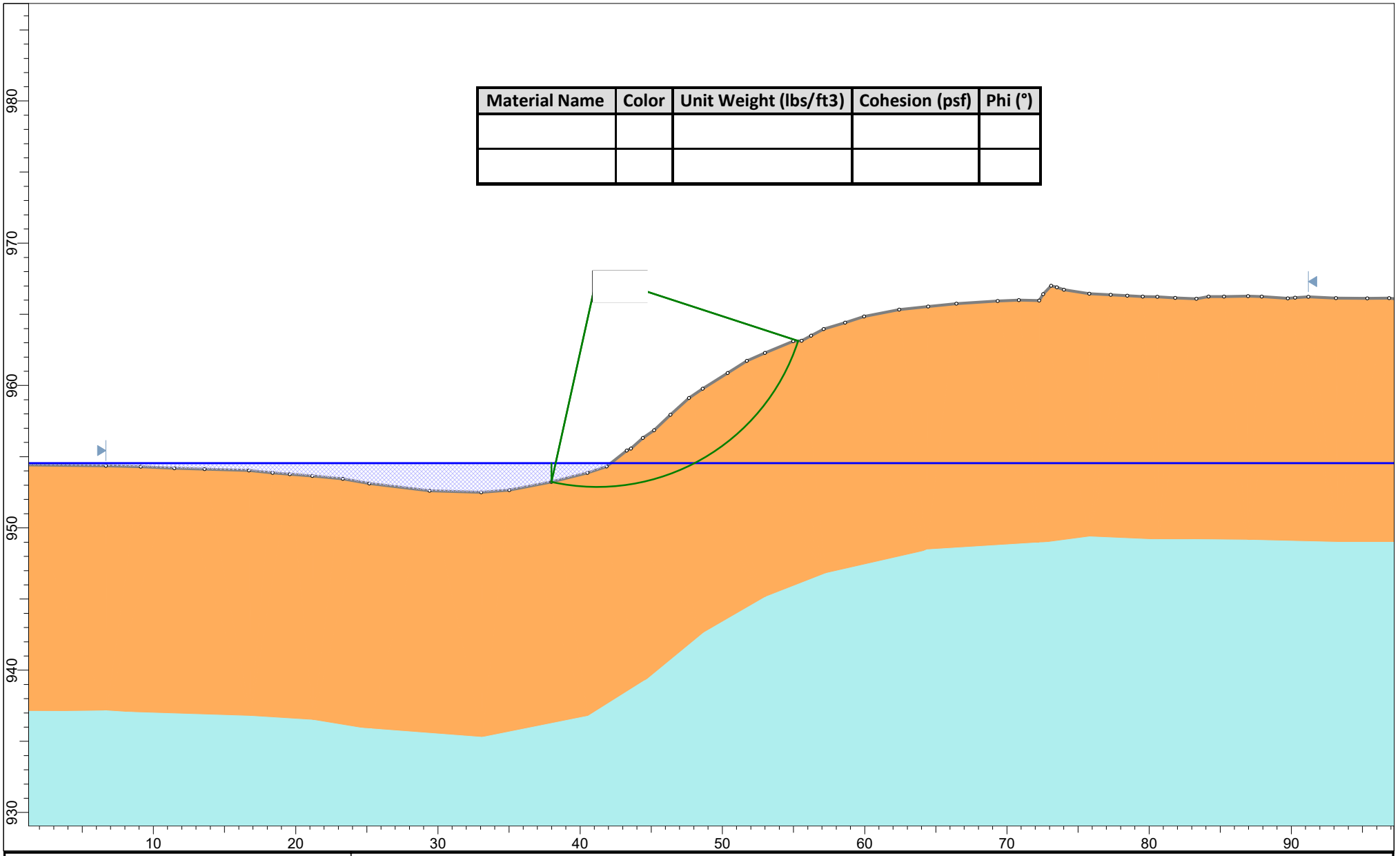


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 49+50 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 17

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

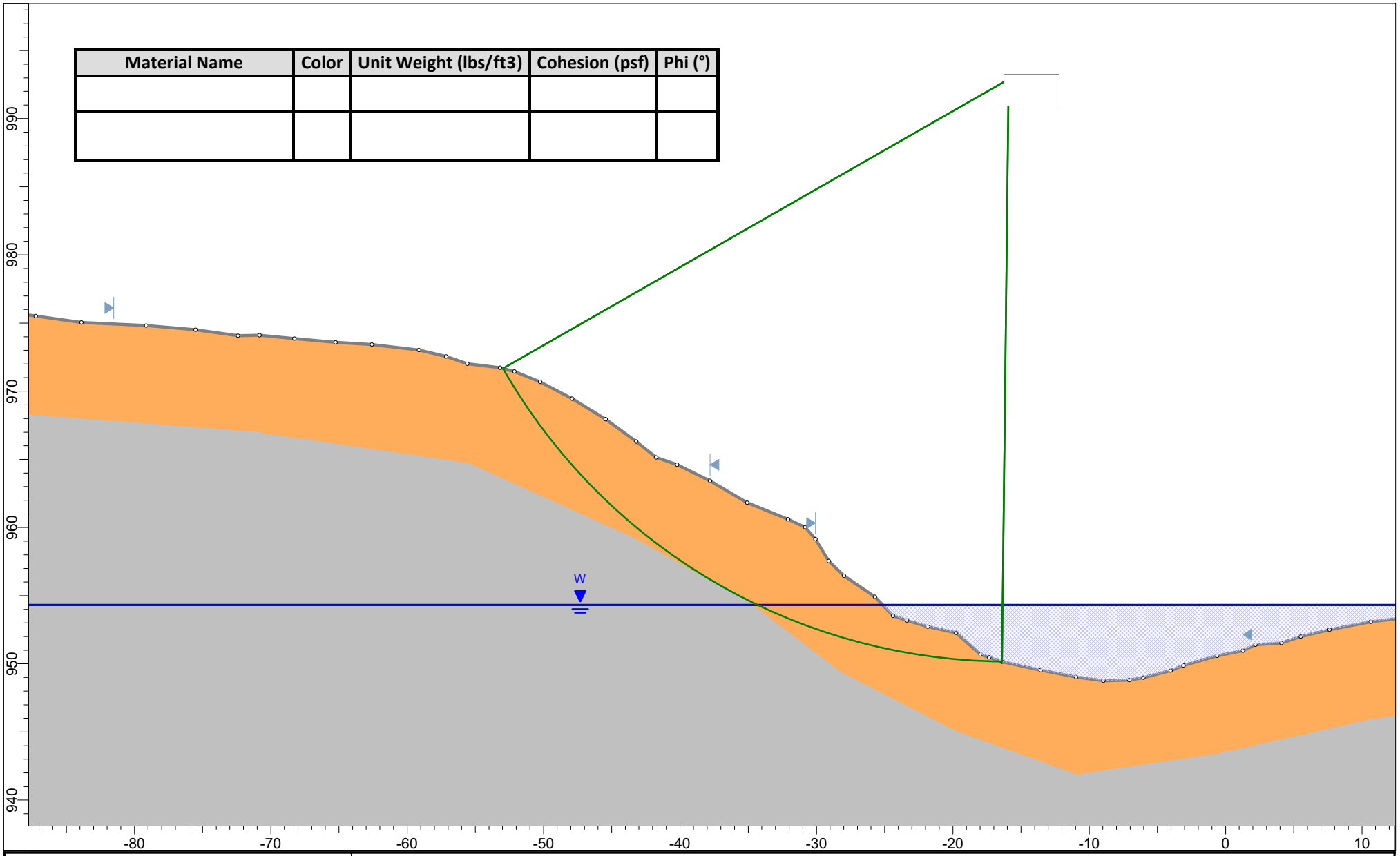


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 49+50 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 18

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

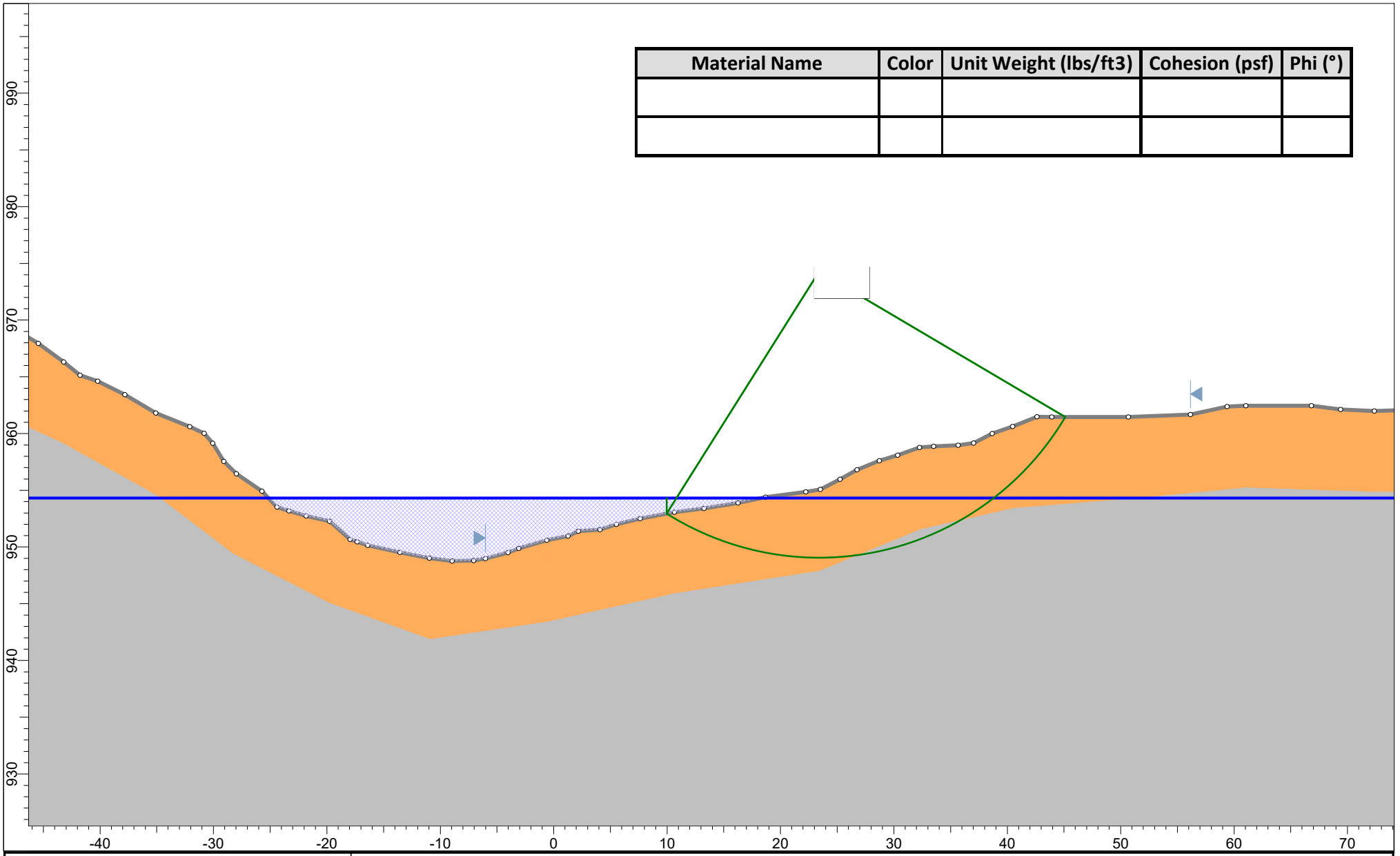


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 54+50 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 19

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)



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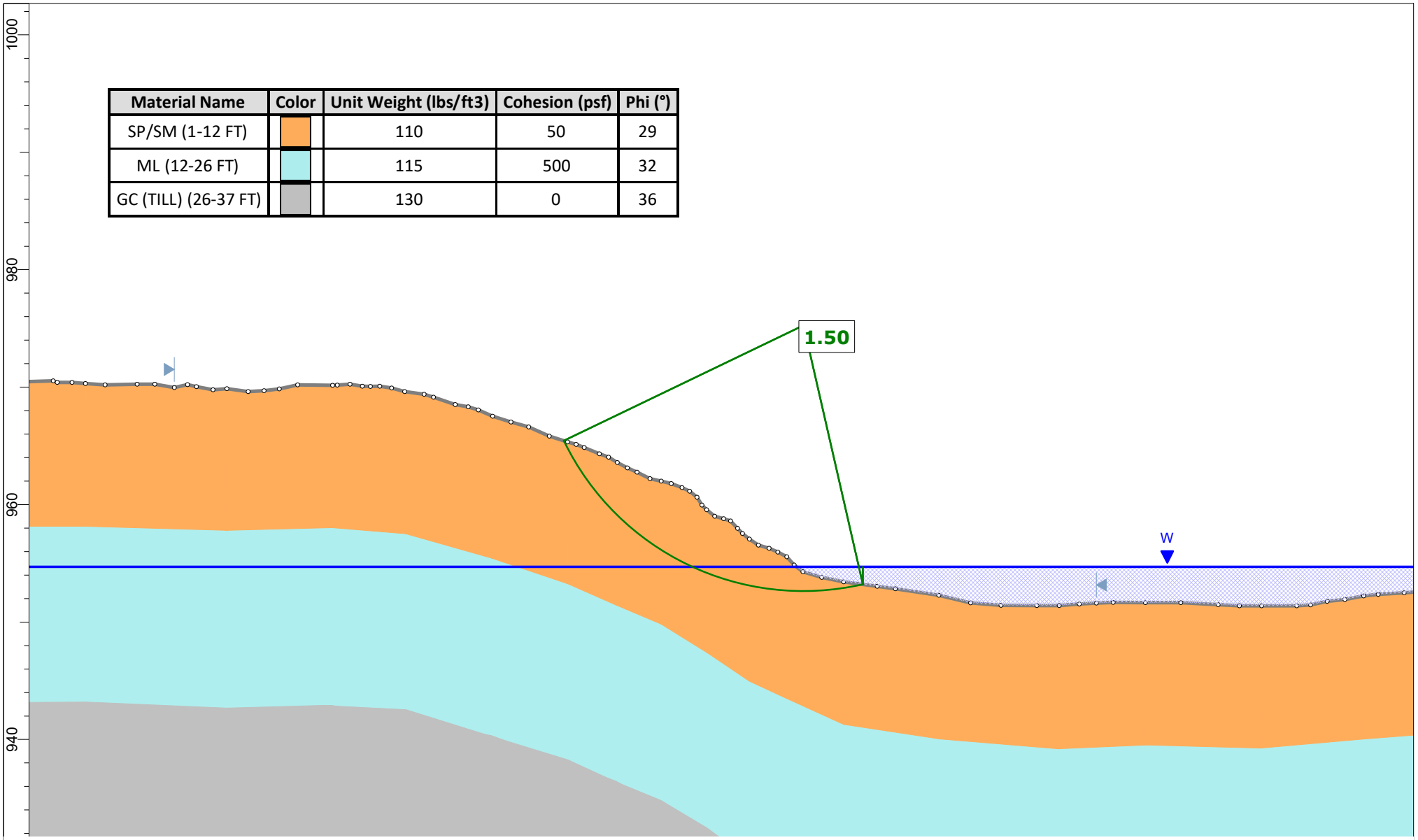
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 54+50 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 20

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)
SP/SM (1-12 FT)		110	50	29
ML (12-26 FT)		115	500	32
GC (TILL) (26-37 FT)		130	0	36



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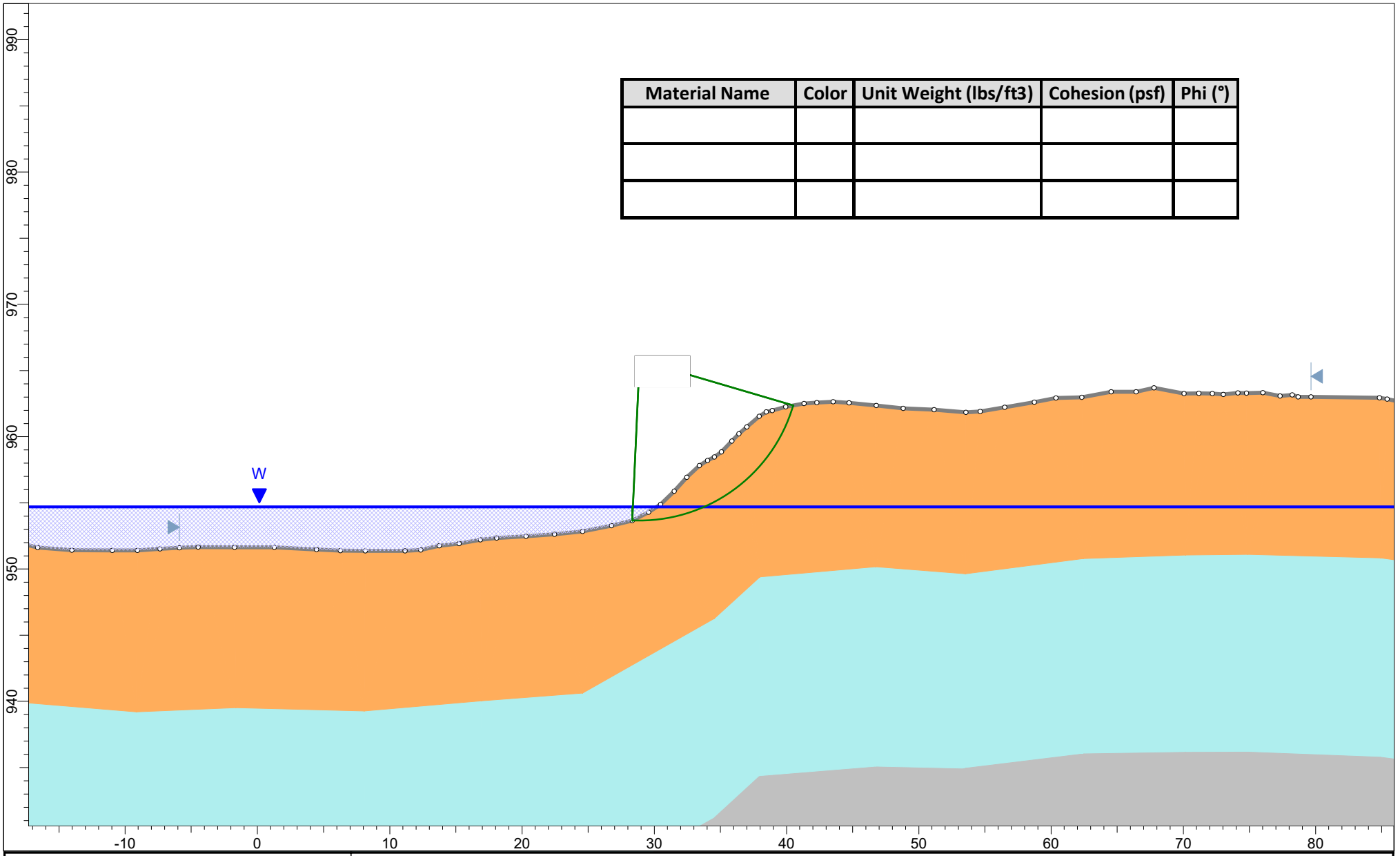
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 68+00 - Existing Conditions - Left	*Scenario*	Master Scenario
Drawn By	Leah Dorris	*Company*	Anchor QEA, Inc.
Date	1/20/2026	*Figure Number*	Figure 21

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

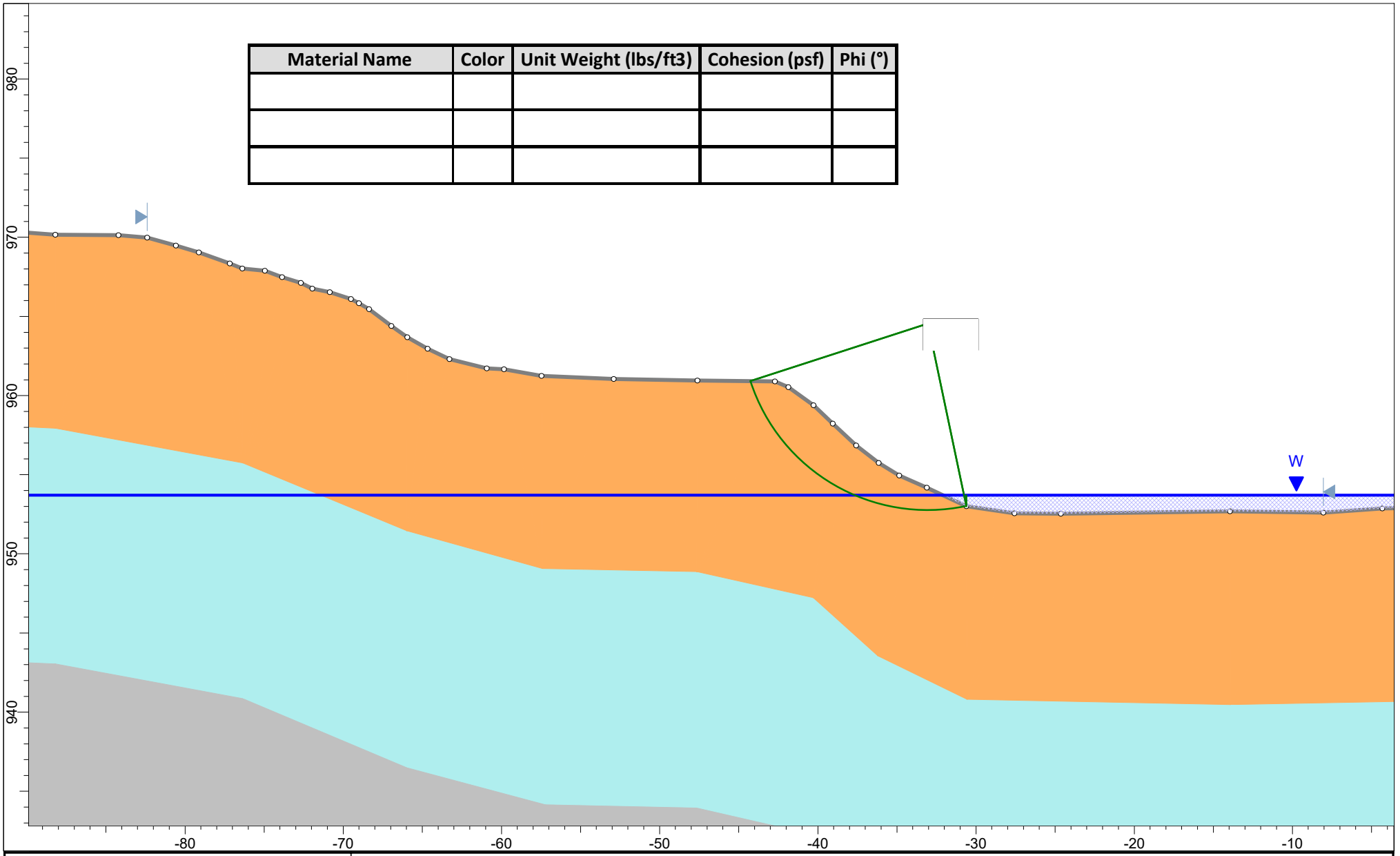


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 68+00 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 22

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

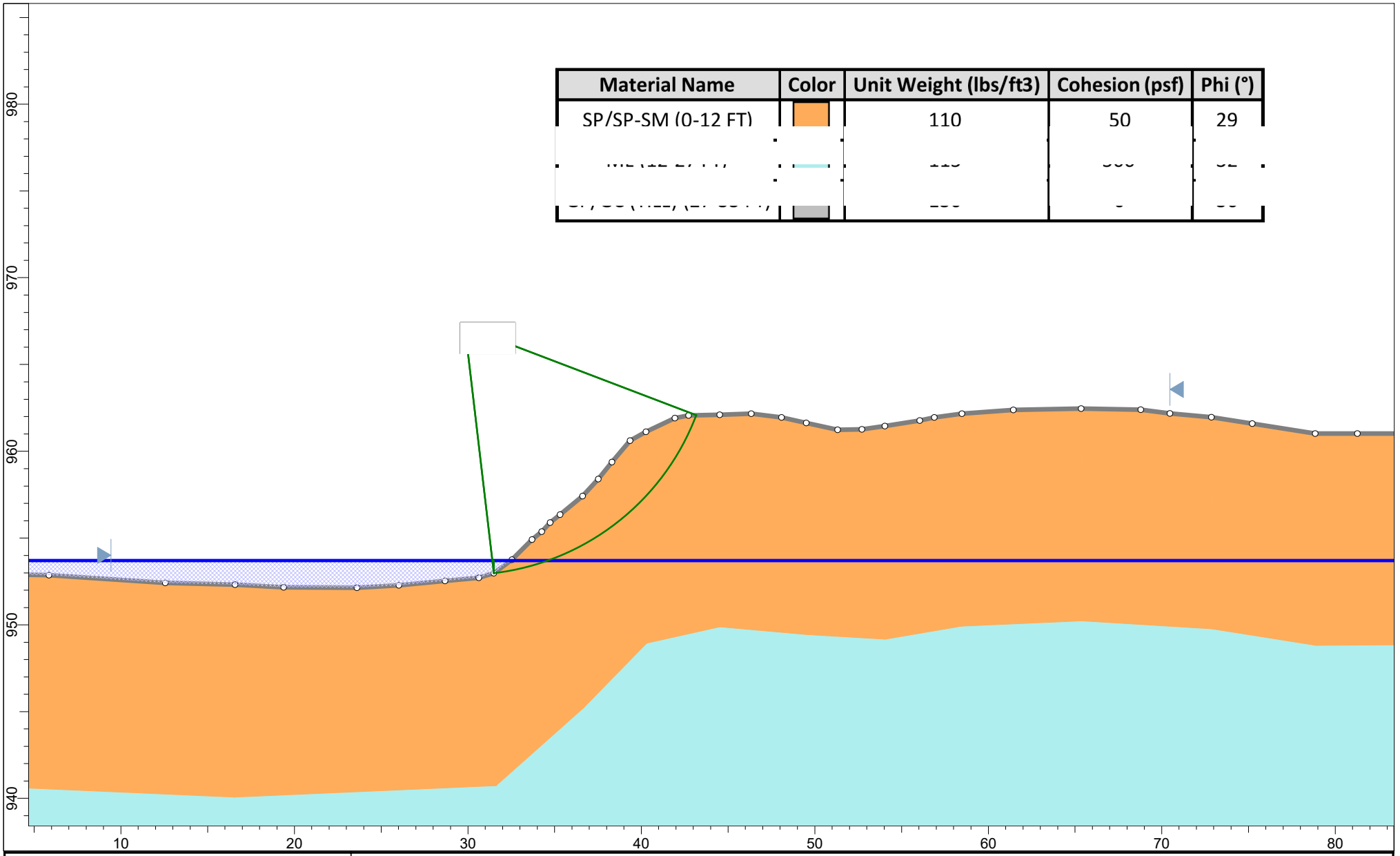


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 70+00 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 23

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)
SP/SP-SM (0-12 FT)		110	50	29
[illegible]		[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]



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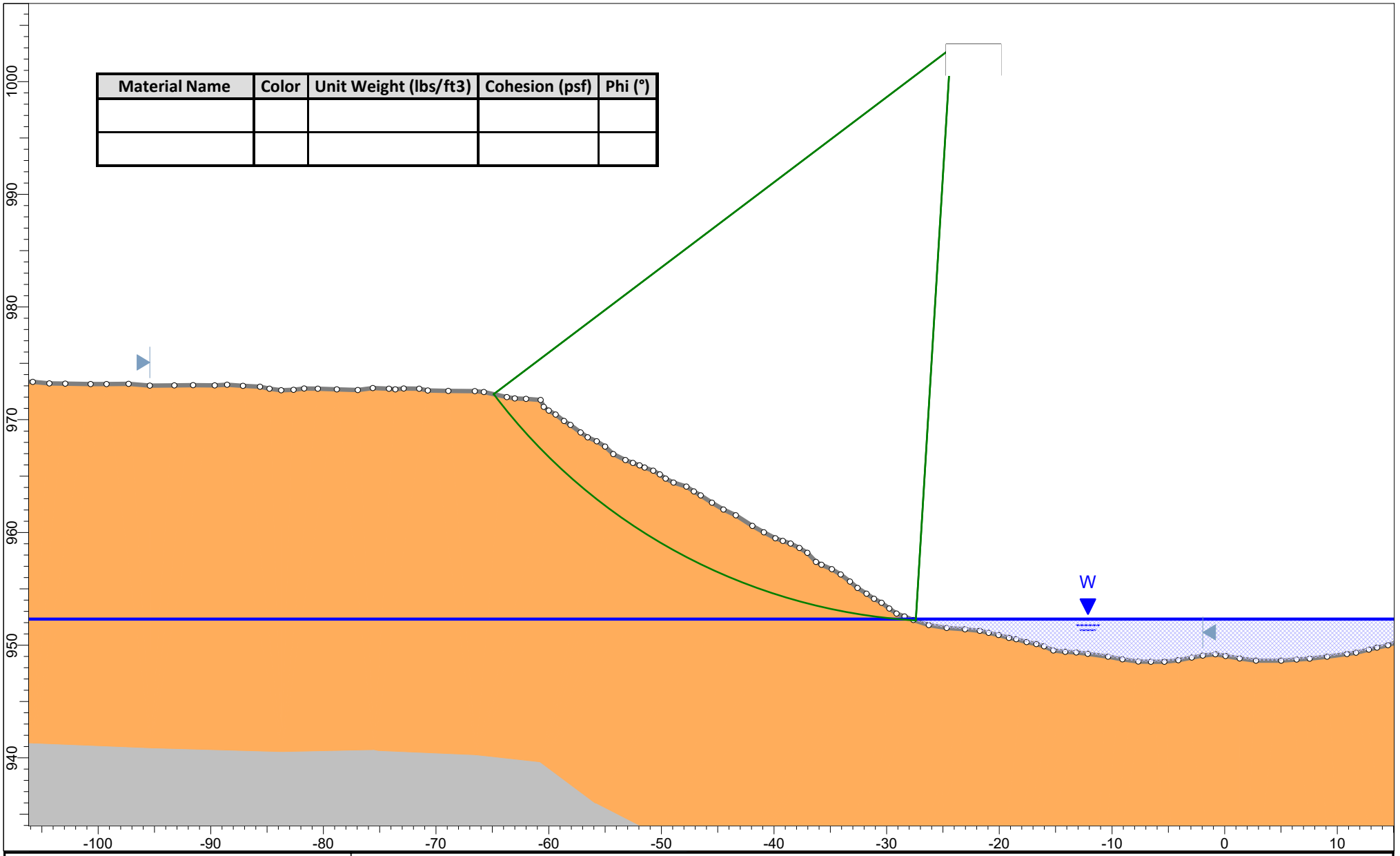
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 70+00 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 24

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)



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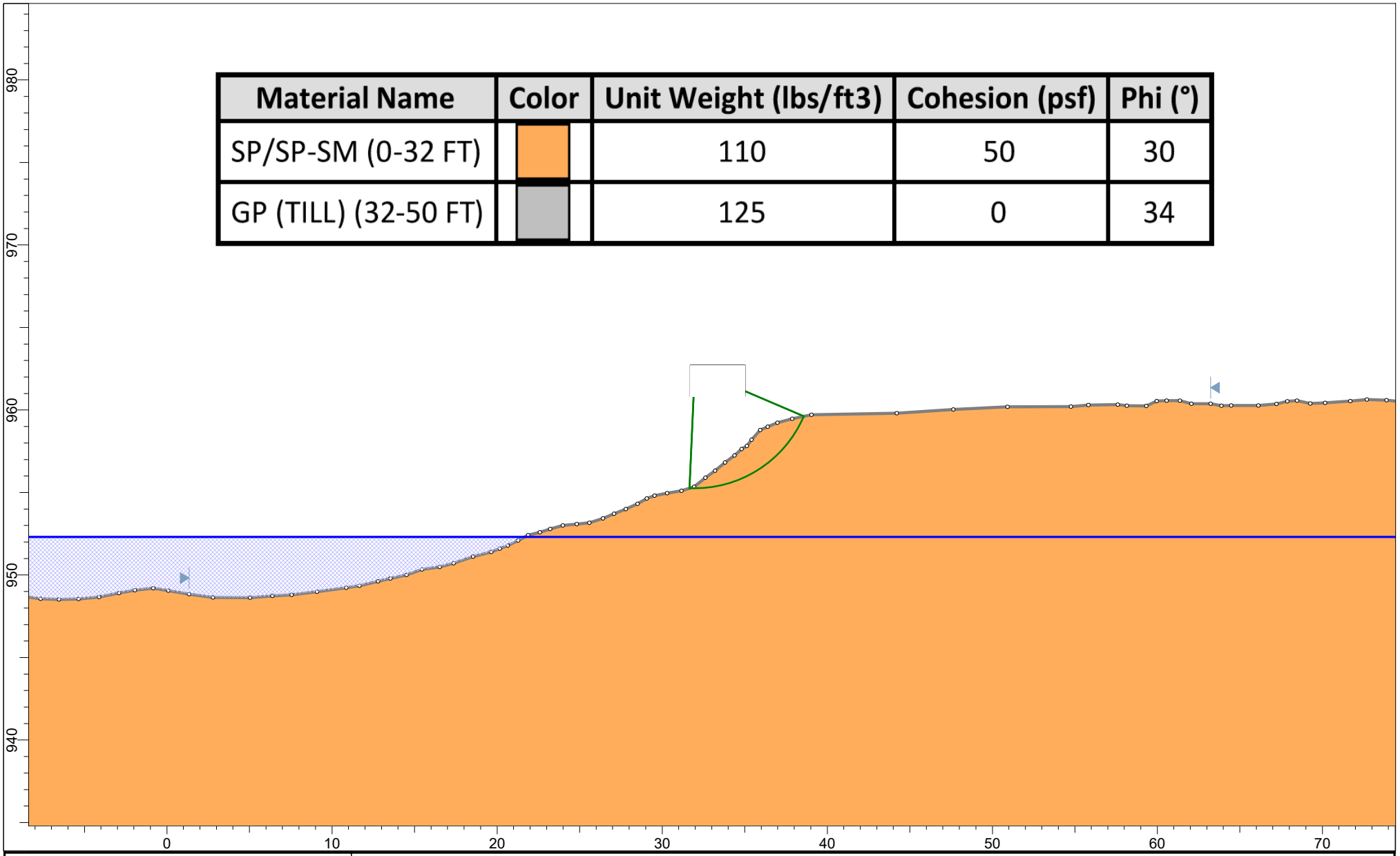
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 100+00 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 25

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)
SP/SP-SM (0-32 FT)		110	50	30
GP (TILL) (32-50 FT)		125	0	34



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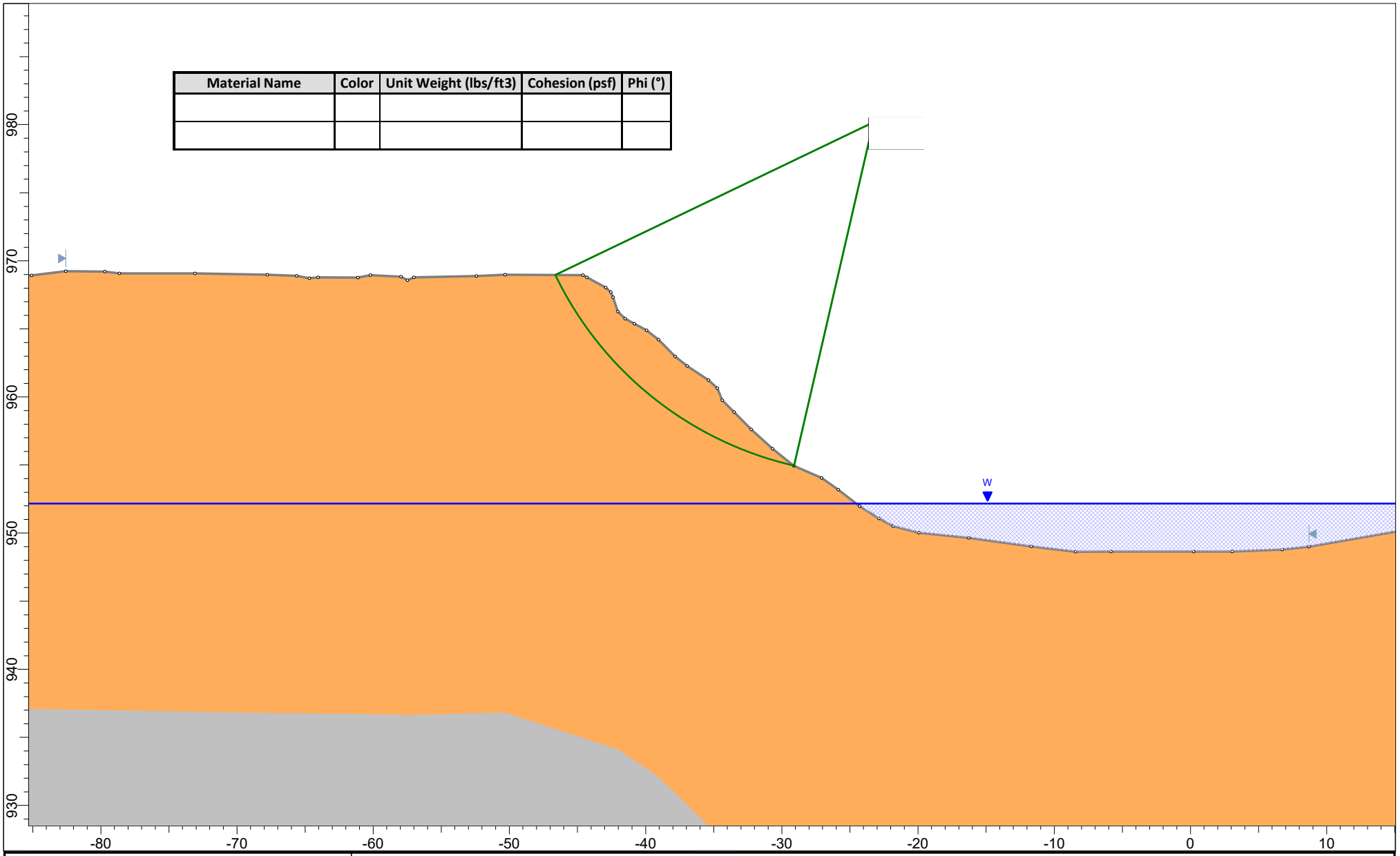
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 100+00 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 26

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

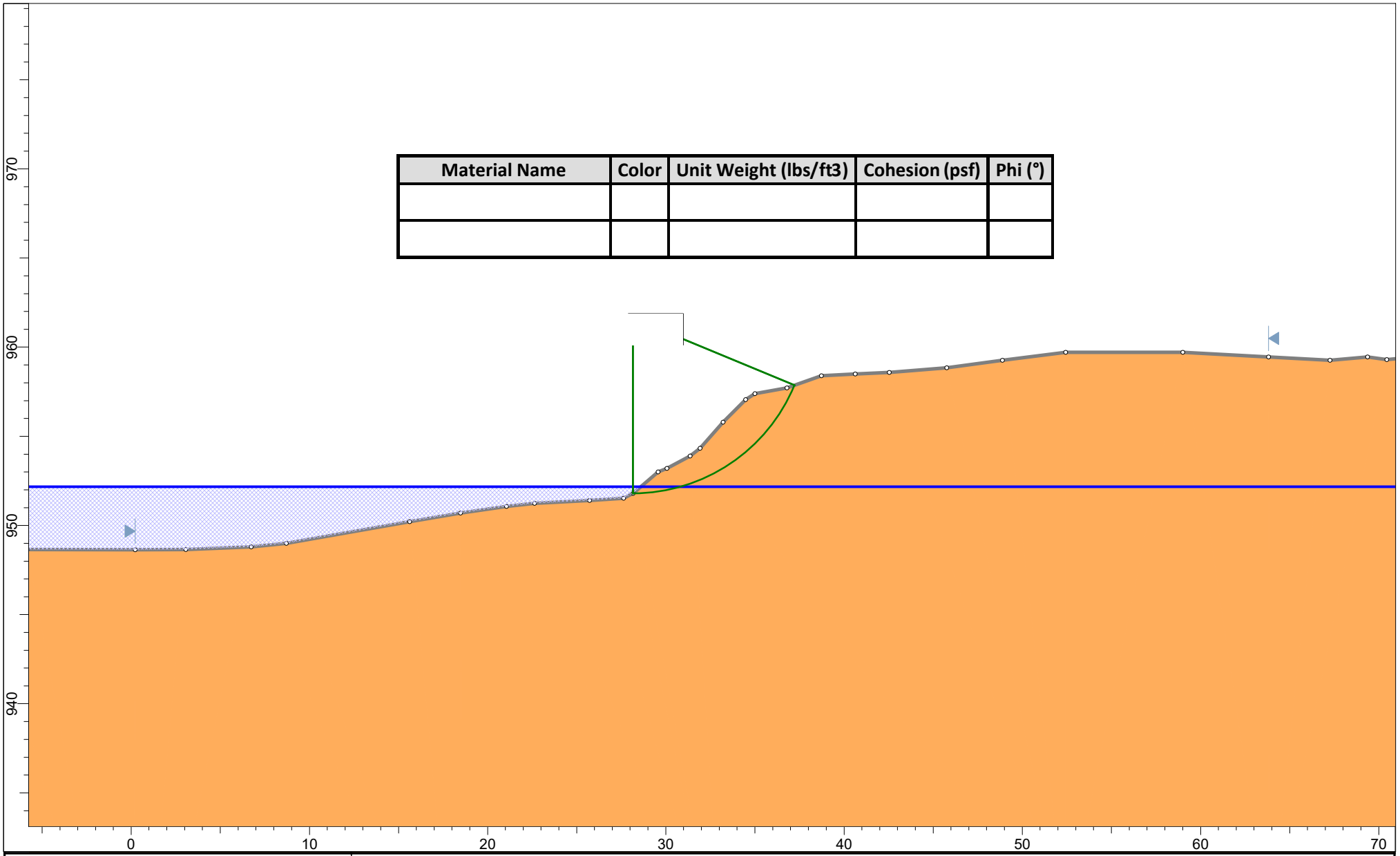


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 106+25 - Existing Conditions - Left	*Scenario*	Master Scenario
Drawn By	Leah Dorris	*Company*	Anchor QEA, Inc.
Date	1/20/2026	*Figure Number*	Figure 27

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

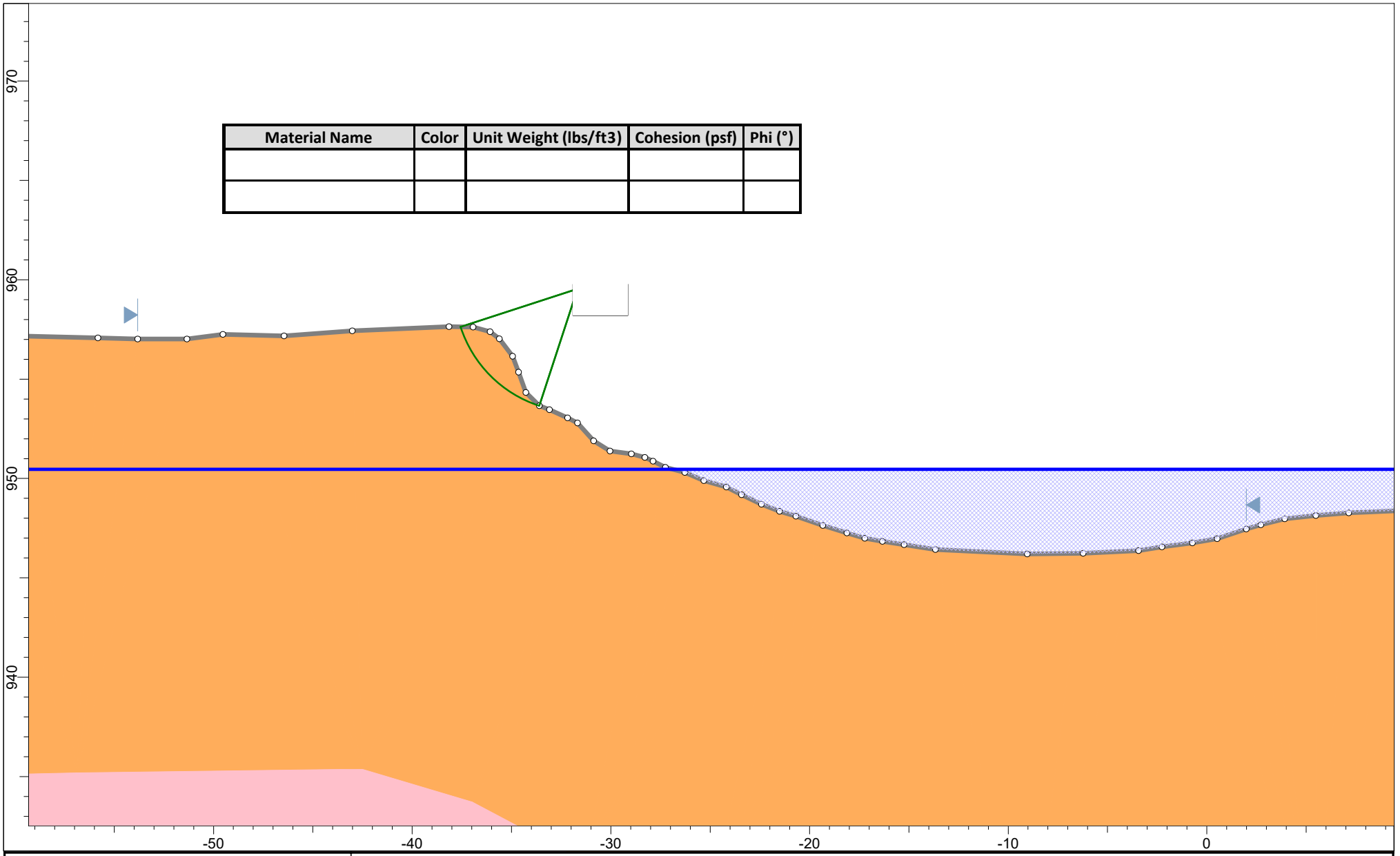


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 106+25 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 28

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)



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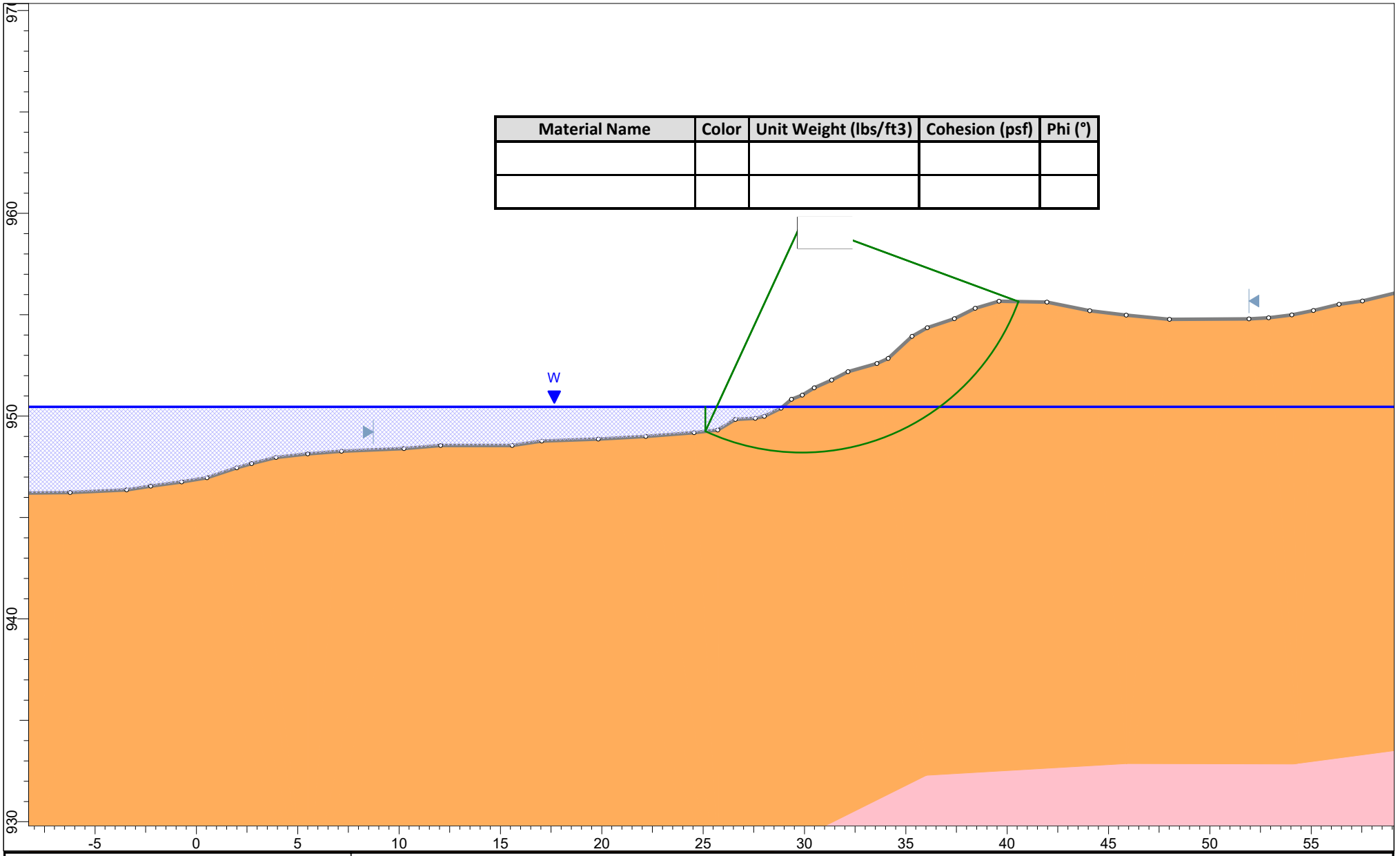
SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 135+00 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 29

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

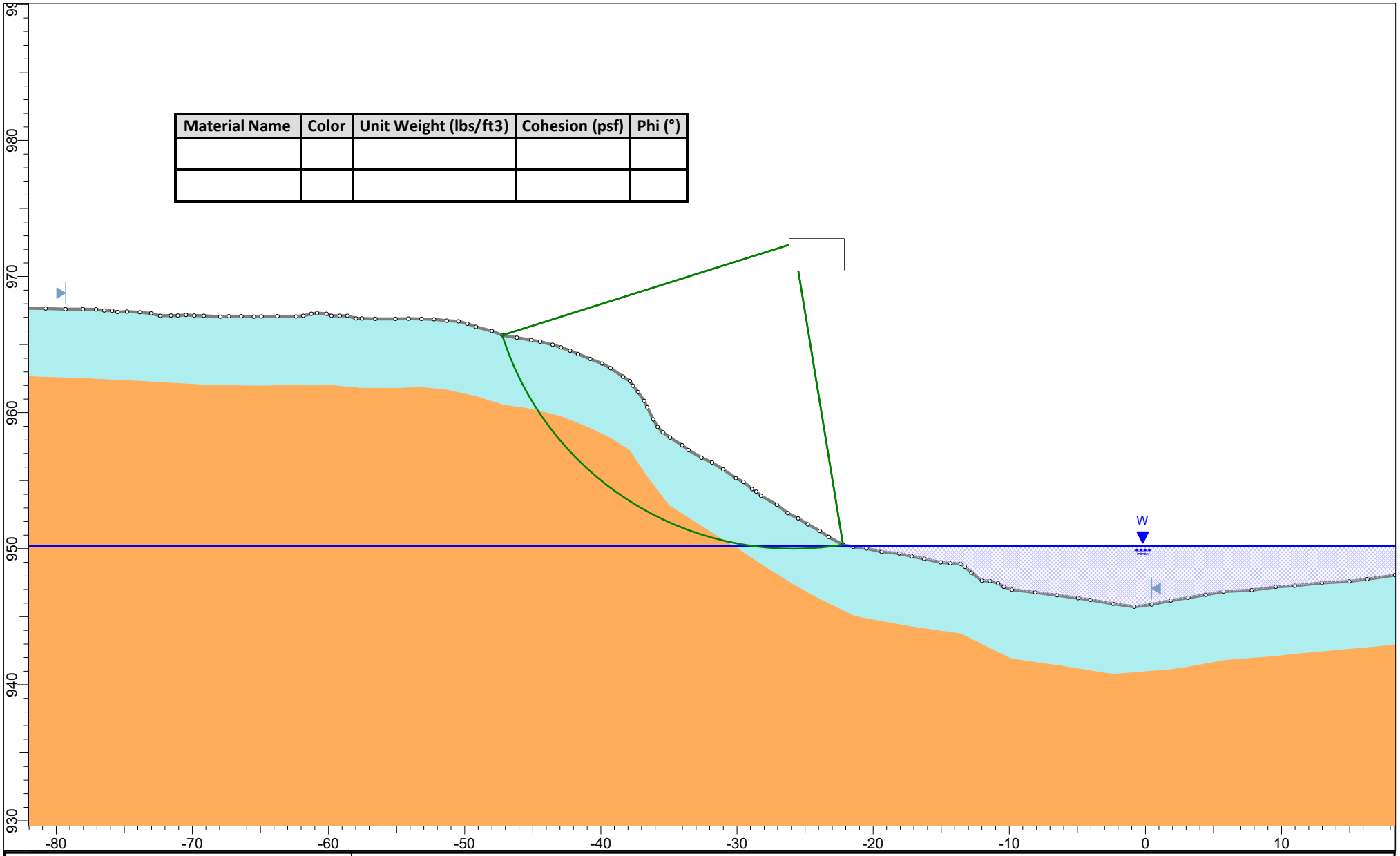


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 135+00 - Existing Conditions - Right	*Scenario*	Master Scenario
Drawn By	Leah Dorris	*Company*	Anchor QEA, Inc.
Date	1/20/2026	*Figure Number*	Figure 30

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

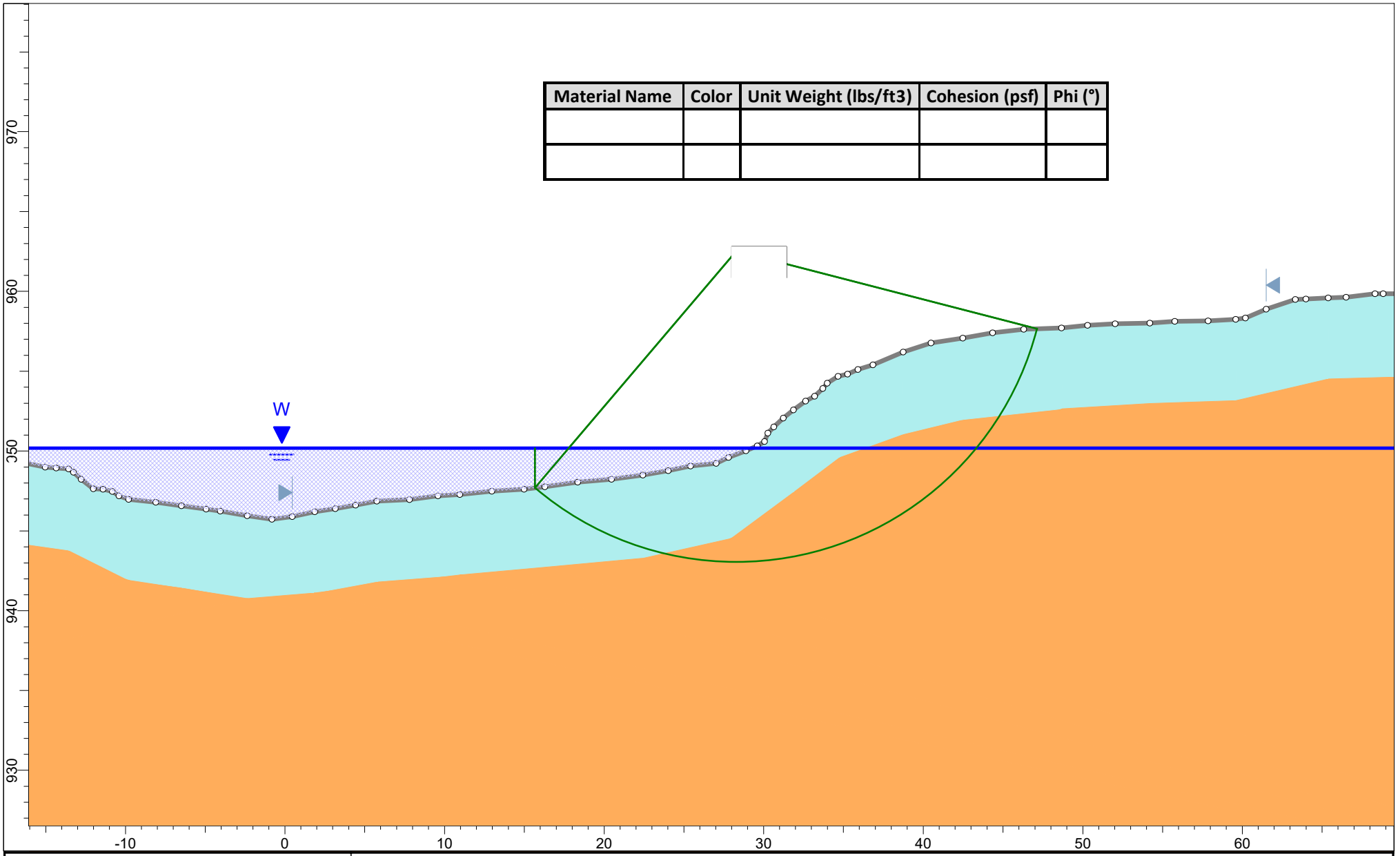


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 158+50 - Existing Conditions - Right	*Scenario*	Master Scenario
Drawn By	Leah Dorris	*Company*	Anchor QEA, Inc.
Date	1/20/2026	*Figure Number*	Figure 31

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

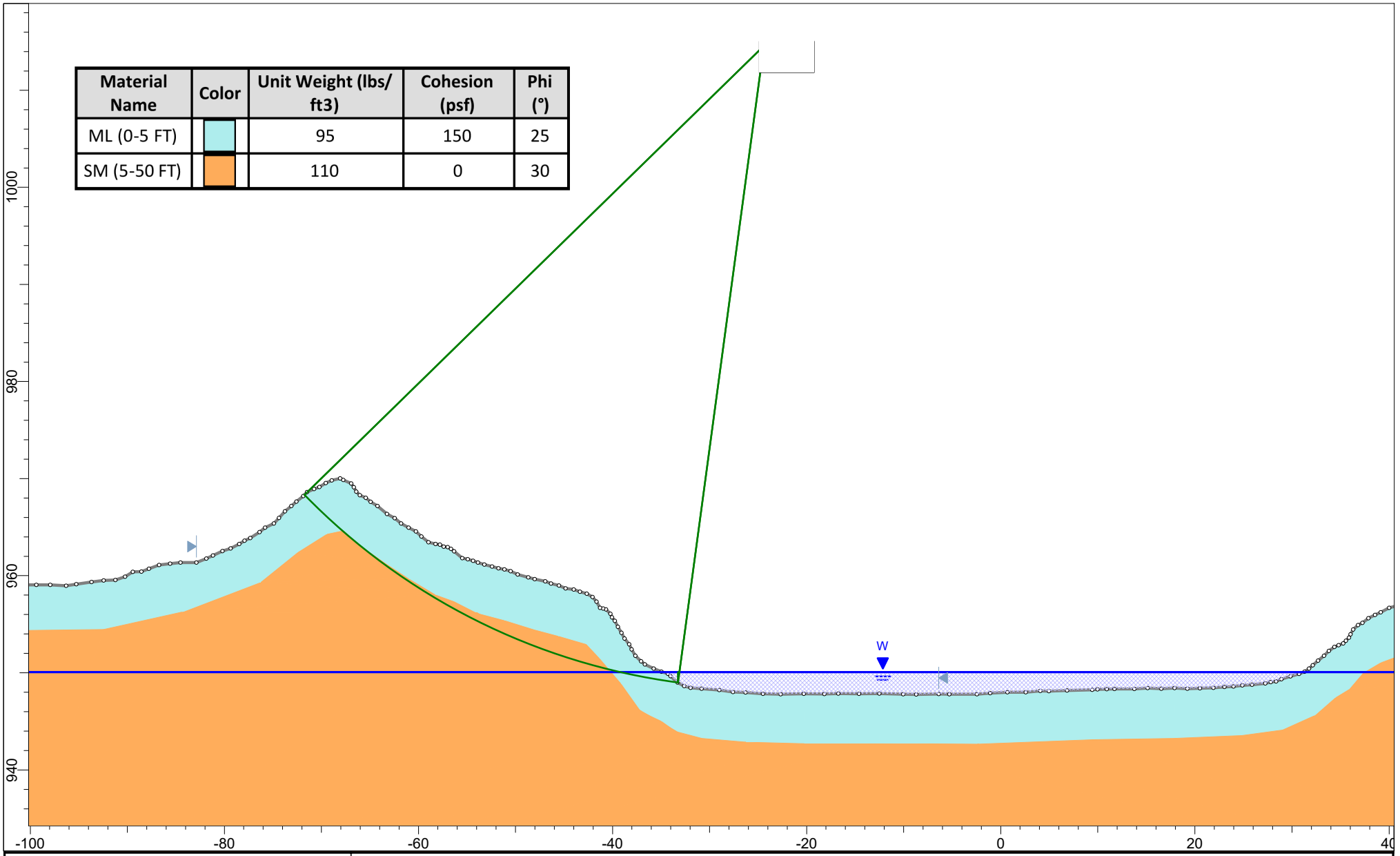


ANCHOR QEA

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 158+50 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 32

SLIDEINTERPRET 9.041

Material Name	Color	Unit Weight (lbs/ ft3)	Cohesion (psf)	Phi (°)
ML (0-5 FT)		95	150	25
SM (5-50 FT)		110	0	30

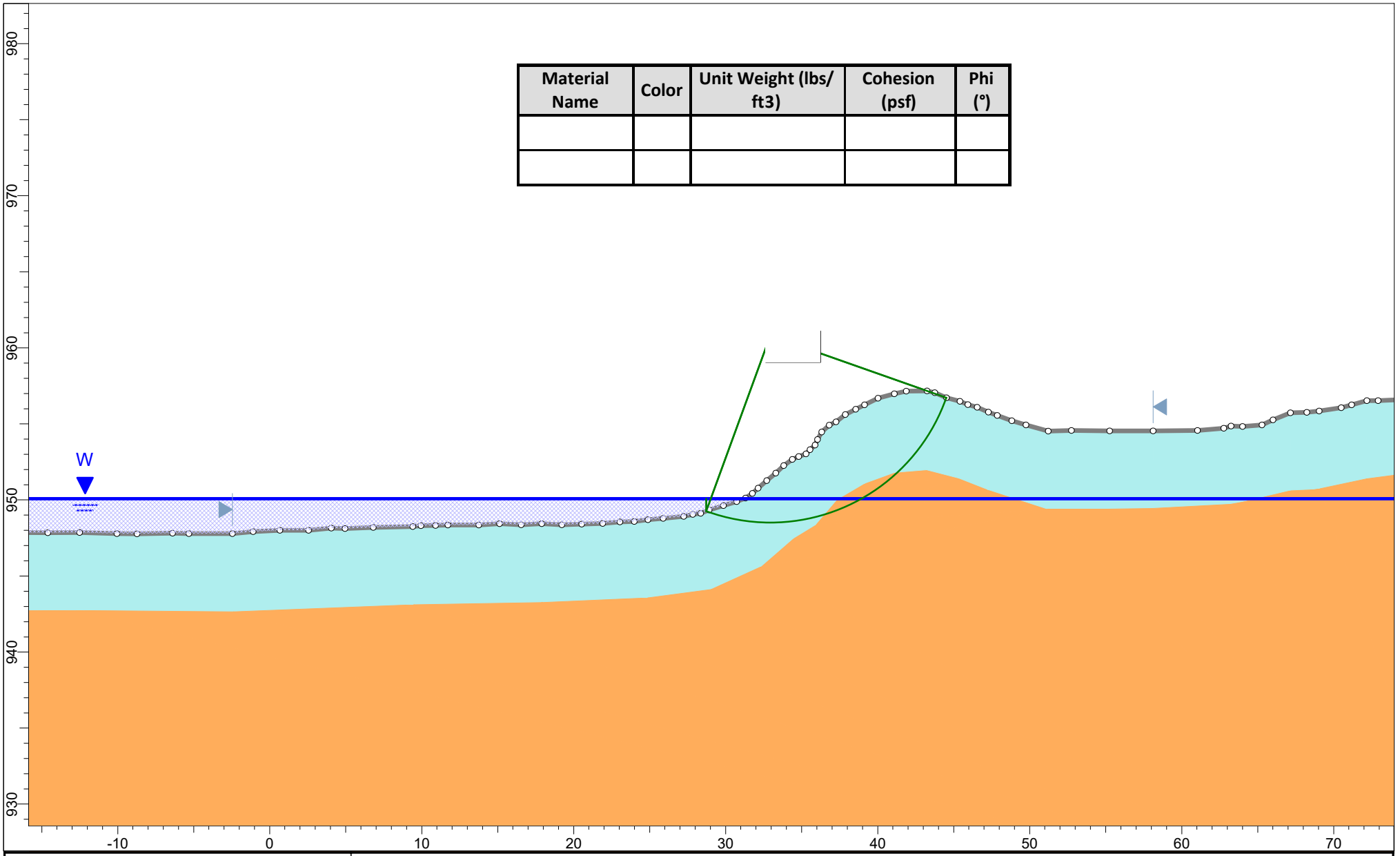


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 163+00 - Existing Conditions - Left	*Scenario*	Master Scenario
Drawn By	Leah Dorris	*Company*	Anchor QEA, Inc.
Date	1/20/2026	*Figure Number*	Figure 33

Material Name	Color	Unit Weight (lbs/ ft3)	Cohesion (psf)	Phi (°)

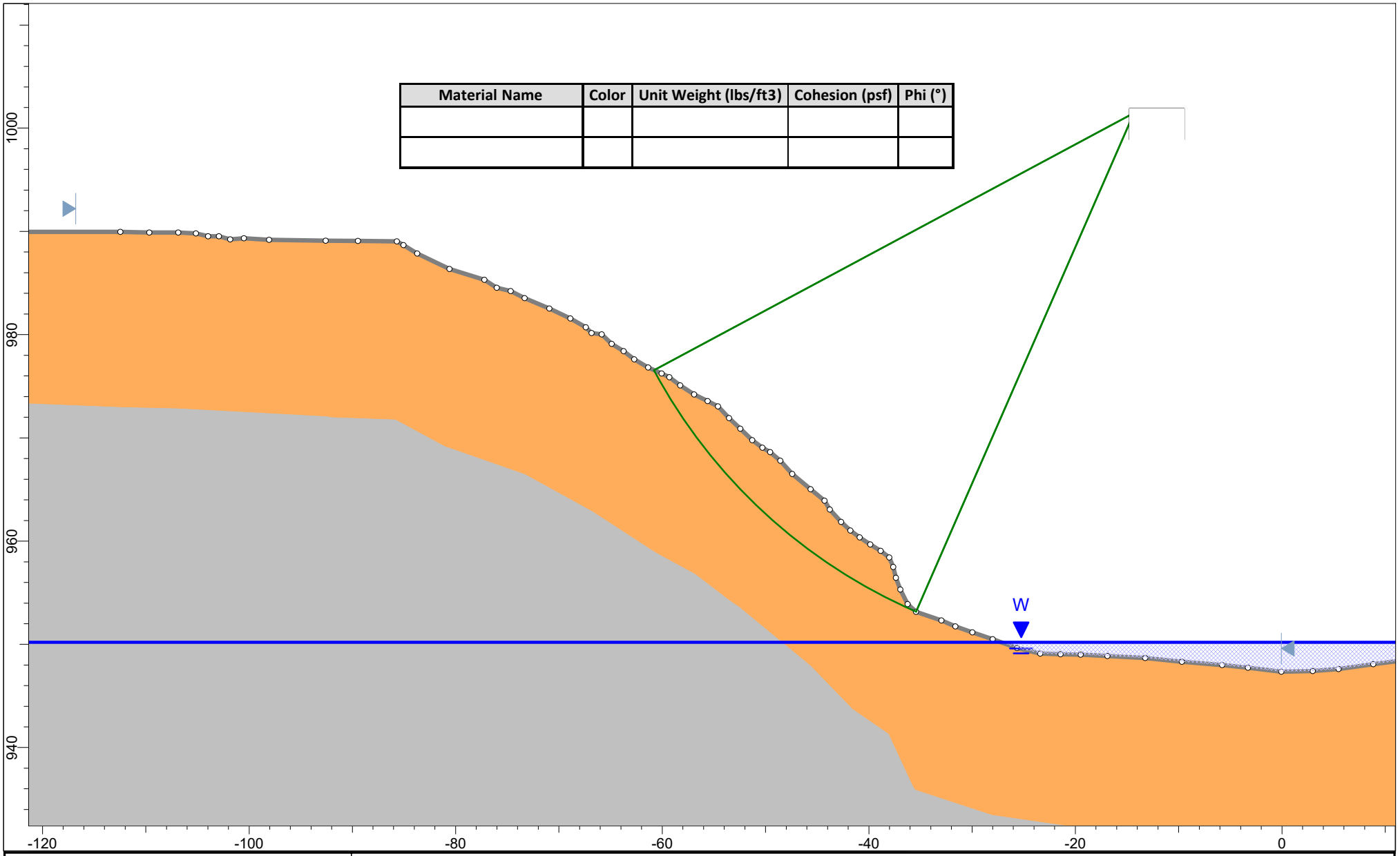


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 163+00 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 34

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

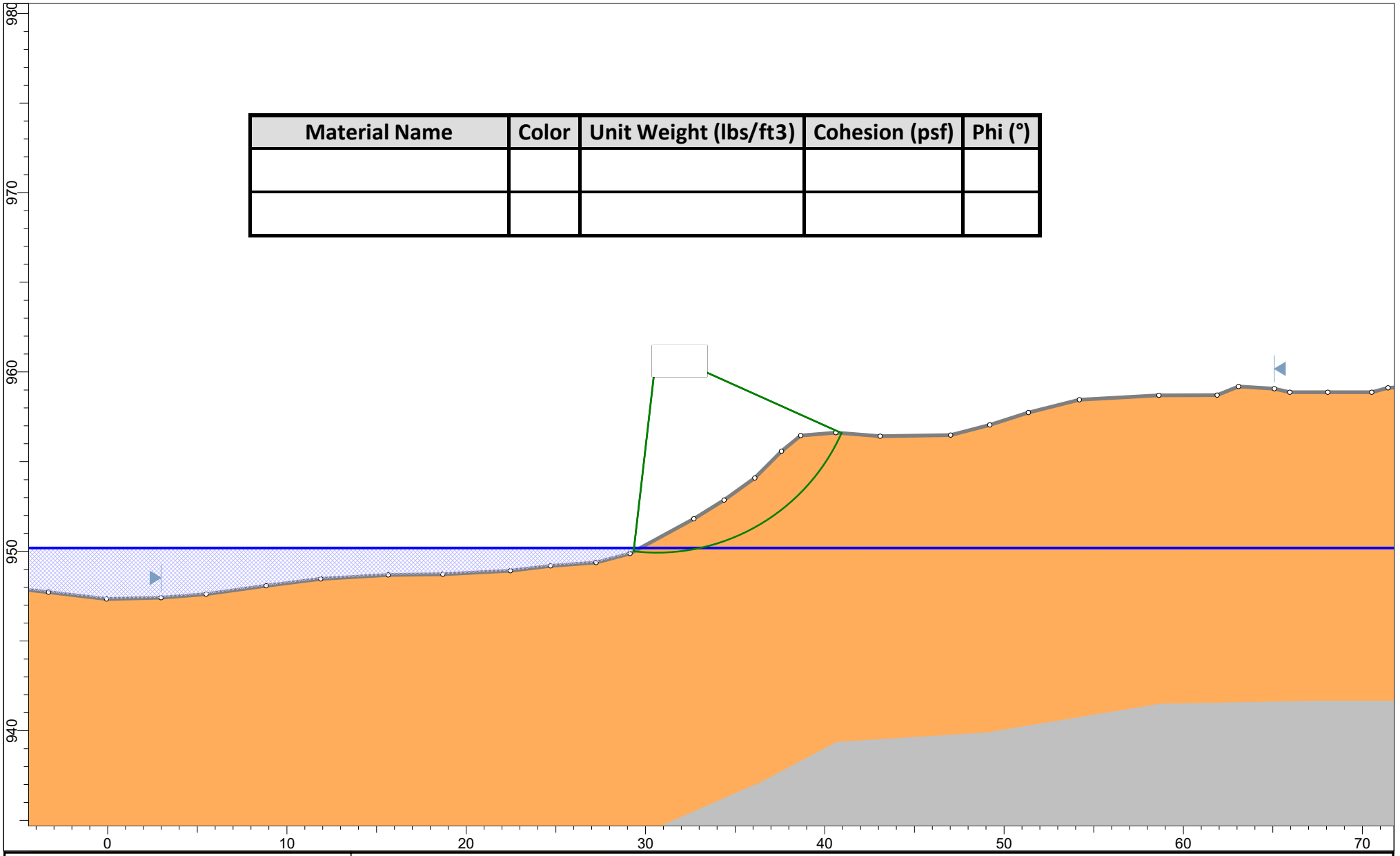


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 174+00 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA
Date	1/20/2026	Figure Number	Figure 35

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

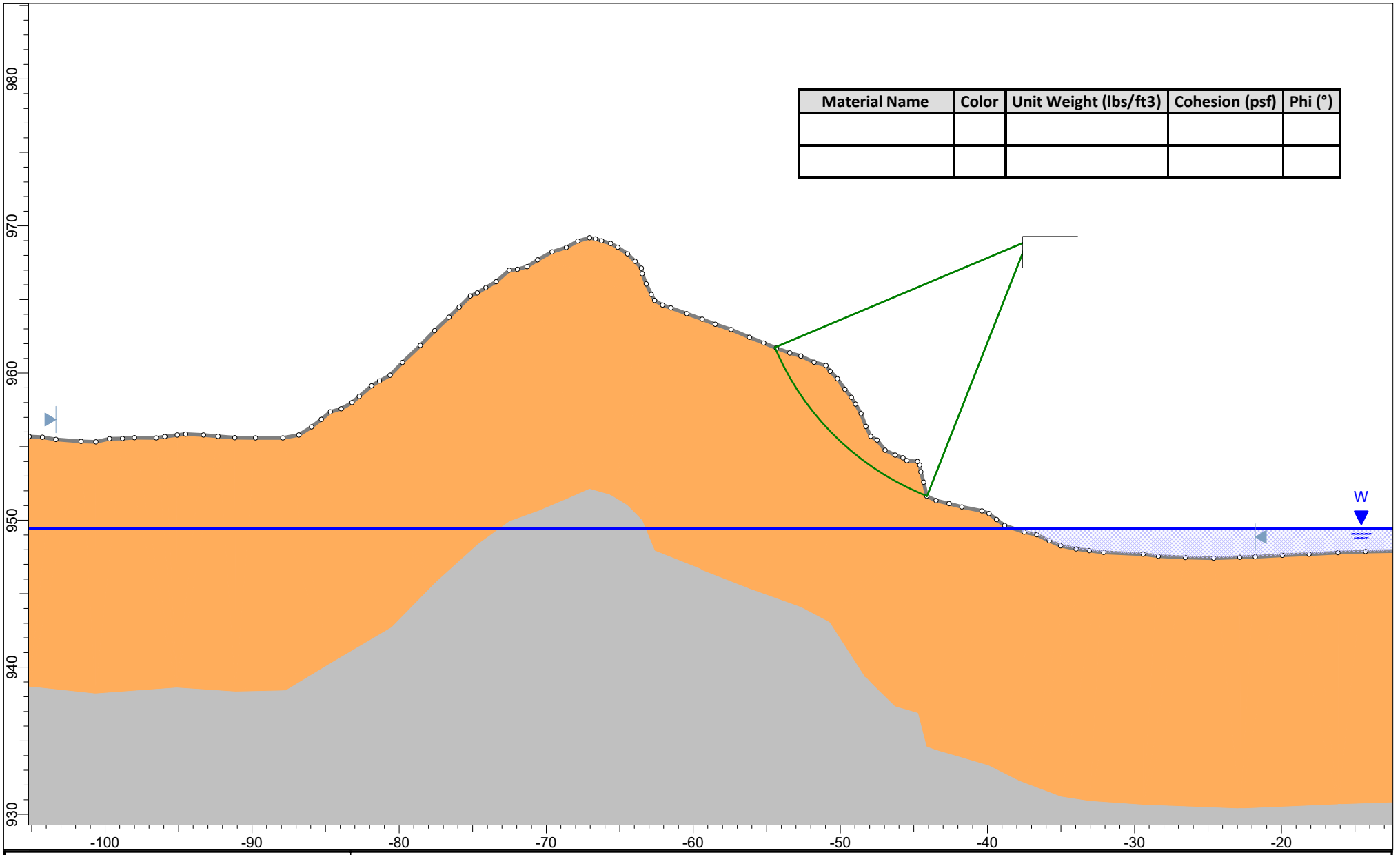


ANCHOR QEA

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 174+00 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 36

SLIDEINTERPRET 9.041

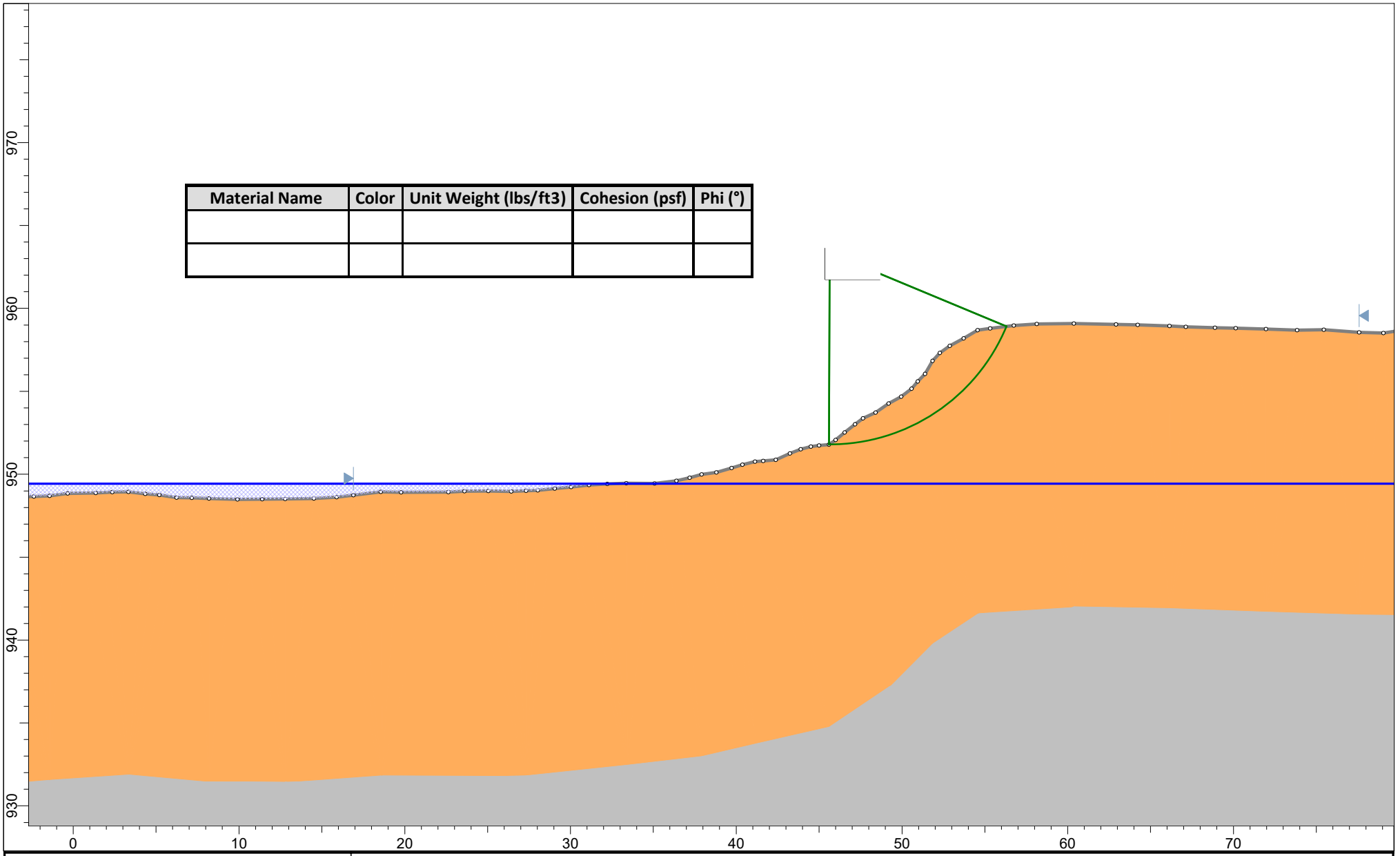
Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)



ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 182+50 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 37

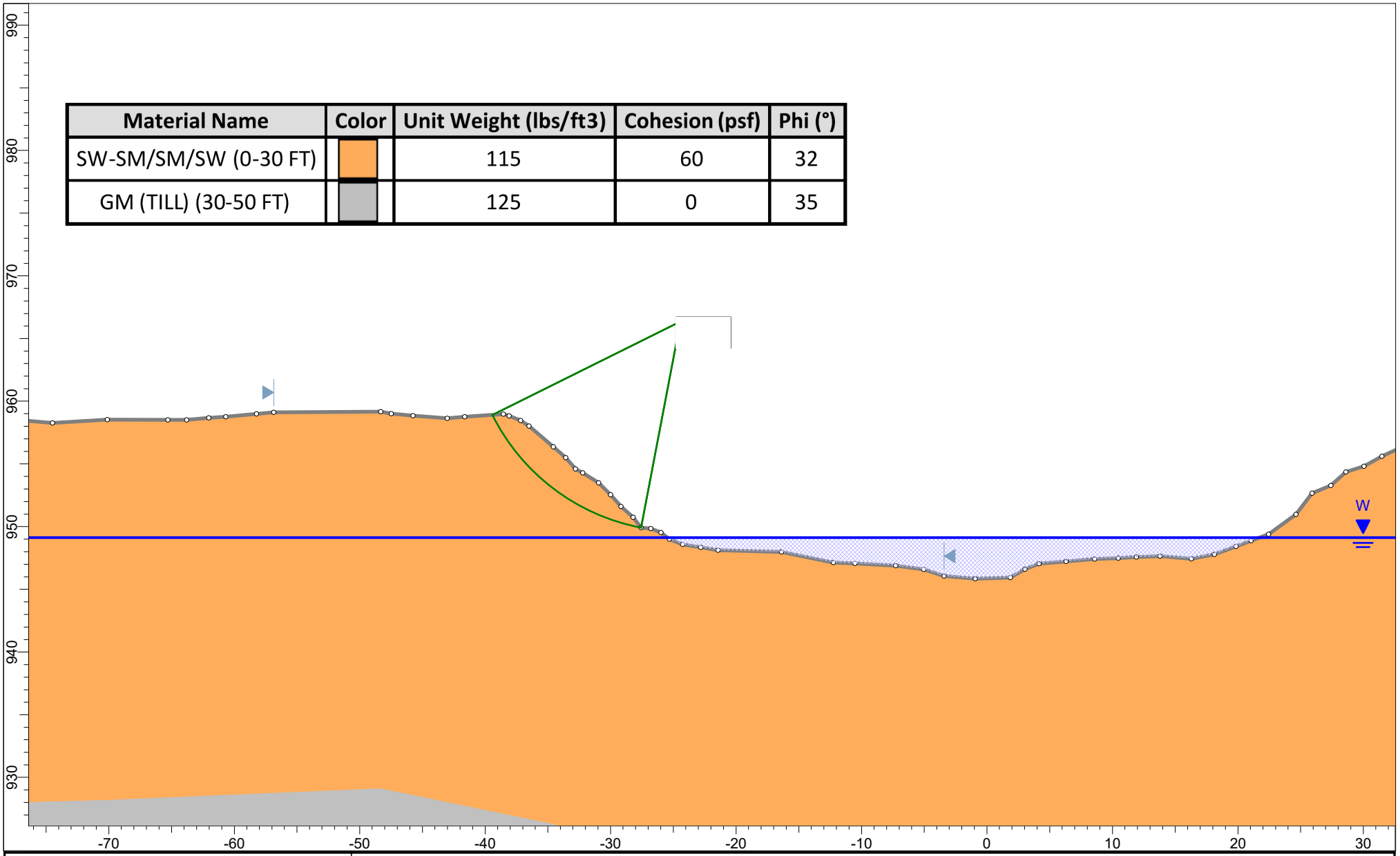


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 182+50 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 38

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)
SW-SM/SM/SW (0-30 FT)		115	60	32
GM (TILL) (30-50 FT)		125	0	35

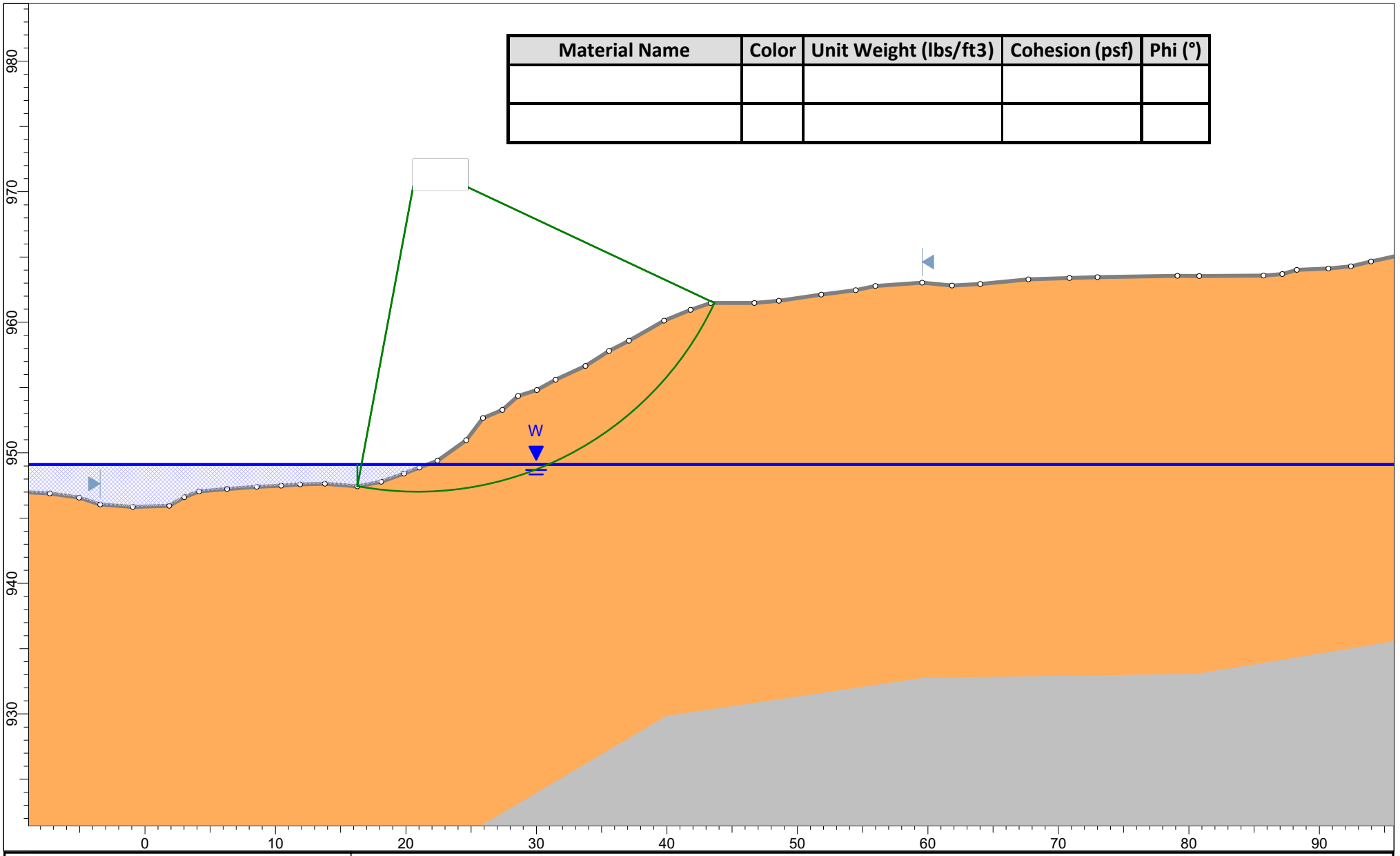


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 189+00 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 39

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

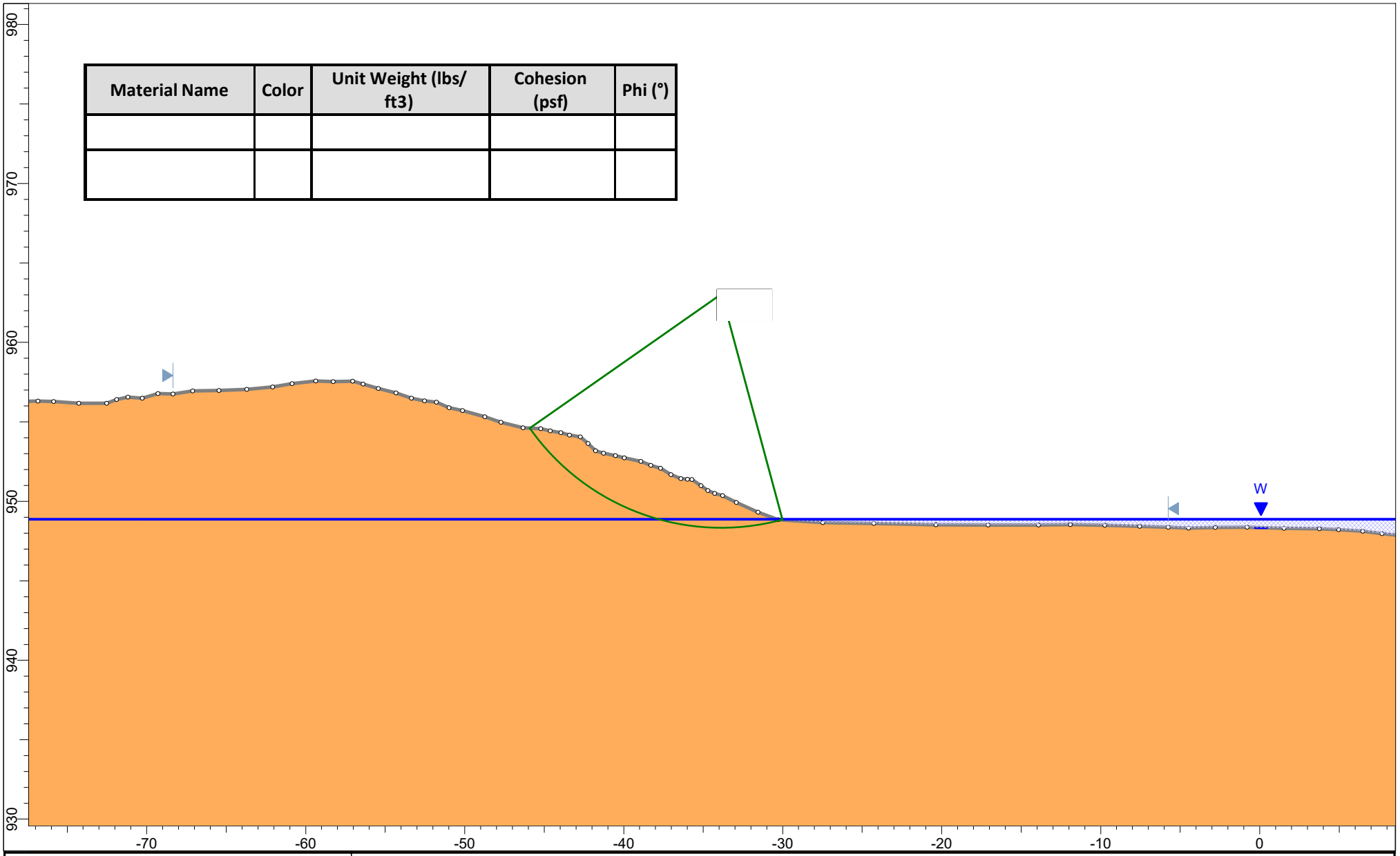


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 189+00 - Existing Conditions - Right	*Scenario*	Master Scenario
Drawn By	Leah Dorris	*Company*	Anchor QEA, Inc.
Date	1/20/2026	*Figure Number*	Figure 40

Material Name	Color	Unit Weight (lbs/ ft3)	Cohesion (psf)	Phi (°)

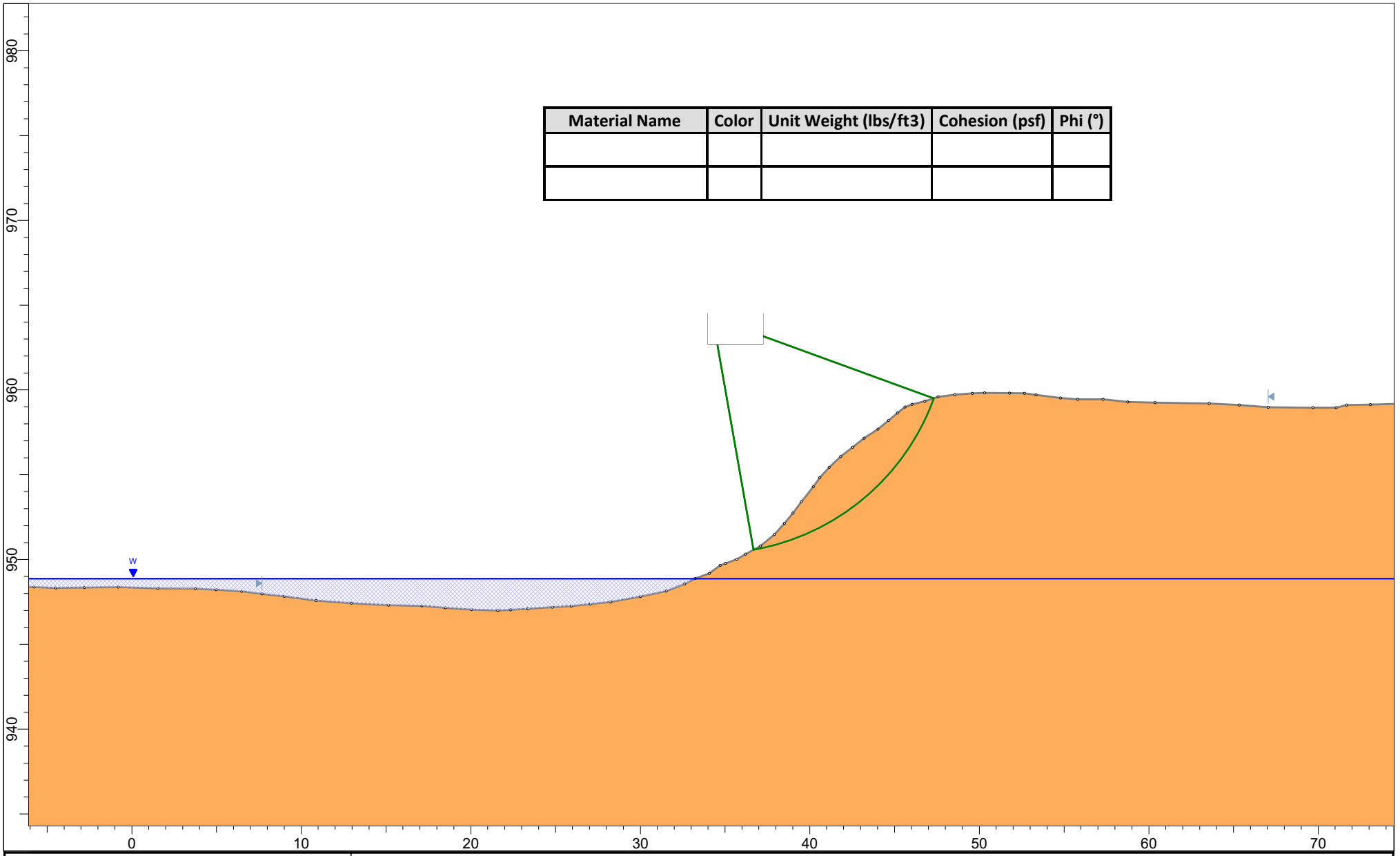


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 194+25 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 41

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

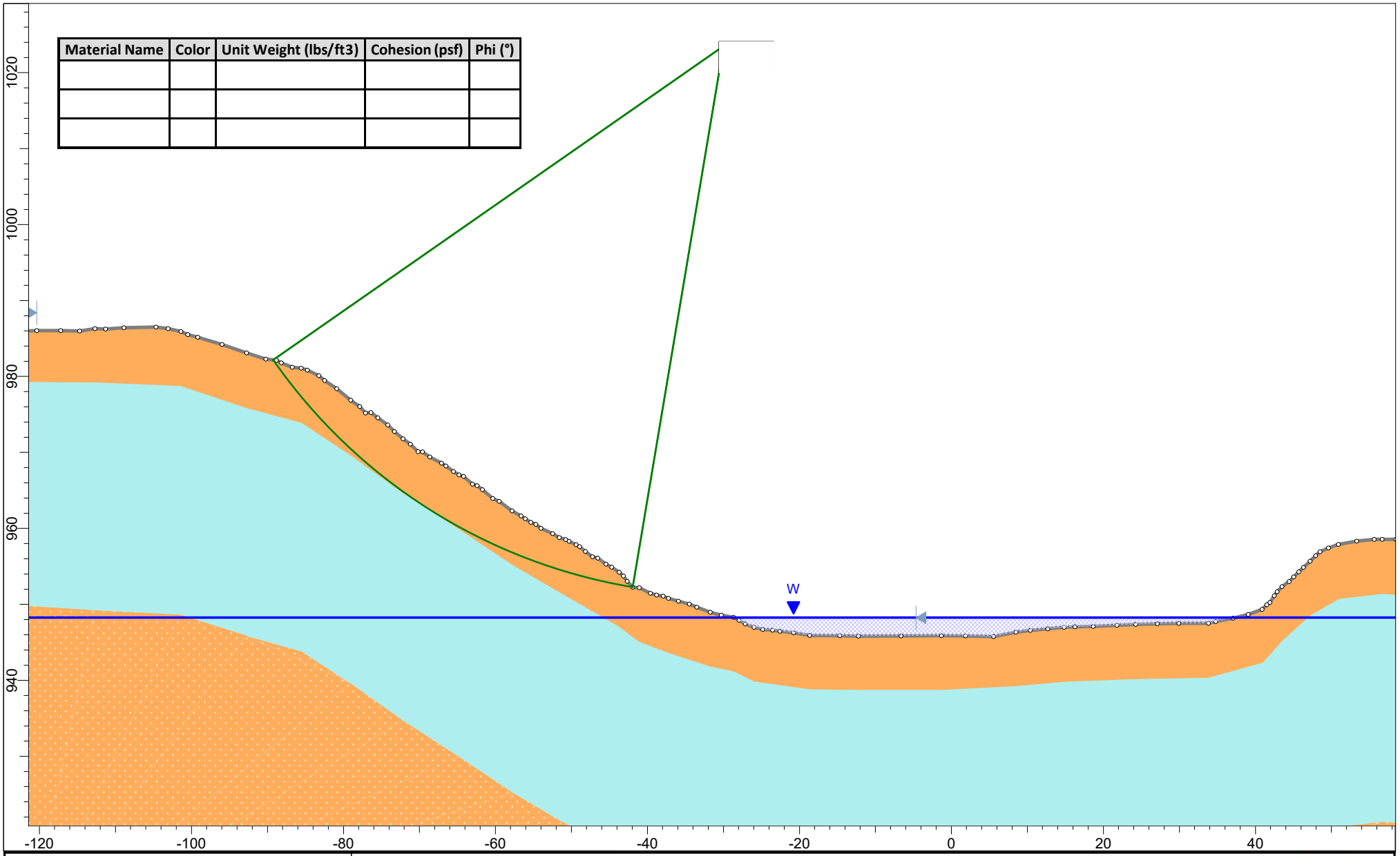


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 194+25 - Existing Conditions - Right	*Scenario*	Master Scenario
Drawn By	Leah Dorris	*Company*	Anchor QEA, Inc.
Date	1/20/2026	*Figure Number*	Figure 42

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

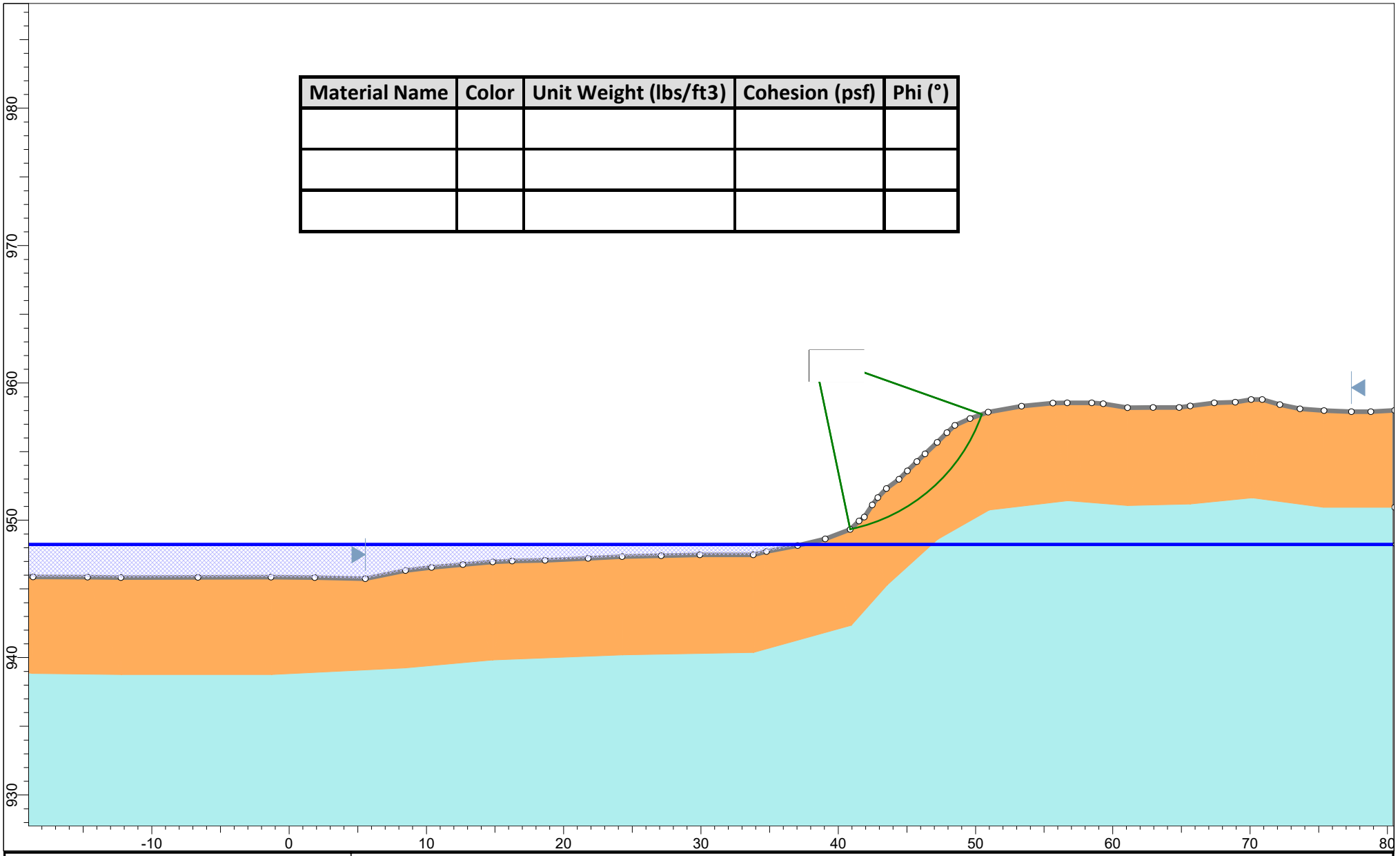


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 205+50 - Existing Conditions - Left	*Scenario*	Master Scenario
Drawn By	Leah Dorris	*Company*	Anchor QEA, Inc.
Date	1/20/2026	*Figure Number*	Figure 43

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)



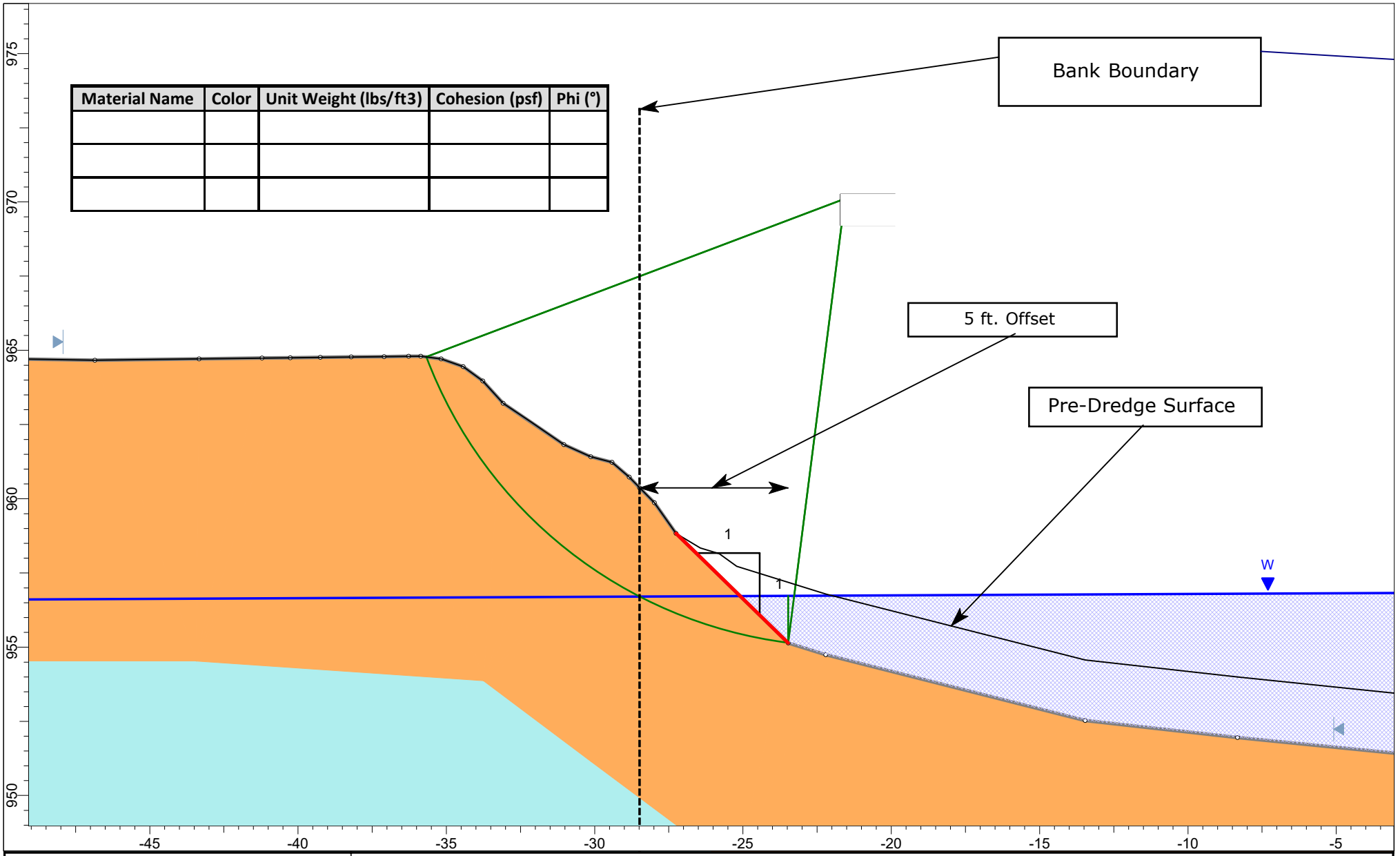
ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 205+50 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/20/2026	Figure Number	Figure 44

Attachment 3
Slope Stability Results | Dredge Scenarios

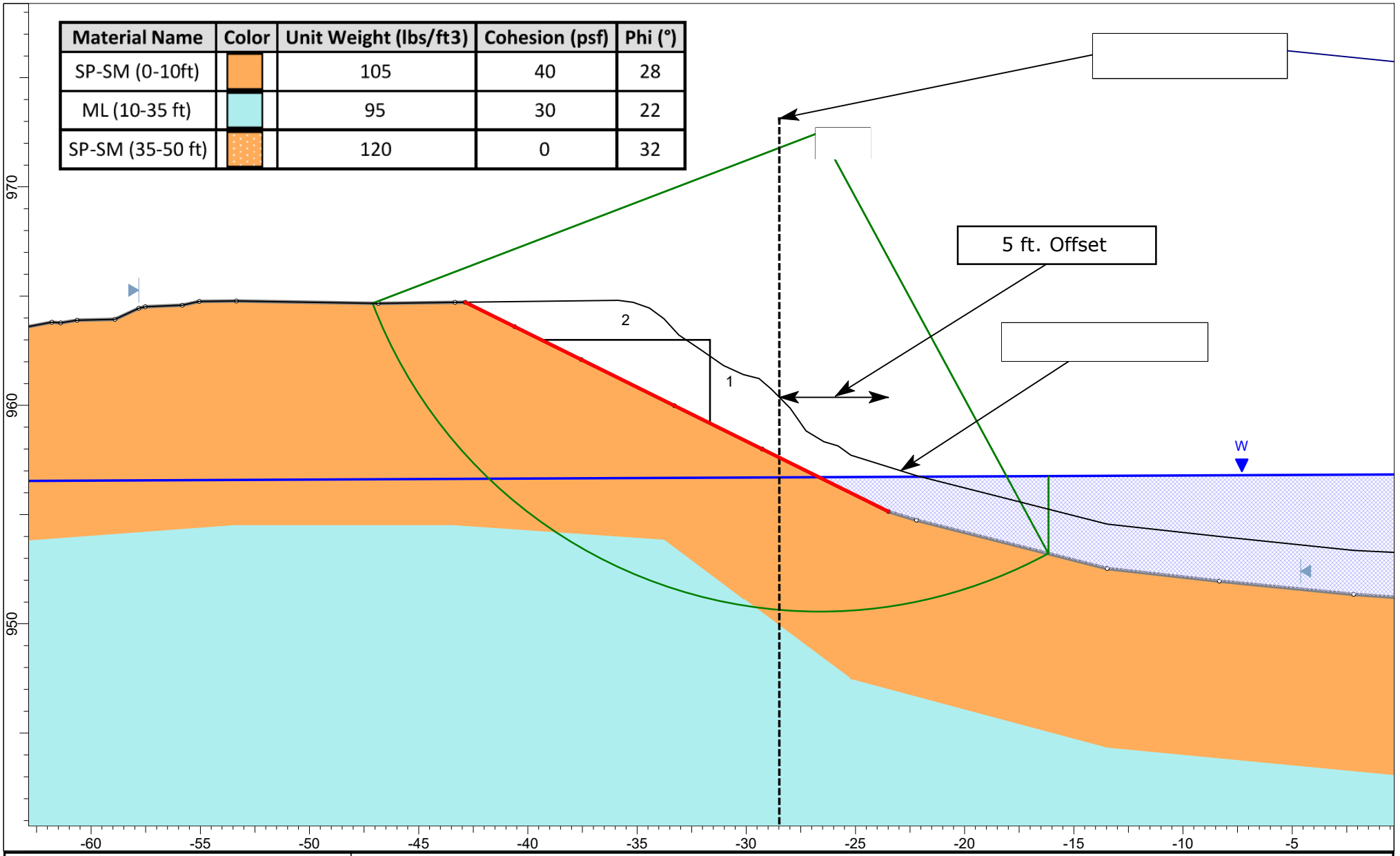
Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)



ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 2+00 - 5' Offset Dredge (1:1) - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/27/2026	Figure Number	Figure 1

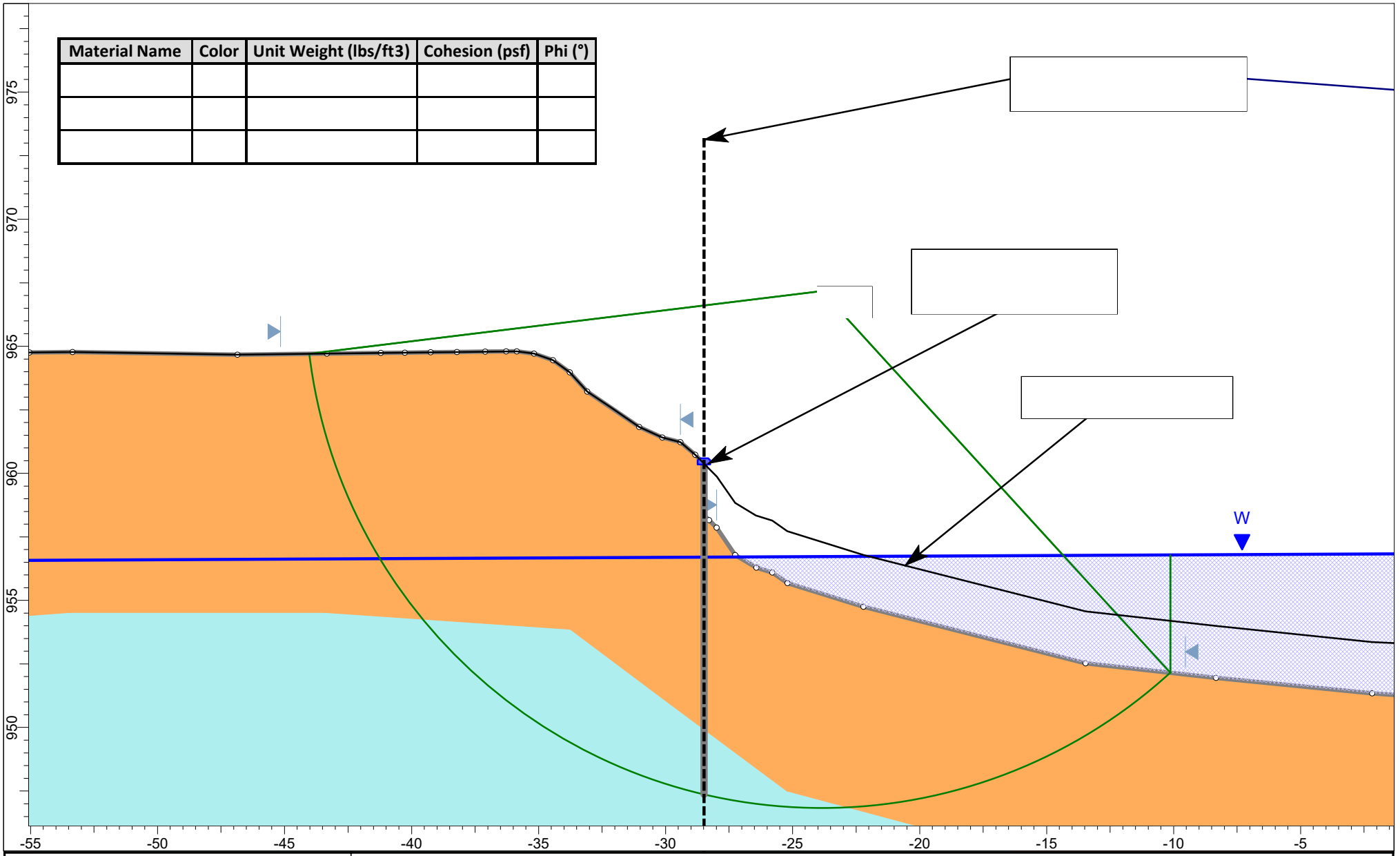


ANCHOR QEA

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 2+00 - 5' Offset Dredge (2:1) - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/27/2026	Figure Number	Figure 2

SLIDEINTERPRET 9.041

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

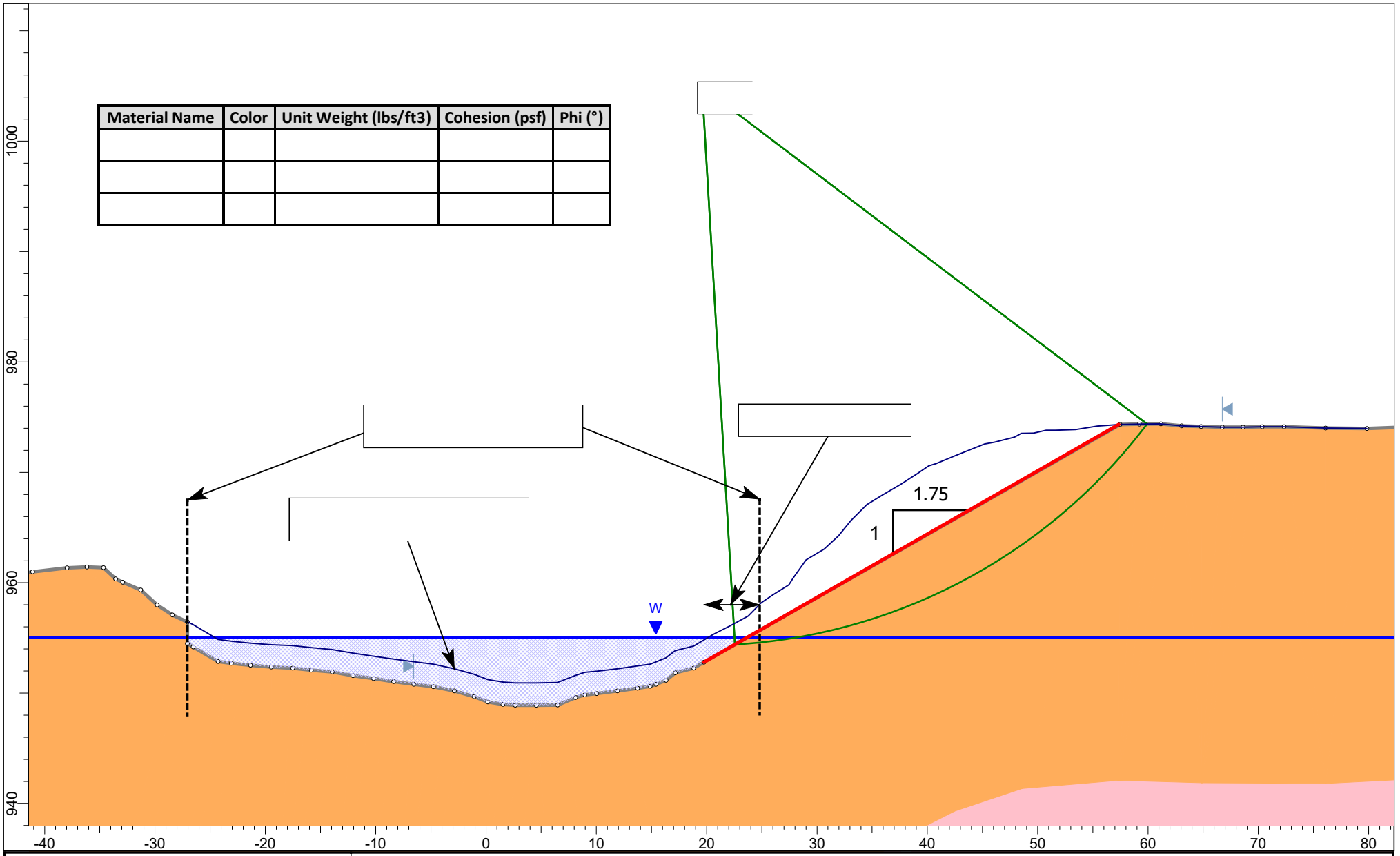


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 2+00 - Sheet Pile - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/27/2026	Figure Number	Figure 3

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

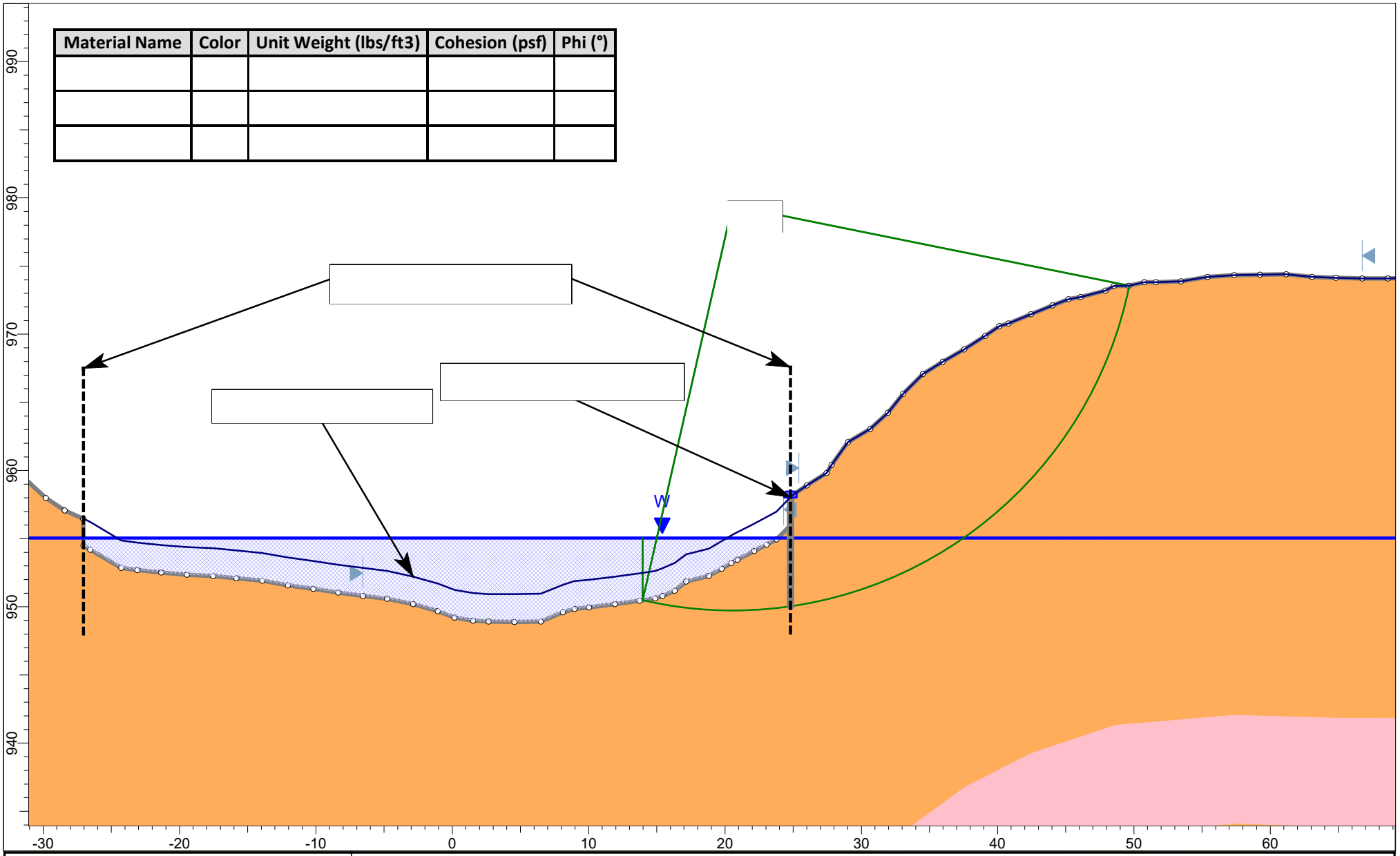


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 37+50 - 5' Offset (1.75:1) - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/27/2026	Figure Number	Figure 4

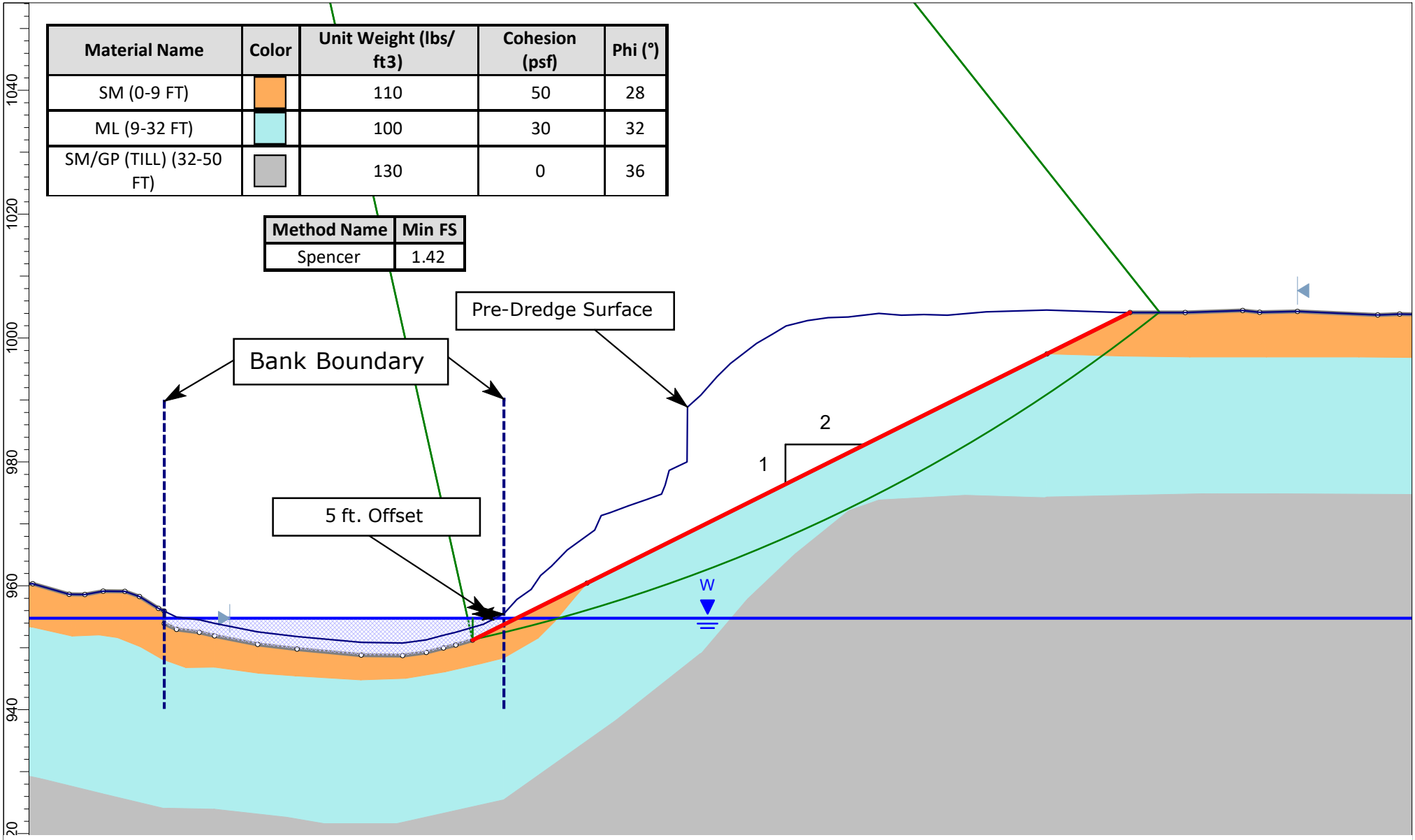
Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)



ANCHOR QEA

SLIDEINTERPRET 9.041

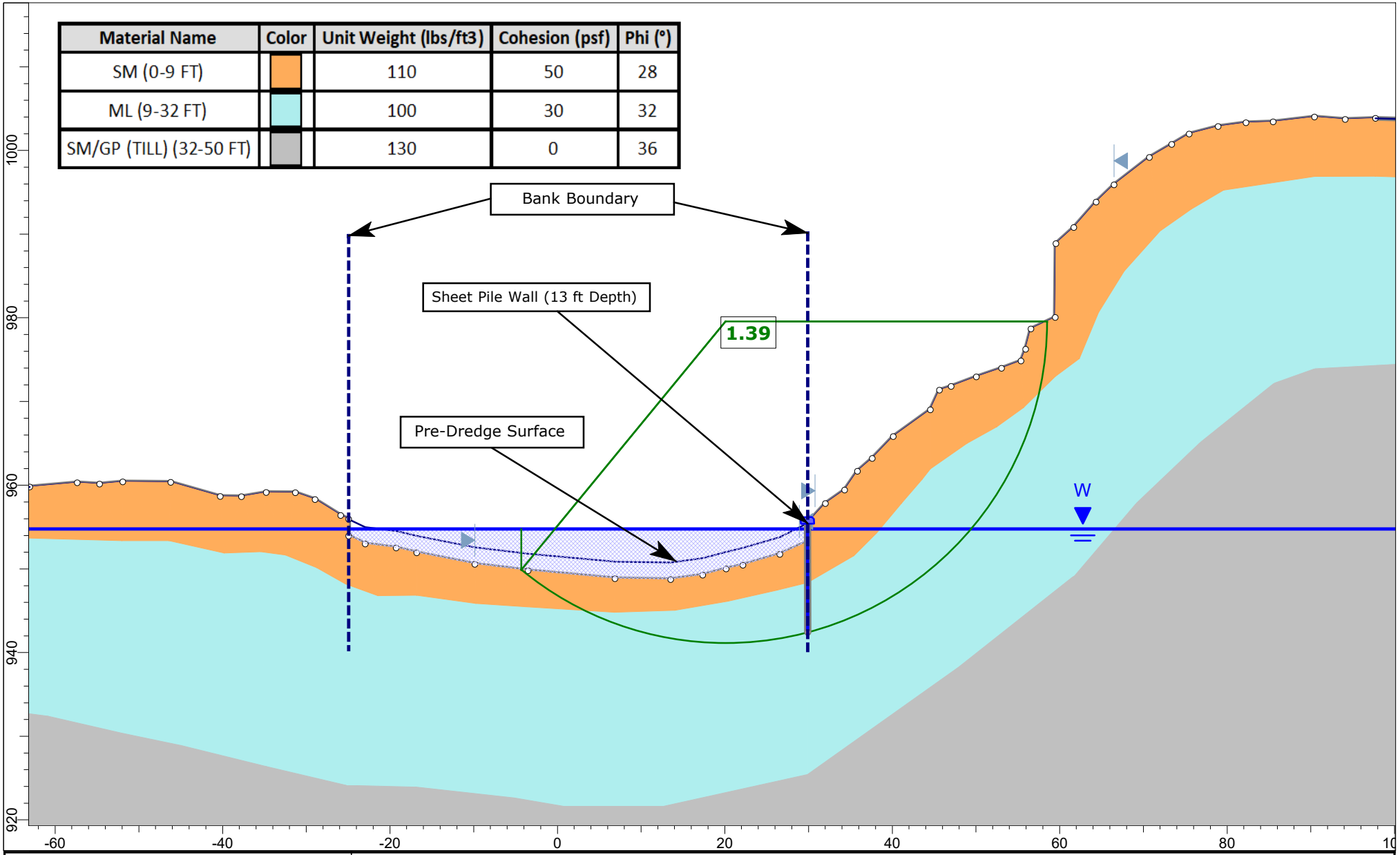
Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 37+50 - Sheet Pile - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/27/2026	Figure Number	Figure 5



ANCHOR QEA	*Project*	Housatonic Reach 5A Slope Stability Analysis	
	Group	STA. 45+25 - 5' Offset (2:1) - Right	*Scenario* Master Scenario
	Drawn By	Leah Dorris	*Company* Anchor QEA, Inc.
	Date	1/27/2026	*Figure Number* Figure 6

SLIDEINTERPRET 9.041

Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)
SM (0-9 FT)		110	50	28
ML (9-32 FT)		100	30	32
SM/GP (TILL) (32-50 FT)		130	0	36

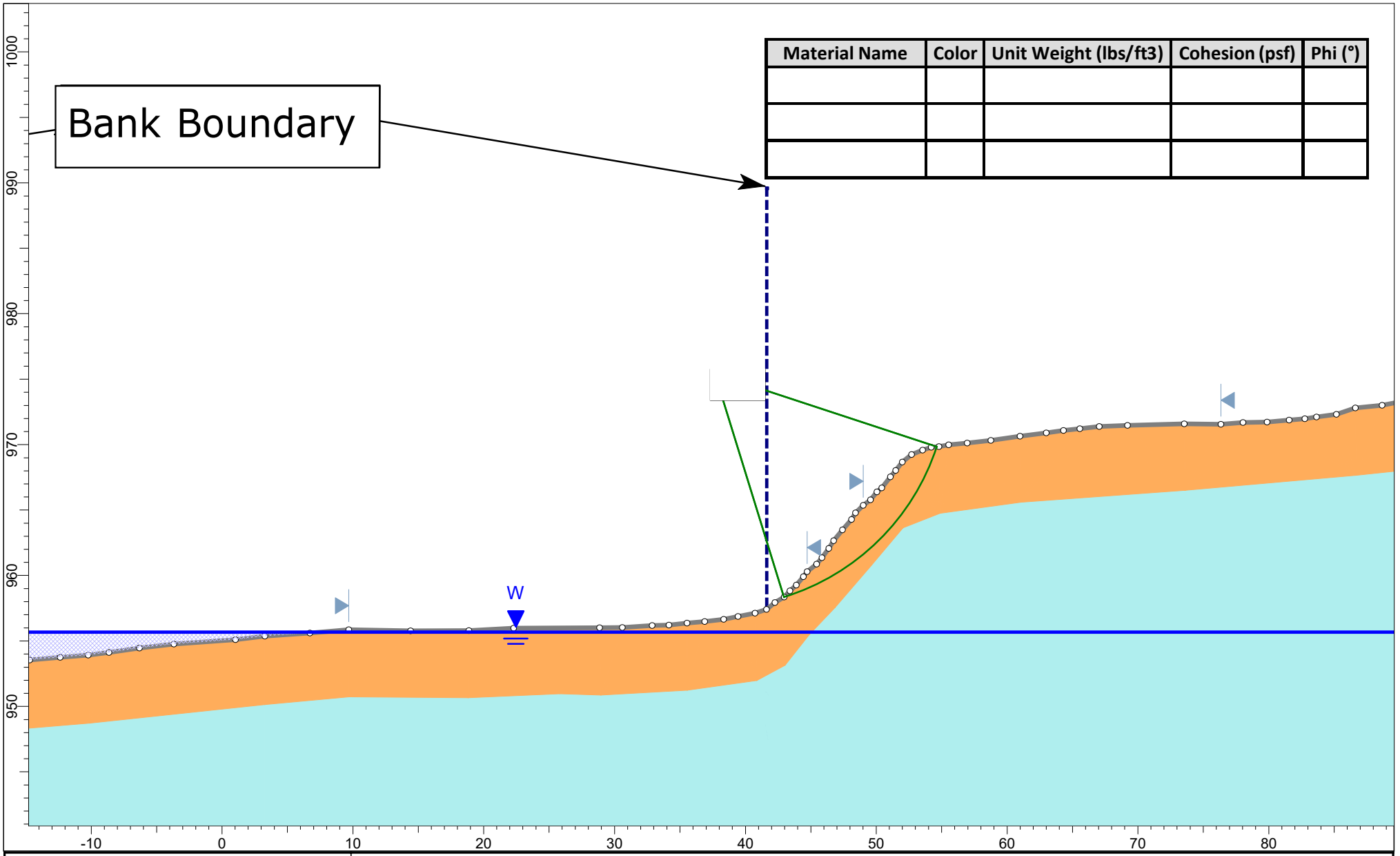


ANCHOR QEA

Project	Housatonic Reach 5A Slope Stability Analysis		
Group	STA. 45+25 - Sheet Pile - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	1/27/2026	Figure Number	Figure 7

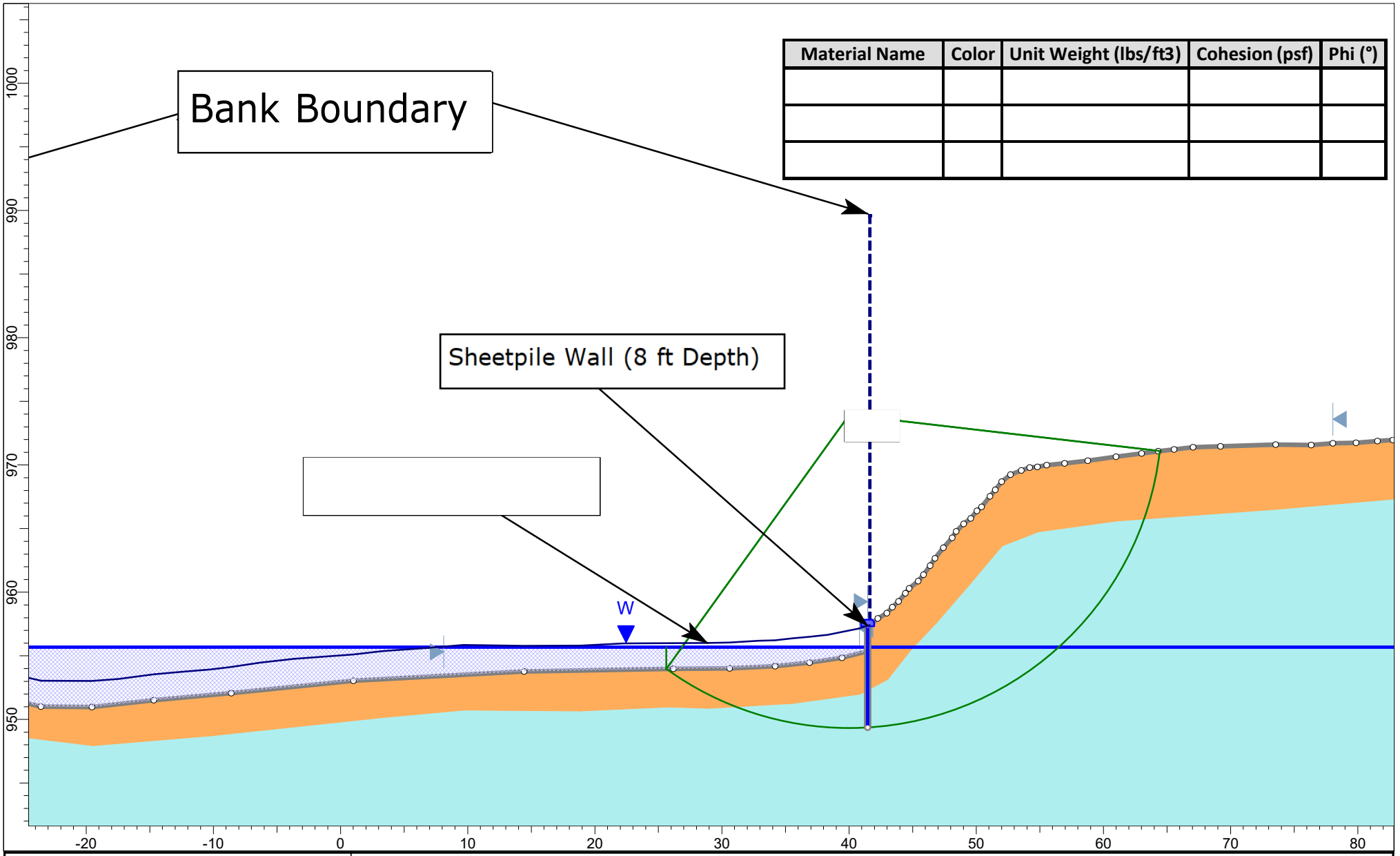
SLIDEINTERPRET 9.041

Attachment 4
Slope Stability Results | Risk Analysis Models



ANCHOR QEA	Project	Housatonic Reach 5A Slope Stability Risk Analysis	
	Group	STA. 15+25 - Existing Conditions - Right	Scenario: Master Scenario
	Drawn By	Leah Dorris	Company: Anchor QEA, Inc.
	Date	3/18/2026	Figure Number: Figure 1

SLIDEINTERPRET 9.041

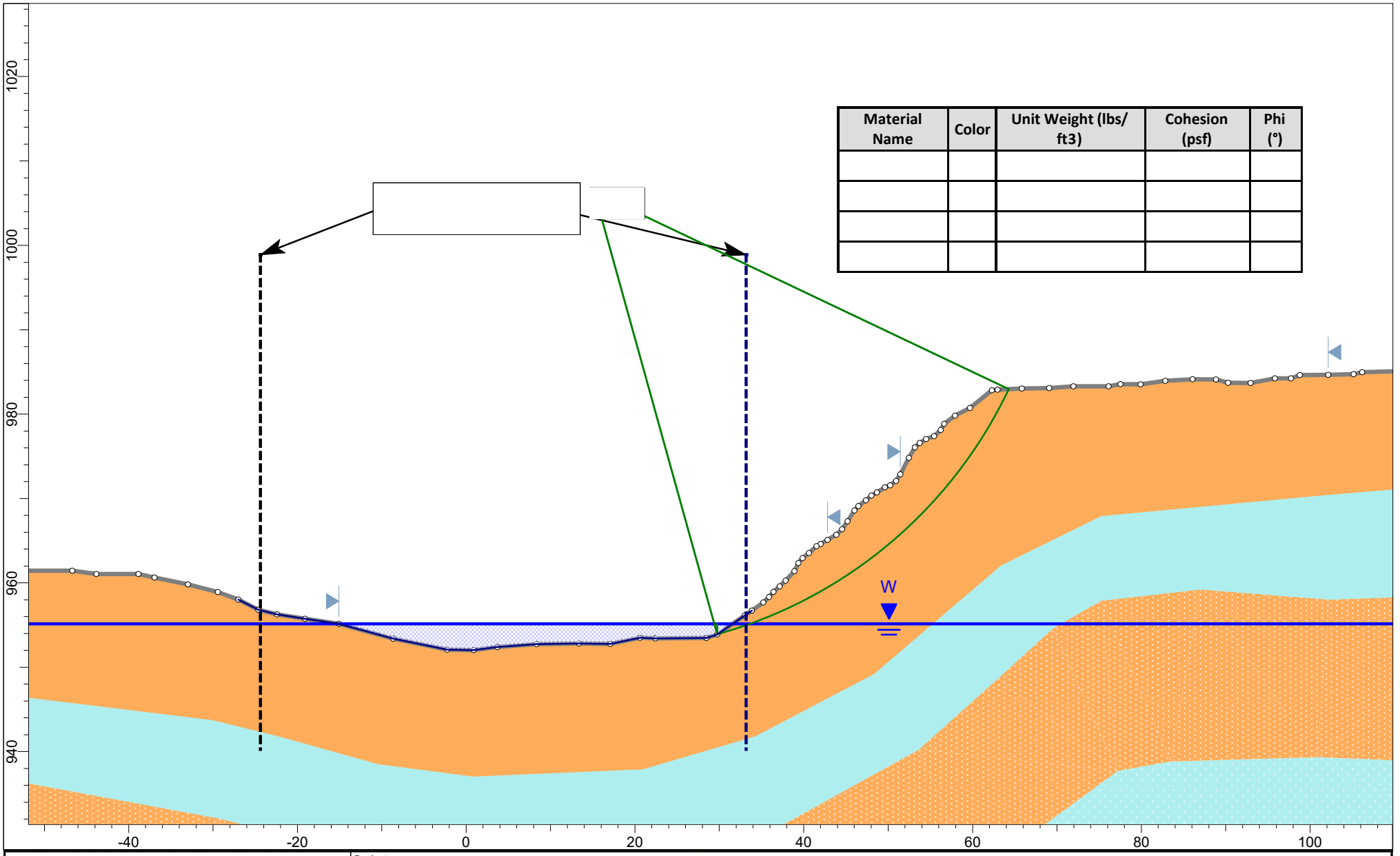


Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Risk Analysis		
Group	STA. 15+25 - Sheetpile - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	3/18/2026	Figure Number	Figure 2

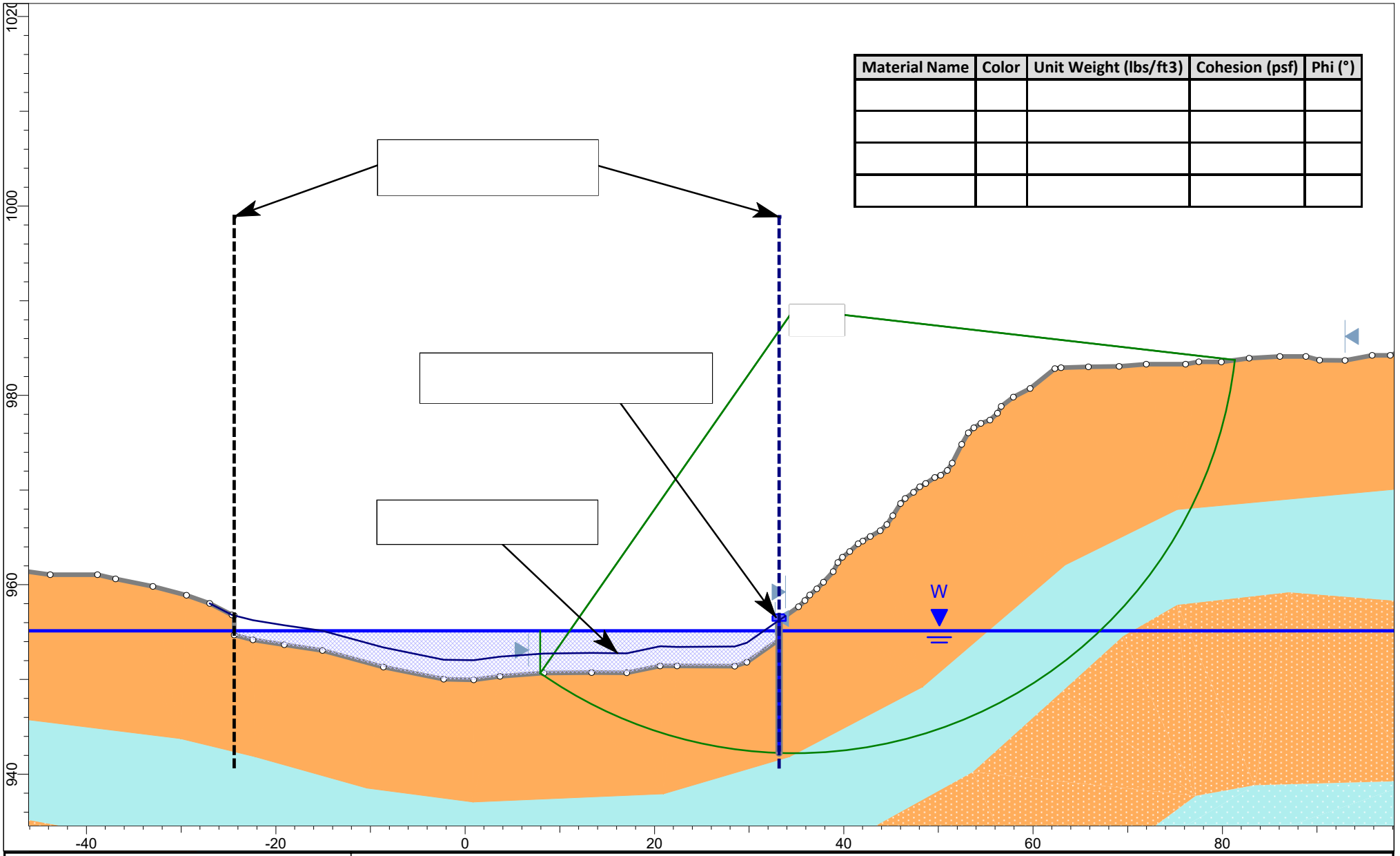


Material Name	Color	Unit Weight (lbs/ ft3)	Cohesion (psf)	Phi (°)

ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Risk Analysis		
Group	STA. 25+50 - Existing Conditions - Right	*Scenario*	Master Scenario
Drawn By	Leah Dorris	*Company*	Anchor QEA, Inc.
Date	3/18/2026	*Figure Number*	Figure 3

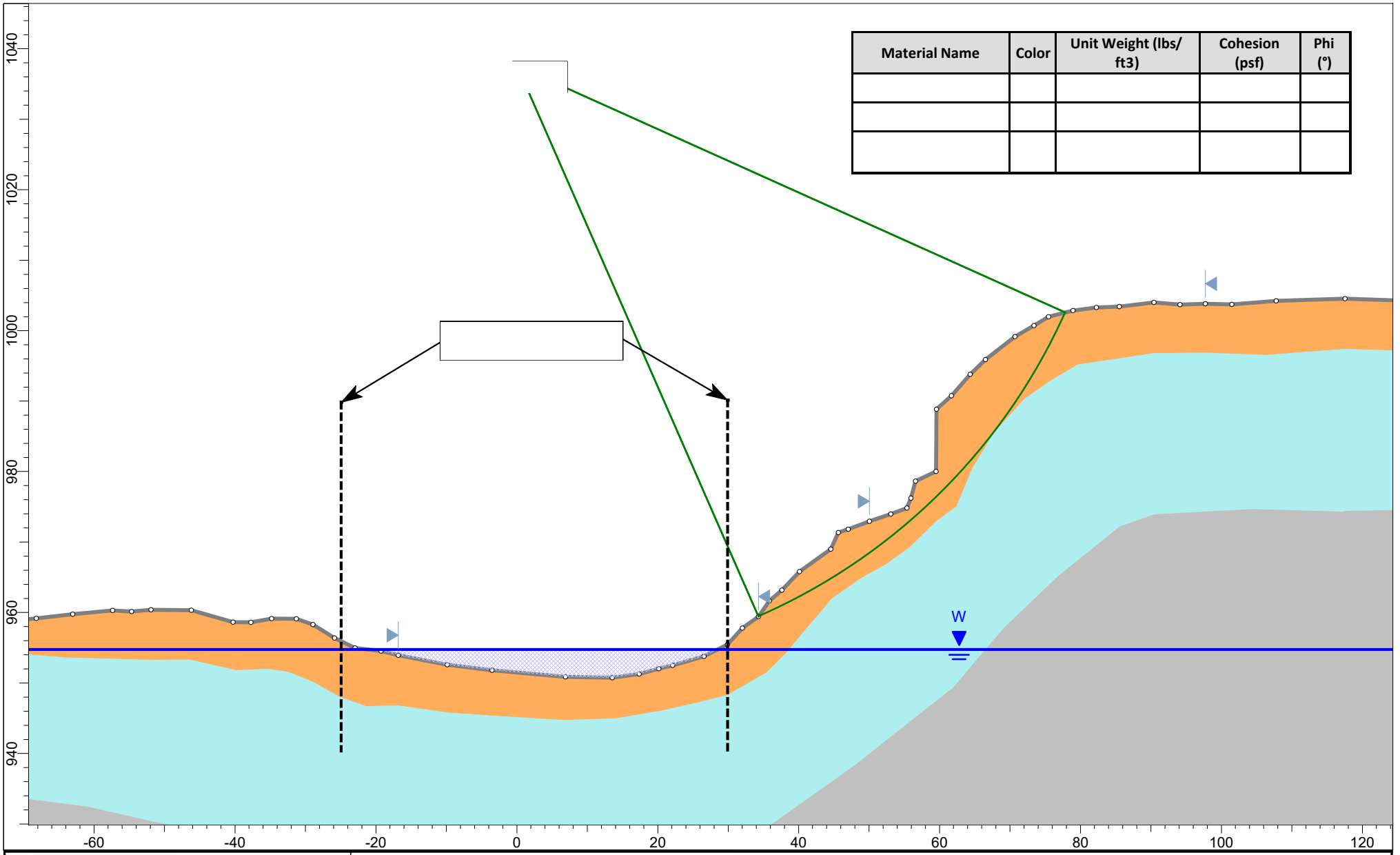


Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)

ANCHOR QEA

SLIDEINTERPRET 9.041

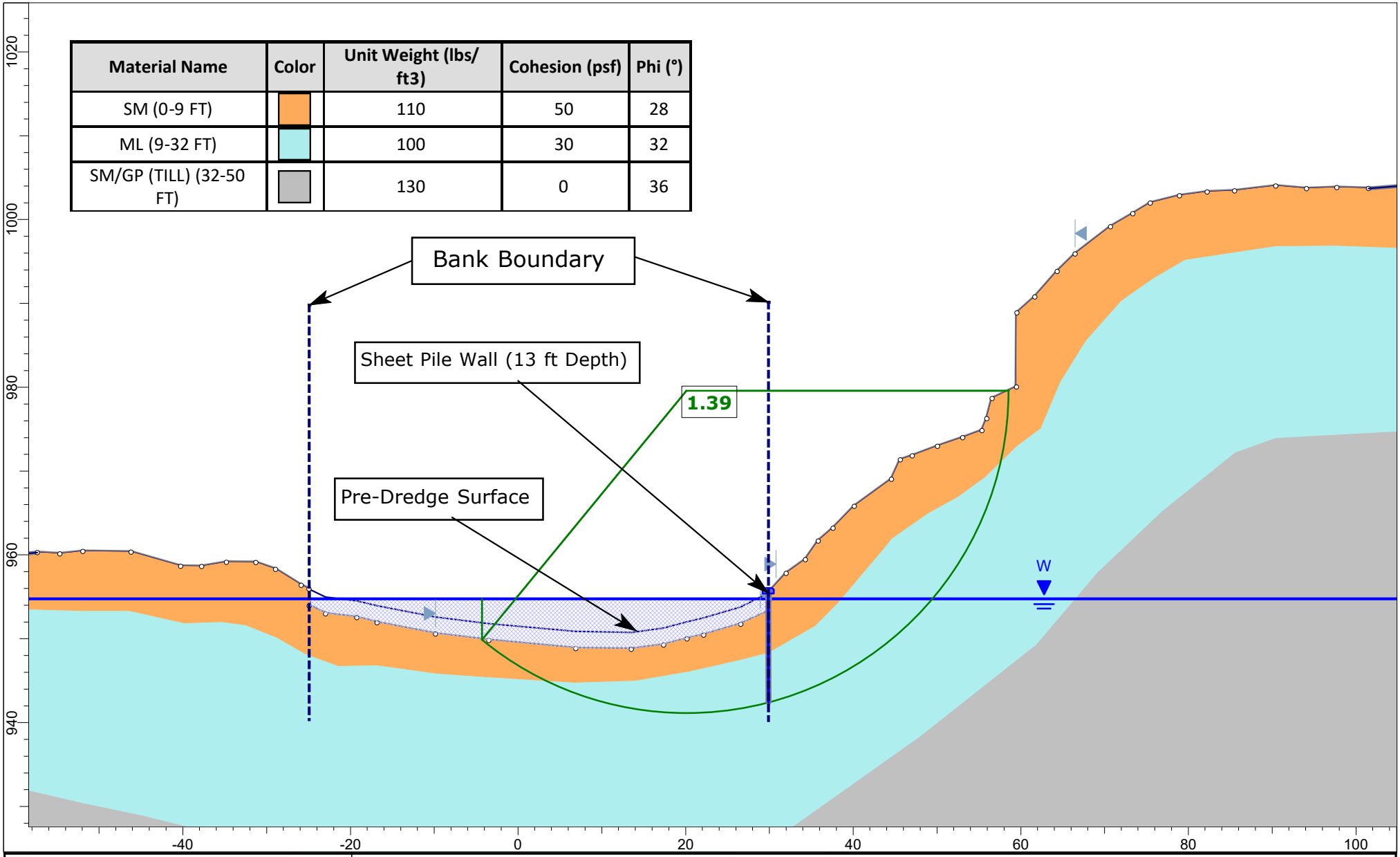
Project	Housatonic Reach 5A Slope Stability Risk Analysis		
Group	STA. 25+50 - Sheetpile - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	3/18/2026	Figure Number	Figure 4



ANCHOR QEA	Project	Housatonic Reach 5A Slope Stability Risk Analysis	
	Group	STA. 45+25 - Existing Conditions - Right	Scenario: Master Scenario
	Drawn By	Leah Dorris	Company: Anchor QEA, Inc.
	Date	3/23/2026	Figure Number: Figure 5

SLIDEINTERPRET 9.041

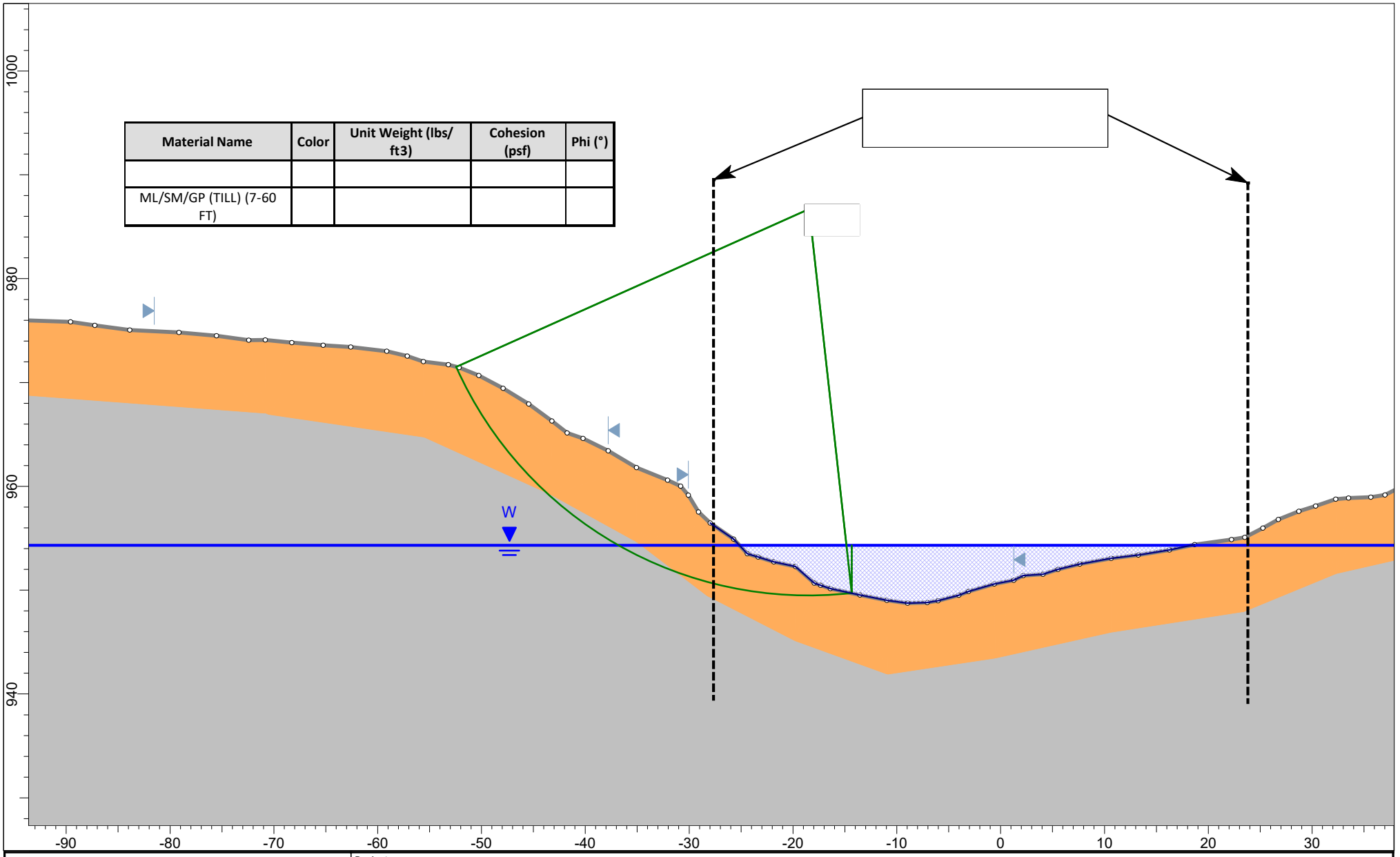
Material Name	Color	Unit Weight (lbs/ ft3)	Cohesion (psf)	Phi (°)
SM (0-9 FT)		110	50	28
ML (9-32 FT)		100	30	32
SM/GP (TILL) (32-50 FT)		130	0	36



ANCHOR QEA

Project	Housatonic Reach 5A Slope Stability Risk Analysis		
Group	STA. 45+25 - Sheetpile - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	3/23/2026	Figure Number	Figure 6

SLIDEINTERPRET 9.041

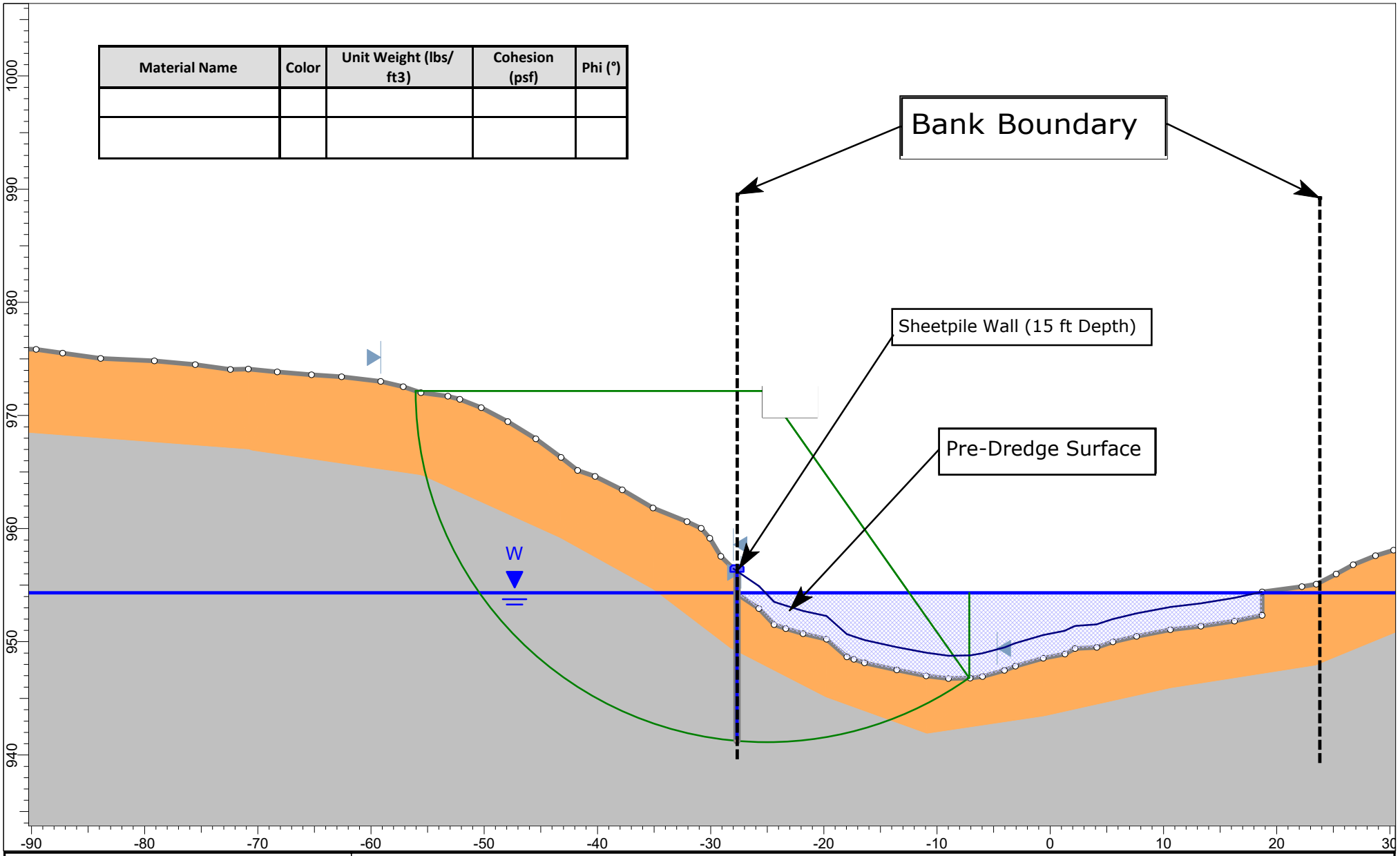


ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Risk Analysis		
Group	STA. 54+50 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	3/20/2026	Figure Number	Figure 7

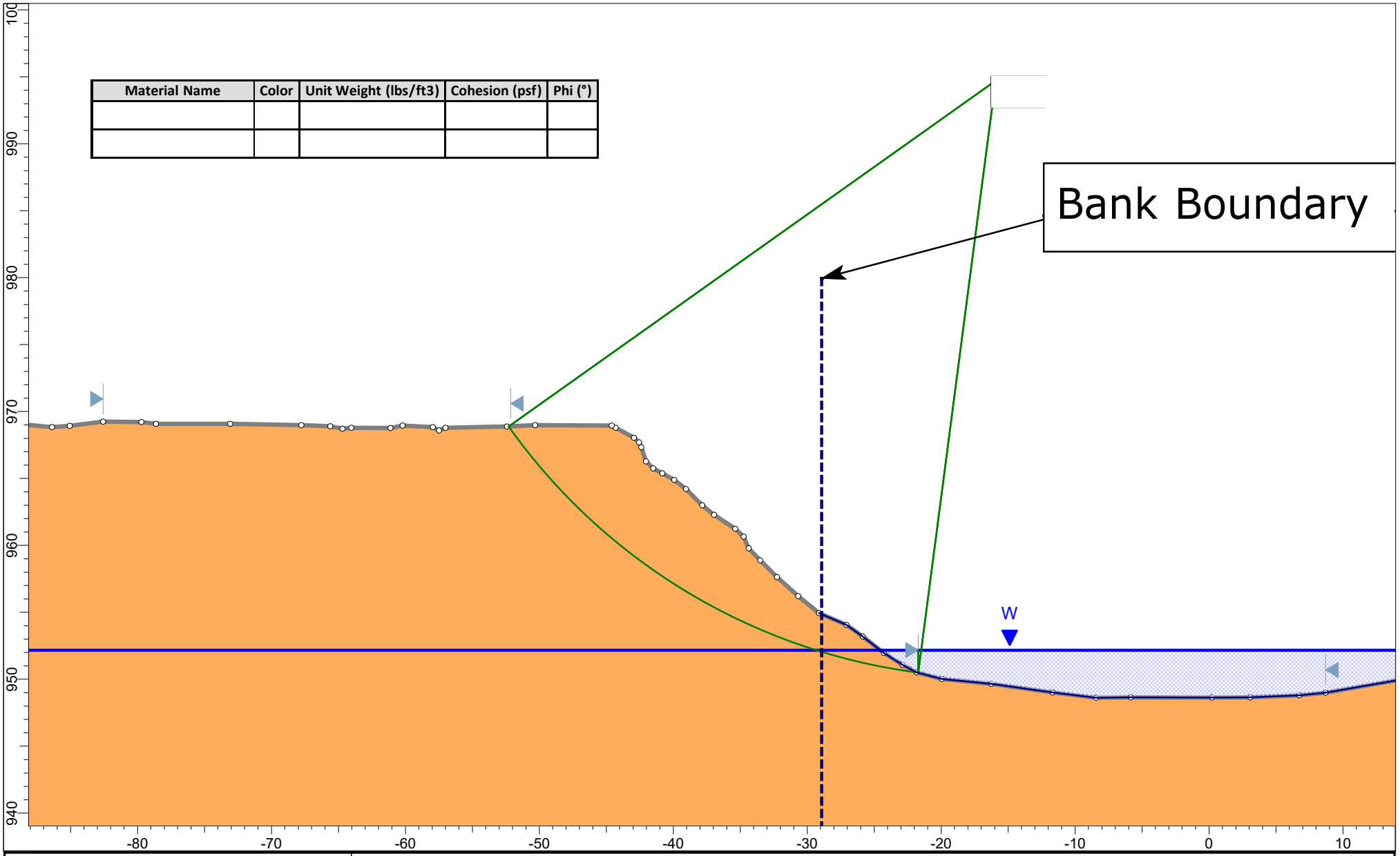
Material Name	Color	Unit Weight (lbs/ ft3)	Cohesion (psf)	Phi (°)



ANCHOR QEA

SLIDEINTERPRET 9.041

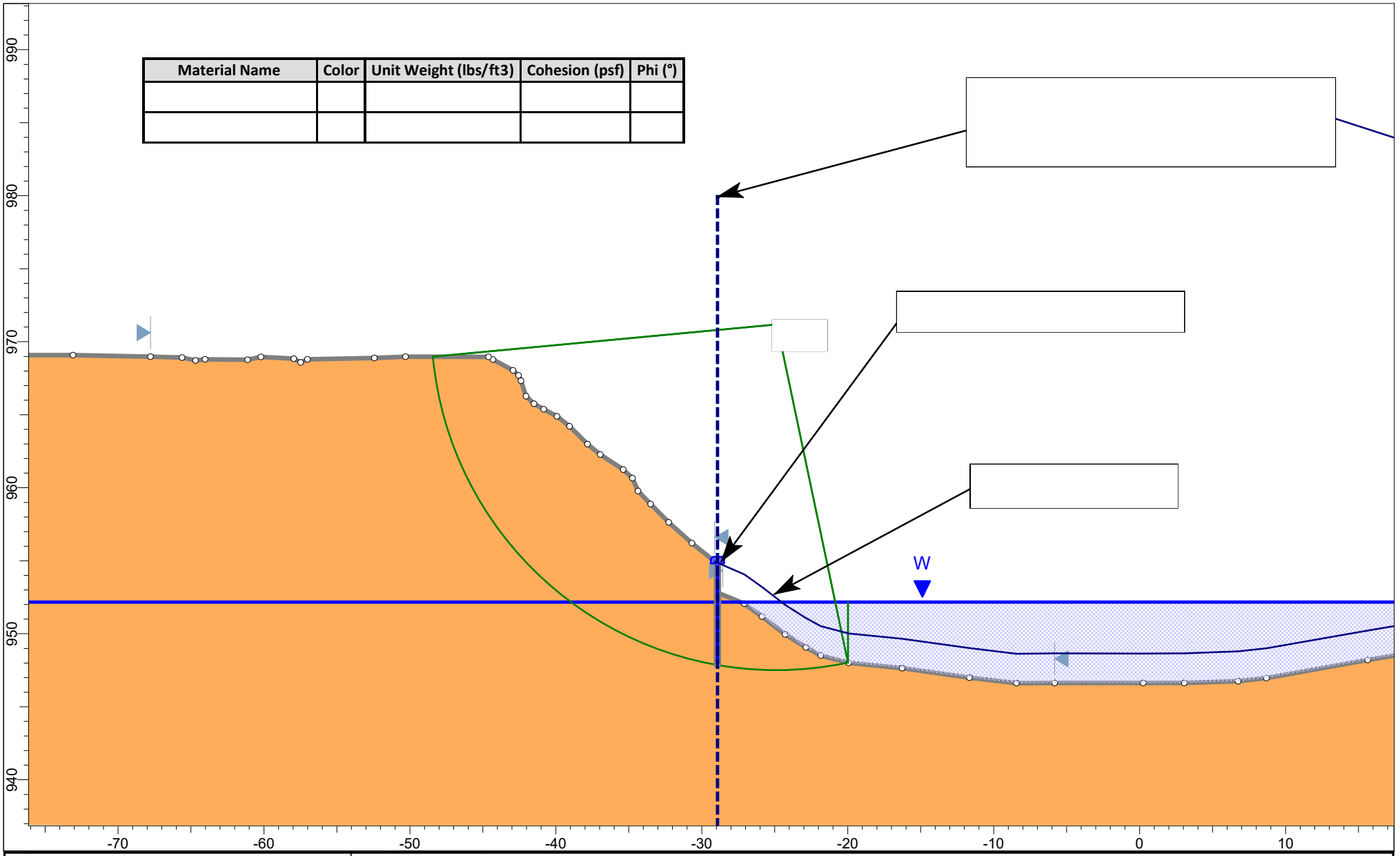
Project	Housatonic Reach 5A Slope Stability Risk Analysis		
Group	STA. 54+50 - Sheetpile - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	3/20/2026	Figure Number	Figure 8



ANCHOR QEA

SLIDEINTERPRET 9.041

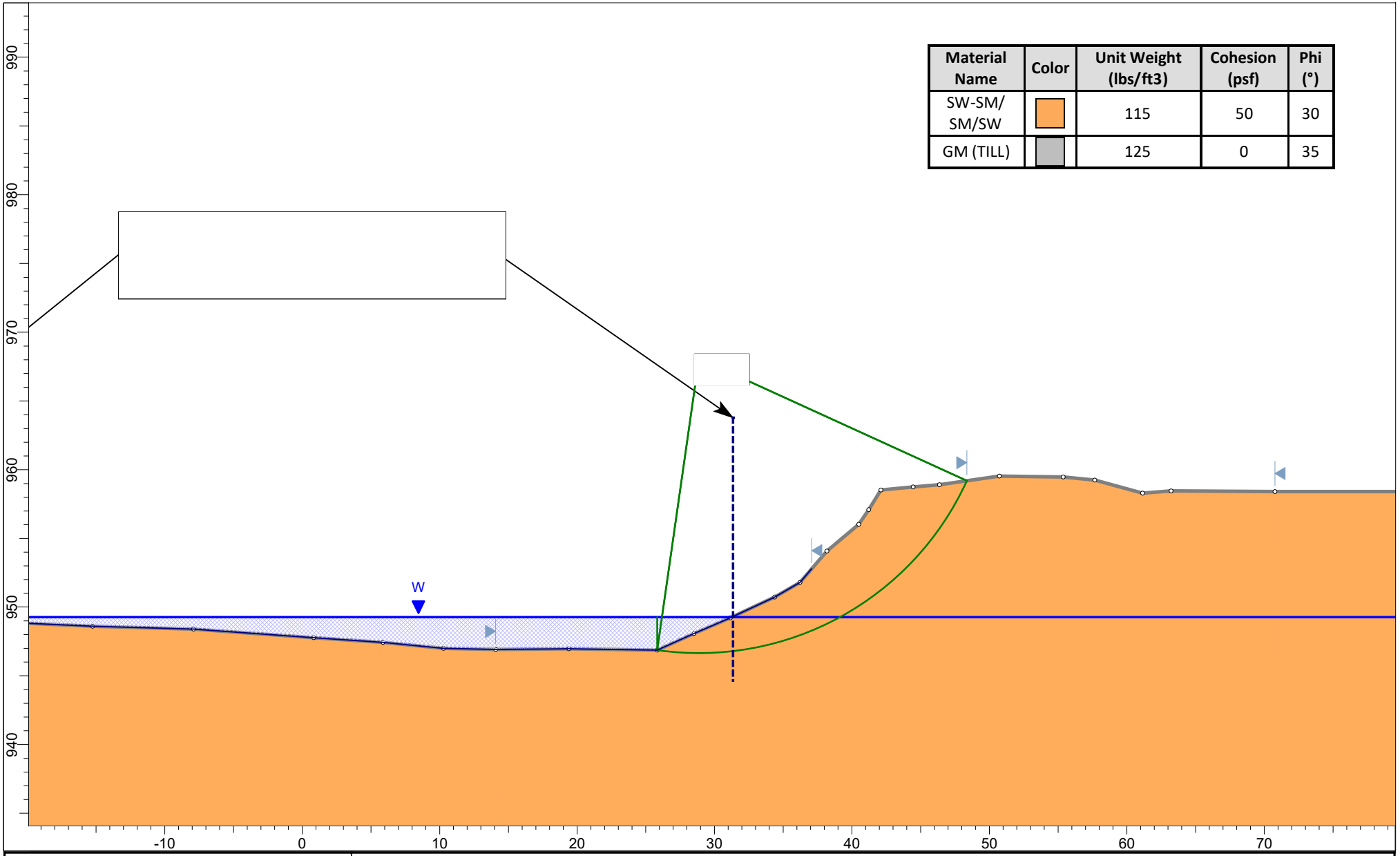
Project	Housatonic Reach 5A Slope Stability Risk Analysis		
Group	STA. 106+25 - Existing Conditions - Left	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	3/18/2026	Figure Number	Figure 9



ANCHOR QEA	Project	Housatonic Reach 5A Slope Stability Risk Analysis	
	Group	STA. 106+25 - Sheetpile - Left	Scenario: Master Scenario
	Drawn By	Leah Dorris	Company: Anchor QEA, Inc.
	Date	3/18/2026	Figure Number: Figure 10

SLIDEINTERPRET 9.041

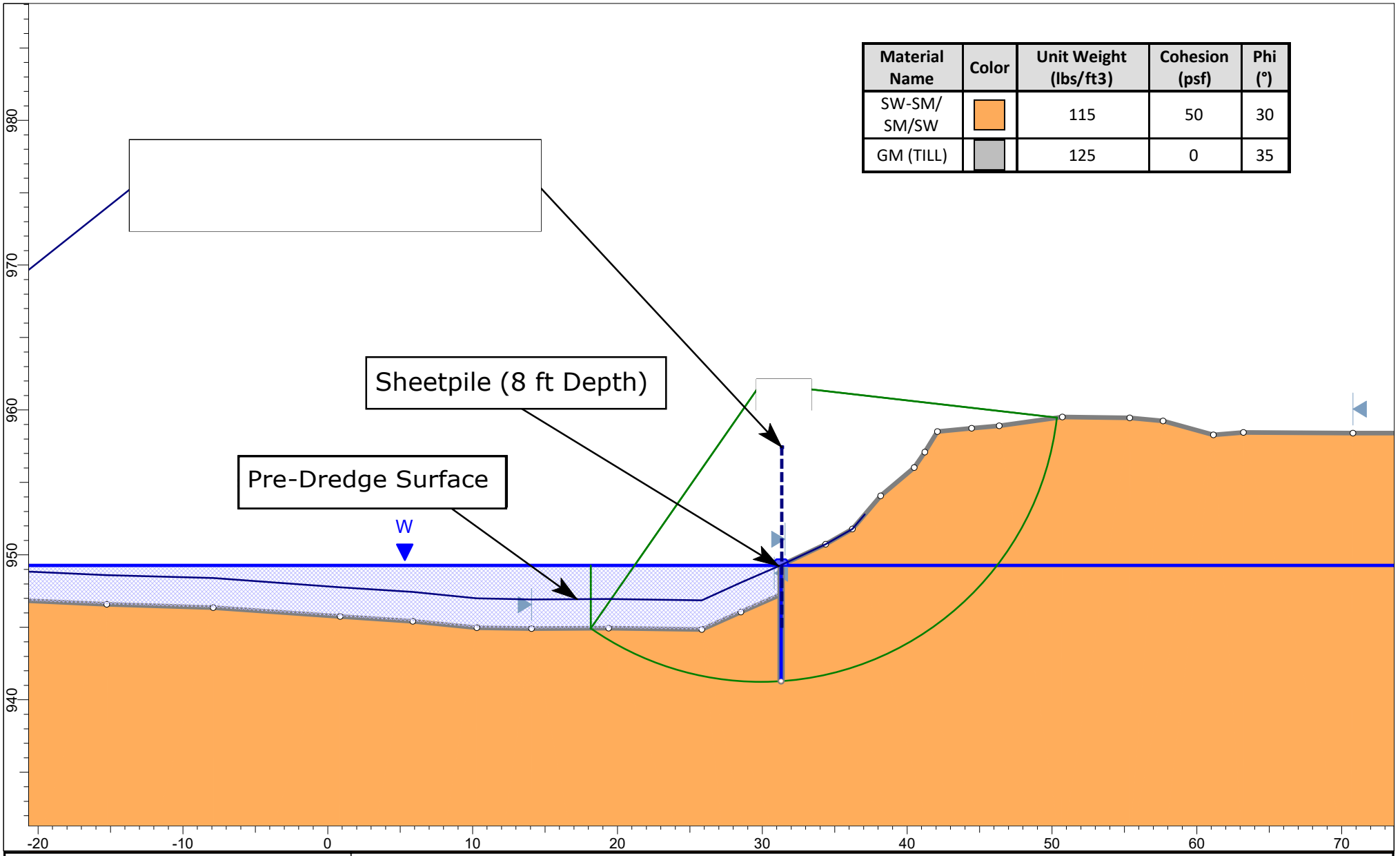
Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (°)
SW-SM/ SM/SW		115	50	30
GM (TILL)		125	0	35



ANCHOR QEA

SLIDEINTERPRET 9.041

Project	Housatonic Reach 5A Slope Stability Risk Analysis		
Group	STA. 196+00 - Existing Conditions - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	3/20/2026	Figure Number	Figure 11



ANCHOR QEA

Project	Housatonic Reach 5A Slope Stability Risk Analysis		
Group	STA. 196+00 - Sheetpile - Right	Scenario	Master Scenario
Drawn By	Leah Dorris	Company	Anchor QEA, Inc.
Date	3/20/2026	Figure Number	Figure 12

SLIDEINTERPRET 9.041

Attachment 5
CWALSHT Outputs

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 12-MARCH-2026 TIME: 11:38:50

****
* INPUT DATA *
****

I.--HEADING
'REACH 5A- MAX WATER HEIGHT

II.--CONTROL
CANTILEVER WALL DESIGN
FACTOR OF SAFETY FOR ACTIVE PRESSURES = 1.00
FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.00

III.--WALL DATA
ELEVATION AT TOP OF WALL = 10.50 FT.

IV.--SURFACE POINT DATA

IV.A.--RIGHTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	0.00
200.00	0.00

IV.B.--LEFTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	-2.00
200.00	-2.00

V.--SOIL LAYER DATA

V.A.--RIGHTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = 1.00
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = 1.50

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
110.00	110.00	30.00	50.00	14.00	50.00	-10.00	0.00	1.00	1.00
100.00	100.00	28.00	300.00	11.00	300.00	-35.00	0.00	1.00	1.00
120.00	120.00	32.00	0.00	16.00	0.00			1.00	1.00

V.B.--LEFTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = 1.00
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = 1.50

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
110.00	110.00	30.00	50.00	14.00	50.00	-10.00	0.00	1.00	1.00
100.00	100.00	28.00	300.00	11.00	300.00	-35.00	0.00	1.00	1.00
120.00	120.00	32.00	0.00	16.00	0.00			1.00	1.00

VI.--WATER DATA
UNIT WEIGHT = 62.40 (PCF)
RIGHTSIDE ELEVATION = 10.50 (FT)
LEFTSIDE ELEVATION = -2.00 (FT)
NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS
DATE: 12-MARCH-2026 TIME: 11:38:52

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'REACH 5A- MAX WATER HEIGHT

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY FIXED SURFACE WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY FIXED SURFACE WEDGE METHOD.

NET	<---LEFTSIDE--->	<------NET------> (SOIL + WATER)	<--RIGHTSIDE--->

ELEV. (FT)	WATER (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.5	62.4	0.0	0.0	62.4	62.4	0.0	0.0
8.5	124.8	0.0	0.0	124.8	124.8	0.0	0.0
7.5	187.2	0.0	0.0	187.2	187.2	0.0	0.0
6.5	249.6	0.0	0.0	249.6	249.6	0.0	0.0
5.5	312.0	0.0	0.0	312.0	312.0	0.0	0.0
4.5	374.4	0.0	0.0	374.4	374.4	0.0	0.0
3.5	436.8	0.0	0.0	436.8	436.8	0.0	0.0
2.5	499.2	0.0	0.0	499.2	499.2	0.0	0.0
1.5	561.6	0.0	0.0	561.6	561.6	0.0	0.0
0.5	624.0	0.0	0.0	624.0	624.0	0.0	0.0
0.0+	655.2	0.0	0.0	655.2	655.2	0.0	0.0
0.0-	655.2	0.0	0.0	655.2	874.1	0.0	218.9
-0.5	686.4	0.0	0.0	686.4	1269.4	0.0	583.0
-1.5	748.8	0.0	0.0	748.8	1583.1	0.0	834.3
-2.0+	780.0	0.0	0.0	780.0	1740.0	0.0	960.0
-2.0-	780.0	218.9	0.0	561.1	1740.0	0.0	960.0
-2.5	780.0	583.0	0.0	197.0	1865.6	0.0	1085.6
-3.0	780.0	708.6	0.0	71.4	1991.3	0.0	1211.3
-3.3	780.0	780.0	0.0	0.0	2062.7	0.0	1282.7
-3.5	780.0	834.3	0.0	-54.3	2117.0	0.0	1337.0
-4.5	780.0	1085.6	0.0	-305.6	2368.3	0.0	1588.3
-5.5+	780.0	1326.5	0.0	-546.5	2614.4	0.0	1839.7
-5.5-	780.0	1326.5	0.0	-546.5	2614.4	0.0	1829.1
-5.5	780.0	1337.0	0.0	-556.4	2619.7	0.6	1839.7
-6.5	780.0	1588.3	0.0	-793.9	2871.0	14.5	2091.0
-7.5+	780.0	1839.7	0.0	-1026.7	3111.8	27.7	2331.8
-7.5-	780.0	1829.1	0.0	-1026.7	3111.8	27.7	2331.8
-7.5	780.0	1839.7	0.6	-1031.3	3121.8	28.3	2342.3
-8.5	780.0	2091.0	14.5	-1263.5	3367.4	47.5	2601.8
-9.3+	780.0	2287.2	37.6	-1507.2	3406.1	0.0	2670.7
-9.3-	780.0	2287.2	37.6	-1507.2	3406.1	0.0	2656.5
-9.5	780.0	2324.9	13.9	-1544.9	3436.8	0.0	2670.7
-9.5+	780.0	2817.5	0.0	-1810.9	3483.2	0.0	2703.2
-9.5-	780.0	2364.3	0.0	-1810.9	3483.2	0.0	2703.2
-10.0	780.0	2817.5	0.0	-2037.5	3856.3	0.0	3076.3
-10.5	780.0	3622.2	0.0	-2842.2	4704.5	0.0	3924.5
-11.5	780.0	4320.6	0.0	-3540.6	5533.2	0.0	4753.2
-12.5	780.0	4394.4	0.0	-3614.4	5603.1	0.0	4823.1
-13.5	780.0	4519.7	0.0	-3739.7	5729.4	0.0	4949.4
-14.5	780.0	4652.4	0.0	-3872.4	5862.0	0.0	5082.0
-15.5	780.0	4790.0	0.0	-4010.0	5998.9	0.0	5218.9
-16.5	780.0	4931.3	0.0	-4151.3	6139.2	0.0	5359.2
-17.5	780.0	5075.1	0.0	-4295.1	6281.9	0.0	5501.9
-18.5	780.0	5220.8	0.0	-4440.8	6426.6	0.0	5646.6
-19.5	780.0	5368.0	0.0	-4588.0	6572.7	0.0	5792.7
-20.5	780.0	5516.4	0.0	-4736.4	6720.1	0.0	5940.1
-21.5	780.0	5665.6	0.0	-4885.6	6868.4	0.0	6088.4

-22.5	780.0	5815.5	0.0	-5035.5	7017.5	0.0	6237.5
-23.5	780.0	5966.1	0.0	-5186.1	7167.3	0.0	6387.3
-24.5	780.0	6117.1	0.0	-5337.1	7317.6	0.0	6537.6
-25.5	780.0	6268.5	0.0	-5488.5	7468.3	0.0	6688.3
-26.5	780.0	6420.2	0.0	-5640.2	7619.4	0.0	6839.4
-27.5	780.0	6572.1	0.0	-5792.1	7770.9	0.0	6990.9
-28.5	780.0	6724.3	0.0	-5944.3	7922.6	0.0	7142.6
-29.5	780.0	6876.8	0.0	-6096.8	8074.5	0.0	7294.5
-30.5	780.0	7029.3	0.0	-6249.3	8226.7	0.0	7446.7
-31.5	780.0	7182.0	0.0	-6402.0	8379.0	0.0	7599.0
-32.5	780.0	7334.9	0.0	-6554.9	8531.5	0.0	7751.5
-33.5	780.0	7487.8	0.0	-6707.8	8179.4	0.0	7399.4
-33.7+	780.0	7318.1	0.0	-6538.1	13213.1	0.0	15776.7
-33.7-	780.0	7318.1	0.0	-6538.1	13213.1	0.0	9089.4
-33.9+	780.0	13792.7	0.0	-10688.8	11920.3	79.4	11140.3
-33.9-	780.0	9303.7	0.0	-10688.8	11920.3	79.4	11140.3
-34.5	780.0	13792.7	186.0	-12753.7	16370.7	259.0	15776.7
-35.0	780.0	18641.0	491.1	-17324.1	20638.7	536.9	20349.8
-35.5	780.0	15132.2	529.0	-13791.7	16572.3	560.4	16321.3
-36.5	780.0	8069.2	383.1	-6882.3	8988.7	407.0	8591.8
-37.5	780.0	8866.1	406.7	-7654.8	9808.8	431.2	9435.5
-38.5	780.0	9215.6	421.5	-7989.5	10146.0	446.1	9787.5
-39.5	780.0	9567.6	436.3	-8326.6	10485.4	461.0	10141.7
-40.5	780.0	9921.8	451.2	-8665.8	10826.7	475.9	10497.9

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 12-MARCH-2026 TIME: 11:38:53

****
* SUMMARY OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'REACH 5A- MAX WATER HEIGHT

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY FIXED SURFACE WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY FIXED SURFACE WEDGE METHOD.

WALL BOTTOM ELEV. (FT) : -17.35
PENETRATION (FT) : 15.35

MAX. BEND. MOMENT (LB-FT) : 4.8896E+04
AT ELEVATION (FT) : -9.70

MAX. SCALED DEFL. (LB-IN^3): 1.7517E+10
AT ELEVATION (FT) : 10.50

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF
ELLASTICITY IN PSI TIMES PILE MOMENT
OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS
DATE: 12-MARCH-2026 TIME: 11:38:53

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'REACH 5A- MAX WATER HEIGHT

II.--RESULTS

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
10.50	0.0000E+00	0.	1.7517E+10	0.00
9.50	1.0400E+01	31.	1.6553E+10	62.40
8.50	8.3200E+01	125.	1.5589E+10	124.80
7.50	2.8080E+02	281.	1.4626E+10	187.20
6.50	6.6560E+02	499.	1.3663E+10	249.60
5.50	1.3000E+03	780.	1.2701E+10	312.00
4.50	2.2464E+03	1123.	1.1742E+10	374.40
3.50	3.5672E+03	1529.	1.0786E+10	436.80
2.50	5.3248E+03	1997.	9.8367E+09	499.20
1.50	7.5816E+03	2527.	8.8967E+09	561.60
0.50	1.0400E+04	3120.	7.9698E+09	624.00
0.00	1.2039E+04	3440.	7.5128E+09	655.20
-0.50	1.3842E+04	3775.	7.0610E+09	686.40

-1.50	1.7971E+04	4493.	6.1763E+09	748.80
-2.00+	2.0313E+04	4875.	5.7451E+09	780.00
-2.00-	2.0312E+04	4875.	5.7451E+09	561.14
-2.50	2.2805E+04	5065.	5.3226E+09	197.04
-3.00	2.5357E+04	5132.	4.9101E+09	71.37
-3.28	2.6816E+04	5142.	4.6806E+09	0.00
-3.50	2.7926E+04	5136.	4.5085E+09	-54.30
-4.50	3.2993E+04	4956.	3.7425E+09	-305.64
-5.46	3.7564E+04	4548.	3.0620E+09	-546.46
-5.50	3.7754E+04	4525.	3.0336E+09	-556.40
-6.50	4.1961E+04	3850.	2.3898E+09	-793.87
-7.46	4.5249E+04	2977.	1.8408E+09	-1026.66
-7.50	4.5373E+04	2934.	1.8184E+09	-1031.34
-8.50	4.7753E+04	1787.	1.3252E+09	-1263.51
-9.29	4.8748E+04	687.	9.9236E+08	-1507.21
-9.50	4.8857E+04	372.	9.1443E+08	-1544.86
-9.54	4.8871E+04	305.	8.9973E+08	-1810.89
-10.00	4.8812E+04	-580.	7.4058E+08	-2037.46
-10.50	4.8234E+04	-1800.	5.8780E+08	-2842.19
-11.50	4.4896E+04	-4991.	3.4412E+08	-3540.60
-12.08	4.1403E+04	-7057.	2.3870E+08	-3583.39
-12.50	3.8147E+04	-8397.	1.7752E+08	-2799.33
-13.50	2.8661E+04	-10263.	7.6441E+07	-932.04
-14.50	1.8243E+04	-10262.	2.4750E+07	935.24
-15.50	8.7601E+03	-8393.	4.7173E+06	2802.53
-16.50	2.0799E+03	-4656.	2.2547E+05	4669.82
-17.35	0.0000E+00	0.	0.0000E+00	6260.77

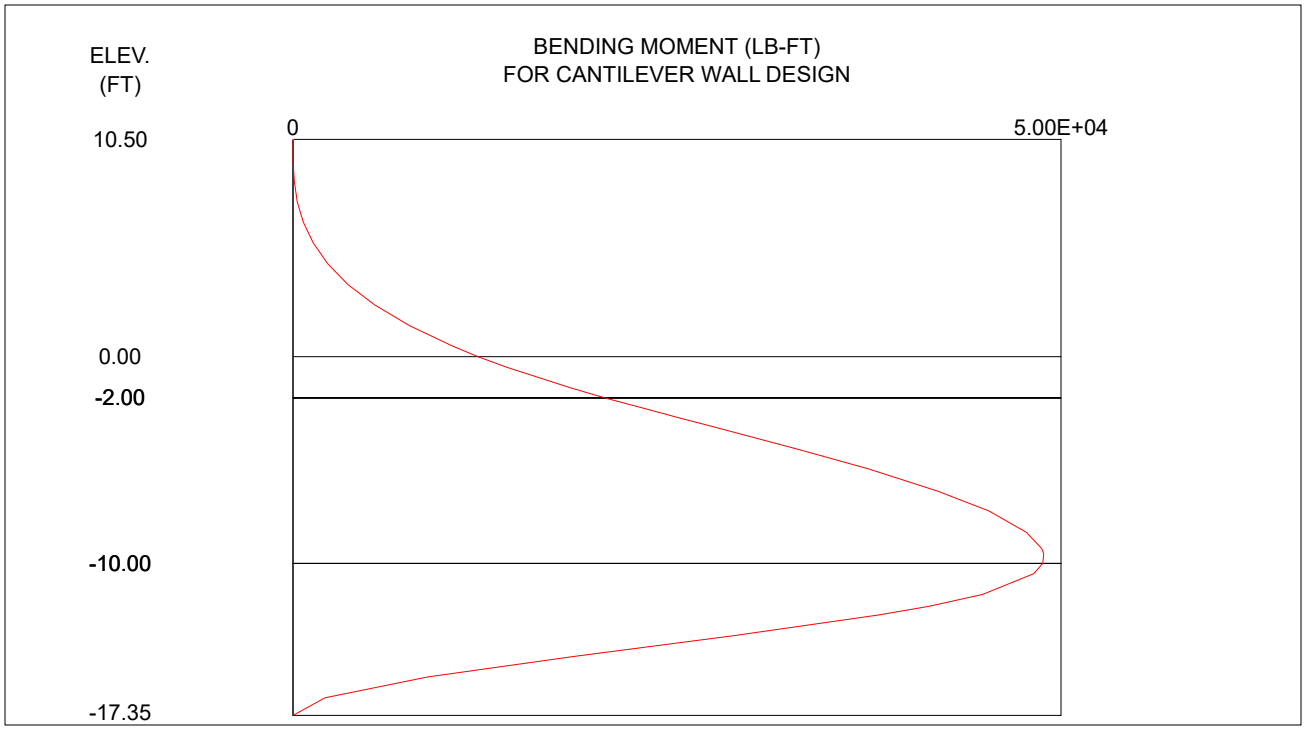
NOTE: DIVIDE SCALED DEFLECTION MODULUS OF ELLASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN^4 TO OBTAIN DEFLECTION IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
10.50	0.	0.	0.	0.	0.
9.50	62.	0.	0.	0.	0.
8.50	125.	0.	0.	0.	0.
7.50	187.	0.	0.	0.	0.
6.50	250.	0.	0.	0.	0.
5.50	312.	0.	0.	0.	0.
4.50	374.	0.	0.	0.	0.
3.50	437.	0.	0.	0.	0.
2.50	499.	0.	0.	0.	0.
1.50	562.	0.	0.	0.	0.
0.50	624.	0.	0.	0.	0.

0.00+	655.	0.	0.	0.	0.
0.00-	655.	0.	0.	0.	219.
-0.50	686.	0.	0.	0.	583.
-1.50	749.	0.	0.	0.	834.
-2.00+	780.	0.	0.	0.	960.
-2.00-	780.	219.	0.	0.	960.
-2.50	780.	583.	0.	0.	1086.
-3.00	780.	709.	0.	0.	1211.
-3.28	780.	780.	0.	0.	1283.
-3.50	780.	834.	0.	0.	1337.
-4.50	780.	1086.	0.	0.	1588.
-5.46+	780.	1326.	0.	0.	1840.
-5.46-	780.	1326.	0.	0.	1829.
-5.50	780.	1337.	0.	1.	1840.
-6.50	780.	1588.	0.	14.	2091.
-7.46+	780.	1840.	0.	28.	2332.
-7.46-	780.	1829.	0.	28.	2332.
-7.50	780.	1840.	1.	28.	2342.
-8.50	780.	2091.	14.	47.	2602.
-9.29+	780.	2287.	38.	0.	2671.
-9.29-	780.	2287.	38.	0.	2657.
-9.50	780.	2325.	14.	0.	2671.
-9.54+	780.	2817.	0.	0.	2703.
-9.54-	780.	2364.	0.	0.	2703.
-10.00	780.	2817.	0.	0.	3076.
-10.50	780.	3622.	0.	0.	3924.
-11.50	780.	4321.	0.	0.	4753.
-12.08	780.	4363.	0.	0.	4794.
-12.50	780.	4394.	0.	0.	4823.
-13.50	780.	4520.	0.	0.	4949.
-14.50	780.	4652.	0.	0.	5082.
-15.50	780.	4790.	0.	0.	5219.
-16.50	780.	4931.	0.	0.	5359.
-17.35	780.	5075.	0.	0.	5502.
-18.50	780.	5221.	0.	0.	5647.

'REACH 5A- MAX WATER HEIGHT



PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 12-MARCH-2026 TIME: 12:09:34

****
* INPUT DATA *
****

I.--HEADING
'Reach 5A- Min Water Height

II.--CONTROL
CANTILEVER WALL DESIGN
FACTOR OF SAFETY FOR ACTIVE PRESSURES = 1.00
FACTOR OF SAFETY FOR PASSIVE PRESSURES = 1.00

III.--WALL DATA
ELEVATION AT TOP OF WALL = 5.00 FT.

IV.--SURFACE POINT DATA

IV.A.--RIGHTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	0.00
200.00	0.00

IV.B.--LEFTSIDE

DIST. FROM WALL (FT)	ELEVATION (FT)
0.00	-2.00
200.00	-2.00

V.--SOIL LAYER DATA

V.A.--RIGHTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = 1.00
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = 1.50

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
110.00	110.00	30.00	50.00	14.00	50.00	-10.00	0.00	1.00	1.00
100.00	100.00	28.00	300.00	11.00	300.00	-35.00	0.00	1.00	1.00
120.00	120.00	32.00	0.00	16.00	0.00			1.00	1.00

V.B.--LEFTSIDE
LEVEL 2 FACTOR OF SAFETY FOR ACTIVE PRESSURE = 1.00
LEVEL 2 FACTOR OF SAFETY FOR PASSIVE PRESSURE = 1.50

SAT. WGHT. (PCF)	MOIST WGHT. (PCF)	ANGLE OF INTERNAL FRICTION (DEG)	COH-ESION (PSF)	ANGLE OF WALL FRICTION (DEG)	ADH-ESION (PSF)	<--BOTTOM--> ELEV. (FT)	SLOPE (FT/FT)	<-SAFETY-> <-FACTOR-> ACT.	PASS.
110.00	110.00	30.00	50.00	14.00	50.00	-10.00	0.00	1.00	1.00
100.00	100.00	28.00	300.00	11.00	300.00	-35.00	0.00	1.00	1.00
120.00	120.00	32.00	0.00	16.00	0.00			1.00	1.00

VI.--WATER DATA
UNIT WEIGHT = 62.40 (PCF)
RIGHTSIDE ELEVATION = 5.00 (FT)
LEFTSIDE ELEVATION = -2.00 (FT)
NO SEEPAGE

VII.--VERTICAL SURCHARGE LOADS
NONE

VIII.--HORIZONTAL LOADS
NONE

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS
DATE: 12-MARCH-2026 TIME: 12:09:37

****
* SOIL PRESSURES FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Reach 5A- Min Water Height

II.--SOIL PRESSURES

RIGHTSIDE SOIL PRESSURES DETERMINED BY FIXED SURFACE WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY FIXED SURFACE WEDGE METHOD.

NET	<---LEFTSIDE--->	<------NET------> (SOIL + WATER)	<--RIGHTSIDE--->

ELEV. (FT)	WATER (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.0	62.4	0.0	0.0	62.4	62.4	0.0	0.0
3.0	124.8	0.0	0.0	124.8	124.8	0.0	0.0
2.0	187.2	0.0	0.0	187.2	187.2	0.0	0.0
1.0	249.6	0.0	0.0	249.6	249.6	0.0	0.0
0.0+	312.0	0.0	0.0	312.0	312.0	0.0	0.0
0.0-	312.0	0.0	0.0	312.0	530.9	0.0	218.9
-1.0	374.4	0.0	0.0	374.4	1083.0	0.0	708.6
-2.0+	436.8	0.0	0.0	436.8	1396.8	0.0	960.0
-2.0-	436.8	218.9	0.0	217.9	1396.8	0.0	960.0
-2.4	436.8	436.8	0.0	0.0	1508.6	0.0	1071.8
-3.0	436.8	708.6	0.0	-271.8	1648.1	0.0	1211.3
-4.0	436.8	960.0	0.0	-523.2	1899.5	0.0	1462.7
-5.0	436.8	1211.3	0.0	-774.5	2150.8	0.0	1714.0
-5.5+	436.8	1326.5	0.0	-889.7	2334.0	0.0	1965.3
-5.5-	436.8	1326.5	0.0	-889.7	2334.0	0.0	1829.1
-6.0	436.8	1462.7	0.0	-1018.3	2402.1	7.5	1965.3
-7.0	436.8	1714.0	0.0	-1255.8	2653.5	21.4	2216.7
-7.5+	436.8	1965.3	0.0	-1429.8	2765.5	30.6	2328.7
-7.5-	436.8	1829.1	0.0	-1429.8	2765.5	30.6	2328.7
-8.0	436.8	1965.3	7.5	-1487.0	2890.5	41.6	2461.2
-9.0	436.8	2183.8	36.8	-1736.3	3129.1	10.6	2729.1
-9.1+	436.8	2211.0	32.2	-1774.2	3498.7	0.0	3409.5
-9.1-	436.8	2211.0	32.2	-1774.2	3498.7	0.0	2778.6
-9.2+	436.8	3019.0	0.0	-2247.3	3323.3	0.0	2886.5
-9.2-	436.8	2349.1	0.0	-2247.3	3323.3	0.0	2886.5
-10.0	436.8	3019.0	0.0	-2582.2	3846.3	0.0	3409.5
-11.0	436.8	3982.6	0.0	-3545.8	4801.8	0.0	4365.0
-12.0	436.8	4374.4	0.0	-3937.6	5242.4	0.0	4805.6
-13.0	436.8	4455.9	0.0	-4019.1	5322.2	0.0	4885.4
-14.0	436.8	4585.3	0.0	-4148.5	5451.9	0.0	5015.1
-15.0	436.8	4720.7	0.0	-4283.9	5586.8	0.0	5150.0
-16.0	436.8	4860.3	0.0	-4423.5	5725.5	0.0	5288.7
-17.0	436.8	5002.9	0.0	-4566.1	5867.1	0.0	5430.3
-18.0	436.8	5147.7	0.0	-4710.9	6010.8	0.0	5574.0
-19.0	436.8	5294.3	0.0	-4857.5	6156.3	0.0	5719.5
-20.0	436.8	5442.1	0.0	-5005.3	6303.1	0.0	5866.3
-21.0	436.8	5590.9	0.0	-5154.1	6450.9	0.0	6014.1
-22.0	436.8	5740.5	0.0	-5303.7	6599.7	0.0	6162.9
-23.0	436.8	5890.7	0.0	-5453.9	6749.1	0.0	6312.3
-24.0	436.8	6041.5	0.0	-5604.7	6899.2	0.0	6462.4
-25.0	436.8	6192.7	0.0	-5755.9	7049.7	0.0	6612.9
-26.0	436.8	6344.3	0.0	-5907.5	7200.6	0.0	6763.8
-27.0	436.8	6496.1	0.0	-6059.3	7351.9	0.0	6915.1
-28.0	436.8	6648.2	0.0	-6211.4	7503.5	0.0	7066.7
-29.0	436.8	6800.5	0.0	-6363.7	7655.3	0.0	7218.5
-30.0	436.8	6953.0	0.0	-6516.2	7807.4	0.0	7370.6
-31.0	436.8	7105.7	0.0	-6668.9	7959.6	0.0	7522.8

-32.0	436.8	7258.4	0.0	-6821.6	8112.0	0.0	7675.2
-33.0	436.8	7411.3	0.0	-6974.5	7945.2	0.0	7508.4

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHORED OR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS
DATE: 12-MARCH-2026 TIME: 12:09:38

****
* SUMMARY OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Reach 5A- Min Water Height

II.--SUMMARY

RIGHTSIDE SOIL PRESSURES DETERMINED BY FIXED SURFACE WEDGE METHOD.

LEFTSIDE SOIL PRESSURES DETERMINED BY FIXED SURFACE WEDGE METHOD.

WALL BOTTOM ELEV. (FT) : -9.88
PENETRATION (FT) : 7.88

MAX. BEND. MOMENT (LB-FT) : 7.3747E+03
AT ELEVATION (FT) : -5.54

MAX. SCALED DEFL. (LB-IN^3): 7.6802E+08
AT ELEVATION (FT) : 5.00

NOTE: DIVIDE SCALED DEFLECTION MODULUS OF
ELLASTICITY IN PSI TIMES PILE MOMENT
OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
IN INCHES.

PROGRAM CWALSHT-DESIGN/ANALYSIS OF ANCHOREDOR CANTILEVER SHEET PILE WALLS
BY CLASSICAL METHODS

DATE: 12-MARCH-2026 TIME: 12:09:38

****
* COMPLETE OF RESULTS FOR *
* CANTILEVER WALL DESIGN *
****

I.--HEADING
'Reach 5A- Min Water Height

II.--RESULTS

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN^3)	NET PRESSURE (PSF)
5.00	0.0000E+00	0.	7.6802E+08	0.00
4.00	1.0400E+01	31.	6.8898E+08	62.40
3.00	8.3200E+01	125.	6.0997E+08	124.80
2.00	2.8080E+02	281.	5.3111E+08	187.20
1.00	6.6560E+02	499.	4.5277E+08	249.60
0.00	1.3000E+03	780.	3.7562E+08	312.00
-1.00	2.2464E+03	1123.	3.0076E+08	374.40
-2.00+	3.5672E+03	1529.	2.2983E+08	436.80
-2.00-	3.5672E+03	1529.	2.2983E+08	217.94
-2.44	4.2619E+03	1577.	2.0011E+08	0.00
-3.00	5.1233E+03	1502.	1.6511E+08	-271.83
-4.00	6.4474E+03	1104.	1.0920E+08	-523.17
-5.00	7.2483E+03	456.	6.4361E+07	-774.51
-5.46	7.3717E+03	74.	4.7928E+07	-889.66
-6.00	7.2750E+03	-443.	3.1934E+07	-1018.34
-7.00	6.2836E+03	-1580.	1.1932E+07	-1255.81
-7.46	5.4220E+03	-2195.	6.5158E+06	-1429.80
-7.69	4.8657E+03	-2534.	4.5185E+06	-1454.62
-8.00	4.0320E+03	-2868.	2.6053E+06	-724.04
-9.00	1.1990E+03	-2401.	1.4731E+05	1659.35
-9.07	1.0288E+03	-2273.	1.0555E+05	1832.79
-9.23	6.9295E+02	-1953.	4.5203E+04	2210.71
-9.88	0.0000E+00	0.	0.0000E+00	3767.80

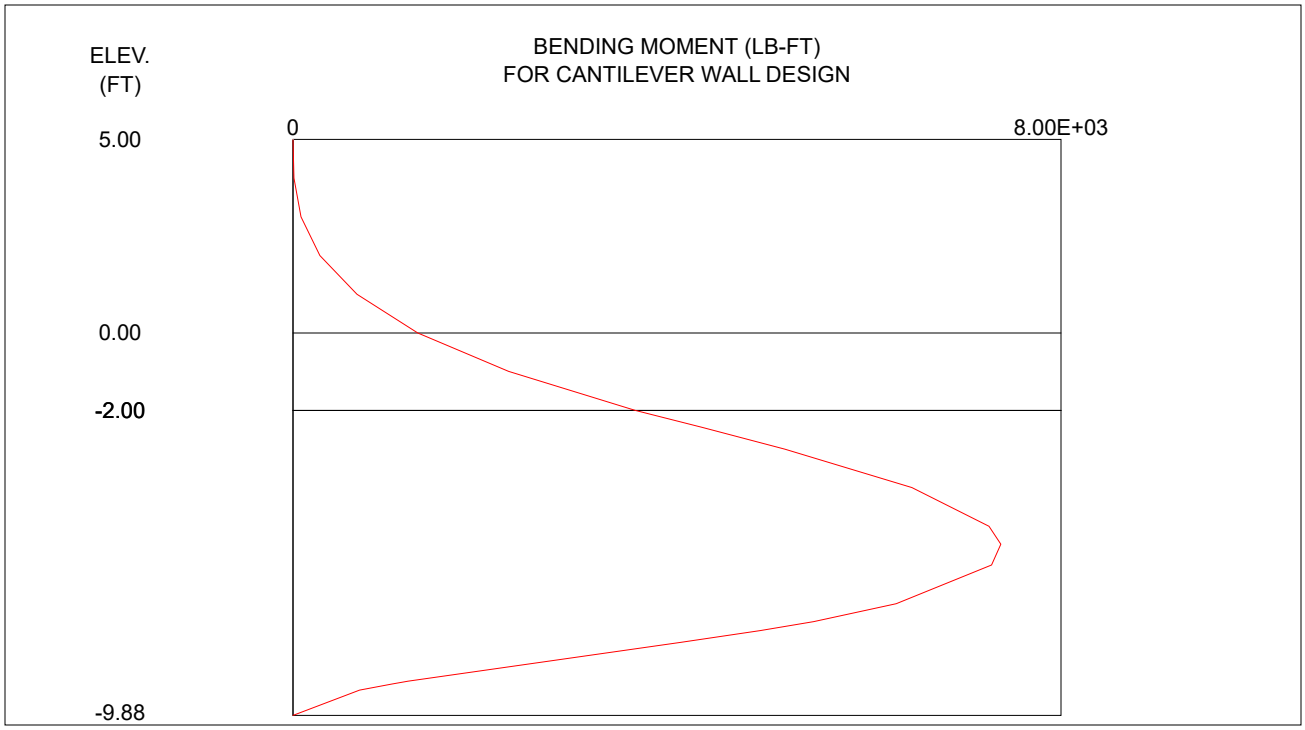
NOTE: DIVIDE SCALED DEFLECTION MODULUS OF
ELLASTICITY IN PSI TIMES PILE MOMENT
OF INERTIA IN IN^4 TO OBTAIN DEFLECTION
IN INCHES.

III.--WATER AND SOIL PRESSURES

		<----------SOIL PRESSURES---------->			
	WATER	<----LEFTSIDE----->		<---RIGHTSIDE---->	
ELEVATION (FT)	PRESSURE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)

5.00	0.	0.	0.	0.	0.
4.00	62.	0.	0.	0.	0.
3.00	125.	0.	0.	0.	0.
2.00	187.	0.	0.	0.	0.
1.00	250.	0.	0.	0.	0.
0.00+	312.	0.	0.	0.	0.
0.00-	312.	0.	0.	0.	219.
-1.00	374.	0.	0.	0.	709.
-2.00+	437.	0.	0.	0.	960.
-2.00-	437.	219.	0.	0.	960.
-2.44	437.	437.	0.	0.	1072.
-3.00	437.	709.	0.	0.	1211.
-4.00	437.	960.	0.	0.	1463.
-5.00	437.	1211.	0.	0.	1714.
-5.46+	437.	1326.	0.	0.	1965.
-5.46-	437.	1326.	0.	0.	1829.
-6.00	437.	1463.	0.	8.	1965.
-7.00	437.	1714.	0.	21.	2217.
-7.46+	437.	1965.	0.	31.	2329.
-7.46-	437.	1829.	0.	31.	2329.
-7.69	437.	1888.	3.	35.	2386.
-8.00	437.	1965.	8.	42.	2461.
-9.00	437.	2184.	37.	11.	2729.
-9.07+	437.	2211.	32.	0.	3409.
-9.07-	437.	2211.	32.	0.	2779.
-9.23+	437.	3019.	0.	0.	2886.
-9.23-	437.	2349.	0.	0.	2886.
-9.88	437.	3019.	0.	0.	3409.
-11.00	437.	3983.	0.	0.	4365.

'Reach 5A- Min Water Height



Appendix F
Supporting PCB Evaluations for Backwaters, Other Waterbodies, and Riverbanks

Appendix F-1
Backwaters

Table 1-1
Spatially Weighted Average PCB Summary: BW5A-1 (within Core Area 1 Habitat)

Depth (feet)	Location ID	Remedial Approach	Total PCB (mg/kg)	Area (square feet)	Removal Volume (cy)
0–1	SE-BW5A-1-C-D-8-9	Dredge and cap	75.70	2,340	87
	SE-BW5A-1-C-D-7-8		68.70	2,116	78
	SE-BW5A-1-D-E-9		66.30	1,276	47
	SE-BW5A-1-B-3-4		56.10	644	24
	SE-BW5A-1-B-4	Amendment Required	46.70	875	-
	SE-BW5A-1-C-7-8		43.10	1,543	-
	SE-BW5A-1-E-F-9-10		42.74	1,359	-
	SE-BW5A-1-C-D-2		42.60	1,376	-
	SE-BW5A-1-G-3		35.27	1,223	-
	SE-BW5A-1-B-C-8-9		30.20	2,350	-
	SE-BW5A-1-D-E-7-8		23.11	2,350	-
	SE-BW5A-1-A-B-4		22.99	1,185	-
	SE-BW5A-1-C-D-6-7		22.56	1,960	-
	SE-BW5A-1-B-C-2-3		22.18	1,670	-
	SE-BW5A-1-D-E-8-9		20.53	2,088	-
	SE-BW5A-1-F-G-5-6		19.00	2,365	-
	SE-BW5A-1-G-3-4		17.63	1,423	-
	SE-BW5A-1-C-D-2-3		17.46	1,843	-
	SE-BW5A-1-D-E-3-4		17.05	2,226	-
	SE-BW5A-1-D-E-2		15.37	1,427	-
	SE-BW5A-1-C-2		15.22	1,005	-
	SE-BW5A-1-D-5		14.33	1,415	-
	SE-BW5A-1-F-G-9-10		14.23	2,294	-
	SE-BW5A-1-F-G-4-5		13.49	1,666	-
	SE-BW5A-1-D-E-6-7		12.98	2,649	-
	SE-BW5A-1-F-8-9		12.35	1,413	-
	SE-BW5A-1-F-G-3-4		11.19	1,797	-
	SE-BW5A-1-E-F-8-9		11.06	1,917	-
	SE-BW5A-1-F-8		10.11	678	-
	SE-BW5A-1-E-F-7-8		10.02	1,895	-
	SE-BW5A-1-D-E-4-5		9.76	2,311	-
	SE-BW5A-1-G-4-5		9.31	1,773	-
	SE-BW5A-1-E-F-6-7		8.59	2,065	-
	SE-BW5A-1-D-3-4		8.17	1,437	-
	SE-BW5A-1-E-F-2-3		7.52	2,126	-
	SE-BW5A-1-F-G-11-12		6.86	1,369	-
	SE-BW5A-1-E-F-3-4		6.13	2,768	-
	SE-BW5A-1-D-4-5		5.63	1,242	-
	SE-BW5A-1-F-12		5.57	374	-
	SE-BW5A-1-F-G-2-3		4.91	1,830	-
	SE-BW5A-1-F-G-10-11		4.76	1,528	-
	SE-BW5A-1-C-7		4.64	1,017	-
	SE-BW5A-1-C-D-5-6		4.64	1,398	-
	SE-BW5A-1-G-11-12		4.42	712	-
	SE-BW5A-1-G-10-11		3.88	1,159	-
	SE-BW5A-1-D-E-2-3		3.65	2,113	-
	SE-BW5A-1-F-13		3.39	99	-
	SE-BW5A-1-E-F-2		2.90	1,459	-
	SE-BW5A-1-F-6		2.88	1,297	-
	SE-BW5A-1-F-2		2.49	1,183	-
	SE-BW5A-1-F-5-6		1.36	978	-
			Total	**80,605**	**236**

Notes:

1. Volumes represent in-place quantities and are based on the target removal depth for each location.
Remedial Approach: Removal of the top foot of sediment followed by engineered cap placement where PCB >50 mg/kg; amendment placement where PCB >1 mg/kg

Exceeds surface remedial criteria; dredge and cap

-: not applicable

cy: cubic yard

mg/kg: milligram per kilogram

PCB: polychlorinated biphenyl

Table 1-2
Spatially Weighted Average PCB Summary: BW5A-2

Depth (feet)	Location ID	Remedial Approach	Existing			Post-Cap		
			Total PCB (mg/kg)	Area (square feet)	Total PCB × Area	Total PCB[1] (mg/kg)	Total PCB × Area	Removal Volume (cy)
0–1	SE-BW5A-2-A-4	Dredge and cap (surface)	21.69	1,454	31,533	0.12	171	54
	SE-BW5A-2-A-B-3		20.46	1,239	25,352	0.12	146	46
	SE-BW5A-2-A-B-5		15.07	1,365	20,576	0.12	161	51
	SE-BW5A-2-D-1-2		14.33	1,028	14,727	0.12	121	38
	SE-BW5A-2-B-C-1-2		14.09	1,036	14,597	0.12	122	38
	SE-BW5A-2-B-C-5		8.97	1,761	15,797	0.12	207	65
	SE-BW5A-2-C-D-1		6.92	1,087	7,521	0.12	128	40
	SE-BW5A-2-D-5		6.69	1,193	7,981	0.12	141	44
	SE-BW5A-2-B-2		6.46	978	6,317	0.12	115	36
	SE-BW5A-2-C-D-5-6	Dredge and cap (subsurface)	3.767	1,647	6,203	0.12	194	61
				Total	12,787	150,604	-	1,506	474
				0–1 feet Average Total PCB (mg/kg)		**11.8**		**0.12**	
1–1.5	SE-BW5A-2-A-4	Below surface cap	13.02	1,454	18,929	0.12	171	-
	SE-BW5A-2-A-B-3		1.69	1,239	2,094	0.12	146	-
	SE-BW5A-2-A-B-5		55	1,365	75,094	0.12	161	-
	SE-BW5A-2-D-1-2		163.6	1,028	168,133	0.12	121	-
	SE-BW5A-2-B-C-1-2		12.94	1,036	13,405	0.12	122	-
	SE-BW5A-2-B-C-5		5.616	1,761	9,891	0.12	207	-
	SE-BW5A-2-C-D-1		39.91	1,087	43,377	0.12	128	-
	SE-BW5A-2-D-5		2.038	1,193	2,431	0.12	141	-
	SE-BW5A-2-B-2		9.53	978	9,319	0.12	115	-
	SE-BW5A-2-C-D-5-6		2.596	1,647	4,275	0.12	194	-
				Total	12,787	346,947	-	1,506	
				1–1.5 feet Average Total PCB (mg/kg)		**27.1**		**0.12**	
1.5–2	SE-BW5A-2-A-4	Below surface cap	24.6	1,454	35,764	0.12	171	-
	SE-BW5A-2-A-B-3		0.036	1,239	45	0.12	146	-
	SE-BW5A-2-A-B-5		8.58	1,365	11,715	0.12	161	-
	SE-BW5A-2-D-1-2		6.918	1,028	7,110	0.12	121	-
	SE-BW5A-2-B-C-1-2		14.05	1,036	14,555	0.12	122	-
	SE-BW5A-2-B-C-5		29.18	1,761	51,390	0.12	207	-
	SE-BW5A-2-C-D-1		9.98	1,087	10,847	0.12	128	-
	SE-BW5A-2-D-5		1.506	1,193	1,797	0.12	141	-
	SE-BW5A-2-B-2		7.81	978	7,637	0.12	115	-
	SE-BW5A-2-C-D-5-6		6.963	1,647	11,466	0.12	194	-
				Total	12,787	152,324	-	1,506	
				1.5–2 feet Average Total PCB (mg/kg)		**11.9**		**0.12**	
2–2.5	SE-BW5A-2-A-4	Below surface cap	67.04	1,454	97,464	0.12	171	-
	SE-BW5A-2-A-B-3		0.0222	1,239	28	0.12	146	-
	SE-BW5A-2-A-B-5		78.37	1,365	107,002	0.12	161	-
	SE-BW5A-2-D-1-2		15	1,028	15,416	0.12	121	-
	SE-BW5A-2-B-C-1-2		39.76	1,036	41,189	0.12	122	-
	SE-BW5A-2-B-C-5		7.18	1,761	12,645	0.12	207	-
	SE-BW5A-2-C-D-1		31.14	1,087	33,845	0.12	128	-
	SE-BW5A-2-D-5		5.496	1,193	6,556	0.12	141	-
	SE-BW5A-2-B-2		90.6	978	88,594	0.12	115	-
	SE-BW5A-2-C-D-5-6		3.405	1,647	5,607	0.12	194	-
				Total	12,787	408,346	-	1,506	
				2–2.5 feet Average Total PCB (mg/kg)		**31.9**		**0.12**	
2.5–3	SE-BW5A-2-A-B-5	Below surface cap	9.62	4,440	42,708	0.12	523	-
	SE-BW5A-2-D-1-2		32.95	1,028	33,863	0.12	121	-
	SE-BW5A-2-B-C-1-2		54.31	2,502	135,898	0.12	295	-
	SE-BW5A-2-C-D-1		37.3	1,087	40,540	0.12	128	-
	SE-BW5A-2-C-D-5-6		0.0637	3,731	238	0.12	439	-
				Total	12,787	253,247	-	1,506	
				2.5-3 feet Average Total PCB (mg/kg)		**19.8**		**0.12**	
3–3.5	SE-BW5A-2-C-D-1	Below surface cap	9.36	12,787	119,690	0.12	1,506	-
				Total	12,787	119,690	-	1,506	
				3–3.5 feet Average Total PCB (mg/kg)		**9.4**		**0.12**	

Notes:

1. In areas where an engineered cap will be placed, the post-cap surface and subsurface total PCB values assume 1% of the existing average surficial total PCB concentration in accordance with Section II.B.2.d(1)(a) in the Revised Final Permit.

2. Volumes represent in-place quantities and are based on the target removal depth for each location.
Remedial Approach: Removal of the top foot of sediment followed by engineered cap placement

Exceeds surface remedial criteria; dredge and cap

Exceeds subsurface remedial criteria; dredge and cap

-: not applicable

cy: cubic yard

mg/kg: milligram per kilogram

PCB: polychlorinated biphenyl

Table 1-3
Spatially Weighted Average PCB Summary: BW5A-3

Depth (feet)	Location ID	Remedial Approach	Existing			Post-Backfill			
			Total PCB (mg/kg)	Area (square feet)	Total PCB × Area	Total PCB[1] (mg/kg)	Area (square feet)	Total PCB × Area	Removal Volume (cy)
0–1	SE-BW5A-3-A-B-4-5	Dredge and backfill	585	1,435	839,726	-	-	-	53
	SE-BW5A-3-B-1-2		35.54	440	15,636	-	-	-	16
	SE-BW5A-3-A-B-3-4		18.54	1,308	24,241	-	-	-	48
	SE-BW5A-3-A-B-2-3		16.39	1,145	18,774	-	-	-	42
	SE-BW5A-3-A-B-1-2		16.27	683	11,115	-	-	-	25
	SE-BW5A-3-B-7		15.28	230	3,514	-	-	-	9
	SE-BW5A-3-A-B-5-6		7.78	1,055	8,210	-	-	-	39
	SE-BW5A-3-B-5		7.225	677	4,894	-	-	-	25
	SE-BW5A-3-B-6		7.06	909	6,416	-	-	-	34
Total				7,883	932,527		-	-	292
0–1 feet Average Total PCB (mg/kg)					**118**				
1–1.5	SE-BW5A-3-A-B-4-5	Dredge and backfill	5.957	1,435	8,551	-	-	-	27
	SE-BW5A-3-B-1-2		27.8	440	12,231	-	-	-	8
	SE-BW5A-3-A-B-3-4		505	1,308	660,290	-	-	-	24
	SE-BW5A-3-A-B-2-3		12.37	1,145	14,169	-	-	-	21
	SE-BW5A-3-A-B-1-2		7.78	683	5,315	-	-	-	13
	SE-BW5A-3-B-7		6.17	230	1,419	-	-	-	4
	SE-BW5A-3-A-B-5-6		11.64	1,055	12,283	-	-	-	20
	SE-BW5A-3-B-5		9.027	677	6,115	-	-	-	13
	SE-BW5A-3-B-6		33.78	909	30,697	-	-	-	17
1.5–2	SE-BW5A-3-B-1-2	Dredge and backfill	14.91	440	6,560	-	-	-	8
	SE-BW5A-3-A-B-3-4		9.01	1,308	11,781	-	-	-	24
	SE-BW5A-3-A-B-1-2		6.241	683	4,264	-	-	-	13
	SE-BW5A-3-B-7		116	230	26,680	-	-	-	4
	SE-BW5A-3-A-B-5-6		331	1,055	349,292	-	-	-	20
	SE-BW5A-3-B-5		34.7	677	23,505	-	-	-	13
	SE-BW5A-3-B-6		514.2	909	467,269	-	-	-	17
	SE-BW5A-3-A-B-4-5	Below remedial criteria	1.68	1,435	2,412	1.68	1,435	2,412	-
	SE-BW5A-3-A-B-2-3		0.989	1,145	1,133	0.99	1,145	1,133	-
2–2.5	SE-BW5A-3-B-7	Dredge and backfill	46.07	230	10,596	-	-	-	4
	SE-BW5A-3-A-B-5-6		251.8	1,055	265,715	-	-	-	20
	SE-BW5A-3-B-5		47.43	677	32,128	-	-	-	13
	SE-BW5A-3-A-B-4-5	Below remedial criteria	0.9284	1,435	1,333	0.93	1,435	1,333	-
	SE-BW5A-3-B-1-2		11.02	440	4,848	11.02	440	4,848	-
	SE-BW5A-3-A-B-3-4		2.57	1,308	3,360	2.57	1,308	3,360	-
	SE-BW5A-3-A-B-2-3		0.27	1,145	309	0.27	1,145	309	-
	SE-BW5A-3-A-B-1-2		0.2607	683	178	0.26	683	178	-
	SE-BW5A-3-B-6		1.096	909	996	1.10	909	996	-
2.5–3	SE-BW5A-3-A-B-5-6	Dredge and backfill	120.8	1,055	127,476	-	-	-	20
	SE-BW5A-3-B-5		33.68	677	22,814	-	-	-	13
	SE-BW5A-3-A-B-4-5	Below remedial criteria	0.414	1,435	594	0.41	1,435	594	-
	SE-BW5A-3-B-1-2		10.13	440	4,457	10.13	440	4,457	-
	SE-BW5A-3-A-B-3-4		0.0437	1,308	57	0.04	1,308	57	-
	SE-BW5A-3-A-B-2-3		0.0454	1,145	52	0.05	1,145	52	-
	SE-BW5A-3-A-B-1-2		0.038	683	26	0.04	683	26	-
	SE-BW5A-3-B-7		17.87	230	4,110	17.87	230	4,110	-
	SE-BW5A-3-B-6		0.1621	909	147	0.16	909	147	-
3–3.5	SE-BW5A-3-B-1-2	Below remedial criteria	8.76	440	3,854	8.76	440	3,854	-
	SE-BW5A-3-A-B-2-3		0.0985	2,268	223	0.10	2,268	223	-
	SE-BW5A-3-A-B-1-2		0.0579	683	40	0.06	683	40	-
	SE-BW5A-3-B-7		1.282	230	295	1.28	230	295	-
	SE-BW5A-3-B-5		0.0487	2,819	137	0.05	2,819	137	-
	SE-BW5A-3-B-6		0.1705	1,443	246	0.17	1,443	246	-
3.5–4	SE-BW5A-3-A-B-1-2	Below remedial criteria	0.051	7,883	402	0.05	7,883	402	-
Total				47,297	2,128,360		30,417	29,210	313
Subsurface Average Total PCB (mg/kg)					**45.0**			**0.96**	

Notes:

1. Thiessen polygons are generated based on the data available per depth interval. The measured PCB concentration is used for subsurface intervals not dredged, regardless of the extent of backfill placement.
2. Volumes represent in-place quantities and are based on the target removal depth for each location.

Remedial Approach: Dredge to achieve 1 mg/kg in the surface and subsurface, followed by backfill placement

Exceeds remedial criteria; dredge and backfill

Below remedial criteria; no remediation necessary

-: not applicable

cy: cubic yard

mg/kg: milligram per kilogram

PCB: polychlorinated biphenyl

Table 1-4
Spatially Weighted Average PCB Summary: BW5A-4

Depth (feet)	Location ID	Remedial Approach	Existing			Post-Cap		
			Total PCB (mg/kg)	Area (square feet)	Total PCB × Area	Total PCB[1] (mg/kg)	Total PCB × Area	Removal Volume (cy)
0–1	SE-BW5A-4-A-B-2-3	Dredge and cap (surface)	42.06	417	17,554	0.17	71	15
	SE-BW5A-4-A-B-1-2		17.05	1,087	18,530	0.17	185	40
	SE-BW5A-4-A-B-3-4		6.55	1,011	6,619	0.17	172	37
			Total	2,515	42,703		427	93
			0–1 feet Average Total PCB (mg/kg)		**17.0**		**0.17**	
1–1.5	SE-BW5A-4-A-B-2-3	Below surface cap	10.128	417	4,227	0.17	71	-
	SE-BW5A-4-A-B-1-2		26.24	1,087	28,518	0.17	185	-
	SE-BW5A-4-A-B-3-4		9.465	1,011	9,565	0.17	172	-
			Total	2,515	42,310		427	
			1–1.5 feet Average Total PCB (mg/kg)		**16.8**		**0.17**	
1.5–2	SE-BW5A-4-A-B-2-3	Below surface cap	0.0498	417	21	0.17	71	-
	SE-BW5A-4-A-B-1-2		5.057	1,087	5,496	0.17	185	-
	SE-BW5A-4-A-B-3-4		5.775	1,011	5,836	0.17	172	-
			Total	2,515	11,353		427	
			1.5–2 feet Average Total PCB (mg/kg)		**4.5**		**0.17**	
2–2.5	SE-BW5A-4-A-B-2-3	Below surface cap	0.034	417	14	0.17	71	-
	SE-BW5A-4-A-B-1-2		3.123	1,087	3,394	0.17	185	-
	SE-BW5A-4-A-B-3-4		3.401	1,011	3,437	0.17	172	-
			Total	2,515	6,845		427	
			2–2.5 feet Average Total PCB (mg/kg)		**2.7**		**0.17**	
2.5–3	SE-BW5A-4-A-B-2-3	Below surface cap	0.034	1,504	51	0.17	255	-
	SE-BW5A-4-A-B-3-4		25.19	1,011	25,456	0.17	172	-
			Total	2,515	25,507		427	
			2.5–3 feet Average Total PCB (mg/kg)		**10.1**		**0.17**	
3–3.5	SE-BW5A-4-A-B-2-3	Below surface cap	0.037	1,504	56	0.17	255	-
	SE-BW5A-4-A-B-3-4		28.37	1,011	28,670	0.17	172	-
			Total	2,515	28,726		427	
			3–3.5 feet Average Total PCB (mg/kg)		**11.4**		**0.17**	
3.5–4	SE-BW5A-4-A-B-3-4	Below surface cap	41.26	2,515	103,757	0.17	427	-
			Total	2,515	103,757		427	
			3.5–4 feet Average Total PCB (mg/kg)		**41.3**		**0.17**	

Notes:

1. In areas where an engineered cap will be placed, the post-cap surface and subsurface total PCB values assume 1% of the existing average surficial total PCB concentration in accordance with Section II.B.2.d(1)(a) in the Revised Final Permit.

2. Volumes represent in-place quantities and are based on the target removal depth for each location.

Remedial Approach: Removal of the top foot of sediment followed by engineered cap placement

Exceeds surface remedial criteria; dredge and cap

-: not applicable

cy: cubic yard

mg/kg: milligram per kilogram

PCB: polychlorinated biphenyl

Table 1-5
Spatially Weighted Average PCB Summary: BW5A-5

Depth (feet)	Location ID	Remedial Approach	Existing			Post-Cap		
			Total PCB (mg/kg)	Area (square feet)	Total PCB × Area	Total PCB[1] (mg/kg)	Total PCB × Area	Removal Volume (cy)
0–1	SE-BW5A-5-D-E-14-15	Dredge and cap (surface)	43.92	1,494	65,629	0.10	145	55
	SE-BW5A-5-B-3-4		37.9	1,503	56,960	0.10	146	56
	SE-BW5A-5-C-7-8		29.45	1,487	43,788	0.10	145	55
	SE-BW5A-5-C-D-6-7		28.88	1,366	39,453	0.10	133	51
	SE-BW5A-5-D-E-15-16		27.97	1,580	44,181	0.10	154	59
	SE-BW5A-5-C-8-9		23.05	1,441	33,216	0.10	140	53
	SE-BW5A-5-D-17-18		21.07	1,406	29,621	0.10	137	52
	SE-BW5A-5-C-6		15.85	945	14,974	0.10	92	35
	SE-BW5A-5-C-D-7-8		15.61	1,199	18,709	0.10	117	44
	SE-BW5A-5-C-6-7		15.32	1,438	22,034	0.10	140	53
	SE-BW5A-5-B-3		15.1	1,299	19,610	0.10	126	48
	SE-BW5A-5-A-B-2-3		14.33	988	14,157	0.10	96	37
	SE-BW5A-5-A-B-3-4		10.28	1,463	15,043	0.10	142	54
	SE-BW5A-5-C-D-10-11		9.23	1,483	13,690	0.10	144	55
	SE-BW5A-5-D-E-16-17		8.49	2,943	24,984	0.10	286	109
	SE-BW5A-5-D-18-19		7.09	1,964	13,928	0.10	191	73
	SE-BW5A-5-D-9-10		6.76	1,376	9,299	0.10	134	51
	SE-BW5A-5-D-E-11-12		6.36	1,526	9,706	0.10	148	57
	SE-BW5A-5-D-E-13-14		5.77	2,064	11,910	0.10	201	76
	SE-BW5A-5-D-11-12		5.4	1,517	8,190	0.10	148	56
	SE-BW5A-5-B-2		5.356	1,169	6,259	0.10	114	43
	SE-BW5A-5-E-15-16		5.24	1,299	6,808	0.10	126	48
	SE-BW5A-5-C-D-9-10		4.83	2,026	9,785	0.10	197	75
	SE-BW5A-5-D-E-17-18		3.76	2,056	7,730	0.10	200	76
	SE-BW5A-5-B-C-4-5		3.18	1,337	4,252	0.10	130	50
	SE-BW5A-5-D-E-12-13	Dredge and cap (subsurface)	2.84	2,095	5,950	0.10	204	78
	SE-BW5A-5-B-C-5-6	Adjacent to remedial areas; dredge and cap	0.681	1,426	971	0.10	139	53
	SE-BW5A-5-C-D-8-9		0.585	1,687	987	0.10	164	62
	SE-BW5A-5-D-E-10-11		0.264	981	259	0.10	95	36
	SE-BW5A-5-B-C-20	Below remedial criteria; no remediation necessary	12.48	1,645	20,531	12.5	20,531	-
	SE-BW5A-5-A-B-19-20		5.59	1,155	6,455	5.6	6,455	-
	SE-BW5A-5-C-D-18-19		5.12	1,140	5,839	5.1	5,839	-
	SE-BW5A-5-C-D-19-20		4.9	1,794	8,790	4.9	8,790	-
	SE-BW5A-5-E-13-14		2.193	584	1,282	2.2	1,282	-
	SE-BW5A-5-E-14-15		1.865	966	1,801	1.9	1,801	-
	SE-BW5A-5-D-E-21-22		1.758	1,370	2,408	1.8	2,408	-
	SE-BW5A-5-B-C-19-20		1.716	1,774	3,045	1.7	3,045	-
	SE-BW5A-5-E-22-23		1.683	2,540	4,275	1.7	4,275	-
	SE-BW5A-5-E-12-13		0.864	615	532	0.86	532	-
	SE-BW5A-5-D-20-21		0.1318	1,274	168	0.13	168	-
	SE-BW5A-5-A-B-20		0.05	1,138	57	0.05	57	-
	SE-BW5A-5-D-19-20		0.036	1,865	67	0.04	67	-
			Total	62,417	607,332		59,583	1,650
			0–1 feet Average Total PCB (mg/kg)		**9.73**		**0.95**	
1–1.5	SE-BW5A-5-B-3-4	Below surface cap	14.98	1,503	22,514	0.10	146	-
	SE-BW5A-5-C-7-8		0.123	1,487	183	0.10	145	-
	SE-BW5A-5-C-D-6-7		2.942	1,366	4,019	0.10	133	-
	SE-BW5A-5-C-8-9		1.05	1,441	1,513	0.10	140	-
	SE-BW5A-5-C-6		0.2285	945	216	0.10	92	-
	SE-BW5A-5-C-D-7-8		0.161	1,199	193	0.10	117	-
	SE-BW5A-5-C-6-7		0.1053	1,438	151	0.10	140	-
	SE-BW5A-5-B-3		14.77	1,918	28,327	0.10	187	-
	SE-BW5A-5-A-B-3-4		6.611	1,486	9,822	0.10	145	-
	SE-BW5A-5-D-18-19		1.548	2,222	3,440	0.10	216	-
	SE-BW5A-5-D-9-10		0.0252	1,609	41	0.10	157	-
	SE-BW5A-5-D-E-11-12		0.2739	2,565	702	0.10	250	-
	SE-BW5A-5-D-E-13-14		0.259	2,183	565	0.10	212	-
	SE-BW5A-5-B-2		8.53	1,515	12,923	0.10	147	-
	SE-BW5A-5-C-D-9-10		0.0961	2,261	217	0.10	220	-
	SE-BW5A-5-D-E-17-18		0.11	6,369	701	0.10	620	-
	SE-BW5A-5-B-C-4-5		0.512	1,337	685	0.10	130	-
	SE-BW5A-5-D-E-12-13		0.075	2,190	164	0.10	213	-
	SE-BW5A-5-B-C-20		0.11	2,491	274	0.10	242	-
	SE-BW5A-5-A-B-19-20		0.0698	1,480	103	0.10	144	-
	SE-BW5A-5-C-D-18-19		9.7	1,167	11,320	0.10	114	-
	SE-BW5A-5-B-C-5-6		0.5923	1,426	845	0.10	139	-
	SE-BW5A-5-C-D-8-9		0.086	1,687	145	0.10	164	-
	SE-BW5A-5-D-E-10-11		0.1053	2,380	251	0.10	232	-
	SE-BW5A-5-C-D-19-20	Outside remedial extent	3.77	2,397	9,036	3.8	9,036	-
	SE-BW5A-5-E-13-14		0.0253	584	15	0.025	15	-
	SE-BW5A-5-E-14-15		0.0248	4,970	123	0.025	123	-
	SE-BW5A-5-D-E-21-22		0.037	1,370	51	0.037	51	-
	SE-BW5A-5-E-22-23		0.55	2,540	1,397	0.55	1,397	-
	SE-BW5A-5-E-12-13		10.14	615	6,239	10.1	6,239	-
	SE-BW5A-5-D-20-21		0.039	1,274	50	0.039	50	-
	SE-BW5A-5-A-B-20		0.049	1,138	56	0.049	56	-
	SE-BW5A-5-D-19-20		0.036	1,865	67	0.036	67	-
			Total	62,417	116,347		21,476	
			1–1.5 feet Average Total PCB (mg/kg)		**1.9**		**0.34**	

Table 1-5
Spatially Weighted Average PCB Summary: BW5A-5

Depth (feet)	Location ID	Remedial Approach	Existing			Post-Cap		
			Total PCB (mg/kg)	Area (square feet)	Total PCB × Area	Total PCB[1] (mg/kg)	Total PCB × Area	Removal Volume (cy)
1.5–2	SE-BW5A-5-B-3-4	Below surface cap	57.49	1,503	86,402	0.10	146	-
	SE-BW5A-5-C-8-9		0.088	1,675	147	0.10	163	-
	SE-BW5A-5-C-6		0.0451	1,485	67	0.10	144	-
	SE-BW5A-5-C-D-7-8		0.082	2,478	203	0.10	241	-
	SE-BW5A-5-C-6-7		0.044	2,237	98	0.10	218	-
	SE-BW5A-5-B-3		9.25	3,433	31,754	0.10	334	-
	SE-BW5A-5-A-B-3-4		3.847	1,486	5,716	0.10	145	-
	SE-BW5A-5-D-18-19		0.2237	2,222	497	0.10	216	-
	SE-BW5A-5-D-9-10		0.036	1,609	58	0.10	157	-
	SE-BW5A-5-D-E-11-12		0.08	2,578	206	0.10	251	-
	SE-BW5A-5-C-D-9-10		0.073	2,261	165	0.10	220	-
	SE-BW5A-5-D-E-17-18		0.12	6,369	764	0.10	620	-
	SE-BW5A-5-B-C-4-5		0.685	1,337	916	0.10	130	-
	SE-BW5A-5-D-E-12-13		59.1	4,344	256,754	0.10	423	-
	SE-BW5A-5-B-C-20		0.074	2,491	184	0.10	242	-
	SE-BW5A-5-A-B-19-20		0.1744	1,480	258	0.10	144	-
	SE-BW5A-5-C-D-18-19		0.282	1,167	329	0.10	114	-
	SE-BW5A-5-B-C-5-6		0.2812	1,426	401	0.10	139	-
	SE-BW5A-5-C-D-8-9		0.088	1,687	148	0.10	164	-
	SE-BW5A-5-D-E-10-11		2.309	2,380	5,494	0.10	232	-
	SE-BW5A-5-C-D-19-20	Outside remedial extent	0.802	2,397	1,922	0.802	1,922	-
	SE-BW5A-5-E-14-15		0.04	6,185	247	0.040	247	-
	SE-BW5A-5-D-E-21-22		0.035	1,370	48	0.035	48	-
	SE-BW5A-5-E-22-23		0.036	2,540	91	0.036	91	-
	SE-BW5A-5-D-20-21		0.039	1,274	50	0.039	50	-
	SE-BW5A-5-A-B-20		0.057	1,138	65	0.057	65	-
	SE-BW5A-5-D-19-20		0.0772	1,865	144	0.077	144	-
			Total	62,417	393,130		7,009	
			1.5–2 feet Average Total PCB (mg/kg)		**6.3**		**0.11**	
2–2.5	SE-BW5A-5-D-E-14-15	Below surface cap	4.761	1,494	7,114	0.10	145	-
	SE-BW5A-5-B-3-4		98	1,503	147,285	0.10	146	-
	SE-BW5A-5-C-7-8		25.08	1,487	37,291	0.10	145	-
	SE-BW5A-5-C-D-6-7		0.054	1,366	74	0.10	133	-
	SE-BW5A-5-D-E-15-16		9.07	1,580	14,327	0.10	154	-
	SE-BW5A-5-C-8-9		0.083	1,441	120	0.10	140	-
	SE-BW5A-5-D-17-18		0.463	1,524	705	0.10	148	-
	SE-BW5A-5-C-6		0.057	1,595	91	0.10	155	-
	SE-BW5A-5-C-D-7-8		0.072	1,199	86	0.10	117	-
	SE-BW5A-5-C-6-7		0.093	1,697	158	0.10	165	-
	SE-BW5A-5-B-3		71.42	1,299	92,752	0.10	126	-
	SE-BW5A-5-A-B-2-3		5.087	988	5,026	0.10	96	-
	SE-BW5A-5-A-B-3-4		31.63	1,463	46,286	0.10	142	-
	SE-BW5A-5-C-D-10-11		0.922	1,621	1,494	0.10	158	-
	SE-BW5A-5-D-E-16-17		9.63	2,943	28,338	0.10	286	-
	SE-BW5A-5-D-E-11-12		0.082	1,526	125	0.10	148	-
	SE-BW5A-5-D-E-13-14		0.51	2,528	1,290	0.10	246	-
	SE-BW5A-5-D-11-12		0.86	1,517	1,304	0.10	148	-
	SE-BW5A-5-B-2		6.75	1,169	7,888	0.10	114	-
	SE-BW5A-5-E-15-16		2.043	1,299	2,654	0.10	126	-
	SE-BW5A-5-C-D-9-10		0.055	3,018	166	0.10	294	-
	SE-BW5A-5-D-E-17-18		0.059	2,763	163	0.10	269	-
	SE-BW5A-5-B-C-4-5		0.044	1,853	82	0.10	180	-
	SE-BW5A-5-D-E-12-13		0.067	2,095	140	0.10	204	-
	SE-BW5A-5-B-C-20		0.041	2,838	116	0.10	276	-
	SE-BW5A-5-A-B-19-20		0.1977	2,271	449	0.10	221	-
	SE-BW5A-5-C-D-18-19		0.086	2,628	226	0.10	256	-
	SE-BW5A-5-C-D-8-9		0.082	1,689	138	0.10	164	-
	SE-BW5A-5-D-E-10-11		0.084	1,224	103	0.10	119	-
	SE-BW5A-5-C-D-19-20	Outside remedial extent	0.068	3,368	229	0.068	229	-
	SE-BW5A-5-E-14-15		0.04	1,078	43	0.040	43	-
	SE-BW5A-5-D-E-21-22		0.038	1,370	52	0.038	52	-
	SE-BW5A-5-E-22-23		0.035	2,540	89	0.035	89	-
	SE-BW5A-5-E-12-13		0.983	623	613	0.983	613	-
	SE-BW5A-5-D-20-21		0.038	1,820	69	0.038	69	-
			Total	62,417	397,087		6,117	
			2–2.5 feet Average Total PCB (mg/kg)		**6.4**		**0.10**	

Table 1-5
Spatially Weighted Average PCB Summary: BW5A-5

Depth (feet)	Location ID	Remedial Approach	Existing			Post-Cap		
			Total PCB (mg/kg)	Area (square feet)	Total PCB × Area	Total PCB[1] (mg/kg)	Total PCB × Area	Removal Volume (cy)
2.5–3	SE-BW5A-5-D-E-14-15	Below surface cap	0.119	1,494	178	0.10	145	-
	SE-BW5A-5-B-3-4		30.6	1,837	56,208	0.10	179	-
	SE-BW5A-5-C-7-8		0.0969	1,487	144	0.10	145	-
	SE-BW5A-5-C-D-6-7		0.047	1,366	64	0.10	133	-
	SE-BW5A-5-D-E-15-16		0.118	1,580	186	0.10	154	-
	SE-BW5A-5-C-8-9		0.057	1,985	113	0.10	193	-
	SE-BW5A-5-D-17-18		1.013	3,195	3,237	0.10	311	-
	SE-BW5A-5-C-6		0.075	1,595	120	0.10	155	-
	SE-BW5A-5-C-D-7-8		0.05	1,199	60	0.10	117	-
	SE-BW5A-5-C-6-7		0.13	1,697	221	0.10	165	-
	SE-BW5A-5-A-B-2-3		13.2	1,866	24,626	0.10	182	-
	SE-BW5A-5-A-B-3-4		140.3	1,533	215,109	0.10	149	-
	SE-BW5A-5-C-D-10-11		0.078	4,068	317	0.10	396	-
	SE-BW5A-5-D-E-16-17		2.068	3,583	7,411	0.10	349	-
	SE-BW5A-5-D-E-11-12		0.058	1,680	97	0.10	164	-
	SE-BW5A-5-D-E-13-14		0.11	2,528	278	0.10	246	-
	SE-BW5A-5-D-11-12		0.12	1,574	189	0.10	153	-
	SE-BW5A-5-B-2		10.35	1,186	12,273	0.10	115	-
	SE-BW5A-5-E-15-16		0.035	1,299	45	0.10	126	-
	SE-BW5A-5-B-C-4-5		0.2384	1,853	442	0.10	180	-
	SE-BW5A-5-D-E-12-13		0.085	2,095	178	0.10	204	-
	SE-BW5A-5-C-D-18-19		0.056	12,793	716	0.10	1,245	-
	SE-BW5A-5-C-D-8-9		0.056	2,729	153	0.10	266	-
	SE-BW5A-5-E-14-15	Outside remedial extent	0.035	1,078	38	0.035	38	-
	SE-BW5A-5-E-22-23		0.037	4,493	166	0.037	166	-
	SE-BW5A-5-E-12-13		0.037	623	23	0.037	23	-
				Total	62,417	322,592		5,698	
				2.5–3 feet Average Total PCB (mg/kg)		**5.2**		**0.09**	
3–3.5	SE-BW5A-5-B-3-4	Below surface cap	0.819	1,837	1,504	0.10	179	-
	SE-BW5A-5-C-7-8		0.0912	1,487	136	0.10	145	-
	SE-BW5A-5-C-D-6-7		0.0321	1,366	44	0.10	133	-
	SE-BW5A-5-D-E-15-16		0.119	3,078	366	0.10	300	-
	SE-BW5A-5-C-8-9		0.059	1,985	117	0.10	193	-
	SE-BW5A-5-C-6		0.067	1,595	107	0.10	155	-
	SE-BW5A-5-C-D-7-8		0.062	1,199	74	0.10	117	-
	SE-BW5A-5-C-6-7		0.067	1,697	114	0.10	165	-
	SE-BW5A-5-A-B-2-3		42.82	1,866	79,884	0.10	182	-
	SE-BW5A-5-A-B-3-4		30.7	1,533	47,069	0.10	149	-
	SE-BW5A-5-C-D-10-11		0.056	4,106	230	0.10	399	-
	SE-BW5A-5-D-E-16-17		0.12	5,236	628	0.10	509	-
	SE-BW5A-5-D-11-12		0.069	3,113	215	0.10	303	-
	SE-BW5A-5-B-2		24.43	1,186	28,969	0.10	115	-
	SE-BW5A-5-E-15-16		0.036	2,231	80	0.10	217	-
	SE-BW5A-5-B-C-4-5		0.035	1,853	65	0.10	180	-
	SE-BW5A-5-C-D-18-19		0.0294	18,829	554	0.10	1,832	-
	SE-BW5A-5-C-D-8-9		0.048	2,729	131	0.10	266	-
	SE-BW5A-5-E-12-13	Outside remedial extent	0.039	5,492	214	0.039	214	-
				Total	62,417	160,502		5,753	
				3–3.5 feet Average Total PCB (mg/kg)		**2.6**		**0.09**	
3.5–4	SE-BW5A-5-C-7-8	Below surface cap	0.073	1,487	109	0.10	145	-
	SE-BW5A-5-C-D-6-7		1.432	1,366	1,956	0.10	133	-
	SE-BW5A-5-C-8-9		0.044	5,231	230	0.10	509	-
	SE-BW5A-5-C-6		0.0497	1,595	79	0.10	155	-
	SE-BW5A-5-C-D-7-8		0.0531	1,635	87	0.10	159	-
	SE-BW5A-5-C-6-7		0.059	1,697	100	0.10	165	-
	SE-BW5A-5-A-B-3-4		3.388	3,627	12,289	0.10	353	-
	SE-BW5A-5-D-11-12		0.512	41,130	21,059	0.10	4,002	-
	SE-BW5A-5-B-2		9.48	2,396	22,714	0.10	233	-
	SE-BW5A-5-B-C-4-5		0.044	2,251	99	0.10	219	-
				Total	62,417	58,722		6,073	
				3.5–4 feet Average Total PCB (mg/kg)		**0.9**		**0.10**	
4–4.5	SE-BW5A-5-D-E-14-15	Below surface cap	1.148	2,498	2,868	0.10	243	-
	SE-BW5A-5-B-3-4		1.827	4,304	7,864	0.10	419	-
	SE-BW5A-5-C-7-8		0.611	2,508	1,533	0.10	244	-
	SE-BW5A-5-C-D-6-7		1.177	1,366	1,608	0.10	133	-
	SE-BW5A-5-D-17-18		0.059	20,481	1,208	0.10	1,993	-
	SE-BW5A-5-C-6		0.2585	2,219	574	0.10	216	-
	SE-BW5A-5-C-D-7-8		0.102	3,390	346	0.10	330	-
	SE-BW5A-5-C-6-7		1.142	1,720	1,964	0.10	167	-
	SE-BW5A-5-A-B-2-3		5.237	2,139	11,200	0.10	208	-
	SE-BW5A-5-C-D-10-11		0.336	5,607	1,884	0.10	546	-
	SE-BW5A-5-D-E-16-17		5.81	3,829	22,246	0.10	373	-
	SE-BW5A-5-D-E-13-14		3.235	2,463	7,966	0.10	240	-
	SE-BW5A-5-D-11-12		0.685	3,112	2,132	0.10	303	-
	SE-BW5A-5-B-2		47.39	1,186	56,196	0.10	115	-
	SE-BW5A-5-E-15-16		0.2167	2,429	526	0.10	236	-
	SE-BW5A-5-E-13-14	Outside remedial extent	0.479	749	359	0.48	359	-
	SE-BW5A-5-E-12-13		0.93	2,418	2,249	0.93	2,249	-
				Total	62,417	122,721		8,373	
				4–4.5 feet Average Total PCB (mg/kg)		**2.0**		**0.13**	

Table 1-5
Spatially Weighted Average PCB Summary: BW5A-5

Depth (feet)	Location ID	Remedial Approach	Existing			Post-Cap		
			Total PCB (mg/kg)	Area (square feet)	Total PCB × Area	Total PCB[1] (mg/kg)	Total PCB × Area	Removal Volume (cy)
4.5–5	SE-BW5A-5-D-E-14-15	Below surface cap	3.51	2,498	8,767	0.10	243	-
	SE-BW5A-5-B-3-4		0.0587	7,629	448	0.10	742	-
	SE-BW5A-5-C-7-8		0.057	2,508	143	0.10	244	-
	SE-BW5A-5-C-D-6-7		0.054	1,366	74	0.10	133	-
	SE-BW5A-5-D-17-18		0.059	20,481	1,208	0.10	1,993	-
	SE-BW5A-5-C-6		0.054	2,219	120	0.10	216	-
	SE-BW5A-5-C-D-7-8		0.06	3,390	203	0.10	330	-
	SE-BW5A-5-C-6-7		0.062	1,720	107	0.10	167	-
	SE-BW5A-5-C-D-10-11		0.059	5,607	331	0.10	546	-
	SE-BW5A-5-D-E-16-17		0.12	3,829	459	0.10	373	-
	SE-BW5A-5-D-E-13-14		0.0496	2,463	122	0.10	240	-
	SE-BW5A-5-D-11-12		0.073	3,112	227	0.10	303	-
	SE-BW5A-5-E-15-16		0.036	2,429	87	0.10	236	-

Notes:

1. In areas where an engineered cap will be placed, the post-cap surface and subsurface total PCB values assume 1% of the existing average surficial total PCB concentration in accordance with Section II.B.2.d(1)(a) in the Revised Final Permit.
2. EPA Condition 23 requested the inclusion of areas adjacent to locations exceeding the remedial criteria for constructability considerations and to mitigate potential for cross contamination.
3. Volumes represent in-place quantities and are based on the target removal depth for each location.

Remedial Approach: Removal of the top foot of sediment followed by engineered cap placement

Exceeds surface remedial criteria; dredge and cap

Exceeds subsurface remedial criteria; dredge and cap

Adjacent to remedial areas; dredge and cap per EPA Condition 23 (see note 2)

Below remedial criteria; no sediment removal or cap placement at this location

-: not applicable
cy: cubic yard
EPA: U.S. Environmental Protection Agency
mg/kg: milligram per kilogram
PCB: polychlorinated biphenyl

Table 1-6
Spatially Weighted Average PCB Summary: BW5A-6

Depth (feet)	Location ID[1]	Remedial Approach	Existing			Post-Backfill			
			Total PCB (mg/kg)	Area (square feet)	Total PCB × Area	Total PCB[2] (mg/kg)	Area (square feet)	Total PCB × Area	Removal Volume (cy)
0–1	SE-BW5A-6-B-C-4-5	Dredge and backfill	35.03	1,962	68,725	-	-	-	73
	SE-BW5A-6-A-B-5-6		18.8	1,851	34,799	-	-	-	69
	SE-BW5A-6-B-C-6		13.53	964	13,049	-	-	-	36
	SE-BW5A-6-C-6		11.61	888	10,305	-	-	-	33
	SE-BW5A-6-B-C-5-6		6.08	1,763	10,719	-	-	-	65
	SE-BW5A-6-B-6		5.33	880	4,690	-	-	-	33
	SE-BW5A-6-C-D-6-7		4.5	1,677	7,548	-	-	-	62
	SE-BW5A-6-D-1-2		4.85	380	1,843	-	-	-	14
	SE-BW5A-6-C-D-3-4		4.4	1,471	6,471	-	-	-	54
	SE-BW5A-6-D-2-3		3.596	572	2,055	-	-	-	21
	SE-BW5A-6-A-B-4-5		1.62	1,485	2,405	-	-	-	55
	SE-BW5A-6-B-C-4	Adjacent to remedial areas; dredge and backfill	0.778	1,355	1,054	-	-	-	50
			Total	15,248	163,664		-	-	565
			0–1 feet Average Total PCB (mg/kg)		**10.7**				
1–1.5	SE-BW5A-6-A-B-5-6	Dredge and backfill	271	1,851	501,617	-	-	-	34
	SE-BW5A-6-B-C-4-5		33.96	1,962	66,626	-	-	-	36
	SE-BW5A-6-C-6		26.3	888	23,344	-	-	-	16
	SE-BW5A-6-B-C-6		12.02	964	11,593	-	-	-	18
	SE-BW5A-6-C-D-6-7		8.94	1,677	14,996	-	-	-	31
	SE-BW5A-6-B-6		8.44	880	7,427	-	-	-	16
	SE-BW5A-6-B-C-5-6		1.376	1,763	2,426	-	-	-	33
	SE-BW5A-6-C-D-3-4	Below remedial criteria	0.055	1,471	81	0.055	1,471	81	-
	SE-BW5A-6-D-1-2		0.053	380	20	0.053	380	20	-
	SE-BW5A-6-B-C-4		0.052	1,355	70	0.052	1,355	70	-
	SE-BW5A-6-D-2-3		0.048	572	27	0.048	572	27	-
	SE-BW5A-6-A-B-4-5		0.04	1,485	59	0.04	1,485	59	-
1.5–2	SE-BW5A-6-B-C-5-6	Dredge and backfill	105.5	2,159	227,769	-	-	-	40
	SE-BW5A-6-A-B-5-6		32.7	1,851	60,527	-	-	-	34
	SE-BW5A-6-C-D-6-7		22.79	1,700	38,750	-	-	-	31
	SE-BW5A-6-B-6		15.22	1,062	16,160	-	-	-	20
	SE-BW5A-6-C-6		2.061	1,251	2,579	-	-	-	23
	SE-BW5A-6-B-C-4-5	Below remedial criteria	2.03	1,962	3,983	2.03	1,962	3,983	-
	SE-BW5A-6-D-1-2		0.064	380	24	0.064	380	24	-
	SE-BW5A-6-C-D-3-4		0.047	1,471	69	0.047	1,471	69	-
	SE-BW5A-6-D-2-3		0.047	572	27	0.047	572	27	-
	SE-BW5A-6-A-B-4-5		0.042	1,485	62	0.042	1,485	62	-
	SE-BW5A-6-B-C-4		0.042	1,355	57	0.042	1,355	57	-
2–2.5	SE-BW5A-6-B-C-5-6	Dredge and backfill	33.8	1,763	59,591	-	-	-	33
	SE-BW5A-6-A-B-5-6		24.41	1,856	45,302	-	-	-	34
	SE-BW5A-6-B-C-6		12.29	964	11,853	-	-	-	18
	SE-BW5A-6-B-6		7.74	880	6,811	-	-	-	16
	SE-BW5A-6-C-D-6-7	Below remedial criteria	2.587	1,677	4,339	2.59	1,677	4,339	-
	SE-BW5A-6-C-6		0.962	888	854	0.96	888	854	-
	SE-BW5A-6-B-C-4-5		0.646	2,584	1,669	0.65	2,584	1,669	-
	SE-BW5A-6-D-1-2		0.055	380	21	0.06	380	21	-
	SE-BW5A-6-C-D-3-4		0.041	1,471	60	0.041	1,471	60	-
	SE-BW5A-6-D-2-3		0.04	572	23	0.04	572	23	-
	SE-BW5A-6-A-B-4-5		0.042	850	36	0.038	850	32	-
	SE-BW5A-6-B-C-4		0.038	1,364	52	0.038	1,364	52	-
2.5–3	SE-BW5A-6-A-B-5-6	Dredge and backfill	275	1,851	509,022	-	-	-	34
	SE-BW5A-6-B-C-5-6		62.4	1,763	110,014	-	-	-	33
	SE-BW5A-6-B-6		44.07	880	38,779	-	-	-	16
	SE-BW5A-6-B-C-6		8.42	964	8,121	-	-	-	18
	SE-BW5A-6-C-D-6-7	Below remedial criteria	10.02	1,677	16,808	10.02	1,677	16,808	-
	SE-BW5A-6-C-6		0.346	888	307	0.35	888	307	-
	SE-BW5A-6-D-2-3		0.0872	572	50	0.0872	572	50	-
	SE-BW5A-6-D-1-2		0.069	380	26	0.07	380	26	-
	SE-BW5A-6-B-C-4-5		0.047	2,584	121	0.05	2,584	121	-
	SE-BW5A-6-B-C-4		0.045	1,364	61	0.045	1,364	61	-
	SE-BW5A-6-A-B-4-5		0.042	854	36	0.045	854	38	-
	SE-BW5A-6-C-D-3-4		0.038	1,471	56	0.038	1,471	56	-
3–3.5	SE-BW5A-6-A-B-5-6	Dredge and backfill	66.2	2,373	157,114	-	-	-	44
	SE-BW5A-6-B-6		37.67	945	35,605	-	-	-	18
	SE-BW5A-6-B-C-6		20.01	2,140	42,813	-	-	-	40
	SE-BW5A-6-C-D-6-7	Below remedial criteria	1.996	1,677	3,348	1.996	1,677	3,348	-
	SE-BW5A-6-C-6		0.346	888	307	0.346	888	307	-
	SE-BW5A-6-D-1-2		0.052	380	20	0.052	380	20	-
	SE-BW5A-6-B-C-4-5		0.049	2,584	127	0.049	2,584	127	-
	SE-BW5A-6-D-2-3		0.046	1,500	69	0.046	1,500	69	-
	SE-BW5A-6-A-B-4-5		0.042	854	36	0.04	854	34	-
	SE-BW5A-6-B-C-4		0.04	1,906	76	0.04	1,906	76	-

Table 1-6
Spatially Weighted Average PCB Summary: BW5A-6

Depth (feet)	Location ID[1]	Remedial Approach	Existing			Post-Backfill			
			Total PCB (mg/kg)	Area (square feet)	Total PCB × Area	Total PCB[2] (mg/kg)	Area (square feet)	Total PCB × Area	Removal Volume (cy)
3.5–4	SE-BW5A-6-B-6	Dredge and backfill	13.32	945	12,590	-	-	-	18
	SE-BW5A-6-B-C-6		13.15	2,140	28,145	-	-	-	40
	SE-BW5A-6-A-B-5-6		7.53	2,378	17,905	-	-	-	44
	SE-BW5A-6-C-D-6-7	Assume below remedial criteria[4]	1.996	1,677	3,348	2.0	1,677	3,348	-
	SE-BW5A-6-C-6		0.346	888	307	0.3	888	307	-
	SE-BW5A-6-A-B-4-5		0.042	850	36	0.039	850	33	-
	SE-BW5A-6-D-2-3		0.039	6,370	248	0.039	6,370	248	-
4–4.5	SE-BW5A-6-B-C-6	Dredge and backfill	7.98	5,463	43,597	-	-	-	101
	SE-BW5A-6-C-D-6-7	Assume below remedial criteria[4]	1.996	1,677	3,348	2.0	1,677	3,348	-
	SE-BW5A-6-C-6		0.346	888	307	0.3	888	307	-
	SE-BW5A-6-A-B-4-5		0.042	850	36	0.0	850	36	-
	SE-BW5A-6-D-2-3		0.039	6,370	248	0.0	6,370	248	-
4.5–5	SE-BW5A-6-B-C-6	Dredge and backfill	6.82	5,463	37,260	-	-	-	101
	SE-BW5A-6-C-D-6-7	Assume below remedial criteria[4]	1.996	1,677	3,348	2.0	1,677	3,348	-
	SE-BW5A-6-C-6		0.346	888	307	0.3	888	307	-
	SE-BW5A-6-A-B-4-5		0.042	850	36	0.0	850	36	-
	SE-BW5A-6-D-2-3		0.039	6,370	248	0.0	6,370	248	-

Notes:

1. Thiessen polygons are generated based on the data available per depth interval. Select polygons at depth are split with a portion of that extent targeted for remediation based on the remedial extent of shallower depth intervals.
2. The measured PCB concentration is used for subsurface intervals not dredged, regardless of the extent of backfill placement.
3. EPA Condition 23 requested the inclusion of areas adjacent to locations exceeding the remedial criteria for constructability considerations and to mitigate potential for cross contamination.
4. The remedial boundary for the 2 to 2.5-foot interval will be used to define the limits of removal from 2.5 to 5 feet due to limited data available below 2.5 feet (see Figure 8-5f). The PCB concentration of the last measured section is assumed for cores outside the dredge extent without recovery between 2.5 and 5 feet.
5. Volumes represent in-place quantities and are based on the target removal depth for each location.

Remedial Approach: Dredge to achieve 1 mg/kg in the surface and subsurface, followed by backfill placement

Exceeds remedial criteria; dredge and backfill

Below remedial criteria; no remediation necessary

Adjacent to remedial areas; dredge and backfill per EPA Condition 23 (see note 3)

-: not applicable

cy: cubic yard

EPA: U.S. Environmental Protection Agency

mg/kg: milligram per kilogram

PCB: polychlorinated biphenyl

Table 1-7
Spatially Weighted Average PCB Summary: Disposal

Area ID	Location ID	Area (square feet)	Target Dredge Interval (feet)	Dredge Cut Thickness (feet)	Required Removal (Neat)		Disposal Volume[1,2] (cy)	
					Depth-Weighted Average Total PCB (mg/kg)	Total PCB × Area	On-Site (UDF)	Off-Site
Inside Core Area 1 Habitat								
BW5A-1	SE-BW5A-1-C-D-8-9	2,340	0–1	1.0	75.7	177,116	87	-
	SE-BW5A-1-C-D-7-8	2,116	0–1	1.0	68.7	145,387	78	-
	SE-BW5A-1-D-E-9	1,276	0–1	1.0	66.3	84,588	47	-
	SE-BW5A-1-B-3-4	644	0–1	1.0	56.1	36,135	24	-
Total (Core Area 1 Habitat)		6,376			-	443,226	236	-
Outside Core Area 1 Habitat								
BW5A-2	SE-BW5A-2-A-4	1,454	0–1	1.0	21.69	31,533	54	-
	SE-BW5A-2-A-B-3	1,239	0–1	1.0	20.46	25,352	46	-
	SE-BW5A-2-A-B-5	1,365	0–1	1.0	15.07	20,576	51	-
	SE-BW5A-2-D-1-2	1,028	0–1	1.0	14.33	14,727	38	-
	SE-BW5A-2-B-C-1-2	1,036	0–1	1.0	14.09	14,597	38	-
	SE-BW5A-2-B-C-5	1,761	0–1	1.0	8.97	15,797	65	-
	SE-BW5A-2-C-D-1	1,087	0–1	1.0	6.92	7,521	40	-
	SE-BW5A-2-D-5	1,193	0–1	1.0	6.69	7,981	44	-
	SE-BW5A-2-B-2	978	0–1	1.0	6.46	6,317	36	-
	SE-BW5A-2-C-D-5-6	1,647	0–1	1.0	3.767	6,203	61	-
BW5A-3	SE-BW5A-3-A-B-1-2	683	0–2	2.0	11.64	7,952	51	-
	SE-BW5A-3-A-B-2-3	1,145	0–1.5	1.5	15.05	17,239	64	-
	SE-BW5A-3-A-B-3-4	1,308	0–2	2.0	137.8	-	-	97
	SE-BW5A-3-A-B-4-5	1,435	0–1.5	1.5	392.0	-	-	80
	SE-BW5A-3-A-B-5-6	1,055	0–3	3.0	121.8	-	-	117
	SE-BW5A-3-B-1-2	440	0–2	2.0	28.45	12,516	33	-
	SE-BW5A-3-B-5	677	0–3	3.0	23.21	15,725	75	-
	SE-BW5A-3-B-6	909	0–2	2.0	140.5	-	-	67
	SE-BW5A-3-B-7	230	0–2.5	2.5	39.76	9,145	21	-
BW5A-4	SE-BW5A-4-A-B-2-3	417	0–1	1.0	42.06	17,554	15	
	SE-BW5A-4-A-B-1-2	1,087	0–1	1.0	17.05	18,530	40	
	SE-BW5A-4-A-B-3-4	1,011	0–1	1.0	6.55	6,619	37	
BW5A-5	SE-BW5A-5-D-E-14-15	1,494	0–1	1.0	43.92	65,629	55	
	SE-BW5A-5-B-3-4	1,503	0–1	1.0	37.9	56,960	56	
	SE-BW5A-5-C-7-8	1,487	0–1	1.0	29.45	43,788	55	
	SE-BW5A-5-C-D-6-7	1,366	0–1	1.0	28.88	39,453	51	
	SE-BW5A-5-D-E-15-16	1,580	0–1	1.0	27.97	44,181	59	
	SE-BW5A-5-C-8-9	1,441	0–1	1.0	23.05	33,216	53	
	SE-BW5A-5-D-17-18	1,406	0–1	1.0	21.07	29,621	52	
	SE-BW5A-5-C-6	945	0–1	1.0	15.85	14,974	35	
	SE-BW5A-5-C-D-7-8	1,199	0–1	1.0	15.61	18,709	44	
	SE-BW5A-5-C-6-7	1,438	0–1	1.0	15.32	22,034	53	
	SE-BW5A-5-B-3	1,299	0–1	1.0	15.1	19,610	48	
	SE-BW5A-5-A-B-2-3	988	0–1	1.0	14.33	14,157	37	
	SE-BW5A-5-A-B-3-4	1,463	0–1	1.0	10.28	15,043	54	
	SE-BW5A-5-C-D-10-11	1,483	0–1	1.0	9.23	13,690	55	
	SE-BW5A-5-D-E-16-17	2,943	0–1	1.0	8.49	24,984	109	
	SE-BW5A-5-D-18-19	1,964	0–1	1.0	7.09	13,928	73	
	SE-BW5A-5-D-9-10	1,376	0–1	1.0	6.76	9,299	51	
	SE-BW5A-5-D-E-11-12	1,526	0–1	1.0	6.36	9,706	57	
	SE-BW5A-5-D-E-13-14	2,064	0–1	1.0	5.77	11,910	76	
	SE-BW5A-5-D-11-12	1,517	0–1	1.0	5.4	8,190	56	
	SE-BW5A-5-B-2	1,169	0–1	1.0	5.356	6,259	43	
	SE-BW5A-5-E-15-16	1,299	0–1	1.0	5.24	6,808	48	
	SE-BW5A-5-C-D-9-10	2,026	0–1	1.0	4.83	9,785	75	
	SE-BW5A-5-D-E-17-18	2,056	0–1	1.0	3.76	7,730	76	
	SE-BW5A-5-B-C-4-5	1,337	0–1	1.0	3.18	4,252	50	
	SE-BW5A-5-D-E-12-13	2,095	0–1	1.0	2.84	5,950	78	
	SE-BW5A-5-B-C-5-6	1,426	0–1	1.0	0.681	971	53	
	SE-BW5A-5-C-D-8-9	1,687	0–1	1.0	0.585	987	62	
	SE-BW5A-5-D-E-10-11	981	0–1	1.0	0.264	259	36	
BW5A-6	SE-BW5A-6-A-B-5-6	1,851	0–3	3.0	89.31	165,302	206	
		2,373	3–4	1.0		211,949	88	
	SE-BW5A-6-B-C-4-5	1,962	0–1.5	1.5	34.67	68,026	109	
	SE-BW5A-6-B-C-6	964	0–1.5, 2-3	2.5	10.78	10,392	89	
		2,140	3–4	1.0		23,054	79	
		5,463	4–5	1.0		58,867	202	
	SE-BW5A-6-C-6	888	0–1.5	1.5	16.51	14,651	49	
		1,251	1.5-2	0.5		20,657	23	
	SE-BW5A-6-B-C-5-6	1,763	0–1.5	1.5	35.87	63,245	98	
		2,159	1.5–2	0.5		77,447	40	
		1,763	2–3	1.0		63,244	65	
	SE-BW5A-6-B-6	880	0–1.5 2–3	2.5	17.14	15,082	81	
		1,062	1.5–2	0.5		18,198	20	
		945	3–4	1.0		16,200	35	
	SE-BW5A-6-C-D-6-7	1,677	0–1.5	1.5	10.18	17,080	93	
		1,700	1.5-2	0.5		17,310	31	
	SE-BW5A-6-D-1-2	380	0–1	1.0	4.85	1,843	14	
	SE-BW5A-6-C-D-3-4	1,471	0–1	1.0	4.40	6,471	54	
	SE-BW5A-6-D-2-3	572	0–1	1.0	3.60	2,055	21	
	SE-BW5A-6-A-B-4-5	1,485	0–1	1.0	1.62	2,405	55	
	SE-BW5A-6-B-C-4	1,355	0–1	1.0	0.78	1,054	50	
Total (Outside Core Area 1 Habitat)		101,845	-	-	-	1,682,503	3,965	361
Total (All Reach 5A Backwaters)[2]		**108,221**	**-**	**-**	**-**	**2,125,729**	**4,200**	**360**
					Volume-Weighted Average PCB (mg/kg)	**20.5**	**-**	**-**

Notes:

1. Volumes represent in-place quantities and are based on the target removal depth for each location. The total volumes for all Reach 5A backwaters (in bold) are rounded.
2. Cores SE-BW5A-3-A-B-3-4, SE-BW5A-3-A-B-4-5, SE-BW5A-3-A-B-5-6, and SE-BW5A-3-B-6 (shaded gray) have total PCB concentrations greater than 100 mg/kg and require off-site disposal.

-: not applicable
cy: cubic yard
mg/kg: milligram per kilogram
PCB: polychlorinated biphenyl
UDF: Upland Disposal Facility

Appendix F-2
Other Waterbodies

Table 2-1
Spatially Weighted Average PCB Summary: Outlet from Morewood Lake (W-OWB1)

Depth (feet)	Location ID	Existing		
		Total PCB (mg/kg)	Area (square feet)	TPCB × Area
0–1	SE-W-OWB1-01	1.285	1,937	2,489
	SE-W-OWB1-03	0.126	964	121
	SE-W-OWB1-02	0.1015	1,194	121
	SE-W-OWB1-04	0.0551	1,243	68
	SE-W-OWB1-05	0.04	2,454	98
		Total	7,792	2,898
		0–1 feet Average Total PCB (mg/kg)		**0.4**
1–1.5	SE-W-OWB1-03	0.038	4,612	175
	SE-W-OWB1-05	0.042	3,180	134
		Total	7,792	309
		1–1.5 feet Average Total PCB (mg/kg)		**0.04**
1.5–2	SE-W-OWB1-05	0.043	7,792	335
		Total	7,792	335
		1.5–2 feet Average Total PCB (mg/kg)		**0.04**

Notes:

Remedial Approach: No remediation required

Below remedial criteria; no remediation necessary

mg/kg: milligram per kilogram

PCB: polychlorinated biphenyl

Table 2-2
Spatially Weighted Average PCB Summary: West Pond (OWB-WP)

Depth (feet)	Location ID[1]	Remedial Approach	Existing			Post-Backfill		
			Total PCB (mg/kg)	Area (square feet)	TPCB × Area	Total PCB[2] (mg/kg)	TPCB × Area	Removal Volume (cy)
0–1	SE-WP-D-E-4-5	Dredge and backfill	12.74	2,503	31,869	-	-	93
	SE-WP-F-6-7		12.51	2,764	34,583	-	-	102
	SE-WP-C-D-3-4		8.47	2,291	19,407	-	-	85
	SE-WP-F-G-3-4		8.16	2,537	20,686	-	-	94
	SE-WP-B-C-5-6		7.74	1,843	14,257	-	-	68
		Structural offset[4]		299	2,316	8	2,316	-
	SE-WP-B-C-4-5	Dredge and backfill	7.62	2,486	18,944	-	-	92
	SE-WP-F-7-8		7.60	2,847	21,624	-	-	105
	SE-WP-D-E-5-6		7.57	2,500	18,913	-	-	93
	SE-WP-D-E-6-7		7.26	2,265	16,443	-	-	84
	SE-WP-G-4-5		7.17	2,020	14,478	-	-	75
	SE-WP-E-F-4-5		6.91	2,482	17,136	-	-	92
	SE-WP-E-F-5-6		6.66	2,554	16,996	-	-	95
	SE-WP-C-D-5-6		6.58	2,084	13,705	-	-	77
	SE-WP-F-G-4-5		6.54	2,099	13,720	-	-	78
	SE-WP-E-F-9-10		6.53	3,121	20,365	-	-	116
	SE-WP-D-E-3-4		6.46	2,479	16,009	-	-	92
	SE-WP-E-F-10-11		6.11	3,350	20,452	-	-	124
	SE-WP-E-F-3-4		5.41	2,392	12,930	-	-	89
	SE-WP-F-G-5-6		5.38	2,057	11,056	-	-	76
	SE-WP-D-E-2-3		5.26	2,274	11,963	-	-	84
	SE-WP-G-H-3-4		5.17	2,371	12,245	-	-	88
	SE-WP-E-F-8-9		5.05	2,619	13,211	-	-	97
	SE-WP-F-12-13		4.65	3,639	16,909	-	-	135
	SE-WP-E-F-2-3		3.08	2,275	7,006	-	-	84
	SE-WP-C-D-4-5		4.38	2,377	10,416	-	-	88
	SE-WP-F-G-2		3.95	1,280	5,054	-	-	47
	SE-WP-G-16-17		3.93	2,700	10,615	-	-	100
	SE-WP-G-18-19		3.29	2,915	9,575	-	-	108
	SE-WP-F-11-12		3.26	3,772	12,288	-	-	140
	SE-WP-E-9		3.17	1,569	4,975	-	-	58
	SE-WP-G-H-17-18		3.09	2,547	7,858	-	-	94
	SE-WP-E-7-8		3.03	1,902	5,760	-	-	70
	SE-WP-E-F-6-7		1.72	2,380	4,105	-	-	88
	SE-WP-G-5		0.88	1,746	1,529	-	-	65
	SE-WP-F-G-13-14		1.95	3,216	6,277	-	-	119
	SE-WP-G-15-16	Adjacent to remedial areas; Dredge and backfill	1.36	3,512	4,773	-	-	130
	SE-WP-G-19-20	Below remedial criteria	2.75	3,433	9,456	2.75	9,456	-
	SE-WP-G-H-2-3		1.64	1,790	2,932	1.64	2,932	-
	SE-WP-F-G-2-3		0.80	2,220	1,786	0.80	1,786	-
	SE-WP-A-B-4-5		0.65	1,840	1,200	0.65	1,200	-
	SE-WP-D-E-2		0.58	1,176	681	0.58	681	-
	SE-WP-B-C-3-4		0.30	1,415	431	0.30	431	-
	SE-WP-A-B-5-6		0.30	1,926	576	0.30	576	-
	SE-WP-E-8-9		0.29	1,736	512	0.29	512	-
	SE-WP-B-C-6		0.20	1,227	245	0.20	245	-
	SE-WP-C-D-6		0.11	1,726	188	0.11	188	-
	SE-WP-C-D-2-3		0.08	1,611	126	0.08	126	-
	SE-WP-E-F-2		0.04	1,515	55	0.04	55	-
			Total	111,685	518,640		20,505	3,325
			0–1 feet Average Total PCB (mg/kg)		**4.64**		**0.94**	

Table 2-2
Spatially Weighted Average PCB Summary: West Pond (OWB-WP)

Depth (feet)	Location ID[1]	Remedial Approach	Existing			Post-Backfill		
			Total PCB (mg/kg)	Area (square feet)	TPCB × Area	Total PCB[2] (mg/kg)	TPCB × Area	Removal Volume (cy)
1-1.5	SE-WP-F-G-3-4	Dredge and backfill	2.557	2,537	6,486	-	-	47
	SE-WP-B-C-5-6	Dredge and backfill	3.79	1,843	6,986	-	-	34
		Structural offset[4]	3.79	929	3,519	3.79	3,519	-
	SE-WP-F-7-8	Dredge and backfill	19.28	3,711	71,545	-	-	69
	SE-WP-D-E-5-6		7.04	2,500	17,601	-	-	46
	SE-WP-G-4-5		6.49	2,020	13,112	-	-	37
	SE-WP-E-F-4-5		6.99	2,482	17,347	-	-	46
	SE-WP-C-D-5-6		5.61	2,084	11,693	-	-	39
	SE-WP-E-F-9-10		8.01	3,121	25,000	-	-	58
	SE-WP-D-E-3-4		2.024	2,479	5,018	-	-	46
	SE-WP-E-F-10-11		1.472	3,350	4,931	-	-	62
	SE-WP-E-F-3-4		3.76	2,392	8,995	-	-	44
	SE-WP-E-F-8-9		4.45	2,631	11,706	-	-	49
	SE-WP-F-12-13		3.59	3,639	13,065	-	-	67
	SE-WP-E-F-2-3		2.739	2,298	6,295	-	-	43
	SE-WP-G-18-19		4.515	2,915	13,160	-	-	54
	SE-WP-F-11-12		1.1	3,772	4,149	-	-	70
	SE-WP-E-F-6-7		2.09	2,489	5,202	-	-	46
	SE-WP-G-5		6.22	1,746	10,862	-	-	32
	SE-WP-F-G-2-3		0.16	490	78	-	-	9
		Exclude portion of area[1]	0.16	2,564	410	0.16	410	-
	SE-WP-E-F-2	Dredge and backfill	0.033	422	14	-	-	8
		Exclude portion of area[1]	0.033	1,515	50	0.033	50	-
	SE-WP-D-E-4-5	Below remedial criteria	1.561	2,503	3,906	1.561	3,906	-
	SE-WP-F-6-7		0.0377	2,764	104	0.0377	104	-
	SE-WP-C-D-3-4		0.035	3,080	108	0.035	108	-
	SE-WP-B-C-4-5		1.121	3,051	3,420	1.121	3,420	-
	SE-WP-D-E-6-7		0.0315	2,638	83	0.0315	83	-
	SE-WP-E-F-5-6		1.738	2,554	4,439	1.738	4,439	-
	SE-WP-F-G-4-5		0.188	2,099	395	0.188	395	-
	SE-WP-F-G-5-6		0.0312	2,057	64	0.0312	64	-
	SE-WP-D-E-2-3		0.061	2,274	139	0.061	139	-
	SE-WP-G-H-3-4		0.303	2,371	718	0.303	718	-
	SE-WP-C-D-4-5		1.201	2,377	2,855	1.201	2,855	-
	SE-WP-E-9		0.836	1,569	1,312	0.836	1,312	-
	SE-WP-G-H-17-18		1.099	5,611	6,166	1.099	6,166	-
	SE-WP-G-19-20		6.295	3,433	21,611	6.295	21,611	-
	SE-WP-F-G-13-14		0.183	6,365	1,165	0.183	1,165	-
	SE-WP-G-H-2-3		0.603	1,790	1,079	0.603	1,079	-
	SE-WP-A-B-4-5		0.05	2,900	145	0.05	145	-
	SE-WP-D-E-2		0.056	1,176	66	0.056	66	-
	SE-WP-E-8-9		0.042	2,282	96	0.042	96	-
	SE-WP-B-C-6		0.12	1,464	176	0.12	176	-
	SE-WP-C-D-6		0.14	1,726	242	0.14	242	-
	SE-WP-C-D-2-3		0.034	1,672	57	0.034	57	-
1.5–2	SE-WP-B-C-5-6	Dredge and backfill	5.69	1,843	10,488	-	-	34
		Structural offset[4]	5.69	2,345	13,344	5.69	13,344	-
	SE-WP-E-F-2-3	Dredge and backfill	10.43	3,210	33,483	--	-	59
		Exclude portion of area[1]	10.43	2,383	24,859	10.43	24,859	-
	SE-WP-G-18-19	Dredge and backfill	9.37	2,915	27,311	--	-	54
		Exclude portion of area[1]	9.37	3,433	32,167	9.37	32,167	-
	SE-WP-F-11-12	Dredge and backfill	7.5	5,486	41,145	--	-	102
	SE-WP-D-E-4-5	Below remedial criteria	0.071	2,503	178	0.071	178	-
	SE-WP-C-D-3-4		0.083	4,017	333	0.083	333	-
	SE-WP-F-G-3-4		0.057	3,026	173	0.057	173	-
	SE-WP-B-C-4-5		0.032	4,535	145	0.032	145	-
	SE-WP-F-7-8		1.923	4,467	8,590	1.923	8,590	-
	SE-WP-D-E-5-6		0.079	2,500	198	0.079	198	-
	SE-WP-D-E-6-7		0.043	2,641	114	0.043	114	-
	SE-WP-G-4-5		0.17	2,020	343	0.17	343	-
	SE-WP-E-F-4-5		0.059	2,482	146	0.059	146	-
	SE-WP-E-F-5-6		0.069	2,579	178	0.069	178	-
	SE-WP-C-D-5-6		1.084	2,084	2,259	1.084	2,259	-
	SE-WP-F-G-4-5		0.139	2,099	292	0.139	292	-
	SE-WP-E-F-9-10		0.0675	6,474	437	0.0675	437	-
	SE-WP-D-E-3-4		0.17	2,481	422	0.17	422	-
	SE-WP-E-F-3-4		0.21	2,392	502	0.21	502	-
	SE-WP-F-G-5-6		0.034	3,260	111	0.034	111	-
	SE-WP-D-E-2-3		0.033	4,004	132	0.033	132	-
	SE-WP-G-H-3-4		0.033	2,371	78	0.033	78	-
	SE-WP-E-F-8-9		0.811	4,411	3,577	0.811	3,577	-
	SE-WP-F-12-13		5.63	8,613	48,491	5.63	48,491	-
	SE-WP-C-D-4-5		0.0741	2,377	176	0.0741	176	-
	SE-WP-G-H-17-18		2.34	7,002	16,384	2.34	16,384	-
	SE-WP-E-F-6-7		0.0541	3,618	196	0.0541	196	-
	SE-WP-G-5		0.037	1,748	65	0.037	65	-
	SE-WP-G-H-2-3		0.1825	3,175	580	0.1825	580	-
	SE-WP-B-C-6		0.088	1,464	129	0.088	129	-
	SE-WP-C-D-6		0.18	1,726	311	0.18	311	-

Table 2-2
Spatially Weighted Average PCB Summary: West Pond (OWB-WP)

Depth (feet)	Location ID[1]	Remedial Approach	Existing			Post-Backfill		
			Total PCB (mg/kg)	Area (square feet)	TPCB × Area	Total PCB[2] (mg/kg)	TPCB × Area	Removal Volume (cy)
2–2.5	SE-WP-D-E-5-6	Below remedial criteria	0.071	6,258	444	0.071	444	-
	SE-WP-G-4-5		0.049	10,864	532	0.049	532	-
	SE-WP-E-F-5-6		0.342	16,382	5,603	0.342	5,603	-
	SE-WP-C-D-5-6		0.088	8,757	771	0.088	771	-
	SE-WP-D-E-2-3		0.034	10,010	340	0.034	340	-
	SE-WP-F-12-13		1.429	8,613	12,308	1.429	12,308	-
	SE-WP-E-F-2-3		1.15	11,382	13,089	1.15	13,089	-
	SE-WP-G-18-19		0.0766	6,348	486	0.0766	486	-
	SE-WP-F-11-12		1.842	13,392	24,667	1.842	24,667	-
	SE-WP-G-H-17-18		0.039	7,002	273	0.039	273	-
	SE-WP-B-C-6		0.07	6,468	453	0.07	453	-
	SE-WP-C-D-6		0.062	6,210	385	0.062	385	-

Notes:

1. Thiessen polygons are generated based on the data available per depth interval. Select polygons at depth are split with a portion of that extent targeted for remediation based on the remedial extent of shallower depth intervals.
2. The measured PCB concentration is used for subsurface intervals not dredged, regardless of the extent of backfill placement.
3. EPA Condition 23 requested the inclusion of areas adjacent to locations exceeding the remedial criteria for constructability considerations and to mitigate potential for cross contamination.
4. A 10-foot structural offset has been applied to the removal polygon for SE-WP-B-C-5-6 due to the presence of two pipe structures that extend into West Pond.
5. Volumes represent in-place quantities and are based on the target removal depth for each location.

Remedial Approach: Dredge to achieve 1 mg/kg in the surface and subsurface, followed by backfill placement

Exceeds remedial criteria; dredge and backfill

Below remedial criteria; no remediation necessary

Adjacent to remedial areas; dredge and backfill per EPA Condition 23 (see note 3)

-: not applicable
cy: cubic yard
EPA: U.S. Environmental Protection Agency
mg/kg: milligram per kilogram
PCB: polychlorinated biphenyl

Table 2-3
Spatially Weighted Average PCB Summary: Lower Sackett Brook (E-OWB2)

Depth (feet)	Location ID	Existing		
		Total PCB (mg/kg)	Area (square feet)	TPCB × Area
0–1	SE-E-OWB2-06	1.1505	1,938	2,229
	SE-E-OWB2-01	0.76595	1,241	951
	SE-E-OWB2-07	0.3257	1,396	455
	SE-E-OWB2-08	0.2712	1,790	485
	SE-E-OWB2-04	0.11935	1,065	127
	SE-E-OWB2-03	0.11215	1,870	210
	SE-E-OWB2-05	0.089	1,663	148
	SE-E-OWB2-02	0.0674	2,529	170
	SE-E-OWB2-09	0.06135	3,733	229
		Total	17,224	5,004
		0–1 feet Average Total PCB (mg/kg)		**0.29**
1-1.5'	SE-E-OWB2-06	1.711	1,938	3,315
	SE-E-OWB2-07	0.041	1,396	57
	SE-E-OWB2-08	0.042	1,790	75
	SE-E-OWB2-03	0.06	2,370	142
	SE-E-OWB2-05	0.045	2,227	100
	SE-E-OWB2-02	0.0451	3,770	170
	SE-E-OWB2-09	0.2008	3,733	750
		Total	17,224	4,610
		1–1.5 feet Average Total PCB (mg/kg)		**0.27**
1.5-2'	SE-E-OWB2-03	0.068	17,224	1,171
		Total	17,224	1,171
		1.5–2 feet Average Total PCB (mg/kg)		**0.07**

Notes:

Remedial Approach: No remediation required

Below remedial criteria; no remediation necessary

mg/kg: milligram per kilogram

PCB: polychlorinated biphenyl

Table 2-4
Spatially Weighted Average PCB Summary: Lower Sykes Brook (E-OWB3)

Depth (feet)	Location ID	Remedial Approach	Existing			Post-Cap		
			Total PCB (mg/kg)	Area (square feet)	TPCB × Area	Total PCB[1] (mg/kg)	TPCB × Area	Removal Volume (cy)
0–1	SE-E-OWB3-03	Dredge and cap (surface)	17.733	2,789	49,465	0.08	224	103
	SE-E-OWB3-01	Below remedial criteria; no remediation necessary	1.332	1,566	2,085	1.33	2,085	-
	SE-E-OWB3-02		0.056	2,078	116	0.06	116	-
			Total	6,433	51,666		2,425	103
			0–1 feet Average Total PCB (mg/kg)		**8.03**		**0.38**	
1–1.5	SE-E-OWB3-03	Dredge and cap (see note 3)	118.4	2,789	330,268	0.08	224	52
	SE-E-OWB3-01	Outside remedial extent	0.043	1,566	67	0.04	67	-
	SE-E-OWB3-02		0.039	2,078	81	0.04	81	-
			Total	6,433	330,416		372	52
			1–1.5 feet Average Total PCB (mg/kg)		**51.4**		**0.06**	
1.5–2	SE-E-OWB3-03	Below surface cap	43.7	4,176	182,507	0.08	335	-
	SE-E-OWB3-01	Outside remedial extent	0.039	2,257	88	0.04	88	-
			Total	6,433	182,595		423	
			1.5–2 feet Average Total PCB (mg/kg)		**28.4**		**0.07**	

Notes:

1. Given that the Revised Final Permit did not establish specific Performance Standards or other requirements for the other waterbodies, PCB concentrations are evaluated against the Performance Standards for backwaters. In areas where an engineered cap will be placed, the post-cap surface and subsurface total PCB values assume 1% of the existing average surficial total PCB concentration in accordance with Section II.B.2.d(1)(a) in the Revised Final Permit.
2. Volumes represent in-place quantities and are based on the target removal depth for each location.
3. In response to EPA Condition 24, the removal depth at SE-E-OWB3-03 was adjusted to include removal of the 1 to 1.5-foot depth interval.

Remedial Approach: Removal of the top foot of sediment followed by engineered cap placement

Exceeds surface remedial criteria; dredge and cap

Below surface remedial criteria; no remediation necessary

-: not applicable

cy: cubic yard

EPA: U.S. Environmental Protection Agency

mg/kg: milligram per kilogram

PCB: polychlorinated biphenyl

Table 2-5
Spatially Weighted Average PCB Summary: Disposal

Area ID	Location ID	Area (square feet)	Target Dredge Inverval (feet)	Dredge Cut Thickness (feet)	Required Removal (Neat)		Disposal Volume[1] (cy)
					Depth-Weighted Average Total PCB (mg/kg)	TPCB × Area	On-Site (UDF)
E-OWB3	SE-E-OWB3-03	2,789	0–1.5	1.5	51.30	143,097	155
OWB-WP	SE-WP-B-C-4-5	2,486	0–1.0	1.0	7.62	18,944	92
	SE-WP-B-C-5-6	1,843	0–2.0	2.0	6.24	11,497	137
	SE-WP-C-D-3-4	2,291	0–1.0	1.0	8.47	19,407	85
	SE-WP-C-D-4-5	2,377	0–1.0	1.0	4.38	10,416	88
	SE-WP-C-D-5-6	2,084	0–1.5	1.5	6.25	13,034	116
	SE-WP-D-E-2-3	2,274	0–1.0	1.0	5.26	11,963	84
	SE-WP-D-E-3-4	2,479	0–1.5	1.5	4.98	12,345	138
	SE-WP-D-E-4-5	2,503	0–1.0	1.0	12.74	31,869	93
	SE-WP-D-E-5-6	2,500	0–1.5	1.5	7.39	18,476	139
	SE-WP-D-E-6-7	2,265	0–1.0	1.0	7.26	16,443	84
	SE-WP-E-7-8	1,902	0–1.0	1.0	3.03	5,760	70
	SE-WP-E-9	1,569	0–1.0	1.0	3.17	4,975	58
	SE-WP-E-F-10-11	3,350	0–1.5	1.5	4.56	15,279	186
	SE-WP-E-F-2 [2]	422	1–1.5	0.5	0.01	5	8
	SE-WP-E-F-2-3	2,275	0–1.0	1.0	4.83	10,992	84
		2,298	1–1.5	0.5		11,107	43
		3,210	1.5–2	0.5		15,513	59
	SE-WP-E-F-3-4	2,392	0–1.5	1.5	4.86	11,619	133
	SE-WP-E-F-4-5	2,482	0–1.5	1.5	6.93	17,206	138
	SE-WP-E-F-5-6	2,554	0–1.0	1.0	6.66	16,996	95
	SE-WP-E-F-6-7	2,380	0–1.5	1.5	1.85	4,395	134
	SE-WP-E-F-8-9	2,619	0–1.0	1.0	4.85	12,692	97
		2,631	1–1.5	0.5		12,749	49
	SE-WP-E-F-9-10	3,121	0–1.5	1.5	7.02	21,910	173
	SE-WP-F-11-12	3,772	0–1.5	1.5	3.78	14,254	210
		5,486	1.5–2	0.5		20,730	102
	SE-WP-F-12-13	3,639	0–1.5	1.5	4.29	15,628	202
	SE-WP-F-6-7	2,764	0–1.0	1.0	12.51	34,583	102
	SE-WP-F-7-8	2,847	0–1.0	1.0	11.49	32,713	105
		3,711	1–1.5	0.5		42,638	69
	SE-WP-F-G-13-14	3,216	0–1.0	1.0	1.95	6,277	119
	SE-WP-F-G-2	1,280	0–1.0	1.0	3.95	5,054	47
	SE-WP-F-G-2-3 [2]	490	1–1.5	0.5	0.08	39	9
	SE-WP-F-G-3-4	2,537	0–1.5	1.5	6.29	15,953	141
	SE-WP-F-G-4-5	2,099	0–1.0	1.0	6.54	13,720	78
	SE-WP-F-G-5-6	2,057	0–1.0	1.0	5.38	11,056	76
	SE-WP-G-15-16	3,512	0–1.0	1.0	1.36	4,777	130
	SE-WP-G-16-17	2,700	0–1.0	1.0	3.93	10,615	100
	SE-WP-G-18-19	2,915	0–2.0	2.0	5.11	14,905	216
	SE-WP-G-4-5	2,020	0–1.5	1.5	6.94	14,023	112
	SE-WP-G-5	1,746	0–1.5	1.5	2.66	4,640	97
	SE-WP-G-H-17-18	2,547	0–1.0	1.0	3.09	7,858	94
	SE-WP-G-H-3-4	2,371	0–1.0	1.0	5.17	12,245	88
Total		**110,808**	**-**	**-**	**-**	**750,397**	**4,640**
Volume-Weighted Average PCB (mg/kg)						**6.8**	**-**

Notes:

1. Volumes represent in-place quantities and are based on the target removal depth for each location. The total volume for all Reach 5A other waterbodies (in bold) is rounded.

2. Include the portion of SE-WP-E-F-2 and SE-WP-F-G-2-3 from 1 to 1.5 feet that overlaps with the extent of SE-WP-E-F-2-3 from 1.5 to 2 feet.

cy: cubic yard
E-OWB3: Lower Sykes Brook
mg/kg: milligram per kilogram
OWB-WP: West Pond
PCB: polychlorinated biphenyl
UDF: Upland Disposal Facility

Appendix F-3
Riverbanks

Disposal Evaluation for Riverbank Remediation

As described in Section 9.1 of the *Final Remedial Design/Remedial Action Work Plan for Reach 5A* (Final RD/RA Work Plan), a total of approximately 16,700 linear feet of riverbanks were identified for soil removal and stabilization in Reach 5A. Those banks subject to remediation were identified in part based on soil polychlorinated biphenyl (PCB) concentrations measured within the top one foot of soil. However, in addition, as described in Section 9.4 of the Final RD/RA Work Plan, application of the principles of Natural Channel Design required additional bank grading (and other stabilization measures and channel modifications) to reduce bank erosion and maintain a stable channel in Reach 5A. That bank grading required to maintain a stable channel included additional bank areas (i.e., in addition to the 16,700 feet noted above), and in many instances, extended into the adjacent floodplain beyond the existing top of bank.

On-site versus off-site disposal of excavated riverbank (and adjacent floodplain soils that will be removed due to the bank grading) was determined based on a combination of riverbank and floodplain soil PCB concentrations. As described in Section 3.6 of the Final RD/RA Work Plan, soil to be disposed of on-site in the Upland Disposal Facility (UDF) must have a volume-weighted average PCB concentration of less than 50 milligrams per kilogram (mg/kg). If the volume-weighted average PCB concentration of riverbank soils to be removed from Reach 5A equals or exceeds 50 mg/kg, soil with the highest PCB concentrations will be segregated for off-site disposal until the average concentration of the remaining soil to be removed decreases to less than 50 mg/kg for subsequent disposal in the UDF.

Because PCB concentrations in riverbank soils and floodplain soils were characterized only in the top one foot of soil during the Pre-Design Investigation (PDI),[1] a surface-weighted average concentration (SWAC) of PCBs was calculated as an approximation for the volume-weighted average PCB concentration for the disposal evaluation. For the riverbank areas subject to soil excavation and grading, Thiessen polygons of 0- to 1-foot riverbank soil PCB samples were used to calculate the SWAC. For the floodplain areas subject to grading, Thiessen polygons of 0- to 0.5-foot and 0.5- to 1-foot floodplain soil PCB samples were used to calculate the SWAC.[2] The grading areas that overlap with any planned removal as part of the residential and/or non-residential floodplain soil remediation in Reach 5A were excluded from this evaluation.

Results of the disposal evaluation are summarized in Table 3-1. The overall SWAC for excavated riverbank and floodplain soils in Reach 5A is approximately 15 mg/kg, with averages of 9 mg/kg in

[1] See Section 5.1 of the Final RD/RA Work Plan for details related to riverbank and floodplain soil PDI sampling.

[2] The same concentrations were also used for the evaluation of floodplain remediation for the non-residential floodplain Exposure Areas. Detailed descriptions on the development of floodplain PCB concentrations are provided in Appendix F of the *Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A* (Anchor QEA et al. 2023).

the riverbank soil portion and 19 mg/kg in soil from the adjacent floodplain due to grading. Since the resulting SWAC of 15 mg/kg is well below the 50 mg/kg criterion for on-site disposal, all excavated soils will be disposed of in the UDF. Although the soil excavation associated with bank grading extends to depths greater than one foot, the 0- to 1-foot SWAC calculations presented here are considered reasonably applicable to the volume-weighted average PCB concentration for the purposes of evaluating disposal. This evaluation will be refined after the remedial design downstream of Station 48+00 and the resulting excavation volume in Reach 5A are finalized.

Table 3-1
Estimated Reach 5A PCB Concentrations for Disposal

Remediation Area	Area (acre)	SWAC PCBs (mg/kg)
Riverbank (shoreline to top of bank)	2.8	9.0
Grading (floodplain)	6.0	18.5
All	8.8	15.5

Reference

Anchor QEA, AECOM, and Arcadis, 2023. *Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A*. Housatonic River – Rest of River. Prepared for General Electric Company, Pittsfield, Massachusetts. September 2023.

Appendix G
Evaluation of Potential Sediment Remediation Methods for Reach 5A River Channel



April 2026
Housatonic River – Rest of River

ANCHOR QEA

Evaluation of Potential Sediment Remediation Methods for Reach 5A River Channel

Prepared for General Electric Company

April 2026
Housatonic River – Rest of River

Evaluation of Potential Sediment Remediation Methods for Reach 5A River Channel

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ABBREVIATIONS

EPA	U.S. Environmental Protection Agency
Final RD/RA Work Plan	*Final Remedial Design/Remedial Action Work Plan for Reach 5A*
Revised Final Permit	Revised Final Resource Conservation and Recovery Act Permit Modification
SIP	Supplemental Information Package
UDF	Upland Disposal Facility

1 Introduction

This appendix to the *Final Remedial Design/Remedial Action Work Plan for Reach 5A* (Final RD/RA Work Plan) describes possible methods that the remediation contractor may use to carry out the sediment remediation within the Reach 5A river channel.

According to Section II.B.2.a.(2)(a) of the Revised Final Resource Conservation and Recovery Act Permit Modification (Revised Final Permit), sediment removal and capping in Reach 5A "shall generally use engineering methods employed from within the river channel or other methods approved by the U.S. Environmental Protection Agency (EPA)" (EPA 2020). The unique features of Reach 5A present a range of challenges for remediation, including limited access due to steep banks in some areas, two vehicular bridges, utility crossings, residential areas, and extensive floodplain wetland habitats (such as wet meadows, marshes, shrub swamps, and forested wetlands) that make up most of the surrounding area. Additionally, shallow water conditions during the summer limit the feasibility of barge use, deeper water in certain locations prevents the use of standard excavation equipment, and variable flow conditions can cause rapid changes in river levels following precipitation events.

Due to these constraints, several key aspects of the remedy for the Reach 5A channel must be developed based on the remediation contractor's proposed methods. These include river access points and strategies, equipment selection and deployment, sediment removal techniques, handling, dewatering and transport approaches, cap material delivery and placement, temporary stabilization measures, and sequencing of activities both in the river and near the banks.

Remediation contractor input is essential to determine the remediation methods and techniques that will be used in each section of Reach 5A and to develop site-specific implementation details and plans that are effective, efficient, and compliant with the design requirements. Accordingly, those implementation details will be formulated following remediation contractor procurement and will be incorporated into future Supplemental Information Packages (SIPs) submitted for EPA review and approval to ensure that the selected means and methods are responsive to site conditions while meeting the Performance Standards and intent of the Revised Final Permit.

Final selection of the means and methods for performing the in-water sediment remedial construction will consider the following key factors:

- Ability to meet Performance Standards specified in the Revised Final Permit;
- Use of removal and capping methods employed from within the river channel, to the extent practicable;
- Access to the river;

- Access to nearby properties to support sediment dewatering, material segregation, and material staging;
- Ability to achieve sediment removal and cap placement to the required elevations and within acceptable tolerances;
- The need to segregate excavated material for disposal at the Upland Disposal Facility (UDF) or for off-site disposal;
- Ability to remove and handle large woody debris from the river channel;
- The need to reconstruct the river channel and banks after sediment removal (i.e. consistent with the principles of Natural Channel Design);
- Adaptability to variable water depths and river flow conditions;
- Achievement of production rates consistent with the timeframe contemplated in the Revised Final Permit;
- The need to minimize disturbance to private residential properties;
- The need to minimize impacts to sensitive habitat areas for construction of staging areas and access roads; and
- The ability to minimize downstream transport of suspended sediment or turbidity from cap material placement to the extent practicable.

Given the factors and constraints listed above, multiple methods may be used for sediment removal, capping, and restoration within and along the main river channel in Reach 5A. An adaptive management approach will be implemented to effectively complete the remediation, in which lessons learned and experience working in one section of Reach 5A are used to adjust the remedial design or construction methods for other sections of the reach, to the extent practicable.

This appendix is limited to a description of potential methods for sediment removal in the Reach 5A river channel. It is anticipated that some of these methods may also be applicable to sediment removal in backwater and Other Waterbody areas; however, sediment remediation methods for those areas located outside the main river channel will be documented in a future SIP(s) after receiving input from the remediation contractor and may be implemented, if appropriate, in coordination with adjacent floodplain remediation activities.

2 Potential Sediment Remediation Approaches for River Channel

This section describes potential approaches that may be used to implement sediment remediation operations within the river channel in Reach 5A. The remediation contractor will ultimately be responsible for selecting the specific equipment, means, and methods used to perform sediment removal, capping, and restoration activities. Accordingly, the approaches described herein are intended to represent potentially feasible implementation concepts, and the equipment and methods ultimately used by the contractor may differ from those described. Final implementation approaches will be formulated following remediation contractor procurement and will be incorporated into future SIPs.

The following approaches are considered potentially feasible to complete the sediment remediation in the Reach 5A river channel:

- Mechanical excavation within contained, dewatered (i.e., dry) work areas (similar to the approach that was used for remediation of the Upper 0.5-Mile Reach and portions of the 1.5-Mile Reach);
- Mechanical excavation under wet conditions with equipment operating in shallow water areas or along disturbed banks, or using amphibious equipment;
- Mechanical excavation from temporary access roads or temporary causeways constructed within portions of the river channel to access in-river work zones;
- Mechanical excavation under wet conditions using floating equipment in areas with sufficient water depth or by installing temporary weirs to raise the water surface elevation to facilitate use of floating equipment; and
- Hydraulic removal and/or hydraulic material transport in in areas with sufficient water depth or by installing temporary weirs to raise the water surface elevation to facilitate use of floating equipment.

A generalized summary of these potential approaches is provided in the following subsections.

Use of temporary dams and gravity-fed or pumped bypass systems to divert the entire river flow (i.e., similar to the approach that was used for a portion of the river channel in the 1.5-Mile Reach) may be feasible under low-flow conditions. However, this approach is not considered likely to be practicable for Reach 5A given the magnitude of river flows downstream of the confluence of the East and West Branches and other hydraulic inputs to the river.

Due to the prevalence of highly accurate, sensor-equipped construction equipment that uses GPS as well as digital inclinometer sensors to accurately position equipment within digital terrain models, it

is no longer the case that digging and/or placing materials in dry conditions provides substantial accuracy advantages over digging and/or placing materials in wet conditions. Under both conditions, the equipment operator uses a computer screen to confirm that correct removal or placement elevations are being achieved. This liberates the remediation contractor to select the appropriate removal and placement technologies based on site conditions and project requirements.

Ultimately, sediment remediation in the Reach 5A channel will likely involve a combination of multiple methods and equipment types, with the final approach tailored to site conditions and selected means and methods based on remediation contractor input.

2.1 Mechanical Excavation Within Contained, Dewatered Work Areas

One potential approach for sediment remediation in Reach 5A is the use of mechanical excavation equipment operating within contained, dewatered work areas, such as cofferdams.

For this approach, dewatered work areas would be constructed by installing temporary water diversion or containment structures (e.g., using steel sheet piles or other methods) to isolate work areas from the river by diverting river flow around the work area. These temporary structures would be designed to withstand location-specific hydrostatic and hydrodynamic forces from the adjacent channel. This approach assumes that the diversion/containment structures can be constructed using equipment working from within the river channel or from riverbank areas where remediation work is planned. Once installed, the work areas would be dewatered through pumping. Initially, water pumped from the containment cell would be diverted directly to the adjacent flowing river and, as the water depth approaches the sediment bed, the pumped water would be routed to a nearby water treatment system. The containment structures may be designed to allow controlled overtopping during higher flows events, with allowable conditions to be established during the containment structure design (if implemented).

As documented in the *Supplemental Data Collection Summary Report for Reach 5A* (Anchor QEA et al. 2026), glacial till was encountered at in-river borings along portions of the river alignment and may present challenges for sheet pile installation. The shallowest interpreted till or rock depths occur between approximately river Station 45+25 and 70+00, with till depths ranging from 0 to approximately 17 feet below the mudline. In these areas, the high strength of the shallow till may make conventional sheet pile installation difficult or infeasible; therefore, alternative or supplemental construction methods may be required.

Use of contained, dewatered work areas within a flowing river also presents several implementation challenges that can affect schedule and constructability, particularly in areas where subsurface conditions are variable or uncertain. Installation and subsequent removal of sheet pile cofferdams can be time-consuming and may affect overall productivity. The installation of sheet piles can also be

loud, and in order to achieve the noise standards established in GE's *Second Revised Quality of Life Compliance Plan* (Anchor QEA and Arcadis 2025), installation productivity may need to be reduced. In portions of the river where shoreline access is limited, transporting sheet pile sections and installation equipment to in-river locations may require delivery from within the channel, which can further reduce installation efficiency and extend site preparation durations. These factors can result in relatively slow production rates compared to other in-river construction methods. In addition, cofferdam systems introduce added sequencing complexity and schedule sensitivity by requiring completion of sheet pile installation and dewatering before sediment removal can begin and then performing the same activities on the opposite side of the river prior to advancing downstream.

Within the dewatered work areas, appropriately sized track-mounted excavators would remove sediments and load material into off-road haul vehicles for transport to nearby staging areas. At the staging areas, the dredged material would be processed and conditioned to meet requirements for transport and disposal to either the UDF or an off-site disposal facility. Excavation and hauling equipment would need to be capable of operating on uneven terrain and within shallow water conditions. Where necessary, culverts or temporary crossing structures would be constructed to allow construction equipment to cross diverted river channel to access the staging areas. Once sediment removal limits are confirmed, the engineered cap and river channel and riverbank restoration measures would be constructed within the contained work areas under the dewatered conditions.

2.2 Mechanical Excavation Under Wet Conditions

Another potential approach for sediment remediation in Reach 5A is the use of mechanical excavation equipment operating directly in the active river channel. This approach is best suited for locations where and when hydraulic conditions and water depths allow for safe and effective equipment access. Depending on river flow and site conditions, conventional track-mounted excavators or amphibious excavation equipment could be used, with equipment selection based on water depths, flow velocity, and substrate bearing capacity.

In areas characterized by granular sediments and shallow water conditions, conventional track or even wheel-mounted excavators and haulage equipment may be used. In areas characterized by soft or saturated sediments and variable water depths that can exceed the operating limits of conventional equipment, amphibious excavators and material-hauling vehicles may be more suitable. Amphibious equipment offers several advantages for work in riverine areas where water depths vary from shallow margins to deeper channels. These specialized machines are designed to operate effectively within the aquatic environment, providing continuous access without the need for temporary access roads, barges, or extensive dewatering infrastructure. Their low ground pressure reduces disturbance to the riverbed and adjacent habitats and improves stability in soft or unconsolidated sediments. The ability to excavate and transport material within the river also

enhances operational flexibility, reduces the overall construction footprint, and supports efficient sequencing of sediment removal and cap placement. However, amphibious equipment generally operates at lower transit speeds than conventional equipment, and production and material transport rates would need to be evaluated relative to other potential implementation methods. In addition, in conditions where the amphibious excavators do not have contact with the river bottom, an anchoring system would be utilized.

Performing excavation and cap placement under wet conditions in a flowing river presents several challenges related to hydraulic variability and constructability that must be actively managed. River flows and water levels can change rapidly due to storm events, increasing water velocities that reduce operational control and require active day-to-day management. Active in-river work can also increase the potential for turbidity and sediment resuspension, necessitating careful monitoring and, where needed, adjustment of construction operations. In addition, at higher river flow velocities, work may need to slow down or be stopped due to equipment stability, and the potential for increased resuspension of removed sediment or newly placed cap materials.

Successful implementation under wet conditions requires appropriate operational controls, careful sequencing of activities, real-time monitoring, and proactive monitoring and management of hydraulic conditions to maintain constructability and environmental performance.

2.3 Mechanical Excavation from a Temporary Causeway

Another potential method for sediment remediation in Reach 5A involves construction of a temporary access road or causeway within portions of the river channel or to provide access to otherwise difficult-to-reach areas. The temporary roadway or causeway would serve as a stable work platform for excavation equipment operating under wet conditions and represents a variation of the wet construction approaches described in Section 2.2.

Under this method, temporary access roads or causeways could be constructed using imported aggregate, geogrids, construction mats, or other suitable materials to provide a raised work surface for construction equipment. Depending on the river flow, the raised work surface may be dry or wet. The temporary access road or causeway could be configured to extend longitudinally along the river channel or laterally across targeted work areas, depending on location-specific geometry, access constraints, and construction sequencing.

Once constructed, conventional excavation equipment (e.g., track- or wheel-mounted excavators, long-reach excavators, material handlers, and off-road haul vehicles) would operate from the temporary access road or causeway to perform sediment removal and cap placement activities. Excavated material would be loaded directly into off-road haul vehicles and transported to nearby staging areas, while cap materials would be delivered via the same temporary access features and

placed using conventional earthmoving equipment. Directly loading into off-road haul vehicles would reduce or eliminate additional material handling that may be necessary for methods relying on amphibious transport equipment or barges/scows.

Construction of temporary access roads or causeways would require careful layout, design, and sequencing based on the site-specific hydraulic and geomorphic conditions to minimize impacts to flow conveyance, maintain stability during typical and elevated flows, and avoid unintended effects on adjacent work areas. The use of temporary access roads or causeways may be best suited for localized areas where site conditions limit the feasibility or effectiveness of other remediation methods.

In addition, construction and removal of temporary access roads or causeways would involve disturbance of in-river sediments and would need to be carefully sequenced and managed to minimize turbidity and sediment resuspension during those activities, consistent with applicable monitoring requirements and Performance Standards.

Following completion of necessary sediment removal, capping, and restoration activities within a given work area, the materials used to construct the temporary access roads and causeways would be removed, and any required remediation and restoration would be completed beneath those access features. Following removal of temporary access roads and causeways, the construction materials may be reused to construct access in other areas or used to construct the cap erosion protection layer if the materials meet those specifications.

2.4 Mechanical Excavation Using Floating Equipment

Sediment remediation projects often involve the use of dredge equipment operating from floating platforms and the transport of dredged material in barges or smaller scows. It is anticipated that a minimum of three feet of water depth would be necessary to use floating mechanical excavation equipment. The narrow channel and shallow water in the upper portions of Reach 5A are not suitable for barge use. In lower portions of Reach 5A and/or during periods of higher flow, barge use could be an option; however, highly variable river flows may limit the reliability and consistency of floating equipment operations at certain times of the year.

One method to increase water depths to facilitate use of floating equipment is to install temporary weirs across the river channel to increase the water surface elevation within a segment of the river. The primary objective of this method would be to create sufficient water depth to allow the use of floating equipment (e.g., barges outfitted with mechanical excavation equipment and material transport scows) in areas where existing water depths are otherwise too shallow to support such operations. The temporary weirs would be installed at the downstream end of a work area to raise upstream water levels. These structures could be constructed using temporary sheet pile or other

temporary measures designed to withstand anticipated hydraulic conditions. Constructing a weir that raises upstream water surface elevations would also provide an additional construction benefit by reducing average upstream flow velocities within the backwater induced by the weir while still passing the same volumetric flow rate.

When selecting locations and crest elevations for a temporary weir, several hydraulic, geomorphic, and constructability factors would need to be considered to ensure the weir achieves the intended backwater effect without creating unacceptable risks. The selected weir elevation would need to provide sufficient water depths for construction while preventing flooding of adjacent areas. Key considerations for weir design would include the existing channel slope and cross-sectional geometry (including bank heights), as these control how far upstream the backwater will extend and how effectively velocities will be reduced for a given crest elevation. The weir would need to be located where increased water depths do not cause upstream flooding, bank instability, or inundation of adjacent properties or sensitive habitats. Additional considerations include anticipated flow variability during the construction period; provisions for safe overtopping during high-flow events; substrate conditions for weir installation; scour protection downstream of the weir; and the ability to fully remove the structure following the completion of remedial construction in the designated river segment.

If a temporary weir is constructed to establish adequate water depths, sediment removal could be performed using barge-mounted mechanical excavators that would load dredged material into small scows for transport to a transloading area. At the transloading area, material would be transferred to upland material haul vehicles for transport to a nearby staging area for dewatering, processing, and staging prior to disposal. Barge-mounted cap placement could also be used to facilitate construction, and the reduced average water velocities associated with weir-induced backwater would be more favorable for cap material placement and turbidity control.

2.5 Hydraulic Dredging

Another construction method often used in sediment remediation projects is hydraulic dredging and material transport. Under appropriate site conditions, hydraulic dredging may be used as an alternative to mechanical excavation methods for sediment removal in the Reach 5A river channel under wet conditions.

The feasibility of hydraulic dredging in a riverine environment depends on several site-specific factors, including sediment characteristics, water depth, and the presence of debris or coarse material that could interfere with dredge cutterheads or pumping systems. Available space for staging areas, pipelines, and dewatering and water treatment facilities is also a critical factor in determining the viability of hydraulic dredging operations.

Sediment characteristics within Reach 5A are predominantly sand and fine gravel; however, there are several areas containing coarse gravel, cobbles, and boulders, as well as considerable amounts of woody debris both within the channel and buried in the riverbed. While hydraulic dredging can be well suited for rivers dominated by sands and, to a lesser extent, fine gravels, areas containing coarse gravel, cobbles, boulders, or abundant woody debris present significant limitations. Coarse materials cannot be readily or reliably dredged and transported hydraulically and would cause excessive wear, damage, or blockages within dredge equipment, pumps, and pipelines. Woody and buried debris can interfere with dredging operations and interrupt production.

As a result of these riverine conditions, combined with the relatively narrow channel geometry and generally shallow water depths in Reach 5A, hydraulic dredging is not considered suitable throughout much of the reach. In many locations, these limitations would require the use of a combination of remediation methods rather than exclusive reliance on hydraulic dredging (i.e., debris and larger materials would require mechanical removal methods).

Similar to mechanical excavation using floating equipment (as described in Section 2.4), limited hydraulic dredging or hydraulic material transport may be considered by the remediation contractor in isolated downstream portions of Reach 5A where shoreline access is limited. Hydraulic dredging operations would likely require work during periods of higher flow or installation of a temporary weir to raise water surface elevations if existing water depths are insufficient (see also Section 2.4).

If determined to be feasible, hydraulic dredging equipment would utilize a cutterhead or suction head to fluidize and pump sediment as a slurry through a pipeline to a designated dewatering and staging area, where dredged material would undergo dewatering and processing prior to disposal. Compared to mechanical excavation, hydraulic dredging (or mechanical dredging with hydraulic material transport) would require a larger and more complex staging area footprint, including additional space for slurry management, dewatering, and a higher-capacity water treatment system to manage and treat return water.

Hydraulic transport systems may also be used to place finer-grained cap materials under suitable conditions; however, placement of coarser cap materials required for erosion protection would require mechanical placement methods.

3 Conclusion

Overall, remediation of sediment in the Reach 5A river channel will need to be flexible, location-specific, and adaptive due to the variable hydraulic conditions, access constraints, sediment characteristics, and habitat considerations present along the reach. It is anticipated that a combination of methods may be implemented to complete the sediment remediation in the river channel, with equipment selection and construction methods tailored to project requirements, seasonal river flow, site conditions, and construction sequencing needs.

Final selection and application of remediation methods will be informed by remediation contractor input following procurement, including equipment selection, means and methods, and staging and access strategies. Detailed implementation plans, controls, and sequencing approaches will be developed in coordination with the remediation contractor and documented in the respective SIPs that will be submitted to EPA for review and approval for each construction season. In addition, an adaptive management approach will be applied to allow remediation methods to be adjusted, as appropriate, based on lessons learned and experience gained during prior construction seasons.

4 References

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Appendix H
Engineered Cap Modeling and Design Evaluations



April 2026
Housatonic River – Rest of River

ANCHOR QEA

Engineered Cap Modeling and Design Evaluations

Prepared for General Electric Company
Pittsfield, Massachusetts

April 2026
Housatonic River – Rest of River

Engineered Cap Modeling and Design Evaluations

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ABBREVIATIONS

µg	microgram
AC	activated carbon
BTZ	bioturbation zone
cfs	cubic feet per second
cm	centimeter
cm^2	square centimeter
cm^3	cubic centimeter
Conceptual RD/RA Work Plan	*Conceptual Remedial Design/Remediation Action Work Plan for Reach 5A*
D_{15}	15th percentile particle size
D_{50}	median (50th percentile) particle size
D_{85}	85th percentile particle size
D_{100}	maximum particle diameter
DOC	dissolved organic carbon
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FMD	*Final Model Documentation Report*
f_{OC}	fraction organic carbon
g	gram
GAC	granular activated carbon
GE	General Electric Company
HEC-RAS	Hydrologic Engineering Center – River Analysis System
ITRC	Interstate Technology and Regulatory Council
K_d	partition coefficient
K_{DOC}	dissolved organic carbon partition coefficient
kg	kilogram
K_{OC}	organic carbon partition coefficient
K_{OW}	octanol/water partition coefficient
L	liter
mg	milligram
MT	metric ton
NC	not calculated
OC	organic carbon
Other Waterbodies	Other waterbodies in Reach 5A containing sediment
PAC	powdered activated carbon
PCB	polychlorinated biphenyl

PDI	pre-design investigation
PDI Summary Report for Sediment and Riverbanks	*Pre-Design Investigation Summary Report for Reach 5A Sediment and Riverbanks*
Revised Final Permit	Revised Final Resource Conservation and Recovery Act Permit Modification
RFI	RCRA Facility Investigation
ROR	Rest of River
SDC	supplemental data collection
SPME	solid-phase microextraction
Subaqueous Capping Guidance	*Guidance for In-Situ Subaqueous Capping of Contaminated Sediments*
TOC	total organic carbon
Treatability Studies Summary Report	*Treatability Studies Summary Report for Reach 5A*
TSS	total suspended solids
UCL	upper confidence limit
USACE	U.S. Army Corps of Engineers
yr^{-1}	per year

1 Introduction

1.1 Background

The Revised Final Resource Conservation and Recovery Act Corrective Action Permit Modification (Revised Final Permit) issued by the U.S. Environmental Protection Agency (EPA) to the General Electric Company (GE) for the Housatonic Rest of River (ROR; EPA 2020) requires installation of an engineered cap for certain waterbodies in the ROR and sets forth Performance Standards for those caps. The ROR is defined as that portion of the Housatonic River and its backwaters and floodplain (excluding certain Actual/Potential Lawn areas) located downstream of the confluence of the East and West Branches of the Housatonic River (Confluence). This *Engineered Cap Modeling and Design Evaluations* report describes the engineered cap design evaluations conducted for the sediments of Reach 5A, including the main channel (which includes the lower portion of Sykes Brook) and associated backwaters in Reach 5A that will be subject to capping (BW5A-1, BW5A-2, BW5A-4, and BW5A-5), as shown in Figure 1-1. It is being submitted as an appendix to the *Final Remedial Design/Remedial Action Work Plan for Reach 5A* (Final RD/RA Work Plan) in support of the remedial design for Reach 5A.

1.2 Cap Design Evaluation Scope and Requirements

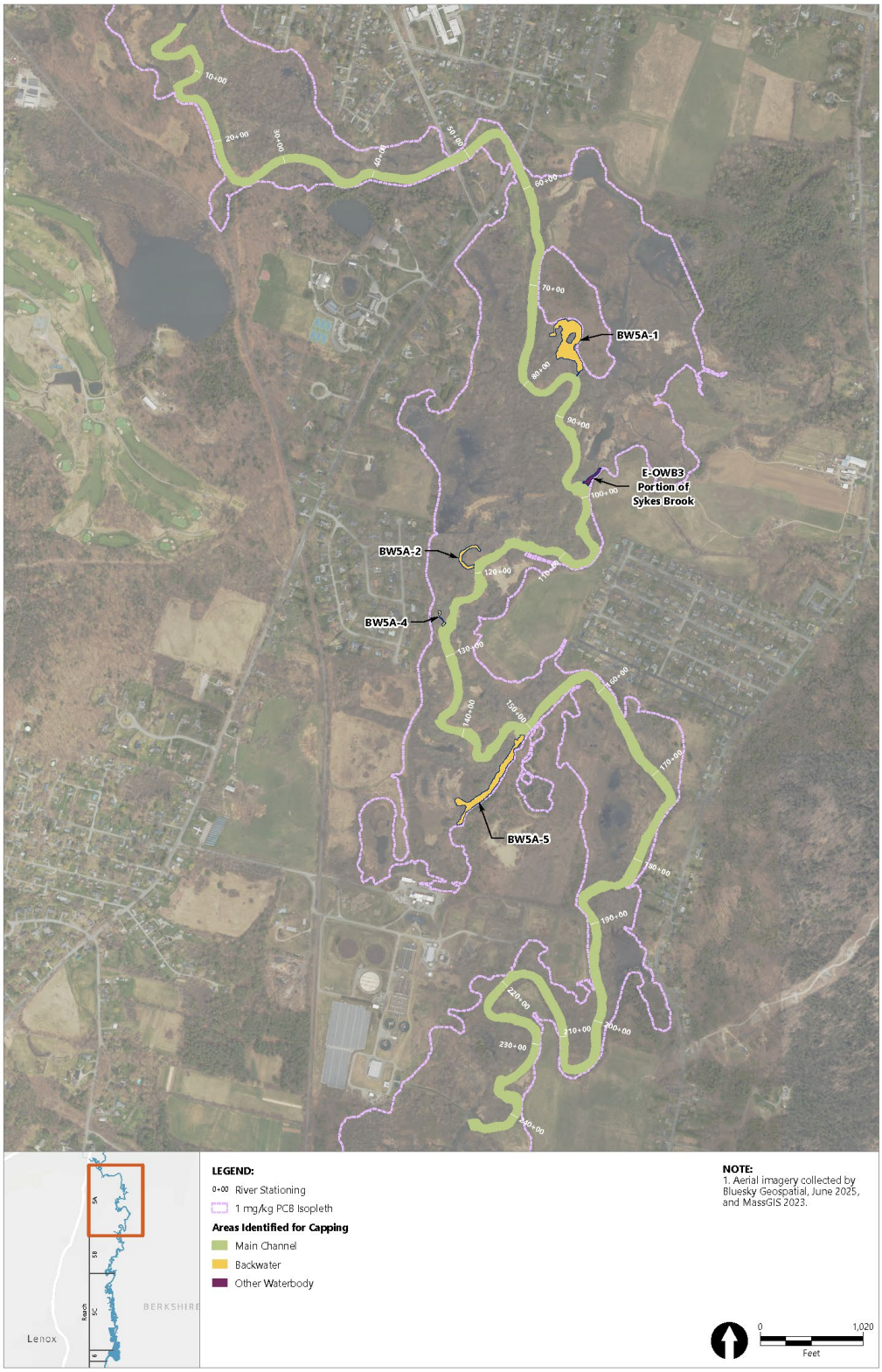
As stated in the Revised Final Permit, the engineered caps are required to be designed "to physically isolate contaminated sediments from potential ecological and human receptors, and minimize the transport of PCBs from the sediment beneath the caps to the bioavailable surface layer and the water column" (Section II.B.2.i.(2)). The designs for the engineered caps in Reach 5A were developed in accordance with guidance set forth in EPA's *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* (EPA 2005), EPA's *Guidance for In-Situ Subaqueous Capping of Contaminated Sediments* (Subaqueous Capping Guidance; Palermo et al. 1998), and the Interstate Technology and Regulatory Council's (ITRC's) *Contaminated Sediments Remediation: Remedy Selection for Contaminated Sediments* (ITRC 2014) and *Sediment Cap Chemical Isolation Guidance* (ITRC 2023). In addition, the final design addresses the conditions in EPA's December 3, 2024 conditional approval of GE's September 2023 *Conceptual Remedial Design/Remediation Action Work Plan for Reach 5A* (Conceptual RD/RA Work Plan; Anchor QEA et al. 2023).

1.2.1 Areas to Be Capped

The Performance Standards for riverbed and backwater sediments set forth in the Revised Final Permit require that an engineered cap be placed over the entire riverbed in Reach 5A and in portions of backwater areas requiring removal to achieve polychlorinated biphenyl (PCB) concentration requirements in those areas. As described in Sections 8.1.1.2 and 8.1.2.2 of the Final RD/RA Work Plan, engineered caps will be placed in the entire riverbed and in all or portions of four backwaters

(i.e., BW5A-1, BW5A-2, BW5A-4, and BW5A-5). Also, as discussed in Section 8.1.2.2.3 of the Final RD/RA Work Plan, GE has elected to evaluate the five Other Waterbodies in Reach 5A against the Performance Standards for backwaters. Based on those evaluations, an engineered cap will be placed in one of those areas—namely, a portion of Lower Sykes Brook. The areas to be capped are shown on Figure 1-1.

Figure 1-1
Reach 5A Areas Identified for Capping



1.2.2 Cap Layers

The Performance Standards for engineered caps set forth in the Revised Final Permit (Section II.B.2.i.(1)(a)) require that engineered caps constructed in the ROR include the following layers or functions: a mixing layer, a chemical isolation layer, an erosion protection layer, a geotechnical filter layer, a bioturbation layer, and a habitat layer. The Revised Final Permit indicates that a single layer can serve multiple functions, which is consistent with EPA's Subaqueous Capping Guidance. The specific layers and their need for inclusion in the Reach 5A caps are based on the design evaluations presented in this report and discussed in the following subsections.

1.2.2.1 Mixing Layer

The Performance Standards for engineered caps state that the cap shall include a "mixing layer to prevent contamination of the chemical isolation layer due to mixing with underlying contaminated sediment during cap placement, taking into account geotechnical considerations, placement techniques, and other factors as appropriate" (Section II.B.2.i.(1)(a)(i)). The concept of a dedicated mixing layer was included in EPA's Subaqueous Capping Guidance based on experience in constructing caps at that time. However, experience from capping projects conducted since that time indicates that contemporary placement techniques have been able to place materials with minimal mixing (e.g., less than one inch; Anchor Environmental 2007; Shaw et al. 2008). As part of the Silver Lake Pilot Study (Arcadis BBL 2008), during which cap material was placed through the water column onto very soft sediment, data indicated that mixing was limited to the bottom one inch (or less) of the chemical isolation material in places where a base layer of geofabric was not installed. Based on simple soil mechanics, mixing of granular (e.g., sand and gravel) cap chemical isolation layer materials and sediments is mainly a concern for fine unconsolidated sediments (Palermo et al. 1998). In Reach 5A, the coarse nature of the native sediment bed (i.e., more than 90% sand and gravel as noted in Section 2.4 of the Final RD/RA Work Plan) does not present a mixing challenge for placement of granular cap chemical isolation layer materials. Nonetheless, as a conservative assumption, the final design provided for some mixing to occur between the placed chemical isolation layer material and underlying sediment. Specifically, the bottom two inches of the placed chemical isolation layer was allotted to mixing with the native sediment during placement. This portion of the placed chemical isolation layer, along with the portion of the underlying sediments with which it is allotted to mix, is referred to hereinafter as the mixed zone.

1.2.2.2 Chemical Isolation Layer

The Performance Standards for engineered caps state that the cap shall include a "chemical isolation layer sufficient to minimize (reduce by 99%) the flux of PCB concentrations through the isolation layer" (Section II.B.2.i.(1)(a)(ii)). Detailed evaluations conducted to identify the thickness and amendment content required to meet these Performance Standards are described in Section 3 of this report.

1.2.2.3 Erosion Protection Layer

The Performance Standards for engineered caps state that the cap shall include an "erosion protection layer to prevent erosion in accordance with federal and state requirements and consistent with pertinent EPA or U.S. Army Corps of Engineers (USACE) guidance" (Section II.B.2.i.(1)(a)(iii)). Detailed evaluations conducted to identify the stable particle size and thickness of the erosion protection layer for the Reach 5A caps are described in Sections 2.1 through 2.3 of this report.

1.2.2.4 Geotechnical Filter Layer

The Performance Standards for engineered caps state that the cap shall include a "geotechnical filter layer, as needed based on the design evaluation, to prevent mixing between other layers" (Section II.B.2.i.(1)(a)(iv)). Depending on the size of the erosion protection layer material (relative to the chemical isolation layer material), a geotechnical filter layer will be included in the Reach 5A caps as well. Evaluations of filter layer requirements are described in Section 2.4 of this report.

1.2.2.5 Bioturbation Layer

The Performance Standards for engineered caps state that the cap shall include a "bioturbation layer to prevent bioturbation from impacting underlying layers" (Section II.B.2.i.(1)(a)(v)). EPA's Subaqueous Capping Guidance discusses bioturbation layers as a separate layer to be included in caps in cases in which the erosion protection layer may consist of a relatively thin layer of finer-grained materials (like sands) to make sure organisms could not burrow down through the chemical isolation layer and come into contact with the underlying sediment, which would result in exposure of the organisms to contaminants and affecting the integrity of the cap by providing a means by which contaminants could be transported to the cap surface. However, for the Reach 5A engineered caps, the erosion protection layer is sufficiently thick (see Section 2) that it is equal to or thicker than the depth of bioturbation for the types of organisms known to be present in Reach 5A based on the ecological characterization performed as part of the site investigations (e.g., as summarized in Appendix B.4 of EPA's *Final Model Documentation Report* [FMD; EPA 2006]).[1] Additionally, as discussed in Section 3 of this report, the chemical transport model used to design the chemical isolation explicitly represents the contaminant mixing effects of bioturbation at the cap's surface.

1.2.2.6 Habitat Layer

The Performance Standards for engineered caps state that the cap shall include a "habitat layer to provide functions and values equivalent to the pre-existing surficial sediment substrate" (Section II.B.2.i.(1)(a)(vi)). As described in Appendix A of the Conceptual RD/RA Work Plan, the erosion protection layer, which was dominated by gravel-sized materials, was similar to the

[1] Table 3 of Appendix B.4 to the FMD indicates that in Reach 5A, the biologically mixed depth interval extends from 0 to 4 cm below the sediment surface, and the biologically influenced depth interval extends from 4 to 10 cm below the sediment surface.

pre-existing surficial sediment substrate, composed primarily of sands and gravels. Thus, the erosion protection layer can also provide the same function as a habitat layer, and a distinct habitat layer was not proposed in the conceptual design. Nonetheless, as a conservative measure, the final design will incorporate a habitat layer to be placed on top of the erosion protection layer. Details on the habitat layer design are provided in Section 4 of this report.

1.2.2.7 Summary

The erosion protection layer design developed for Reach 5A caps can effectively protect against bioturbation penetrating down into the sediment beneath the cap. In addition, the placed chemical isolation layer can effectively serve the functions of chemical isolation and mixing with the underlying sediment (i.e., by allotting the bottom two inches of chemical isolation layer to mix with some amount of underlying sediment in the mixed zone and the upper four inches serving as the primary chemical isolation function). Thus, the engineered cap design for Reach 5A consists of the following distinct layers: a mixing/chemical isolation layer,[2] an erosion protection layer, and a habitat layer. Depending on the size of the erosion protection layer material, a geotechnical filter layer will also be included in some areas. The remainder of this appendix provides detailed descriptions of the engineered cap design for Reach 5A, consisting of the erosion protection layer design evaluations, including evaluations of filter layer requirements (Section 2); the chemical isolation layer design evaluations (Section 3); and the habitat layer evaluations (Section 4). The overall summary of the engineered cap design, as a combination of the erosion protection layer, geotechnical filter layer (when needed), chemical isolation layer, and habitat layer, is provided in Section 5.

[2] Because the mixing layer and chemical isolation layer will consist of the same material (i.e., sand with activated carbon), these layers will be placed as a single layer during construction. Hereafter, this layer is referred to only as the chemical isolation layer (the bottom two inches of which is considered part of the mixed zone).

2 Erosion Protection Layer Design Evaluations

As described in the Revised Final Permit, the engineered caps will include an erosion protection layer (armor layer) to prevent erosion in accordance with federal and state requirements and consistent with pertinent EPA or USACE guidance. EPA's Subaqueous Capping Guidance states the following (p. 31):

> The cap component for stabilization/erosion protection has a dual function. On the one hand, this component of the cap is intended to stabilize the contaminated sediments being capped, and prevent them from being resuspended and transported offsite. The other function of this component is to make the cap itself resistant to erosion. These functions may be accomplished by a single component, or may require two separate components in an in-situ cap. (Palermo et al. 1998)

River currents, particularly during high-flow events, can result in elevated current velocities and bed shear stresses and have the potential to erode or resuspend sediment or cap material. As described in the Revised Final Permit, the design flow event for the erosion protection layer is a flow event up to and including the applicable return interval event, which is to be calculated using up-to-date flow data, with additional considerations for the potential impacts of climate change on cap performance, and appropriate measures to mitigate them. EPA's *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* states the following (p. 5-9):

> The design of the erosion protection features of an in-situ cap (i.e., armor layers) should be based on the magnitude and probability of occurrence of relatively extreme erosive forces estimated at the capping site. Generally, in-situ caps should be designed to withstand forces with a probability of 0.01 per year, for example, the 100-year storm. (EPA 2005)

The erosion protection layer (i.e., often referred to as an armor layer) will be placed above the chemical isolation layer and will be designed to protect it from erosional processes in the river. The erosion protection layer was initially developed using a design flow rate with a 100-year return period based on flow information through 2022 from the USGS Coltsville gage. However, a wide range of flows was evaluated to understand current velocities in the river channel under various conditions, including lower flows during which a greater proportion of the flow remains in-channel and higher flows that were evaluated to assess the potential impacts of climate change on cap performance. This section describes the design of the erosion protection layer for Reach 5A, along

with the evaluation of material gradation for the first subreach (i.e., river Stations 0+00 to 48+00,[3] or Year 1) in Reach 5A.[4]

2.1 River Currents

The stable particle size (e.g., expressed as median diameter [D_{50}]) required to resist a design current velocity was estimated in accordance with Appendix A to EPA's Subaqueous Capping Guidance. The method shown in Equation 2-1 is based on the USACE's *Hydraulic Design of Flood Control Channels* (USACE 1994). This method uses velocity and flow depth to determine the stable median armor stone size (D_{50}).

Equation 2-1

$$D_{50} = S_f C_s C_v C_T C_G d \left[\left(\frac{\gamma_w}{\gamma_s - \gamma_w} \right)^{\frac{1}{2}} \frac{V}{\sqrt{K_1 g d}} \right]^{2.5} \text{ where:}$$

D_{50}	=	median particle size in feet
Sf	=	safety factor = between 1.1 and 1.5
Cs	=	stability coefficient for incipient failure = 0.375 for rounded rock
C_V	=	velocity distribution coefficient = 1.0
C_T	=	blanket thickness coefficient = 1.0 for flood flows
C_G	=	gradation coefficient = $(D_{85}/D_{15})^{1/3}$
D_{85}/D_{15}	=	gradation uniformity coefficient = 3.5 (typical range = 1.8 to 3.5)
d	=	water depth in feet
γ_s	=	unit weight of stone = 165 pounds per cubic foot
γ_w	=	unit weight of water = 62.4 pounds per cubic foot
V	=	depth-averaged velocity in feet per second
K_1	=	side slope correction factor = 1 (for a flat slope)
g	=	acceleration due to gravity = 32.2 feet per second squared

To obtain the current velocity and flow depth, the calibrated 2D Hydrologic Engineering Center – River Analysis System (HEC-RAS) hydraulic model was used. The HEC-RAS model was used to

[3] River stations were established for Reach 5A during the pre-design investigation (PDI) for sediments and riverbanks to provide a locational reference to support the PDI, remedial design, and construction. For each river station, the value to the left of the plus symbol in the number is in hundreds of feet from the first station, and the value to the right of the plus symbol is in feet. The stationing begins with Station 0+00 at the Confluence and extends to the downstream end of Reach 5A at Station 245+00 (located 24,500 feet from Station 0+00 or approximately 4.6 miles). Station 48+00 is located approximately 4,800 feet downstream of Station 0+00 along the river centerline.

[4] As indicated in Section 1 of the Final RD/RA Work Plan, design-level detail for the engineered cap is only provided for the first subreach of Reach 5A planned for Year 1 of construction (i.e., Stations 0+00 to 48+00).

simulate flows associated with various recurrence intervals, including 1-, 5-, 10-, 25-, 50-, 100-, and 200-year return periods along with trend-adjusted 100-year return period flow.[5] In addition, the model was also used to simulate a bankfull flow scenario. The model simulations were performed for the post-remediation conditions (i.e., proposed conditions) that incorporated the changes in river channel and riverbank terrain resulting from the Natural Channel Design, which is discussed in Section 8.5.1 of the Final RD/RA Work Plan. Outputs from these model simulations, including water surface elevations, water depths, and current velocities, were used in the design of the erosion protection layer. HEC-RAS model-computed current velocities and water depths for each flow event that were used for the calculation of stable particle size are provided in Attachment 1 to this appendix. Details regarding the hydrologic analysis and hydraulic model (2D HEC-RAS) development and calibration are provided in Appendix C to the Final RD/RA Work Plan (*Final Hydrologic/Hydraulic Analysis and Modeling*).

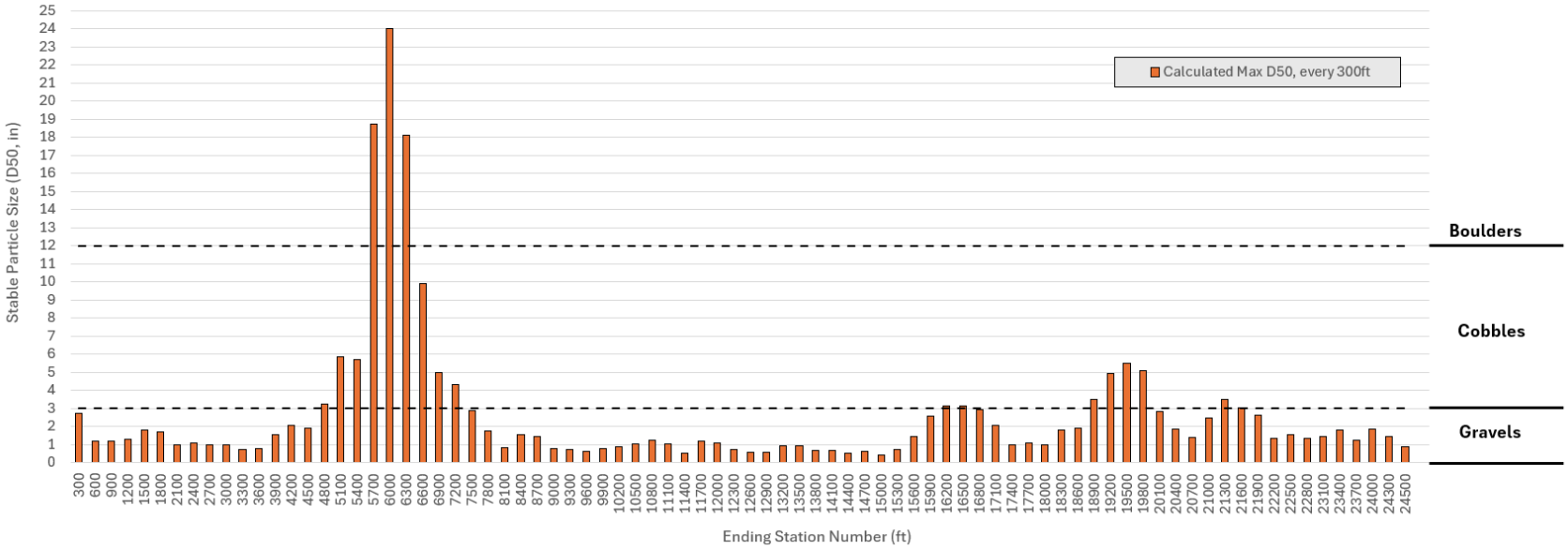
The median armor stone size (D_{50}) in Reach 5A was computed using Equation 2-1 for each flow event described above. To be conservative, a safety factor of 1.5 was used in the calculation of D_{50} for Stations 0+00 through 48+00. The design of the erosion protection layer considered a wide range of flows, ranging from lower flows during which a greater proportion of the flow remains in-channel, to higher flows up to a 200-year return period. Furthermore, a trend-adjusted 100-year flow (i.e., 18,700 cubic feet per second [cfs] at the Confluence) was used to account for the potential impacts of climate change as described in Appendix C to the Final RD/RA Work Plan (*Final Hydrologic/Hydraulic Analysis and Modeling*). This flow represents an approximately 42% and 18% increase relative to the 100-year and 200-year return period flows, respectively, that were considered in the conceptual design.

The calculated D_{50} in Reach 5A for the range of flows simulated using the HEC-RAS model (i.e., up to and including the trend-adjusted 100-year flow) are provided in Figures 1a through 1h of Attachment 1. The associated current velocities and water depths from the HEC-RAS model for each flow event are provided in Figures 2a through 2h and 3a through 3h of Attachment 1, respectively. The trend-adjusted 100-year return flow yielded the largest D_{50} for nearly 30% of the area within Reach 5A relative to other flow events. These areas are mostly between Stations 35+00 and 80+00, and Stations 150+00 and 200+00 where floodplain is relatively narrow. For the remaining areas, the largest D_{50} values were driven by flows lower than a 100-year event (i.e., primarily flows less than a 5-year event). This is consistent with the general understanding that current velocity decrease once the river goes over bank because the flow area increases and hydraulic roughness rises as a result of the vegetation and uneven terrain in the floodplain.

[5] A trend-adjusted 100-year flow was developed based on the trend analysis of the USGS Coltsville gage flow data using a 20-year rolling analysis window to reflect more recent trends in river flow at Coltsville, as required by Conditions 5 and 134 of EPA's conditional approval letter.

Figure 2-1 shows the largest calculated stable D_{50} in Reach 5A from the range of simulated flows. The bar represents the maximum value computed within each 300-feet segment of the river (which approximately coincide with the Cap Certification Units [CCU] defined for dredging and capping in Section 8.1.1.7 of the Final RD/RA Work Plan). The result of this evaluation indicates that a gravel erosion protection layer (with a D_{50} of three inches or less) is sufficient to protect the chemical isolation layer material from erosive forces throughout most of Reach 5A (i.e., over 80%). Between Stations 48+00 and 72+00, river current velocities are calculated to be higher because flows are generally confined to the river channel due to the presence of higher riverbanks in this area, a sharp bend in the river, and flow constrictions created by bridge abutments at Pomeroy Avenue and Holmes Road. Therefore, larger materials such as cobble (e.g., with a D_{50} up to the six- to nine-inch range), or boulder-sized materials (e.g., with a D_{50} of up to two feet) are required for erosion protection in this area. In addition, the hydraulic model predicts increased current velocities in several stretches of the river between approximately Stations 159+00 and 213+00 that require cobble-sized materials for erosion protection. Within the four backwaters (i.e., BW5A-1, BW5A-2, BW5A-4, and BW5A-5) and the portion of Lower Sykes Brook where capping is planned, sands or gravels will be used for the erosion protection layer based on the relatively low velocity conditions in these areas. The materials that were selected as erosion protection for the different portions of Reach 5A are shown in Figure 2-2.

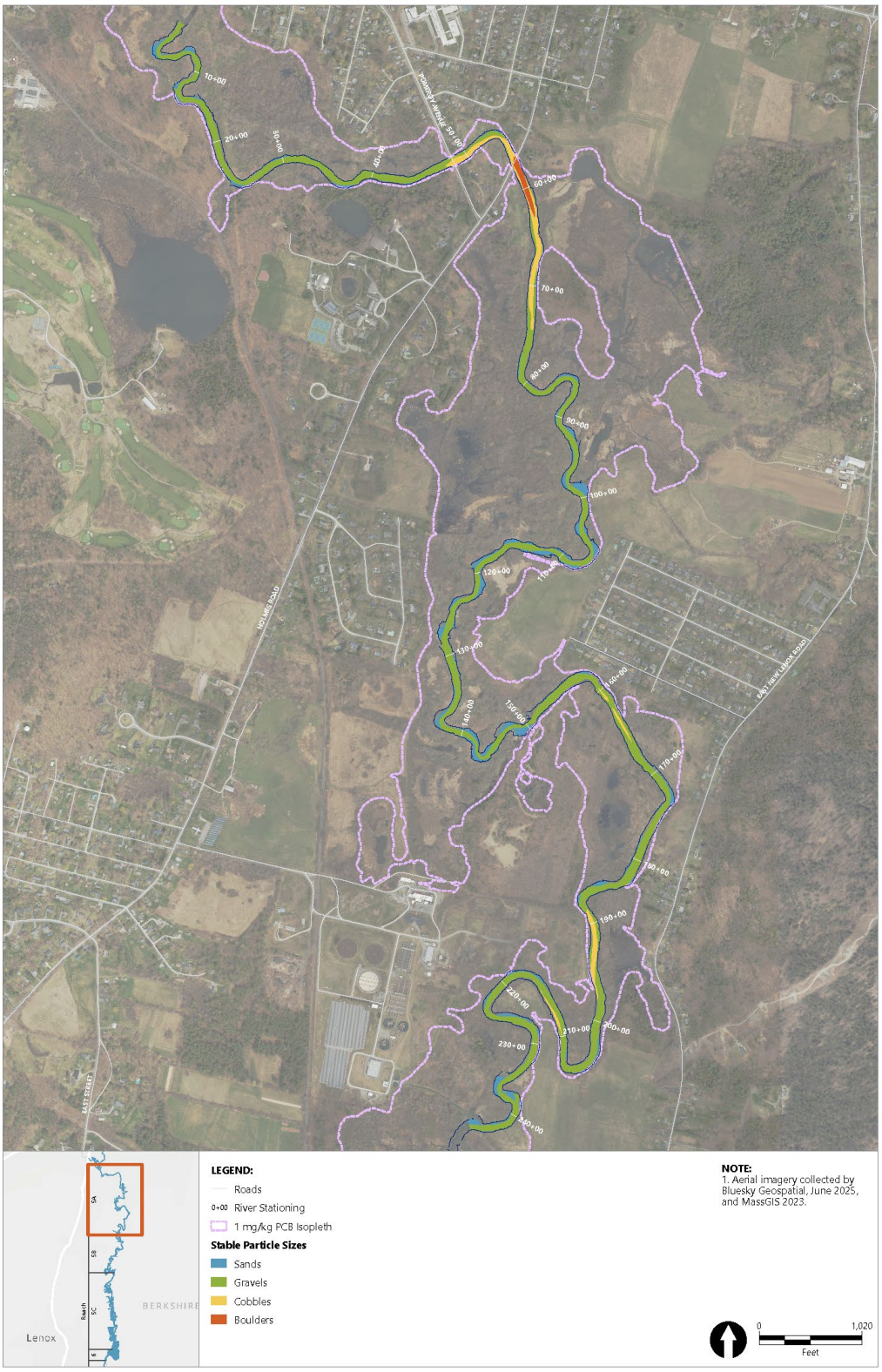
Figure 2-1
Calculated Maximum Stable Particle Sizes for Reach 5A



Notes:

1. The 2D HEC-RAS model was used to simulate flows with various recurrence intervals, including 1-, 5-, 10-, 25-, 50-, 100- and 200-year return periods. The model also simulated a trend-adjusted 100-year flow and bankfull flow.
2. Each bar represents the maximum D_{50} computed every three river stations (i.e., every 300 feet).

Figure 2-2
Erosion Protection Layer Materials in Reach 5A



2.2 Other Erosional Forces

Because the ROR is not a navigable waterway, the river currents and flood flows are the dominant factors contributing to potential erosion; effects from vessel wakes and propellor wash, which are often important considerations for cap design, are not relevant in Reach 5A.

Winds blowing across the surface of bodies of water transmit energy to the water, and waves are formed. The size of these wind-generated waves depends on the wind velocity, the length of time the wind is blowing, and the extent of open water over which it blows (fetch). Because of the ROR sinuosity, fetch distances on the ROR are limited. As such, wind-generated waves are not a significant force compared with river currents, and the erosive forces based on wind-induced waves were assumed to be negligible for the cap design.

Cold winter temperatures in western Massachusetts lead to ice formation along the riverbanks in Reach 5A. However, ice cover is generally limited to thin accumulations near the banks, and the river only freezes over during exceptionally cold winters. As a result, ice is not expected to contact the sediment cap or pose a risk to its integrity. While ice may come into contact with the riverbank, its limited thickness in Reach 5A is not anticipated to cause significant impacts. As described in Section 20 and Appendix M of the Final RD/RA Work Plan, the riverbed, riverbanks, and sediment cap will be subject to physical monitoring to assess whether ice conditions affect cap stability.

2.3 Erosion Protection Layer Material Gradation and Thickness

The selected D_{50} for the erosion protection layer is presented in Figure 2-3. The erosion protection layer D_{50} within each CCU was determined from a range of flows as discussed in Section 2.1. In addition, the selection of D_{50} in several portions of the river channel also considered elements of the Natural Channel Design, such as riffle locations and in-river structures (also shown in Figure 2-3). Within the first subreach of Reach 5A (i.e., river Stations 0+00 to 48+00), a D_{50} of 1.5 inches is sufficient to resist anticipated erosive forces in most areas (Figure 2-1); however, a D_{50} of 3.0 inches was specified in portions of the subreach where relatively higher erosive forces were predicted (e.g., immediately downstream of the Confluence and the lower portion of the subreach), as well as in the specified riffle areas. For the remaining subreaches downstream of Station 48+00, the preliminary design selection of D_{50} was solely based on the erosive forces shown in Figure 2-1 because the Natural Channel Design for this portion of the river has not been finalized. Similar to the first subreach, a D_{50} of 1.5 inches is sufficient for most areas to resistant in anticipated erosive forces while higher D_{50} values of 3, 6, 9, 12, and 24 inches are required for certain areas that experience relatively higher velocities, as discussed in Section 2.1. Further adjustments to account for the riffle areas will be incorporated and presented in a future revision of or addendum to this work plan for these more downstream subreaches.

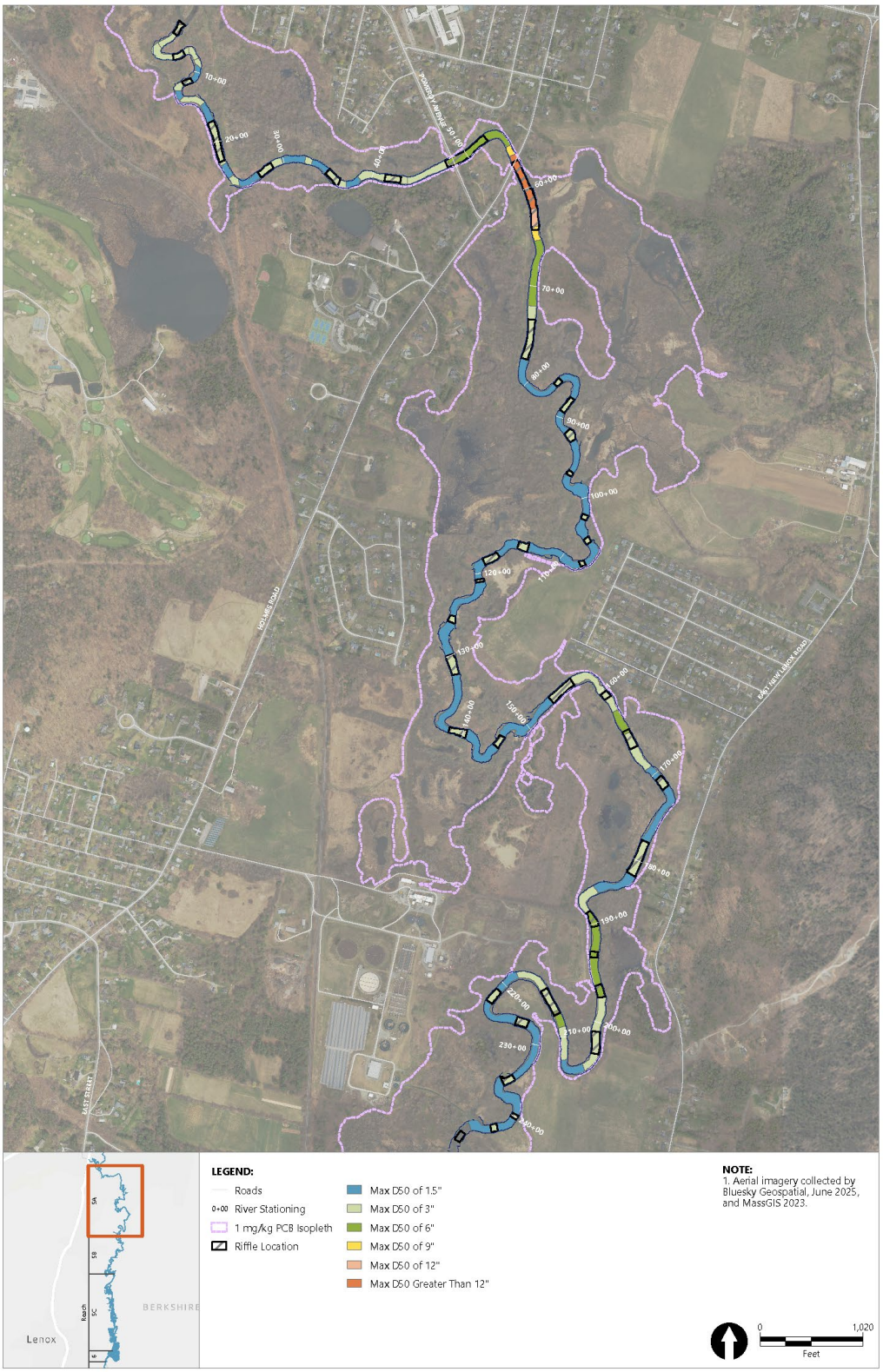
The material gradations for the erosion protection layer were mainly determined using the results of the stable particle size evaluation described above. Table 2-1 presents the design gradations for the erosion protection layer materials for the first subreach. As discussed in Section 2.1, coarser materials, such as cobbles or boulders, are required for certain areas downstream of Station 48+00 to resist the anticipated erosive forces. The design gradations for these coarser materials will be provided in a future revision of or addendum to this work plan for these more downstream subreaches.

Maynord (1998) recommends that the thickness of the erosion protection layer to protect against flood flows be 1.5 times the median particle diameter (i.e., 1.5 times D_{50}) or the maximum particle diameter of the erosion protection layer material gradation (i.e., D_{100}), whichever is greater. The designated erosion protection layer thicknesses for each cap type are summarized in Section 5. For smaller aggregate materials with D_{100} less than six inches, the minimum erosion protection layer thickness was set at six inches. The D_{100} for the erosion protection layer materials for the first subreach (i.e., Stations 0+00 through 48+00) is presented in Table 2-1; D_{100} for the erosion protection layer downstream of Station 48+00 will be presented in a future revision of or addendum to this work plan.

Table 2-1
Armor Layer Material Design Gradation for D_{50} of 1.5 and 3.0 Inches

U.S. Standard Sieve Size	Percent Passing (by weight)	
	D_{50} of 1.5 Inches	**D_{50} of 3.0 Inches**
4 inches	—	100
3 inches	100	30–50
2 inches	30–70	—
1 inch	20–40	—
U.S. No. 4 (4.75 mm)	0–25	0–25
U.S. No. 200 (75 µm)	0–5 (0–3 preferred)	0–5 (0–3 preferred)

Figure 2-3
Selected Particle Size for Erosion Protection Layer in Reach 5A



2.4 Geotechnical Filter Considerations

As described in the Revised Final Permit, "The use of a geotechnical filter layer between the chemical isolation layer material and erosion protection layer material shall be evaluated and may be necessary for those areas requiring cobble or larger sized material in the erosion protection layer" (Section II.B.2.i.(2)(d)).

Where needed, a filter layer provides an interface between the erosion protection layer and the protected material and is an essential element for protecting contaminated sediments (Maynord 1998). The filter prevents migration of one granular material through another (often referred to as "piping"), distributes the weight of overlying armor units to provide more uniform settlement, and permits relief of hydrostatic pressures within the soils. A filter layer is often required when using a larger-diameter material for the erosion protection layer of an engineered cap.

Standard geotechnical filter criteria include recommended particle size ratios between base and overlying materials (e.g., sand chemical isolation layer and overlying erosion protection layer materials). The filter design was evaluated using the Terzaghi-Vicksburg criteria shown in Equation 2-2. The primary filter criteria particle size relationship applicable to subaqueous capping materials is the ratio of D_{15} of the erosion protection material to D_{85} of the underlying base layer (chemical isolation in this case; Equation 2-2). D_{15} is the 15th percentile particle size (15% of the particles are smaller than this size), and D_{85} is the 85th percentile particle size (85% of the particles are smaller than this size). This relationship relates to the ability of the base layer material (i.e., the chemical isolation layer sand) to pass through the void spaces in the overlying larger material (i.e., the erosion protection layer armor stone consisting of gravel-, cobble-, or boulder-sized material). Meeting the recommended filter criteria minimizes the potential for the loss of the base material by the creation of internal filters in the armor stone voids. The potential for piping (the loss of material) can be minimized by using gradations for the two materials that are both well-graded.

For the first subreach (i.e., Stations 0+00 through 48+00), the selected sizing of erosion protection (gravel) and chemical isolation materials (sand) do not require a separate geotechnical filter layer because the gradation specifications were developed to meet the filter criteria while also holding to the required D_{50}.

For the subreaches downstream of Station 48+00, the design evaluations for the erosion protection and chemical isolation layers indicate that a gravel filter will be required for areas that require cobble- or boulder-sized erosion protection layers (e.g., between Stations 48+00 and 72+00, between Stations 160+00 and 165+00, between Stations 188+00 and 198+00, and between Stations 211+00 and 214+00). Therefore, in these areas, a gravel filter layer will be placed between the erosion protection layer and chemical isolation layer. Further design details, including the

material gradation and thickness for the geotechnical filter layer, for these downstream subreaches will be provided in a future revision of or addendum to this work plan.

Equation 2-2

$$D_{X\ (Armor)} < 5D_{X\ (Base)}$$

where:

$D_{X\ (base)}$ = X percentile particle size of the base layer

$D_{X\ (armor)}$ = X percentile particle size of the armor layer

3 Chemical Isolation Layer Design Evaluations

3.1 Chemical Transport Modeling Approach

The design evaluations presented in this section were based on numerical modeling, the primary purpose of which was to simulate the transport of dissolved-phase PCBs within a candidate cap design to identify the chemical isolation layer configuration (thickness and composition) needed to meet the chemical isolation requirements for the Engineered Capping Performance Standard, which are summarized in Section 3.2.4. To account for the range in mobility of the PCB congeners that make up the total PCB concentration, individual PCB homologs were simulated with the model. The modeling documented in this appendix was performed in accordance with industry standard cap design guidance set forth by EPA (EPA 2005; Palermo et al. 1998) and the ITRC (2014, 2023).

3.1.1 Chemical Isolation Cap Performance Standards

As described in the Revised Final Permit, the chemical isolation layer will be "sufficient to minimize (reduce by 99%) the flux of PCB concentrations through the isolation layer" (Section II.B.2.i.(1)(a)(ii)). In backwater areas, removal and capping will be performed to achieve a spatially weighted average concentration of 1 mg/kilogram (kg) total PCB in each averaging area, assuming, as required, a "PCB concentration equal to 1% of the existing average surficial concentration [of the given backwater] […] as the PCB concentration in capped areas" (Section II.B.2.d.(1)(a)(i)).

To meet the requirements for engineered caps in the Revised Final Permit, the chemical isolation layer was designed to meet the following criteria using the modeling evaluation described herein:

- For the main channel (and the lower portion of Sykes Brook):
  - Achieve 99% reduction in total PCB mass flux across the chemical isolation layer throughout a 100-year timeframe based on model calculations.
- For the backwaters:
  - Achieve 99% reduction in total PCB mass flux across the chemical isolation layer within a 100-year timeframe based on model calculations; and
  - Achieve total PCB concentrations within the surficial six inches of the cap that are less than 1% of the existing average surficial concentration (i.e., that used as the replacement value in the evaluation to identify areas requiring capping within the given backwater area).

3.1.2 Model Framework

CapSim (version 4.2.3), a one-dimensional model of chemical transport in sediment and cap systems, was used for this evaluation. This model simulates the time-variable fate and transport of chemicals

(dissolved and sorbed phases, including partitioning between these phases) under the processes of advection, diffusion and dispersion, biodegradation, bioturbation and bioirrigation, and exchange with the overlying surface water, consistent with the requirements of the Revised Final Permit. The cap model predicts contaminant mass flux and concentrations (for both porewater and sorbed phase) vertically throughout the simulated cap profile over time. This model and its predecessors have been used to support the evaluation and design of sediment caps at numerous sites around the United States and internationally, including Onondaga Lake (Parsons and Anchor QEA 2012); Lower Fox River (Tetra Tech et al. 2019); and Hamilton Harbour US Steel Channel (Anchor QEA 2020). Details on the model structure, underlying theory, and governing equations are provided in the model's associated literature (Shen et al. 2018; Go et al. 2009; Lampert and Reible 2009).

3.1.3 Model Domain and Layers

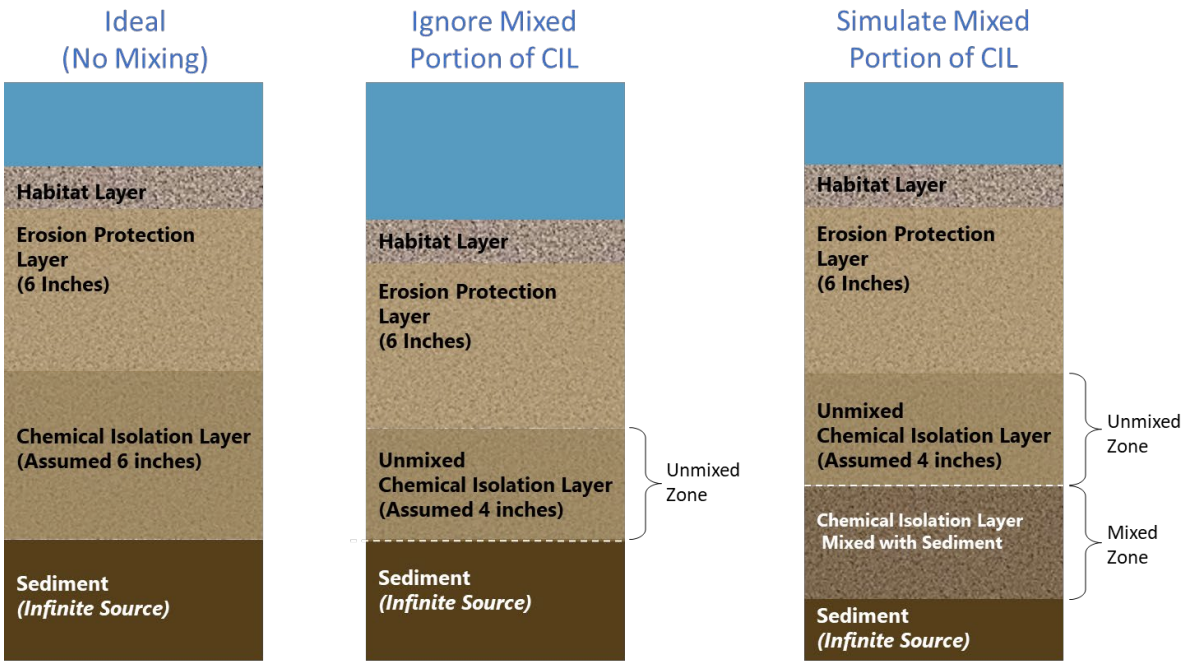
Model evaluations were conducted to support the design of the chemical isolation layer for the Reach 5A caps. As described in Sections 1 and 2, the cap design for Reach 5A consists of three to four distinct layers to be placed, including a chemical isolation layer; an erosion protection layer, with a geotechnical filter layer being included between them in some portions of Reach 5A; and a habitat layer in some areas.[6] The model was set up to account for six inches of placed chemical isolation layer material overlain by at least six inches of material representing a combination of erosion protection material, geotechnical filter layer material (see evaluations presented in Section 2 of this report), and habitat layer material. The erosion protection layer varies across Reach 5A and consists of a minimum of six inches of gravel-sized material in most of the reach, with larger sized materials placed at thicknesses of up to three feet in some areas (i.e., areas where the erosion protection layer is cobble- to boulder-sized material and an underlying filter layer is required), as illustrated on Figure 2-2. The armor layer is thicker than the depth of bioturbation; therefore, bioturbation will not extend beyond the armor (and filter layer, where present) into the chemical isolation layer. Simulating the erosion protection layer as six inches thick is conservative given more than six inches of material will be placed (e.g., the minimum thickness of the erosion protection layer is six inches, and considering that a filter layer will be placed in some areas, and a habitat layer with a 4-inch thickness will be placed atop the erosion protection layer in places). The model simulates bioturbation (mixing of particles by biological activity) at the top of the simulated erosion protection

[6] As discussed in Section 1 of this report and Section 8 of the Final RD/RA Work Plan, the Revised Final Permit requires consideration of layers for mixing and bioturbation. These engineered cap design evaluations considered these functions and determined that separate dedicated layers are not needed for these functions because they can be effectively met by the other primary layers. Specifically, the erosion protection layer in Reach 5A is thick enough to protect against bioturbation, and the potential for mixing between the chemical isolation layer and underlying sediment has been explicitly accounted for in this design through allotment of a portion of the chemical isolation layer's placed thickness to mixing.

layer over a specified thickness; this thickness is referred to hereinafter as the bioturbation zone (BTZ).

As discussed in Section 1.2.2.1, limited mixing is expected between the placed chemical isolation layer and the native sediments. In that ideal scenario, the model domain would consist of a six-inch chemical isolation layer overlain by six inches of armor, as shown in the left diagram of Figure 3-1. However, as discussed in Section 1.2.2.1, this final design has conservatively allotted for some mixing to occur between the bottom two inches of the placed six-inch chemical isolation layer and the native sediment during placement. Such mixing can be accounted for one of two ways in the modeling evaluation: (1) the portion of the chemical isolation layer allotted to mixing can be conservatively ignored altogether and only the remaining portion of the chemical isolation layer material is represented in the model domain (i.e., four inches, which excludes the two inches of chemical isolation layer that is allotted to mix with the native sediment) as shown in the middle diagram of Figure 3-1; or (2) the mixed zone, which was assumed to consist of two inches of chemical isolation layer material completely mixed with two inches of sediment, as shown in the diagram on the right of Figure 3-1, can be can be explicitly represented in the model domain.

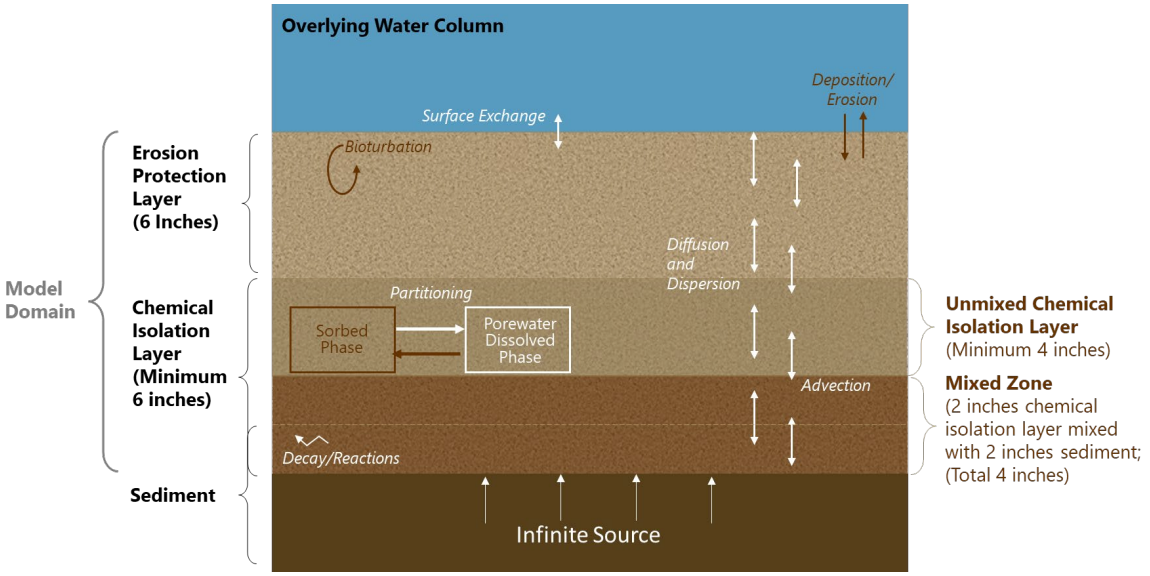
Figure 3-1
Potential Modeled Cap Configurations Representing Potential Mixing Scenarios



Notes:
Not to scale.
Habitat layer placed outside of riffle areas only.

For the purposes of the final design, the scenario that includes the mixed zone in the model domain (diagram on the right of Figure 3-1) was used to configure the base case model simulations because it represents the more realistic of the two approaches. However, because the exact amount of sediment that could potentially mix with the allotted two inches of chemical isolation layer material is unknown, a sensitivity analysis was conducted to evaluate the performance of the cap if the mixed portion of the chemical isolation layer was ignored altogether (i.e., using the approach depicted in the middle diagram in Figure 3-1). This sensitivity analysis is discussed in Section 3.5.1. A schematic showing the cap layers represented in the base case model and the processes simulated by the model is provided on Figure 3-2.

Figure 3-2
Model Domain and Processes Simulated by the Model



Notes:
Decay/reactions and deposition/erosion were not included in the modeling of Reach 5A caps.
In the model, the erosion protection layer is used to represent the material placed on top of the chemical isolation layer, which consists of the armor layer, filter layer (if needed), and habitat layer, where placed.

With the exception of the sediment that may mix with the bottom of the chemical isolation layer in what is referred to as the mixed zone, the underlying sediment was not included as part of the model domain in this modeling evaluation (i.e., the sediment was not simulated explicitly). Rather, the porewater PCB concentrations in the sediment beneath the cap/mixed zone were conservatively represented as an infinite source (i.e., constant concentration boundary condition). This approach is conservative because it assumes that no attenuation or loss of PCB mass occurs in the sediments beneath the cap/mixed zone over time. The model similarly does not simulate the water column but rather uses its concentration as a boundary condition.

3.1.4 Delineation of Reach 5A Cap Sub-Areas

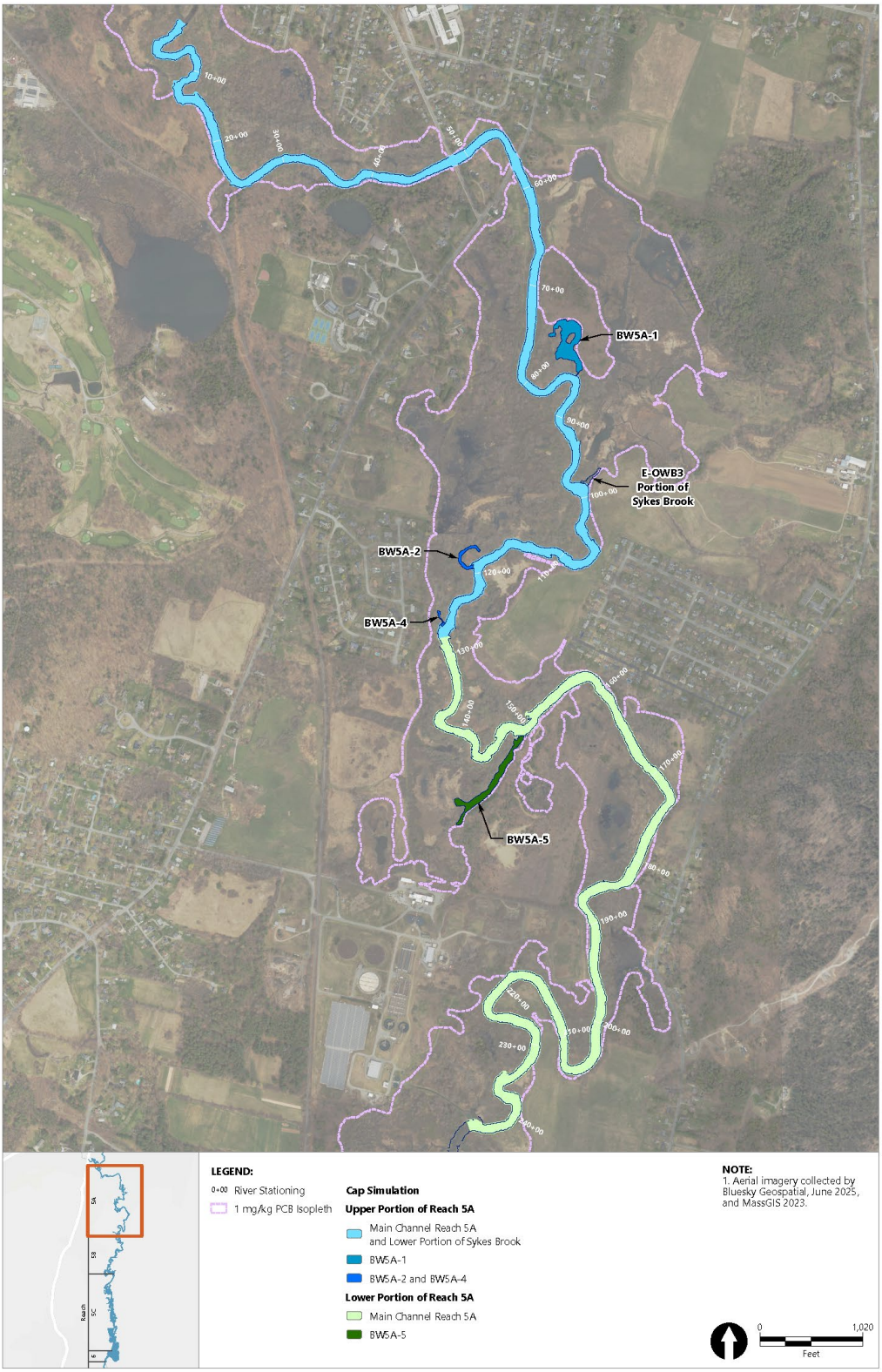
To optimize the chemical isolation layer design and take into account spatial variations in the physical, chemical, and biological properties and characteristics that affect cap design, Reach 5A was subdivided into five unique cap modeling areas based on the following factors:

1. Observed differences in groundwater seepage rates;
2. Differences in waterbody type (i.e., main channel and backwaters);
3. Observed differences in porewater PCB concentrations; and
4. Constructability considerations.

Figure 3-3 shows the five unique cap modeling areas, referred to hereafter as sub-areas, that were simulated with the model (differentiated by color). They are as follows:

- **Subarea 1:** Upper portion of the Reach 5A main channel (Reach 5A-1), which includes the lower portion of Sykes Brook
- **Subarea 2:** Lower portion of the Reach 5A main channel (Reach 5A-2)
- **Subarea 3:** BW5A-1
- **Subarea 4:** BW5A-2 and BW5A-4
- **Subarea 5:** BW5A-5

Figure 3-3
Extents of Cap Model Simulations in Reach 5A



The following factors were considered in the delineation of these subareas:

- **Groundwater Seepage Rates:** Reach 5A was first subdivided geographically based on observed spatial differences in groundwater seepage rates. As discussed in detail in Section 3.2.1 and Attachment 2, data collected over a multi-year investigation show variability across Reach 5A, with a suggestion of differences in groundwater seepage rates between the upper and lower portions of Reach 5A. It cannot be definitively determined whether the variation reflects reach-wide heterogeneity (which is expected with any type of hydrogeological data) or a true spatial difference between the upper and lower portions of the reach; but to be conservative, caps in these two regions were evaluated separately based on the differences in observed seepage rates. These delineations are further discussed in Section 3.2.1.
- **Waterbody Type:** Within each of the two subareas delineated based on differences in seepage rates, areas designated as the main channel were modeled separately from the adjacent backwaters due to differences in: (1) expected bioturbation depths (i.e., consistent with EPA's FMD, bioturbation is expected to be deeper in the backwaters based on the presence of finer substrate with greater organic content, and concomitant differences in infauna); and (2) TOC content of the existing surface sediments (i.e., TOC is generally higher in the backwaters than in the main channel). Thus, in the upper portion of Reach 5A, the main channel was evaluated separately from backwaters BW5A-1, BW5A-2, and BW5A-4. In the lower portion of Reach 5A, caps in the main channel and the portion of Sykes Brook to be capped were evaluated separately from the backwater BW5A-5.
- **Porewater PCB Concentrations:** Meeting the Performance Standard of 99% reduction in PCB mass flux across the chemical isolation layer is independent of the porewater concentration beneath the cap. However, the model-predicted concentration at the top of the cap, and hence the replacement value used in the delineation of cap areas in backwaters, is dependent on the porewater concentrations in sediment beneath the cap. Therefore, starting with the delineations based on differences in seepage rates and waterbody type discussed above, consideration was given to whether cap modeling areas should be further delineated based on differences in PCB porewater concentration. In general, there is not a strong sediment PCB concentration gradient across Reach 5A, so the reach was not divided further. Further, because of the close proximity of BW5A-2 and BW5A-4 as well as the consistency in PCB concentrations between these two areas, the modeling was conducted for BW5A-2 and the cap design identified from that modeling was used to also represent BW5A-4. This consideration is further discussed in Section 3.2.3.
- **Constructability:** For the purposes of efficiency during construction, the proximity of capping areas to one another and the relative size of each were also taken into consideration in

delineating the sub-areas. As discussed in Section 3.2.3, PCB concentrations in Sykes Brook are lower than those in the adjacent main channel. Therefore, this cap area was assigned the same cap design as the adjacent main channel (and thus was not simulated explicitly in the model).

3.2 Model Inputs

The model uses several input parameters that describe chemical-specific properties, cap and sediment material properties, and physical/chemical mass transfer rates. These input parameters were developed based on site-specific data (including the large dataset on PCB concentrations generated as part of the PDI and supplemental data collection [SDC] program),[7] previous site-specific modeling conducted by EPA, information from literature and EPA guidance, and experience with cap design at other similar sites. To the extent possible, input parameters were consistent with the PCB fate and transport model that EPA developed and calibrated to simulate PCBs in the Housatonic River surface water and sediment, as documented in EPA's FMD. A listing of model input parameters, the values used for this modeling evaluation, and the source(s) from which they were derived are provided in Table 3-1. More details describing the key model inputs (i.e., those to which the model is most sensitive) and chemical-specific properties are provided in Sections 3.2.1 through 3.2.5.

Table 3-1
Input Parameter Values for the Chemical Isolation Cap Model

Model Input Parameter	Value	Data Source
Chemical-Specific Properties		
Porewater PCB concentration (µg/L) (boundary condition for bottom of model domain)	See Table 3-6	Values based on sediment sample PCB and TOC concentrations from the PDI converted to porewater concentrations for individual PCB homologs using site-specific partition coefficients and data on PCB homolog composition. See Section 3.2.3 for details.
OC partition coefficient Log K_{OC} (Log L/kg)	See Table 3-3	Site-specific values were developed for the PCB homologs based on PDI data. See Section 3.2.2 for details.
DOC partition coefficient Log K_{DOC} (Log L/kg)	See Table 3-3	Based on relationship with the PCB homolog K_{OW}: $\log K_{DOC} = 0.9 \times \log K_{OW} + 0.8$, derived from the site-specific treatability study (Anchor QEA and Arcadis 2026). K_{OW} values are shown in Table 3-4 and were developed from literature (Hawker and Connell 1988; de Bruijn et al. 1989). See Section 3.2.2 for more details.

[7] Those data are presented in GE's *Pre-Design Investigation Summary Report for Reach 5A Sediment and Riverbanks* (PDI Summary Report for Sediment and Riverbanks; Anchor QEA and AECOM 2023) and *Supplemental Data Collection Summary Report for Reach 5A* (Anchor QEA et al. 2026).

Model Input Parameter	Value	Data Source
Molecular diffusivity (cm^2/s)	Homolog-specific, increasing from 3.3E-6 for mono-PCBs to 6.5E-6 for deca-PCB	Values based on empirical relationship with PCB homolog molecular weight (Schwarzenbach et al. 1993). The model calculates the effective diffusion coefficient by multiplying this input molecular diffusivity value by a tortuosity factor that is a function of the material porosity (Lampert and Reible 2009).
Chemical first-order chemical biodegradation rate (yr^{-1})	0	Assumed no biodegradation.
Surface water PCB concentration (µg/L) (boundary condition for top of model domain)	See Table 3-7	Based on concentrations measured at Pomeroy Avenue Bridge and South Street Bridge collected from March to November 2022 (Anchor QEA and Arcadis 2023). See Section 3.2.5 for details.
Erosion Protection Layer Properties		
Erosion protection layer thickness (cm)	15	Conservatively represented as a 15 cm (six-inch) layer of gravel or cobble/boulder that has infilled, as discussed in Section 3.1.3. As noted previously, this thickness is conservative, given the erosion protection layer will be thicker than six inches (15 cm) in some places, there will also be a geotechnical filter layer beneath it in some places, and there will be a habitat layer placed above it in some places.
Total porosity	0.35 for main channel 0.4 for backwater areas	Typical value for range of gravel sized materials (main channel) and sand (backwater; e.g., Domenico and Schwartz [1990]). The value for the main channel is also taken to be representative of larger sized materials, considering that boulder- or cobble-sized material is expected to be infilled by deposition of native sandy sediments over time and recognizing that the armor materials often have a gradation that may include sand and gravel-sized materials.
Dry bulk density (g/cm^3)	1.69 for main channel 1.56 for backwater areas	Calculated based on typical particle density of 2.6 g/cm^3 for inorganic minerals and representative porosity (see previous row).
Fraction organic carbon within the BTZ f_{OC} (%)	See Table 3-8	Location-specific f_{OC} in the BTZ (top 10 cm or top 15 cm; see below) considering that over time, the materials in the BTZ will equilibrate to the f_{OC} of depositing solids. The location-specific value is based on the average surface sediment f_{OC} within the subarea based on PDI sampling data. See Section 3.2.6 for details.
Fraction organic carbon below the BTZ (main channel only) f_{OC} (%)	0.1%	In the main channel, where the BTZ thickness is 10 cm; the bottom 5 cm of the simulated erosion protection layer is set to a nominal f_{OC} value of 0.1%.

Model Input Parameter	Value	Data Source
Porewater DOC concentration (mg/L)	See Table 3-8	Based on average porewater DOC concentration measured during PDI sampling within each subarea. See Section 3.2.6 for details.
Chemical Isolation Layer Properties		
Chemical isolation layer thickness (cm)	10	Design variable. Started with a thickness of four inches (10 cm), assuming six inches of chemical isolation layer is placed and the bottom two inches is conservatively allotted for mixing with the underlying sediment. Increased based on iterative model simulations as needed to meet Performance Standards. See Section 3.3 for details.
Sand component (% by weight)	Design variable	This input was used to represent the percent by weight of sand in the chemical isolation layer (i.e., 100% minus % by weight of AC amendment)
Total porosity of sand	0.4	Typical value for sand (e.g., Domenico and Schwartz [1990]).
Dry bulk density sand (g/cm^3)	1.56	Calculated based on typical particle density of 2.6 g/cm^3 for inorganic minerals and representative porosity (see previous row).
f_{OC} of sand (% by weight)	0.1%	Nominal value representing the sorptive capacity of sand.
AC component (% by weight)	Design variable	This input was used to represent the percent by weight of AC in the chemical isolation layer. Started with 0% AC (i.e., sand only). Added AC and iteratively increased percent AC as necessary to meet Performance Standards.
Total porosity of AC	0.6	Consistent with Shen et al. (2023)
Dry bulk density of AC (g/cm^3)	0.54	Based on the apparent density of activated carbon (tamped; Appendix B to Anchor QEA and Arcadis [2026])
Freundlich coefficient for AC, Kf ((µg/kg)*(L/µg)^(1/n))	$10^{8.5}$	This input represents the sorptive capacity of AC at equilibrium. This value is based on results of the treatability study for PAC and is used for each PCB homolog group (Anchor QEA and Arcadis 2026). See Section 3.2.2.2 for discussion of PAC as the selected AC and sorptive capacity.
Freundlich exponent for AC, 1/n	0.8	This input represents the linearity of PCB sorption to AC at equilibrium. It is used in the Freindlich Isotherm equation as the exponent to which freely dissolved-phase PCB concentration is raised. This value is based on results of the treatability study for PAC and is used for each PCB homolog group (Anchor QEA and Arcadis 2026). See Section 3.2.2.2 for details.

Model Input Parameter	Value	Data Source
Kinetic sorption rate coefficient for AC, K_{sorp} (/day)	10^7	This input represents the first order rate constant that defines the time for PCB sorption to AC to reach equilibrium. This value is based on results of the treatability study for PAC and is used for each PCB homolog group (Anchor QEA and Arcadis 2026). See Section 3.2.2.2 for details.
Porewater DOC concentration (mg/L)	See Table 3-8	Based on average porewater DOC concentration measured during PDI sampling within each subarea. Values vary by subarea. See Section 3.2.5 for details.
Mixed Zone – Mixed Sediment/Chemical Isolation Layer Properties		
Mixed zone thickness (cm)	10	Assumed two inches of chemical isolation layer mixed with two inches of sediment. See Section 3.1.3 for details. A sensitivity analysis was conducted that conservatively excluded the mixed zone from the model domain altogether, as described in Section 3.1.3.
Mixed zone initial concentration (µg/L)	Varies by Subarea and Amendment Content in Placed Chemical Isolation Layer (see Attachment 4)	Values based on sediment sample PCB concentrations from the PDI, physical properties of sediment, chemical isolation layer material, and AC. A materials balance mixing calculation was performed to calculate the equilibrium porewater concentrations for individual PCB homologs using site-specific partition coefficients and data on PCB homolog composition and AC content of the chemical isolation layer material. See Section 3.2.4 and Attachment 4 for details.
Sand (% by weight)	Design variable	This input was used to represent the percent of chemical isolation layer material sand in the mixed zone (i.e., mixed with AC and sediment). Value was adjusted based on the %AC in the chemical isolation layer.
Total porosity of sand	0.4	Same as for Chemical Isolation Layer.
Dry bulk density of sand (g/cm^3)	1.56	Same as for Chemical Isolation Layer.
Sediment (% by weight)	50%	This input was used to represent the percent of sediment in the mixed zone.
Total porosity of sediment	Varies by Subarea (See Attachment 4)	Value calculated from % solids data for sediment samples collected during the PDI.
Dry bulk density of sediment (g/cm^3)	Varies by Subarea (See Table Attachment 4)	Calculated based on typical particle density of 2.6 g/cm^3 for inorganic minerals and representative porosity (see previous row).
AC (% by weight)	Design variable	Same as for Chemical Isolation Layer.
Total porosity of AC	0.6	Same as for Chemical Isolation Layer.
Dry bulk density of AC (g/cm^3)	0.54	Same as for Chemical Isolation Layer.
Freundlich coefficient for AC, Kf ((µg/kg)*(L/µg)^(1/n))	$10^{8.5}$	Same as for Chemical Isolation Layer.
Freundlich exponent for AC, 1/n	0.8	Same as for Chemical Isolation Layer.

Model Input Parameter	Value	Data Source
Kinetic sorption rate coefficient for AC, K_{sorp} (/day)	10^7	Same as for Chemical Isolation Layer.
Porewater DOC concentration (mg/L)	See Table 3-8	Same as for Chemical Isolation Layer.
Chemical-Independent Mass Transport Properties		
Boundary layer mass transfer coefficient (cm/hour)	0.04	Appendix B-10 of the FMD developed a site-specific value of 1-2 cm/day (0.04 to 0.08 cm/hr) for use in EPA's PCB fate and transport model. The lower end of this range was used in the cap modeling to account for the fact that groundwater seepage is explicitly simulated in the cap model but was not in EPA's PCB fate and transport model.
Groundwater seepage rate (cm/year)	Upper Portion: 50 cm/year Lower Portion: 300 cm/year	Seepage rates calculated from paired vertical hydraulic conductivity and hydraulic gradients measured during the PDI and seepage meters. Different values specified for the upper and lower portions of Reach 5A based on observed spatial patterns in the data. See Sections 3.2.1 and 3.5 for details.
Tortuosity factor for molecular diffusion	Varies with porosity	Model uses an empirical relationship with porosity to calculate a tortuosity factor that is multiplied by the chemical-specific molecular diffusivity to result in an effective diffusion coefficient associated with porous media flow. The Millington and Quirk (1961) relationship was used, because this is applicable to granular material (Lampert and Reible 2009).
Net sedimentation rate (cm/year)	0	Conservatively, no net sedimentation was assumed in the model. It is expected that a transient zone of new native sandy sediment will develop atop the cap to some thickness (and fill in space between large armor stone) and that this zone will likely be in dynamic equilibrium. That is, although no net sedimentation is assumed, it does not mean there is no (gross) sedimentation.
Dispersion length (cm)	1	Dispersion length was calculated from the relationship developed by Neuman (1990), which relates dispersion to model domain length, which resulted in a value that is less than 1 cm. Based on recommendations from Reible (Lampert and Reible 2009), dispersion length was set to 1 cm.

Model Input Parameter	Value	Data Source
Bioturbation depth (cm) (equals BTZ thickness)	Main channel: 10 Backwaters: 15	The literature review presented in Appendix B4 of the FMD conceptualizes the BTZ as a biologically mixed interval (0 to 4 cm in Reach 5A) and a biologically influenced interval (0 to 10 cm in Reach 5A) the literature review also indicated deeper mixing occurs in depositional areas with high f_{OC}. Therefore, a bioturbation depth of 10 cm was used in the main channel. In backwaters where f_{OC} is higher, a bioturbation depth of 15 cm was used. These values are consistent with recommendations from USACE guidance on cap design (Clarke et al. 2001).
Particle biodiffusion coefficient (cm^2/year)	Main channel: 0.3 Backwaters: 1	Parameter represents bioturbation rate applied to particulate phase PCBs; 0.3 cm^2/year is a typical value representing riverine environments (Thibodeaux and Mackay 2011) and was used in the model for the main channel and Other Waterbodies. The FMD states that in the softer sediments of the backwaters, bioturbation is expected to be three times faster than in the river channel. Therefore, in the backwaters, a value of 1 cm^2/year was used.
Porewater biodiffusion coefficient (cm^2/year)	Main channel: 30 Backwaters: 100	Parameter represents bioturbation rate applied to dissolved-phase PCBs. This value is 10 times higher than the particle biodiffusion coefficient based on literature (Reible 2012; Thibodeaux and Mackay 2011).
Consolidation thickness (cm) and time (years) to reach 90% consolidation for underlying sediment	None	Because sediments will be removed to accommodate a cap, the effects of consolidation, which can result in an additional upward flux of porewater, are expected to be negligible.

3.2.1 Groundwater Seepage Rates

Groundwater seepage rates were calculated from PDI data collected at 10 locations throughout Reach 5A, including one backwater area (BW5A-1). Pressure transducers measured hydraulic head within the sediments and water surface elevations every five minutes in paired piezometers during August 2024 through July 2025; these data were used to calculate vertical hydraulic gradients for each measurement period (approximately monthly), as described in Attachment 2. Long-term average vertical hydraulic gradients were then calculated for that period. Sediment cores were collected at each of the 10 locations, and vertical hydraulic conductivity was measured from these cores using the gravity drainage method, as described in Attachment 2.

The seepage rates were calculated from the paired vertical hydraulic gradient (i_v) values and vertical hydraulic conductivity (K_v) values using Darcy's Law (Equation 3-1).

Equation 3-1

$q = K_v i_v$

where:

q	=	seepage rate [L/T]
K_v	=	representative, bulk vertical hydraulic conductivity between shallow and deep piezometers [L/T]
i_v	=	average vertical hydraulic gradient measured using shallow and deep piezometers [L/L]

The vertical hydraulic conductivity values, long-term average vertical hydraulic gradients, and resulting long-term average seepage rates are listed in Table 3-2. Seepage meters were deployed at four locations (PZ-2, PZ-5, PZ-9, and PZ-10) in June 2023 as well. For two of these locations, PZ-5 and PZ-9, damage to piezometers and equipment malfunctions resulted in no hydraulic gradient data; therefore, the seepage meter results were considered the best estimates for seepage values at these locations. A full discussion of the data is included in Attachment 2.

Table 3-2
Seepage Rates Calculated from Data Collected at 10 Locations Throughout Reach 5A

	Piezometer ID	K_v (cm/sec)	i_v (feet/feet)	Long-Term Average Seepage Rate (cm/year)
Upper Portion of Reach 5A Main Channel 5A-1	PZ01 - ST25	6.6E-05	0.009	18
	PZ02 - ST43	1.2E-04	0.006	22
	PZ03 - ST69	5.9E-05	0.008	15
	PZ05 - ST98	3.9E-04	NA	-88[a]
	PZ06 - ST122	4.0E-05	0.0004	0.47
Backwater BW5A-1	PZ04 - BW5A1	4.3E-04	-0.035	-480
Upper Portion of Reach 5A Main Channel 5A-2	PZ07 - ST134	7.3E-05	0.046	110[b]
	PZ08 - ST167	1.1E-04	0.001	4.4
	PZ09 - ST190	3.3E-05	NA	-1.1[a]
	PZ10 - ST230	1.6E-03	0.005	250
			Main Channel Average:	46[c,d]

Notes:

NA: No acceptable vertical hydraulic gradient could be calculated based on the data collected at this location (see Attachment 2), so it is not possible to calculate a seepage rate.

a. No hydraulic gradient data were available for PZ-05 or PZ-09, so the seepage values shown are from seepage meter measurements recorded in 2023.

b. No shallow transducer data were available for PZ-07 in the 2024 to 2025 deployment. A regression analysis was performed using previous recordings from PZ-06 and PZ-08. The regression was best fit with PZ-06 data. The regression from PZ-06 allowed an estimate of the shallow transducer levels, which was subsequently used in the calculation for seepage rate for PZ-07.

c. The average seepage rate was calculated first setting negative seepage values to zero.

d. Backwater excluded from the average.

Observed seepage rates in the Reach 5A main channel ranged from -88 cm/year to 250 cm/year, with an average of 46 cm/year.[8] The reach-average seepage rate (which is equivalent to approximately 18 inches per year) is approximately equal to the midpoint of the range cited in a study of the Housatonic River basin conducted by USGS (that study cited a range of 13 to 25 in/yr; [Bent 1999]). Because the goal of the ROR remedy is to reduce PCB mass flux to the water column and minimize uptake from biota, both of which are assessed on a long-term and area-wide basis, it is appropriate to evaluate capping with a central tendency seepage rate within Reach 5A. Accordingly, the average seepage rate of 50 cm/yr (rounded to one significant digit) was used in the modeling to represent the upper portion of Reach 5A (including the main channel [Subarea 1] and its adjacent backwaters [BW5A-1, BW5A-2, and BW5A-4]). However, in the lower portion of Reach 5A, seepage rates were more variable, including two measurements being greater than 100 cm/year. Therefore, a higher seepage rate of 300 cm/year was used in the modeling (this value represents the maximum observed seepage rate in this area [Location PZ10], rounded to one significant digit).

3.2.2 Partitioning Coefficients

3.2.2.1 Partitioning to Sand or Sediment

Partitioning of chemicals between the dissolved and sorbed phases of sediment or cap material is described in the CapSim model by the chemical-specific equilibrium partition coefficient (K_d). For organic chemicals, such as PCBs, K_d is represented by the OC partition coefficient (K_{OC}) times the fraction OC (f_{OC}), consistent with the formulations used in EPA's PCB fate and transport model documented in the FMD. Site-specific partition coefficients were used in the cap design modeling in the following two ways: (1) to estimate the porewater chemical concentrations beneath the cap based on measured sediment concentrations; and (2) to simulate sorption of PCBs to the various layers of cap materials represented in the model (see Section 3.1.3 and Table 3-1). As stated previously, individual PCB homologs were simulated by the cap model to account for the range in mobility of the PCB congeners that make up the total PCB concentration. Thus, partition coefficients were developed for each of the 10 PCB homologs.

Using the equilibrium partitioning formula shown by Equation 3-2, site-specific K_{OC} values were developed from paired sediment and porewater PCB homolog concentrations measured in samples collected from 20 locations throughout Reach 5A, including some of its backwaters, as part of the PDI (see PDI Summary Report for Sediment and Riverbanks [Anchor QEA and AECOM 2023]).

[8] Seepage rates at main channel locations where measured values were negative were set to zero for this calculation of the average. Furthermore, the seepage measured at BW5A-1 was excluded from the average, given it reflects a different hydrologic environment than the main channel.

Equation 3-2

$$K_{OC} = \frac{C_s}{f_{OC} \cdot C_w}$$

where:

K_{OC}	=	OC partition coefficient [L^3/M]
C_s	=	PCB concentration in sediment [M/M]
f_{OC}	=	fraction OC concentration [M/M]
C_w	=	PCB concentration of chemical in freely dissolved porewater [M/L^3]

The partitioning formulation used in the cap model represents three phases—sorbed, freely dissolved, and DOC-bound—consistent with the EPA fate and transport model documented in the FMD. PCB porewater concentrations were measured during the PDI using solid-phase microextraction (SPME) passive samplers (as described in GE's *Revised Pre-Design Investigation Work Plan for Reach 5A Sediment and Riverbanks* [Anchor QEA and AECOM 2022]), which provided a measurement of the freely dissolved-phase PCB concentration. Thus, for each PCB homolog group, measured bulk sediment PCB concentrations, on an OC-normalized basis (i.e., C_s/f_{OC})[9] were plotted against measured freely dissolved porewater PCB concentrations. This produces a relationship with a slope that is equivalent to K_{OC} if a regression is performed on a linear scale with the intercept forced to zero. Because such regressions can be strongly influenced by a limited number of high concentration data pairs (and the uncertainty in those few data pairs), the analysis was performed on a log-transformed basis. On a log-transformed basis, the intercept of the regression is equal to the K_{OC}, with the slope of the regression forced to a value of one. Homolog PCB concentrations were calculated as the sum of individual congeners that make up each PCB homolog group for the regression analysis. To reduce uncertainty, only detected concentrations were used in the regression analysis. The homolog-specific partition coefficients were calculated using the results of the intercept from the log-transformed regression.[10] The regression analyses are shown in Attachment 3, and the resulting log K_{OC} values are listed in Table 3-3. This approach assumes similar partitioning among the 20 locations that were sampled and that a single site-specific coefficient can describe partitioning across the reach. Exploratory analysis of the data was performed to confirm that there were no obvious spatial differences in the partition coefficients; the degree of scatter exhibited by the figures

[9] f_{OC} values less than 0.2% were set to 0.2% to account for sorption to mineral surfaces that occurs at these low organic carbon contents, consistent with the data treatment used in the partitioning evaluations documented in the FMD.

[10] When the underlying regression equation (i.e., sorbed phase concentration equals freely dissolved-phase concentration times partition coefficient) is log-transformed, it becomes a least squares regression analysis with slope forced to a value of one (i.e., log of sorbed phase concentration equals log of freely dissolved-phase concentration plus log of partition coefficient). The partition coefficient from this regression equation (i.e., the intercept) is mathematically equivalent to the average log ratio of the individual concentration data pairs.

is consistent with similar studies conducted for other projects, including the partitioning study conducted for the Housatonic River in 2001, as documented in the RCRA Facility Investigation (RFI) Report (BBL and QEA 2003). The relationships between the two phases are well explained by the partition coefficient regression lines in most cases (i.e., the data generally follow the regression lines), although some homologs exhibit a higher degree of variability than others. Variability is not uncommon in site-specific partitioning data relationships such as these (based on review of similar data from other projects),[11] due to sampling and analytical variability associated with combining three independent measurements (sorbed phase PCB, porewater PCB, sediment TOC). Given the observed variability and the importance of this parameter to the modeling, sensitivity analyses were performed to evaluate how the partition coefficient variability affects model results (see Section 3.5.2).

Because the sediment porewater concentrations measured during the PDI and the values calculated from bulk sediment PCB measurements specified as the source term in the model (see Section 3.2.3) are on a freely dissolved basis, the model was configured to explicitly simulate partitioning of PCBs in the DOC-bound phase, as quantified by the input values for porewater DOC concentration (also measured as part of the PDI porewater study; see Table 3-1) and K_{DOC}. K_{DOC} was specified by a relationship with K_{OW} developed from the treatability study evaluations discussed in GE's February 2026 *Treatability Studies Summary Report for Reach 5A* (Treatability Studies Summary Report; Anchor QEA and Arcadis 2026): $\log K_{DOC} = 0.9 \times \log K_{OW} + 0.8$. K_{OW} values were developed from literature values reported by Hawker and Connell (1988) and de Bruijn et al. (1989).[12] A sensitivity analysis on this parameter was conducted as well, using K_{DOC} equal to 0.1 times K_{OW}, which is consistent with past literature and site-specific modeling of PCB partitioning documented in the FMD (see Section 3.5.3).

Table 3-3
Chemical-Specific Partition Coefficients

Chemical Name	Log K_{OC} (log L/kg)	Log K_{DOC} (log L/kg)	Log K_{OW} (log L/kg)
PCB-mono	5.3	5.3	5.0
PCB-di	5.5	5.7	5.5
PCB-tri	5.7	6.2	5.9

[11] For example, standard errors for calculated site-specific K_{OC} values in the range of 0.1 to 0.3 log units were found in similar analyses conducted for paired porewater-sediment samples from Onondaga Lake (Parsons and Anchor QEA 2012) and Newtown Creek (Anchor QEA 2023).

[12] Average log K_{OW} values for PCBs were developed by arithmetically averaging results from individual congeners within each homolog group. Log K_{OW} values for PCBs, as cited by Hawker and Connell (1988), are widely used, although they were measured by a generator column. Log K_{OW} values measured by the "slow-stirring" method are considered more accurate (OECD 2006). Therefore, the Hawker and Connell PCB log K_{OW} values were adjusted based on a correlation with log K_{OW} values measured by de Bruijn et al. (1989) using the "slow-stirring" method (de Bruijn's log K_{OW} values were not used directly because that study measured only 20 PCB congeners).

Chemical Name	Log K_{OC} (log L/kg)	Log K_{DOC} (log L/kg)	Log K_{OW} (log L/kg)
PCB-tetra	5.9	6.5	6.4
PCB-penta	6.2	6.9	6.8
PCB-hexa	6.4	7.3	7.2
PCB-hepta	6.7	7.6	7.6
PCB-octa	6.9	7.9	7.9
PCB-nona	7.1	8.2	8.3
PCB-deca	7.4	8.5	8.6

The site- and homolog-specific log K_{OC} values (5.3 to 7.4 log L/kg) are within the range of log K_{OC} values reported in the literature (e.g., converted from K_{OW} using relationship developed by Di Toro [1985]) of 4.9 to 8.4 log L/kg. In addition, the site-specific K_{OC} values on a total PCB basis are within the range of those calculated from porewater samples collected in 2001 and summarized in the RFI Report (Figure 8-22 of BBL and QEA 2003). As shown on Figure 11 of Attachment 3, the total PCB log K_{OC} of 6.2 log L/kg calculated from the more recent PDI is similar to the Reach 5 values presented in the RFI Report and the log K_{OC} value of 6.5 log L/kg used in EPA's fate and transport modeling presented in the FMD. For this evaluation, the K_{OC} values calculated from the more recent PDI dataset were used for this evaluation because the porewater concentrations from the PDI were measured using a more modern sampling method (SPME) that directly measured the freely dissolved phase, rather than a separation based method that measured the freely dissolved plus DOC-bound PCB phases together, and because the more recent samples were analyzed by a more accurate PCB congener analytical method.

3.2.2.2 Partitioning to Activated Carbon

CapSim uses state-of-the science formulations to describe the sorption characteristics of organic chemicals with AC-based cap amendments. Specifically, the model has the ability to simulate adsorption kinetics to represent time-dependent mass transfer between freely dissolved contaminants in porewater and AC within the cap, as well as various isotherm relationships to describe equilibrium partitioning behavior, which is usually found to be non-linear for PCBs and AC and described by the Freundlich Isotherm (e.g., McDonough et al. 2008). This allows the model to capture both short-term, non-equilibrium conditions following cap placement as well as longer-term cap amendment performance as steady state is reached.

Adsorption isotherm and kinetics testing was performed through a site-specific study to evaluate the equilibrium and kinetic adsorption characteristics for Reach 5A porewater PCBs with powdered activated carbon (PAC) and granular activated carbon (GAC), which are candidate adsorptive amendment materials for the Reach 5A sediment caps (Anchor QEA and Arcadis 2026). The isotherm testing characterized the adsorptive capacity of PAC and GAC for sequestering dissolved-phase PCBs transported by porewater within the chemical isolation layer of the cap when the phases are at

equilibrium. Kinetic testing evaluated the rates at which PCBs adsorb from porewater onto an AC-based amendment. Details of the treatability study and the results are discussed in the Treatability Studies Summary Report.

Results of the isotherm and kinetics testing showed that PAC was a more effective amendment than GAC.[13] Thus, based on this finding and preliminary CapSim results, for the purposes of this final design, PAC was specified as the sorptive amendment for cap chemical isolation layers. The empirical constants related to the adsorption capacity of the PAC, K_F values, were relatively constant across the PCB congeners tested, as discussed in the Treatability Studies Summary Report. This is consistent with the findings reported by Shen et al. (2023). As such, a K_F value of $10^{8.5}$ micrograms (µg)/kg*L/µg$^{(1/n)}$ was used in the model for each PCB homolog group. Likewise, the Freundlich isotherm equation exponents (nonlinearity parameter, 1/n) for PAC did not vary greatly across tested PCB congeners in the treatability study, so a value of 0.8 was used in the model for each PCB homolog group. Finally, the PCB congeners tested also showed relatively little variation in the kinetic rate coefficients for PAC adsorption (Anchor QEA and Arcadis 2026), so a value of 10^7 per day was used for each PCB homolog group in the model.

3.2.3 Source Term Porewater PCB Concentrations

The porewater concentration input defines the source term in the cap model and corresponds to the contaminant concentrations present in the porewater immediately beneath the cap. Porewater and paired bulk sediment samples were collected at 20 locations within Reach 5A and analyzed for congener-specific PCBs as part of the PDI, as described in Section 3.2.2. The objective of this component of the PDI was to use the 20 porewater samples to support calculation of site-specific partition coefficients (as presented in Section 3.2.2), which could then be used to convert the larger sediment PCB dataset collected under the PDI (i.e., over 1,600 sediment samples in the main channel and backwaters, as described in Section 5.1.1.1 of the Final RD/RA Work Plan) to corresponding porewater PCB concentrations to fully characterize spatial variations in Reach 5A sediment porewater PCB concentrations for use in cap design model evaluations. The conversion from sediment Aroclor-based PCB concentrations to PCB homolog porewater concentrations in this approach was a multi-step process that is described in the remainder of this section.

[13] As described in Section 5.6.3 of the Final RD/RA Work Plan, the treatability testing of adsorptive amendments was designed as a 24-week study; however, that report included results from only the first eight weeks of testing as directed by EPA. Additional data generated beyond that initial eight-week period were not available in time to be considered in the design presented herein. Initial review of the treatability study isotherm test data suggested that some PCB congeners did not reach full equilibrium for the testing with GAC; likewise, the abbreviated kinetic testing period (i.e., eight versus 24 weeks) did not allow for a complete evaluation of PCB sorption equilibrium with GAC from those tests. Therefore, those results may be considered further in future revisions of or addenda to this work plan.

Step 1: Calculate Sediment PCB Concentration Statistics for Each Sub-Area for Selected Depth Intervals of Interest

Summary statistics for the sediment total PCB concentrations in areas to be capped are shown in Table 3-4. Because a minimum of one foot of sediment will be removed to accommodate the engineered caps, the sediment concentrations below a depth of one foot were considered reflective of the PCB concentrations that would be present beneath the engineered caps and, therefore, used for the capping evaluations for the purpose of defining concentrations beneath the cap. These concentrations are shown on an OC-normalized basis because the conversion to porewater concentration is based on dividing the OC-normalized sediment concentration by the K_{OC} as per Equation 3-2.

Table 3-4
OC-Normalized Total PCB Concentrations in Sediments Below 1 Foot in Areas to Be Capped

Area	Sample Count	OC-Normalized Sediment Total PCB Concentration (mg/kg OC)						
		Minimum	Arithmetic Mean	ProUCL Suggested 95% UCL on the Mean	50th Percentile	75th Percentile	95th Percentile	Maximum
Main Channel Reach 5A-1	398	0.887	1,190	6,480	96.0	538	3,860	125,000
Main Channel Reach 5A-2	242	0.294	2,020	33,000	138	1,110	5,690	208,000
Sykes Brook	2	331	766	NC	766	983	1,160	1,200
BW5A-1[a]	0	—	—	—	—	—	—	—
BW5A-2	36	5.52	3,510	6,630	1420	2,960	14,300	33,500
BW5A-4	14	5.34	1,980	5,930	338	3,060	7,390	11,700
BW5A-5	119	0.364	515	1,160	4.90	52.7	3,050	12,900

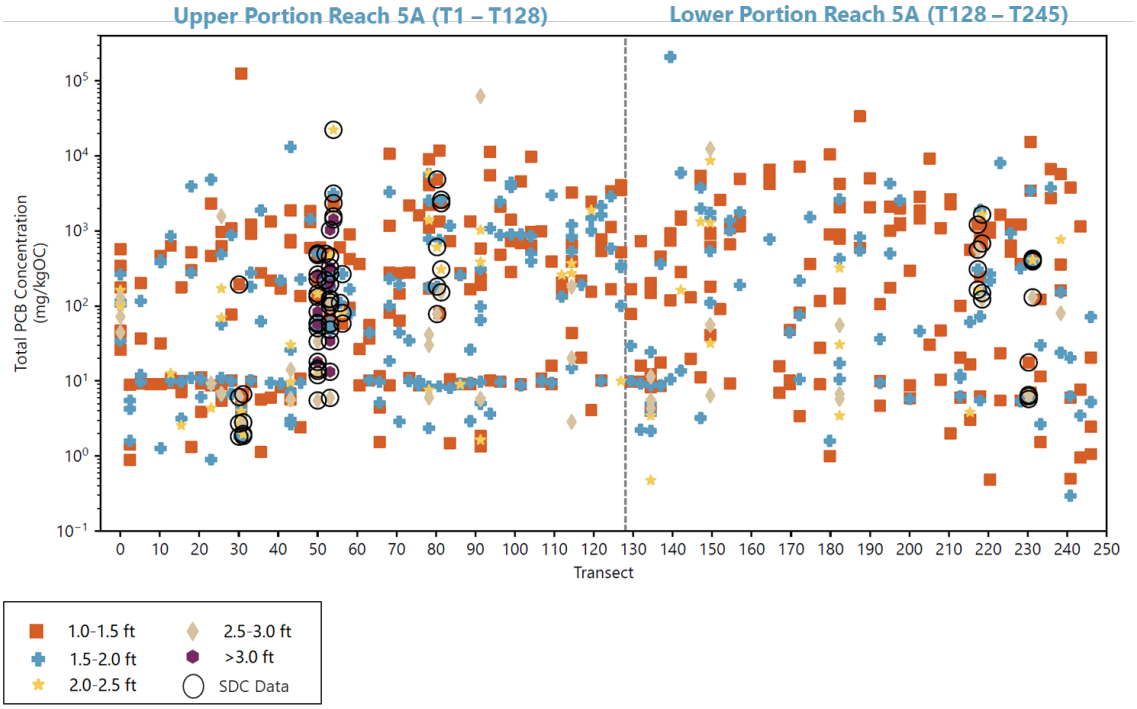
Notes:
Concentrations reported to three significant figures.
a. Samples were not collected from sediment depths below one foot in this area. Average concentration in the surface samples within BW5A-1 is 841 mg/kg OC, and the maximum concentration is 1,287 mg/kg OC.
NC: not calculated due to insufficient number of samples

Because the goal of the remedy is to reduce PCB flux to the water column and PCB uptake from biota, a statistic that represents an area-wide average is appropriate. Conservatively, the 95% upper confidence limits (UCL) on the mean of PCB concentrations and 95th percentile porewater concentrations were considered as metrics for setting cap model input values. The 95% UCLs on the mean of PCB concentrations for each subarea were calculated using the EPA ProUCL software (version 5.1; Singh and Singh 2015). As shown in Table 3-4, the 95% UCLs are greater than the 75th percentile PCB concentrations, which illustrates that this metric represents an upper-bound concentration relative to the full data distributions. In all but one subarea, the 95% UCLs are within a

factor of 2 or 3 of the 95th percentiles. The one exception is Main Channel Reach 5A-2, for which the 95% UCL is approximately six times higher than the 95th percentile. Given this large disparity, the data from this subarea were more closely evaluated.

Figure 3-4 shows the spatial distribution of OC-normalized total PCB sediment concentrations along the transects. Concentrations throughout the main channel are heterogeneous, with no observable differences between the upper and lower portions of Reach 5A. Therefore, the large differences in the 95% UCL between the upper and lower portions of Reach 5A main channel are unexpected.

Figure 3-4
Spatial Distribution of Total PCB Concentrations in Sediments Below 1 Foot in Main Channel Areas to Be Capped

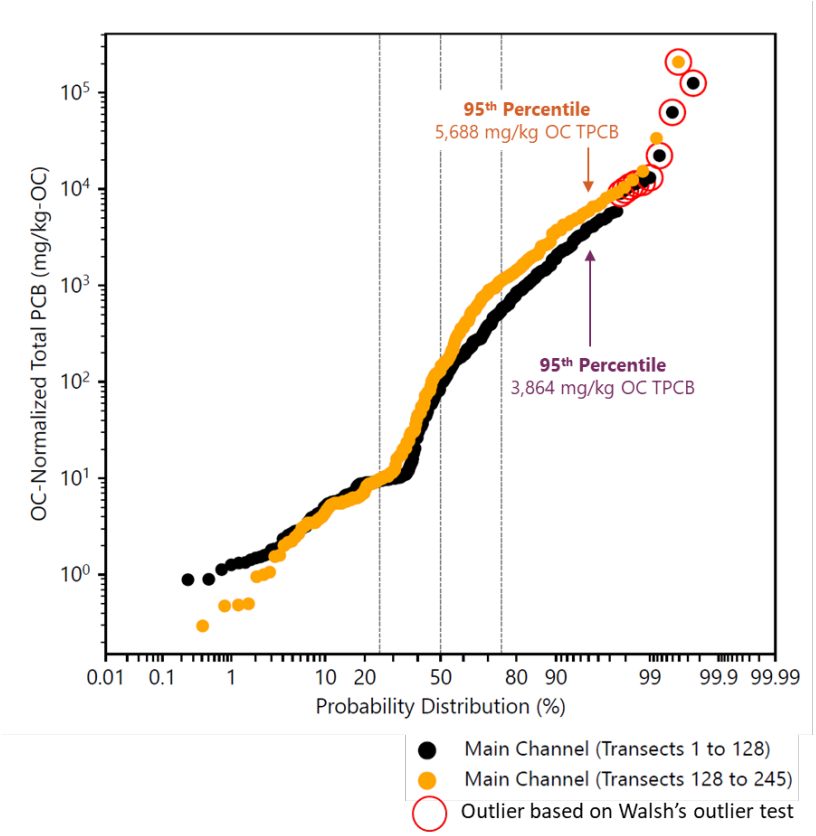


Note:
Symbols shown in color represent 2022 to 2023 PDI sediment data; black circles represent supplemental main channel sediment samples collected in 2024.

As shown in Table 3-5, the ProUCL recommended 95% UCL of 33,000 mg/kg OC for the Main Channel Reach 5A-2 was based on the Halls method (95% H-UCL [KM -Log]). This method was selected due to the highly skewed nature of the dataset is highly sensitive to the single highest data point (208,000 mg/kg OC at Transect 139), which is approximately an order of magnitude greater than the next highest value in the subarea. This data point was identified as an outlier based on Walsh's outlier test.

Figure 3-5 shows the cumulative frequency distributions of the OC-normalized PCB concentrations in the upper and lower portions of the main channel of Reach 5A. This figure shows that the concentration distributions within the upper and lower portions of the main channel are very similar to one another, highlighting that the ProUCL recommended 95% UCL of 33,000 mg/kg OC in the lower portion of the main channel may not be a good representation of central tendency.

Figure 3-5
Distribution of Total PCB Concentrations in Sediments Below 1 Foot in Main Channel Areas to Be Capped



Note:
Decay/reactions and deposition/erosion were not included in the modeling of Reach 5A caps.

With the outlier removed, the 95% UCL in the lower portion of Reach 5A was reduced to 1,999 mg/kg OC (see Table 3-5), which is more than an order of magnitude lower than the value when the outlier is included, further illustrating the sensitivity to this one data point. Furthermore, as shown in Table 3-5, the 95th percentile porewater concentration in Reach 5A-2 is within the range of values for alternate valid methods of calculating the 95% UCL on the mean, specifically, the KM Chebyshev and Bootstrap UCLs. Because the 95th percentile is more consistent with the 95% UCL using the KM Chebyshev UCL and Bootstrap UCL methods and the 95% UCL for the upper portion of Reach 5A, the

95th percentile OC-normalized PCB concentration was used to represent the PCB concentrations in the lower portion of Reach 5A; the 95% UCL values were used for all other subareas.

Table 3-5
Comparison Upper-Bound Statistics of OC-Normalized Total PCB Concentrations in Sediments Below 1 Foot in of Lower Portion of Reach 5A (T128 – T245)

Statistic	OC-Normalized PCB Concentration (mg/kg OC)
95% H-UCL (KM -Log) (Recommended UCL)	33,000
95% KM Chebyshev UCL Recommended UCL (excluding outliers)	2,000
95% KM Chebyshev UCL	5,840
95th Percentile Bootstrap UCL	3,590
95th Percentile	5,690

Notes:
Concentrations reported to three significant figures.
NC: not calculated due to insufficient number of samples

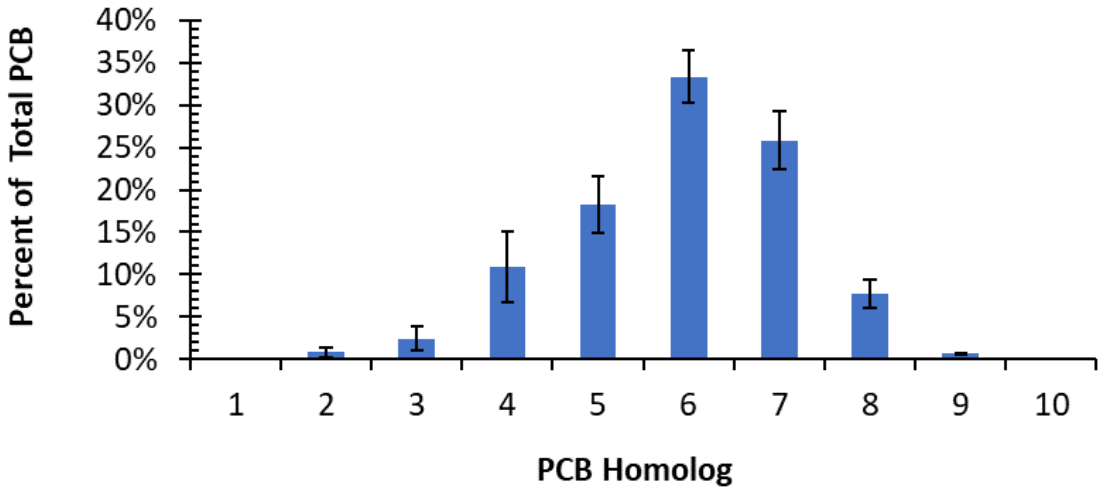
Step 2: Combine Subareas Having Similar Concentrations, After Accounting for Delineation Based on Seepage Rates, Waterbody Type, and Constructability Considerations

Backwaters BW5A-2 and BW5A-4 are geographically close to one another and were, therefore, assigned the same seepage rate, as discussed in Section 3.2.1. As shown in Table 3-4, PCB concentrations in backwaters BW5A-2 and BW5A-4 (green shading on Figure 3-3) are within the same order of magnitude (95% UCLs of 6,630 and 5,930 mg/kg OC, respectively); therefore, BW5A-2, having the higher concentration between these two backwaters (6,630 mg/kg OC), was conservatively selected to represent the conditions of both areas in the modeling evaluation.

Step 3: Calculate PCB Homolog Concentrations from Total PCB Concentrations

As stated previously, individual PCB homologs were simulated by the cap model to account for the range in mobility of the PCB congeners that make up the total. Therefore, the reported PCB concentrations in sediment were first converted to individual PCB homolog concentrations using the average homolog distribution from the 20 sediment samples collected as part of the PDI porewater partitioning study that were analyzed for congener-specific PCBs (see Figure 3-6).

Figure 3-6
Average Homolog Distribution of PDI Sediment Samples Analyzed for Congener-Specific PCBs



Note:
Error bars represent +/- 2 standard errors of the mean.

The average homolog distribution shown on Figure 3-6 is generally consistent with that measured in historical sampling (as documented in the RFI Report) and is consistent with an Aroclor 1260-dominated signature, which is what has consistently been reported for this site, as noted in the RFI Report.

Step 4: Apply Aroclor to Congener Conversion Factor

Because the larger sediment PCB data set was analyzed for PCBs using an Aroclor-based method (consistent with nearly all of the historical sampling conducted for the RFI, risk assessments, and the Corrective Measures Study [see Arcadis et al. 2010]) and the partitioning coefficients were developed using congener-specific PCB data, the evaluation explicitly considered differences in these two methods when converting from sediment Aroclor PCB data to PCB homolog concentrations. The data collected as part of the PDI partitioning study indicates that congener-based total PCB concentrations in sediment samples are generally higher than those measured by Aroclor method. The central tendency value of the ratio of paired congener-based to Aroclor-based PCB concentrations is approximately 1.7, when calculated using both log-transformed and untransformed data. Thus, the Aroclor-based PCB sediment concentration data were multiplied by a factor of 1.7 for converting to sediment PCB homolog concentrations.

Step 5: Use K_{OC} to Convert to Porewater PCB Homolog Concentrations

The calculated sediment PCB homolog concentrations were lastly converted to porewater PCB homolog concentrations using the site-specific log K_{OC} values listed in Table 3-3 and Equation 3-2.

Calculated porewater PCB homolog concentrations based on the 95% UCL of the mean PCB sediment concentrations (OC-normalized) or, in the case of Main Channel Reach 5A-2, the 95th percentile PCB sediment concentrations (OC-normalized) are listed in Table 3-5. The sediment-derived freely dissolved PCB porewater concentrations shown in Table 3-6 are at the upper end of the range or higher when compared to the total PCB concentrations measured in the 20 porewater samples (0.0013 to 5.3 µg/L total PCBs). The lowest freely dissolved total PCB concentration in Table 3-6 (1.0 µg/L for BW5A-5) is greater than the total PCB concentration in 17 of the 20 porewater samples. It should be noted that some of the total PCB concentrations used in the model are approaching solubility limits for several PCB Aroclor mixtures, including Aroclor 1260 (e.g., Yalkowsky et al. 2010), which highlights the conservatism of these porewater PCB concentration inputs.

Table 3-6
Freely Dissolved Porewater Concentrations Representing Source Term

Chemical Name	Freely Dissolved Porewater Concentration (µg/L)				
	Main Channel Reach 5A-1[a]	BW5A-1	BW5A-2[b]	Main Channel Reach 5A-2[c]	BW5A-5
PCB-mono	1.7E-02	3.4E-03	1.7E-02	1.5E-02	3.0E-03
PCB-di	3.0E-01	6.0E-02	3.1E-01	2.7E-01	5.4E-02
PCB-tri	5.9E-01	1.2E-01	6.0E-01	5.1E-01	1.1E-01
PCB-tetra	1.5E+00	3.1E-01	1.6E+00	1.4E+00	2.8E-01
PCB-penta	1.2E+00	2.4E-01	1.2E+00	1.1E+00	2.2E-01
PCB-hexa	1.4E+00	2.7E-01	1.4E+00	1.2E+00	2.4E-01
PCB-hepta	5.9E-01	1.2E-01	6.1E-01	5.2E-01	1.1E-01
PCB-octa	1.0E-01	2.0E-02	1.1E-01	9.0E-02	1.8E-02
PCB-nona	5.3E-03	1.0E-03	5.4E-03	4.6E-03	9.5E-04
PCB-deca	1.4E-04	2.8E-05	1.4E-04	1.2E-04	2.5E-05
Total PCB[d]	5.7E+00	1.1E+00	5.9E+00	5.1E+00	1.0E+00

Notes:

a. Concentrations in the Main Channel Reach 5A-1 were used for the cap modeling that represents the main channel (Stations 00+00 to 128+00).

b. Concentrations in BW5A-2 were used for the cap modeling that represents both BW5A-2 and BW5A-4.

c. Concentrations in the Main Channel Reach 5A-2 were used for the cap modeling that represents the main channel (between Stations 128+00 to 245+00) as well as Sykes Brook.

d. Total PCBs are included for reference only; total PCBs were not simulated with the model. PCBs were simulated by homolog group, and results were summed to calculate total PCB flux and concentration for comparison to the Performance Standards.

3.2.4 Mixed Zone Porewater PCB Concentrations

The initial porewater PCB concentration specified for the mixed zone was calculated using a materials balance assuming 50% sediment and 50% chemical isolation layer material would be mixed together. Calculation sheets documenting this materials balance are provided in Attachment 4.

To start, model simulations were performed assuming the chemical isolation layer was composed of sand only. Table 3 of Attachment 4 shows the porewater concentrations calculated to be at equilibrium with the mixed sand and sediment at a ratio of 50% each. The PCB porewater concentrations in the mixed zone specified for the modeling were modified as the composition of the chemical isolation layer material (i.e., inclusion of PAC amendment, which reduced the percent sand) changed as part of the design process.

3.2.5 Surface Water PCB Concentrations

Surface water concentrations represent the boundary condition at the top of the cap in the model and are used in the cap model to compute the surface exchange flux between porewater and surface water at the cap/surface water interface. These concentrations were based on the flow-weighted average PCB concentrations measured at the Pomeroy Avenue Bridge and South Street Bridge locations from samples collected between March and November 2022 as part of the interim baseline monitoring program (Anchor QEA and Arcadis 2023).[14] Surface water PCB concentrations were measured from whole water samples. For purposes of the cap modeling, these concentrations were converted to freely dissolved surface water concentrations, on a homolog-specific basis, using Equation 3-3, which is the same three-phase PCB partitioning formulation used for porewater (see Sections 3.2.2 and 3.2.3) and used in EPA's PCB fate and transport model documented in the FMD.

[14] Additional surface water samples were collected at the Pomeroy Avenue Bridge location in 2024 as part of the baseline monitoring program (Anchor QEA et al. 2025). The average PCB concentration from 2024 is within a factor of two of the PCB concentrations measured in 2022 (with the 2024 average being lower). For consistency in timing of data from the East and West Branches, conservatively, the 2022 data were used.

Equation 3-3

$$C_f = \frac{C_w}{1 + mdoc \cdot k_{doc} + TSS \cdot K_{OC} \cdot f_{OC}}$$

where:

C_f = freely dissolved surface water PCB homolog concentration (M/L^3)

C_w = sample-specific whole water surface water PCB homolog concentration measured during interim baseline sampling (Anchor QEA and Arcadis 2023) (M/L^3)

mdoc = surface water DOC concentration, specified to be 5 mg/L based on historical surface water data (Figure 8-6 of the RFI Report) (M/L^3)

K_{doc} = DOC partition coefficient, from Table 3-3 (L^3/M)

TSS = average total suspended sediment concentrations in surface water measured during interim baseline sampling (Anchor QEA and Arcadis 2023) (M/L^3)

K_{OC} = OC partition coefficient (see Table 3-3) (L^3/M)

f_{OC} = fraction OC of suspended sediments in surface water, specified to be 10% based on historical surface water data (see Figure 8-5 of the RFI Report) (M/M)

Freely dissolved surface water concentrations were calculated separately for each sample collected from Pomeroy Avenue Bridge and South Street Bridge. The average freely dissolved concentrations from these two locations were then weighted by the 2022 average flow rate from the East Branch (67 cfs at Pomeroy Avenue Bridge) and West Branch (68 cfs at South Street Bridge),[15] respectively, to calculate a flow-weighted average to represent the PCB concentrations of surface water in Reach 5A. The calculated freely dissolved surface water PCB concentrations used in the cap model are listed in Table 3-7.

Table 3-7
Surface Water PCB Concentrations Used in Cap Model

Chemical Name	Freely Dissolved Surface Water Concentration (ng/L)
PCB-mono	0.093
PCB-di	5.5
PCB-tri	1.6
PCB-tetra	0.92

[15] Flows measured between March and November 2022 at Pomeroy Avenue (East Branch) ranged from 23 cfs to 155 cfs. Flows measured between March and November 2022 at the South Street Bridge ranged from 9.1 cfs to 138 cfs (see Table 3-1 of GE's March 2023 *Interim Baseline Surface Water Monitoring Report* [Anchor QEA and Arcadis 2023]). The average flows were 67 and 68 cfs at Pomeroy Avenue Bridge and South Street Bridge, respectively.

Chemical Name	Freely Dissolved Surface Water Concentration (ng/L)
PCB-penta	0.12
PCB-hexa	0.29
PCB-hepta	0.092
PCB-octa	0.0058
PCB-nona	0.0011
PCB-deca	0.00039
Total PCB[a]	8.7

Note:

a. Total PCB is included for reference only; total PCB was not simulated with the model. PCBs were simulated by homolog group.

3.2.6 Organic Carbon Concentrations

OC within the cap affects the transport of PCBs within the cap through the process of sorption. Because porewater PCB concentrations presented in Section 3.2.3 are input to the model on a freely dissolved basis, partitioning to the DOC-bound phase was explicitly simulated in the model. Porewater DOC concentrations specified in the model were based on the average DOC concentrations reported from the porewater samples collected as part of the PDI for each cap subarea. These DOC concentrations in the main channel ranged from 1.0 to 58 mg/L, with an average of 6.9 mg/L. In the upper portion of Reach 5A, DOC ranged from 1.0 to 7.6 mg/L, with an average of 3.1 mg/L. In the lower portion of Reach 5A, DOC ranged from 1.0 to 58 mg/L (note, the second highest DOC concentration in porewater was 12 mg/L), with an average of 11.9 mg/L. DOC was measured in two of the backwaters—BW5A-1 (4.2 mg/L) and BW5A-5 (15.1 mg/L). The value of 16.7 mg/L DOC concentration specified for Reach 5A in EPAs modeling study (FMD) is within the range measured as part of the porewater sampling conducted during PDI, but greater than the average DOC concentrations used in the modeling presented herein for each subreach. These average values were input to the model for each model computational layer discussed in Section 3.1.3 and are listed in Table 3-8.

The f_{OC} in the BTZ (top 10 cm in the main channel or top 15 cm in the backwaters; see Table 3-1) was calculated based on surface sediment PCB concentrations, considering that, over time, the materials in the BTZ will equilibrate with the f_{OC} of depositing solids. The area-specific values used in the model were based on the average f_{OC} measured in surface sediment samples collected during the PDI and are listed in Table 3-8.

Table 3-8
Organic Carbon Concentrations Specified in Cap Layers

Sub-Area	DOC (mg/L)	f_{OC} of Bioturbation Zone (% by weight)
Main Channel Reach 5A-1 (Transects 1 to 84)	3.1	0.8
BW5A-1	4.2	8.8
BW5A-2 and BW5A-4	15[a]	2.9
Main Channel Reach 5A-3 (Transects179 to 245)	12	0.8
BW5A-5	15	6.6

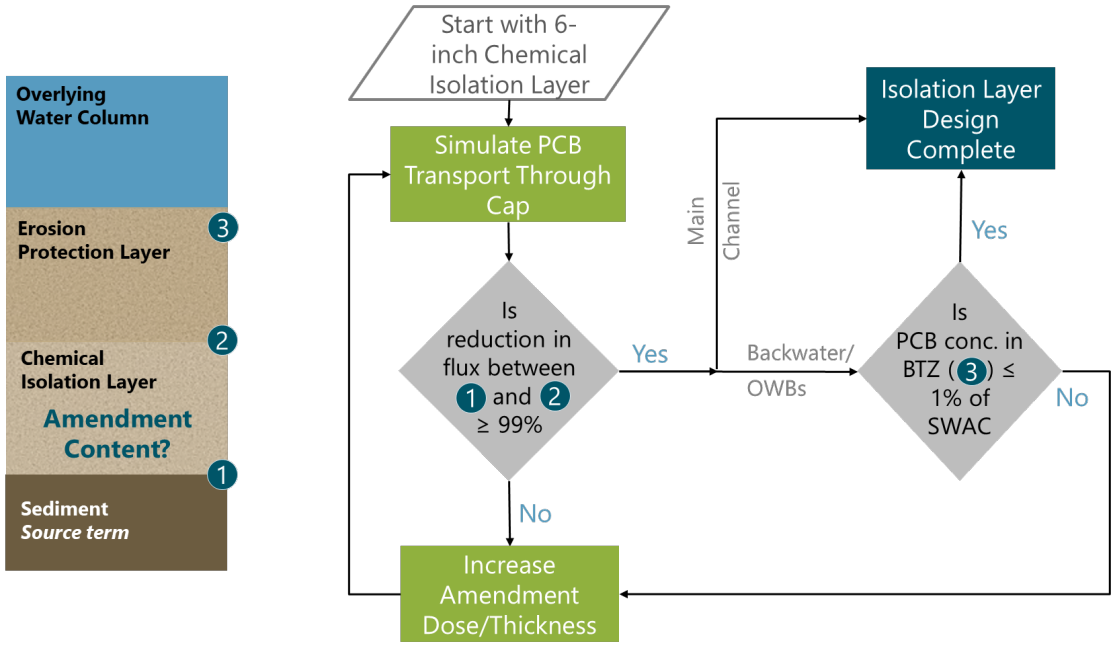
Note:

a. The DOC concentration measured in BW5A-5 was also used to represent DOC in backwaters BW5A-2 and BW5A-4.

3.3 Simulation Setup and Iterative Approach

As described in Section 3.1.3, initially, a six-inch sand chemical isolation layer was evaluated with the model (represented by f_{OC} of 0.1%). In each of the five subareas, the transport of PCBs was simulated for each of the 10 PCB homolog groups (mono- through decachlorobiphenyl) for a 100-year period. Model-predicted PCB mass fluxes and PCB concentrations for each homolog were summed to calculate the total PCB mass flux across the chemical isolation layer (i.e., by comparing predicted values at the bottom and top of that layer in the model) and the total PCB concentration within the BTZ. PCB mass fluxes predicted by the model at the sediment-cap interface and the interface between the chemical isolation layer and erosion protection layer were used to calculate percent reduction in total PCB mass flux across the chemical isolation layer throughout the course of the 100-year simulations. The total PCB concentration within the BTZ and the calculated percent reduction in total PCB mass flux were then compared to the Performance Standards summarized in Section 3.1.1. The model was then run iteratively by adjusting the amendment content and/or thickness of the chemical isolation layer, as needed, to achieve predicted reductions in the PCB mass flux across the chemical isolation layer of 99% throughout the simulation. In the backwaters, if a 99% reduction in PCB mass flux across the chemical isolation layer was achieved, but the sorbed phase total PCB concentration predicted in the BTZ was greater than 1% of the existing average surficial concentration of that backwater at the end of the 100-year simulation, additional iterative model simulations were conducted with higher amendment content and/or increased thickness of the chemical isolation layer until both criteria were satisfied, as illustrated on Figure 3-7.

Figure 3-7
Iterative Process of Simulation Approach



3.4 Model Results

The model results showed that the Performance Standards would not be attained with a sand-only chemical isolation layer. Therefore, the model was run iteratively for each of the corresponding subareas, with the addition of PAC and increasing the PAC dose within the placed chemical isolation layer, as necessary, until the Performance Standards were predicted to be met. Based on constructability considerations from past projects (e.g., ability to place and uniformly mix AC with sand or gravel cap material), a minimum PAC dose of 1% by weight was used as the starting point in the modeling. With the addition of PAC, the initial freely dissolved porewater concentrations in the mixed layer were recalculated following the procedure outlined in Section 3.2.4 and Attachment 4 to account for the added sorption of PCBs by the PAC in this zone. The freely dissolved PCB porewater concentrations in the mixed zone containing 1% by weight PAC are listed in Table 3 of Attachment 4.

The model results, which are shown in Table 3-9, indicate that 1% by weight PAC will meet the Performance Standards in each of the modeled subreaches.

Time series of model-predicted total PCB mass flux at the bottom and top of the chemical isolation layer and total PCB concentrations within the BTZ are shown for each sub-area on Figures 3-8a through 3-8g. The top panel in these figures compares the model-predicted total PCB mass fluxes at the bottom and top of the chemical isolation layer, which were used to calculate the percent reduction in

total PCB mass flux across the layer.[16] The model initiates with a zero PCB mass flux at the start of the model-simulation. Due to the very large initial concentration gradient between the boundary condition (constant porewater concentration beneath the cap) and the initial zero concentration within the bottom of the cap, diffusion- and dispersion-dominated flux causes the total PCB mass flux to increase to a relatively high value and peak very early in the simulation. As concentrations begin to build within the bottom of the cap just above the sediment interface, the concentration gradients are reduced, and as a result, the model-predicted flux decreases until it eventually comes to a steady-state value that is dominated by the advection flux driven by groundwater seepage. The model-predicted fluxes at the top of the chemical isolation layer increase more gradually over the course of the model-simulation. These figures show that the reduction in total PCB mass flux across the chemical isolation layer remains greater than 99% throughout the 100-year simulations for the PAC contents determined during this iterative cap design modeling evaluation. The bottom panel in these figures shows the PCB concentrations for each PCB homolog group and the corresponding total PCB concentrations predicted by the model within the BTZ (as a vertical average) over the course of the 100-year simulation. Within the backwaters, these figures show that the total PCB concentrations within the BTZ are predicted to remain less than the replacement value defined as part of delineating the cap areas for the PAC contents developed during this iterative cap design modeling evaluation.

Table 3-9
Cap Design Model Results

Subarea	Seepage Rate (cm/year)	PAC (% by weight)	Percent Reduction in PCB Mass Flux (%)	Concentration within BTZ at 100 years (mg/kg)
Upper Portion of Reach 5A				
Main Channel Reach 5A-1 (Transects 1 to 128)	50	1.0%	>99.9%	6.2E-03
BW5A-1		1.0%	>99.9%	9.1E-03
BW5A-2 and BW5A-4		1.0%	>99.9%	6.2E-03
Lower Portion of Reach 5A				
Main Channel Reach 5A-2 (Transects 128 to 245)	300	1.0%	>99.9%	4.8E-04
BW5A-5		1.0%	>99.9%	4.4E-03

Note:
PAC content and concentration within the bioturbation zone were rounded to two significant figures. Percent reduction in PCB mass flux was rounded to three significant figures.

[16] This is a conservative approach because it compares flux at the top of the chemical isolation layer to the top of capped sediments. Reductions are even greater if the predicted flux at the top of the chemical isolation layer is compared to the current PCB mass flux from uncapped sediments because the additional transport associated with porewater exchange from surface sediment that occurs for uncapped conditions is absent when the contaminated sediments are a foot or more below the cap/surface water interface.

The PAC amendment contents listed in this table were adjusted based on constructability factors and to include added conservatism when determining the recommended values presented in Section 5.

3.5 Sensitivity Analyses

As discussed previously, sensitivity analyses were performed to evaluate certain model assumptions, approaches, or inputs to see how the associated uncertainty may affect the results of the design modeling and recommended chemical isolation layer thickness and amendment content. Specifically, sensitivity analyses were performed to evaluate the approach for accounting for the mixing allotment of the chemical isolation layer thickness in the model framework, the organic carbon partition coefficient, and the DOC partition coefficient. These are described in the following three subsections, respectively.

3.5.1 Mixed Zone Approach Sensitivity Analysis

The base case modeling performed as part of this RD/RA Work Plan included the mixed zone in the model domain (with a four-inch thickness, assuming two inches of sediment and two inches of chemical isolation layer material were mixed together during placement). Because the amount of mixing and proportions of sediment to chemical isolation layer material within the mixed layer are not known, a sensitivity analysis was conducted in which the bottom two inches of the six-inch placed chemical isolation layer was excluded from the model domain altogether. Excluding that portion of the placed material is conservative because it ignores the sorptive capacity of the PAC within the bottom two inches of the placed chemical isolation layer as well as the additional dilution and separation distance from the underlying sediment that material and the mixed zone provides.

The model results, which are shown in Table 3-10 and Figures 3-9a through 3-9e, indicate that chemical isolation layer design meets the performance standards, even when the bottom two inches of the chemical isolation layer (including the sorptive capacity of the PAC in that zone) is ignored entirely. As shown by the differences in sorbed phase concentrations within the bioturbation zone between the base case and sensitivity analysis results, the model is more sensitive to this change for the lower portion of Reach 5A, where the seepage rates are higher.

Table 3-10
Cap Design Sensitivity Analysis Model Results: Mixed Zone Approach

Subarea	Seepage Rate (cm/year)	Base Case			Sensitivity Analysis		
		PAC (%)	Percent Reduction in PCB Mass Flux (%)	Concentration within BTZ at 100 years (mg/kg)	PAC (%)	Percent Reduction in PCB Mass Flux (%)	Concentration within BTZ at 100 years (mg/kg)
Upper Portion of Reach 5A							
Main Channel Reach 5A-1 (Transects 1 to 128)	50	1.0%	>99.9	6.2E-03	1.0%	>99.9	6.2E-03
BW5A-1		1.0%	>99.9	9.1E-03	1.0%	>99.9	9.1E-03
BW5A-2 and BW5A-4		1.0%	>99.9	6.2E-03	1.0%	>99.9	6.2E-03
Lower Portion of Reach 5A							
Main Channel Reach 5A-2 (Transects 128 to 245)	300	1.0%	>99.9	4.8E-04	1.0%	>99.9	2.6E-03
BW5A-5		1.0%	>99.9	4.4E-03	1.0%	>99.9	5.6E-03

Note:
PCB concentration within the bioturbation zone was rounded to two significant figures. Percent reduction in PCB mass flux was rounded to three significant figures.

3.5.2 OC Partitioning Coefficient Sensitivity Analysis

As discussed in Section 3.2.2.1, the base case modeling performed as part of this RD/RA Work Plan used the site-specific K_{OC} values developed from paired sediment and porewater PCB homolog concentrations measured in samples collected as part of the PDI (see PDI Summary Report for Sediment and Riverbanks). As described in Section 3.2.2.1, the homolog-specific partition coefficients were calculated from a regression analysis based on the paired sediment and freely dissolved porewater concentrations measured from sampling conducted during the PDI. Results of this regression analysis are shown in Attachment 3. Although the data generally follow the regression lines, some homologs exhibit a higher degree of variability than others, as illustrated by the figures in Attachment 3. Thus, to evaluate the sensitivity of the model results to the K_{OC}, the model simulations were repeated, using an upper-bound and lower-bound log K_{OC} for each homolog based on the calculated log K_{OC} plus and minus two standard errors. The log K_{OC} values affect the source term concentrations, which were calculated from sediment concentrations using equilibrium partitioning, the mixed zone concentrations, and the log K_{OC} used in the model for the sand and sediment. Table 3-11 shows the log K_{OC} values used for this sensitivity analysis.

Table 3-11
Upper- and Lower-Bound Log K_{OC} Values for Partitioning Coefficient Sensitivity Analysis

Chemical Name	Base Value Log K_{OC} (log L/kg)	Lower-Bound Log K_{OC} (Log K_{OC} – 2 SE) (log L/kg)	Upper-Bound Log K_{OC} (Log K_{OC} + 2 SE) (log L/kg)
PCB-mono	5.3	5.0	5.6
PCB-di	5.5	5.1	5.8
PCB-tri	5.7	5.4	5.9
PCB-tetra	5.9	5.7	6.1
PCB-penta	6.2	6.0	6.4
PCB-hexa	6.4	6.2	6.6
PCB-hepta	6.7	6.5	6.9
PCB-octa	6.9	6.7	7.2
PCB-nona	7.1	6.8	7.4
PCB-deca	7.4	7.0	7.7

The source term porewater PCB concentrations were re-calculated using the same approach described in Section 3.2.3, using the log K_{OC} values listed in Table 3-11. Table 3-12 lists the sediment porewater concentrations input as the source term to the model for this sensitivity analysis.

Table 3-12
Freely Dissolved Porewater Concentrations Representing Source Term for the Lower- and Upper-Bound Log K_{OC} Scenarios

Chemical Name	Freely Dissolved Porewater Concentration (µg/L) (Lower-Bound-Log K_{OC})					Freely Dissolved Porewater Concentration (µg/L) (Upper-Bound-Log K_{OC})				
	Main Channel Reach 5A-1[a]	BW5A-1	BW5A-2[c]	Main Channel Reach 5A-2[d]	BW5A-5	Main Channel Reach 5A-1[a]	BW5A-1	BW5A-2[c]	Main Channel Reach 5A-2[d]	BW5A-5
PCB-mono	3.5E-02	7.0E-03	3.6E-02	3.1E-02	6.3E-03	8.1E-03	1.6E-03	8.3E-03	7.1E-03	1.5E-03
PCB-di	6.6E-01	1.3E-01	6.7E-01	5.8E-01	1.2E-01	1.4E-01	2.7E-02	1.4E-01	1.2E-01	2.5E-02
PCB-tri	1.1E+00	2.1E-01	1.1E+00	9.4E-01	1.9E-01	3.2E-01	6.4E-02	3.3E-01	2.8E-01	5.8E-02
PCB-tetra	2.6E+00	5.1E-01	2.6E+00	2.3E+00	4.6E-01	9.3E-01	1.9E-01	9.6E-01	8.2E-01	1.7E-01
PCB-penta	1.9E+00	3.7E-01	1.9E+00	1.7E+00	3.4E-01	7.7E-01	1.5E-01	7.8E-01	6.7E-01	1.4E-01
PCB-hexa	2.1E+00	4.1E-01	2.1E+00	1.8E+00	3.7E-01	9.0E-01	1.8E-01	9.2E-01	7.9E-01	1.6E-01
PCB-hepta	9.4E-01	1.9E-01	9.6E-01	8.3E-01	1.7E-01	3.7E-01	7.4E-02	3.8E-01	3.3E-01	6.7E-02
PCB-octa	1.9E-01	3.7E-02	1.9E-01	1.6E-01	3.3E-02	5.6E-02	1.1E-02	5.7E-02	4.9E-02	1.0E-02
PCB-nona	1.0E-02	2.0E-03	1.0E-02	8.9E-03	1.8E-03	2.8E-03	5.6E-04	2.9E-03	2.5E-03	5.0E-04
PCB-deca	3.1E-04	6.1E-05	3.1E-04	2.7E-04	5.5E-05	6.4E-05	1.3E-05	6.5E-05	5.6E-05	1.1E-05
Total PCB[e]	9.4E+00	1.9E+00	9.6E+00	8.3E+00	1.7E+00	3.5E+00	7.0E-01	3.6E+00	3.1E+00	6.3E-01

Notes:

a. Concentrations in the Main Channel Reach 5A-1 were used for the cap modeling that represents the main channel (Stations 00+00 to 128+00).
b. Concentrations in the Main Channel Reach 5A-2 were used for the cap modeling that represents the main channel (between Stations 128+00 to 245+00) and Sykes Brook.
c. Concentrations in BW5A-2 were used for the cap modeling that represents the BW5A-2 and BW5A-4.
d. Total PCBs are included for reference only; total PCBs were not simulated with the model. PCBs were simulated by homolog group, and results were summed to calculate total PCB flux and concentration for comparison to the Performance Standards.

The mixed zone porewater PCB concentrations were re-calculated using the same approach described in Section 3.2.4 and Attachment 4, using the log K_{OC} values listed in Table 3-11. The freely dissolved PCB porewater concentrations in the mixed zone containing 1% by weight PAC are listed in Tables 4 and 5 of Attachment 4 for the upper- and lower-bound log K_{OC} values, respectively.

The model results, which are shown in Table 3-13 indicate that the model is somewhat sensitive to this parameter (i.e., model-predicted sorbed phase concentrations vary), but the conclusions from the base case modeling do not change—the reduction in PCB flux remains greater than 99.9% and 1% PAC in a six-inch sand layer is sufficient to meet the performance standards for more than 100 years. Figures 3-10a through 3-10e show model results for the lower-bound log K_{OC} values, and Figures 3-11a though 3-11e show model results for the upper-bound log K_{OC} values. PCB fluxes into and out of the chemical isolation layer are greater for the lower-bound log K_{OC} scenario due to the higher concentrations in the sediment porewater beneath the cap and the somewhat faster transport with less sorption to sand and sediment. Model-predicted sorbed phase concentrations are greater for the upper-bound log K_{OC} scenario due to the greater partitioning of porewater onto the solids.

Table 3-13
Cap Design Sensitivity Analysis Results: K_{OC} Partitioning

Subarea	Seepage Rate (cm/year)	Base Case			Lower-Bound Sensitivity Analysis (Log K_{OC}-2SE)			Upper-Bound Sensitivity Analysis (Log K_{OC}+2SE)		
		PAC (%)	Percent Reduction in PCB Mass Flux (%)	Concentration within BTZ at 100 Years (mg/kg)	PAC (%)	Percent Reduction in PCB Mass Flux (%)	Concentration within BTZ at 100 Years (mg/kg)	PAC (%)	Percent Reduction in PCB Mass Flux (%)	Concentration within BTZ at 100 Years (mg/kg)
Upper Portion of Reach 5A										
Main Channel Reach 5A-1 (Transects 1 to 128)	50	1.0%	>99.9%	6.2E-03	1.0%	>99.9%	3.3E-03	1.0%	>99.9%	9.9E-03
BW5A-1		1.0%	>99.9%	9.1E-03	1.0%	>99.9%	8.3E-03	1.0%	>99.9%	9.6E-03
BW5A-2 and BW5A-4		1.0%	>99.9%	6.2E-03	1.0%	>99.9%	4.2E-03	1.0%	>99.9%	7.8E-03
Lower Portion of Reach 5A										
Main Channel Reach 5A-2 (Transects 128 to 245)	300	1.0%	>99.9%	4.8E-04	1.0%	>99.9%	2.0E-04	1.0%	>99.9%	1.3E-03
BW5A-5		1.0%	>99.9%	4.4E-03	1.0%	>99.9%	2.3E-03	1.0%	>99.9%	6.4E-03

Note:
Concentration within the bioturbation zone was rounded to two significant figures. Percent reduction in PCB mass flux was rounded to three significant figures.

3.5.3 DOC Partitioning Coefficient Sensitivity Analysis

The base case modeling performed as part of this RD/RA Work Plan used the DOC partition coefficients derived as part of the treatability study of log K_{DOC} = 0.9 × log K_{OW} + 0.8. The results of the treatability study showed that partitioning of PCBs onto DOC was greater than previous literature indicated (e.g., Burkhard 2000) and greater than the relationship of K_{DOC} = 0.1 × K_{OW} used in EPA's modeling study (FMD). Although this disparity between the older estimates and the estimate from the recent treatability study could be due to less reliable methods used to measure dissolved-phase PCBs in the past, the treatability studies were not specifically designed to measure K_{DOC} (i.e., it was just an available outcome of the methods used in the study). There could be uncertainty in the treatability study results introduced by additions of chemical agents to control ionic strength and prevent biodegradation prior to the start of testing that could have resulted in coagulation and condensation of the DOC over time. Therefore, because of these uncertainties, to evaluate the sensitivity of the model results to the K_{DOC}, the model simulations were repeated, using the K_{DOC} set to 0.1 × K_{OW} consistent with EPA's modeling study (FMD). Log K_{DOC} values used for this sensitivity analysis are shown in Table 3-14.

Table 3-14
Log K_{DOC} Values for DOC Partitioning Coefficient Sensitivity Analysis

Chemical Name	Base Case Log K_{DOC} (log L/kg)	Sensitivity Analysis K_{DOC} (log L/kg)
PCB-mono	5.3	4.0
PCB-di	5.7	4.5
PCB-tri	6.2	4.9
PCB-tetra	6.5	5.4
PCB-penta	6.9	5.8
PCB-hexa	7.3	6.2
PCB-hepta	7.6	6.6
PCB-octa	7.9	6.9
PCB-nona	8.2	7.2
PCB-deca	8.5	7.6

The model results, which are shown in Table 3-15 and Figures 3-12a through 3-12e, indicate that the model is somewhat sensitive to this parameter, but the conclusions remain the same—flux reductions remain greater than 99.9% and 1% PAC is sufficient to meet the performance standards. Although the flux reductions are the same (both >99.9%), the magnitude of fluxes predicted by the model using the base case K_{DOC} values are greater than those using the sensitivity analysis K_{DOC} (based on inspection of model outputs), whereas the model-predicted sorbed phase concentrations within the bioturbation zone are greater for the sensitivity analysis scenario.

Table 3-15
Cap Design Sensitivity Analysis Results: DOC Partitioning

Subarea	Seepage Rate (cm/year)	Base Case			Sensitivity Analysis		
		PAC (%)	Percent Reduction in PCB Mass Flux (%)	Concentration within BTZ at 100 years (mg/kg)	PAC (%)	Percent Reduction in PCB Mass Flux (%)	Concentration within BTZ at 100 years (mg/kg)
Upper Portion of Reach 5A							
Main Channel Reach 5A-1 (Transects 1 to 128)	50	1.0%	>99.9%	6.2E-03	1.0%	>99.9%	8.3E-03
BW5A-1		1.0%	>99.9%	9.1E-03	1.0%	>99.9%	9.3E-03
BW5A-2 and BW5A-4		1.0%	>99.9%	6.2E-03	1.0%	>99.9%	8.1E-03
Lower Portion of Reach 5A							
Main Channel Reach 5A-2 (Transects 128 to 245)	300	1.0%	>99.9%	4.8E-04	1.0%	>99.9%	3.6E-03
BW5A-5		1.0%	>99.9%	4.4E-03	1.0%	>99.9%	8.3E-03

Note:
Concentration within the bioturbation zone was rounded to two significant figures. Percent reduction in PCB mass flux was rounded to three significant figures.

3.6 Recommended Chemical Isolation Layer Configuration

The chemical isolation layer modeling results show that placing six inches of chemical isolation layer material (two inches of which is allotted for mixing with native sediments and four inches of which is modeled as the unmixed chemical isolation layer) consisting of sand with 1% PAC by weight is sufficient to meet the Performance Standards (i.e., reduce total PCB mass flux through the chemical isolation layer by 99% and maintain total PCB concentrations in the BTZ to levels less than the replacement value for backwater areas) in each of the five modeled cap areas. Table 3-16 summarizes the chemical isolation layer thickness and amendment requirements recommended for each sub-area based on the modeling. The minimum PAC content used in the modeling (1% by weight, which equates to an application rate of 0.47 pounds per square foot) was established based on past project experience and constructability considerations. Based on review of the sensitivity analysis results (see Section 3.5), that amount is robust across a range of alternate parameter values and model assumptions. As such, that value represents the recommended amendment content for design.

As additional data become available, the final recommended amendment type(s) and dosage(s) may be refined. In particular, as noted previously, data collection is ongoing for the treatability study to evaluate GAC and PAC kinetics. As noted in Section 3.2.2.2, the treatability testing of adsorptive amendments was designed as a 24-week study, but that report included results from only the first eight weeks of testing as directed by EPA. Additional data generated beyond that initial eight-week period were not available in time to be considered in the design presented herein. Initial review of the treatability study isotherm test data suggested that some PCB congeners did not reach full equilibrium for the testing with GAC; likewise, the abbreviated kinetic testing period (i.e., eight versus 24 weeks) did not allow for a complete evaluation of PCB sorption equilibrium with GAC from those tests. Therefore, those results may be considered further in future revisions of or addenda to this work plan.

Table 3-16
Recommended Chemical Isolation Layer Amendment Dose

Area	Area (acres)	Base Case Groundwater Seepage Rate (cm/year)	Placed Chemical Isolation Layer Thickness[1]	PAC Dose Identified from Chemical Isolation Layer Modeling (%)	Recommended PAC Dose (% by weight)	Recommended PAC Dose (lb/sf)
Main Channel 5A-1	24	50	6 inches	1.0%	1%	0.47
BW5A-1	1.9	50	6 inches	1.0%	1%	0.47
Sykes Brook	0.15					
BW5A-2	0.29	50	6 inches	1.0%	1%	0.47
BW5A-4	0.058					
Main Channel 5A-2	25	300	6 inches	1.0%	1%	0.47
BW5A-5	1.4	300	6 inches	1.0%	1%	0.47

Notes:
Areas in bold font are the five areas that were explicitly evaluated with the model; the cap configuration identified to meet the Performance Standards in those areas is considered representative of conditions in the corresponding areas that are not shown in bold font.

1. The bottom two inches of the 6-inch placed chemical isolation layer thickness is allotted to mixing with the native sediments and the upper four inches is the unmixed chemical isolation layer.

4 Habitat Layer Design Evaluations

As described in the Revised Final Permit, the engineered caps will include a habitat layer to provide functions and values equivalent to the pre-existing surficial sediment substrate. A habitat layer is typically placed as the uppermost layer of a cap to accommodate the benthic community and vegetation after recolonization immediately upon construction, although over time natural sedimentation processes may establish a functional habitat layer as well (ITRC 2024).

Extensive sediment surveys and data collection have been conducted historically and as part of the recent PDI and SDC efforts to provide a characterization for the existing surficial sediment in Reach 5A. As described in Section 2.3 of the main report, the surface sediment in Reach 5A consists predominantly of sands and gravels, and the sediment composition has remained relatively consistent over the past three to four decades.

It is anticipated that, at least in some areas, sufficient sediments will be infilled and deposited on top of the cap in Reach 5A after the remediation is complete, as it is an ongoing process occurring presently in the river. A significant infilling was also observed within the first five years after the completion of the Upper ½-Mile and 1.5-Mile Removal Actions in the East Branch of Housatonic River. In addition, based on the data analysis and modeling study conducted by EPA in early- to mid-2000s, approximately 8,000 to 9,000 metric tons (MT) of sediments were estimated to be transported to Reach 5A each year. This sediment load was estimated for the period during 1979 and 2004; however, it is also considered representative of the contemporary sediment load given that total suspended solid concentrations measured at the Pomroy Average Bridge station have been relatively consistent over time. The post-remediation sediment supply to Reach 5A is expected to be reduced to the range of 7,000 to 8,000 MT per year due to the bank stabilization work (described in Section 9 of the Final RD/RA Work Plan). As a result, it was estimated that an infill of the void space within the top three-inch armor layer could be formed in the range of three to six years.

Despite the infill that is expected to occur via natural sedimentation processes, an average of approximately four inches of additional habitat material will be placed on top of the erosion protection layer in Reach 5A. The habitat layer will have a composition similar to the existing sediment bed. In much of the river, a habitat layer consisting of locally available bank run gravelly sand material will be placed above the erosion protection layer. In river channel areas designated as riffles as part of the Natural Channel Design, the habitat layer material will be the same coarse gravel material specified for the erosion protection layer in the riffles (i.e., D_{50} of three inches [see Table 2-1]). In backwater areas and Lower Sykes Brook, a habitat layer consisting of locally available topsoil will be placed above the erosion protection layer. Figure 4-1 shows plot of the grain size data for surface sediment samples collected during the Reach 5A PDI along with the proposed specification for the gravelly sand habitat layer material. Figure 4-2 shows a plot of the grain size data for pebble count

samples collected during the field geomorphic assessments along with the proposed specification for the coarse gravel habitat layer material to be placed in the riffle areas.

Figure 4-1
Gradation Plot of Surface Sediment Samples with Proposed Gradation for Gravelly Sand Habitat Layer

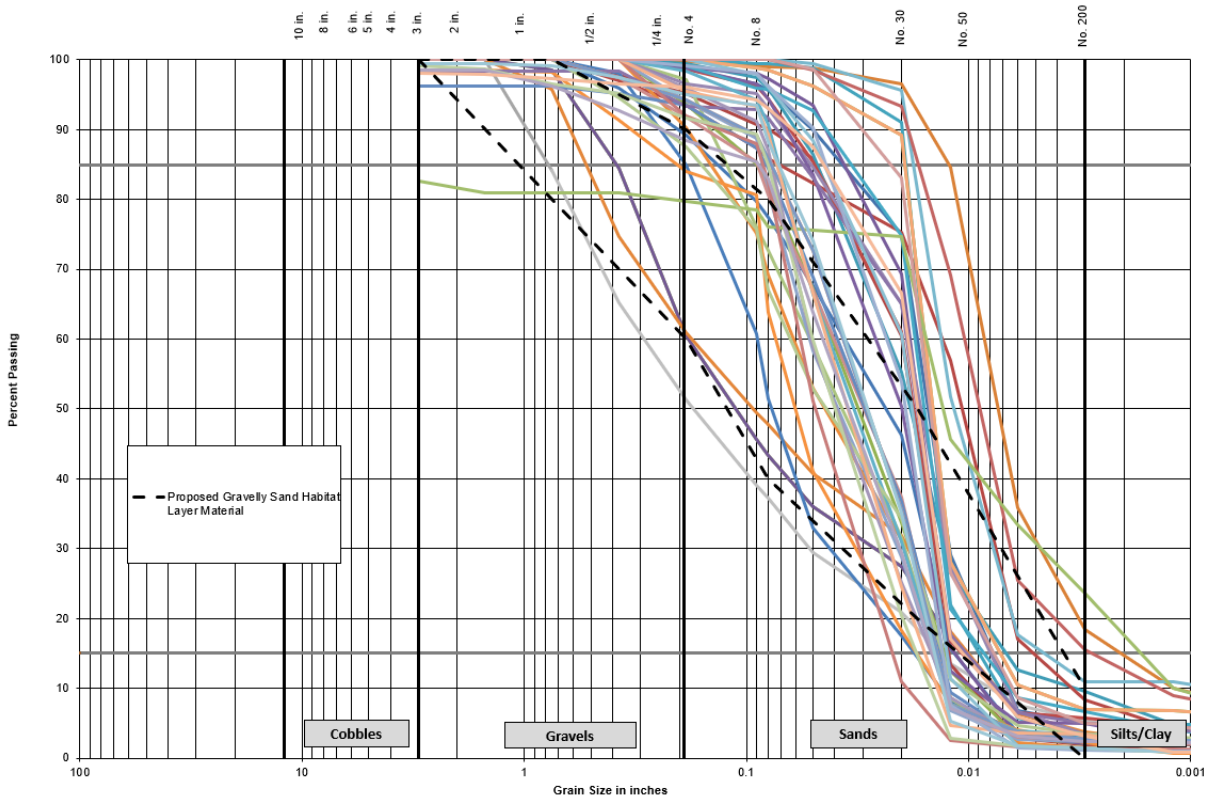
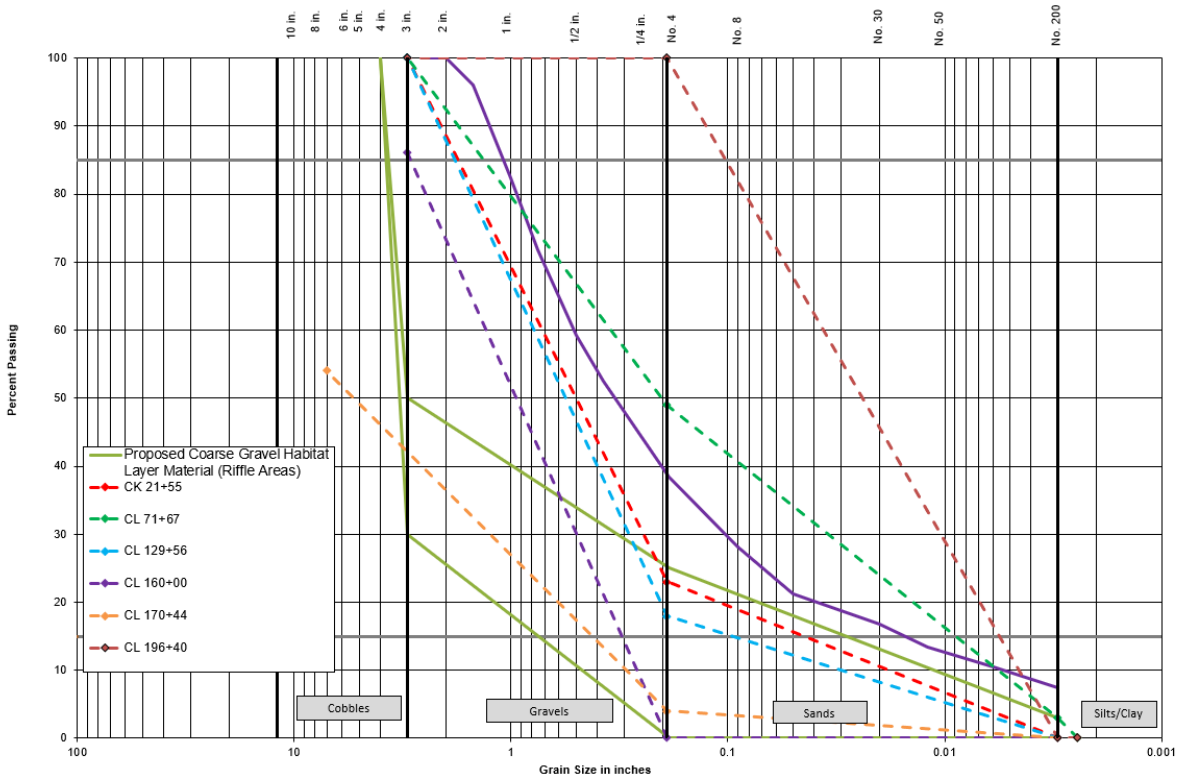


Figure 4-2
Gradation Plot of Geomorphic Assessment Pebble Count Sample Data with Proposed Gradation for the Coarse Gravel Habitat Layer



5 Engineered Cap Design Summary

Based on the results of the evaluations presented in Sections 2 through 4, the cap design resulted in the designation of multiple cap types for Reach 5A. Table 5-1 summarizes the cap types for Stations 0+00 through 48+00 in Reach 5A. Table 5-2 summarizes the preliminary cap types for other caps downstream of Station 48+00, which may be subject revision or refinement. Figure 5-1 shows the shows the extents of where these different cap types are planned in Reach 5A. Figure 5-2 shows the materials of habitat layer for Stations 0+00 through 48+00 in Reach 5A.

Table 5-1
Engineered Cap Types for Station 0+00 through 48+00

Cap Type	Cap Layers
Type A	• Chemical Isolation Layer[1]: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Erosion Protection Layer: Minimum six-inch-thick layer of gravel (D_{50} of 1.5 inches) • Habitat Layer: Approximately four inches (average) of locally available bank run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design
Type B	• Chemical Isolation Layer[1]: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Erosion Protection Layer: Minimum six-inch-thick layer of coarse gravel (D_{50} of 3 inches) • Habitat Layer: Approximately four inches (average) of locally available bank run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design

Note:

1. The bottom two inches of the 6-inch placed chemical isolation layer thickness is allotted to mixing with the native sediments and the upper four inches is acting as the unmixed modeled chemical isolation layer

Table 5-2
Preliminary Engineered Cap Types for Station 48+00 through 245+00[1]

Cap Type	Cap Layers
Type A	• Chemical Isolation Layer[2]: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Erosion Protection Layer: Minimum six-inch-thick layer of gravel (D_{50} of 1.5 inches) • Habitat Layer: Approximately four inches (average) of locally available bank run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design
Type B	• Chemical Isolation Layer[2]: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Erosion Protection Layer: Minimum six-inch-thick layer of coarse gravel (D_{50} of 3 inches) • Habitat Layer: Approximately four inches (average) of locally available bank run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design

Cap Type	Cap Layers
Type C	• Chemical Isolation Layer[2]: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Geotechnical Filter Layer: 6-inch-thick layer of gravel • Erosion Protection Layer: Minimum 13-inch-thick layer of cobble (D_{50} of six inches) • Habitat Layer: Approximately four inches (average) of locally available bank run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design
Type D	• Chemical Isolation Layer[2]: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Geotechnical Filter Layer: 6-inch-thick layer of gravel • Erosion Protection Layer: Minimum 18-inch-thick layer of cobble (D_{50} of nine inches) • Habitat Layer: Approximately four inches (average) of locally available bank run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design
Type E	• Chemical Isolation Layer[2]: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Geotechnical Filter Layer: 9-inch-thick layer of gravel • Erosion Protection Layer: Minimum 18-inch-thick layer of medium riprap (D_{50} of 12 inches) • Habitat Layer: Approximately four inches (average) of locally available bank run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design
Type F	• Chemical Isolation Layer[2]: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Geotechnical Filter Layer: 12-inch-thick layer of gravel • Erosion Protection Layer: Approximately 36-inch-thick layer of large riprap (D_{50} of 24 inches) • Habitat Layer: Approximately four inches (average) of locally available bank run gravelly sand material or coarse gravel (D_{50} of three inches) in areas designated as riffles as part of the Natural Channel Design
Type G (Backwater and Other Waterbodies)	• Chemical Isolation Layer[2]: Minimum six-inch-thick layer of sand with a carbon-based sorptive amendment of 1% PAC (0.47 lb/sf) • Erosion Protection Layer: Minimum six-inch-thick layer of gravel (D_{50} of 1.5 inches) • Habitat Layer: Approximately four inches (average) of locally available topsoil

Notes:

1. The preliminary cap types identified for areas downstream of Station 48+00 are subject to revision as the design progresses once the Natural Channel Design for this portion of the river is finalized. Details of the final cap types will be provided in a future revision of or addendum to this work plan.
2. The bottom two inches of the 6-inch placed chemical isolation layer thickness is allotted to mixing with the native sediments and the upper four inches is the unmixed chemical isolation layer.

Figure 5-1
Extents of Various Cap Types in Reach 5A

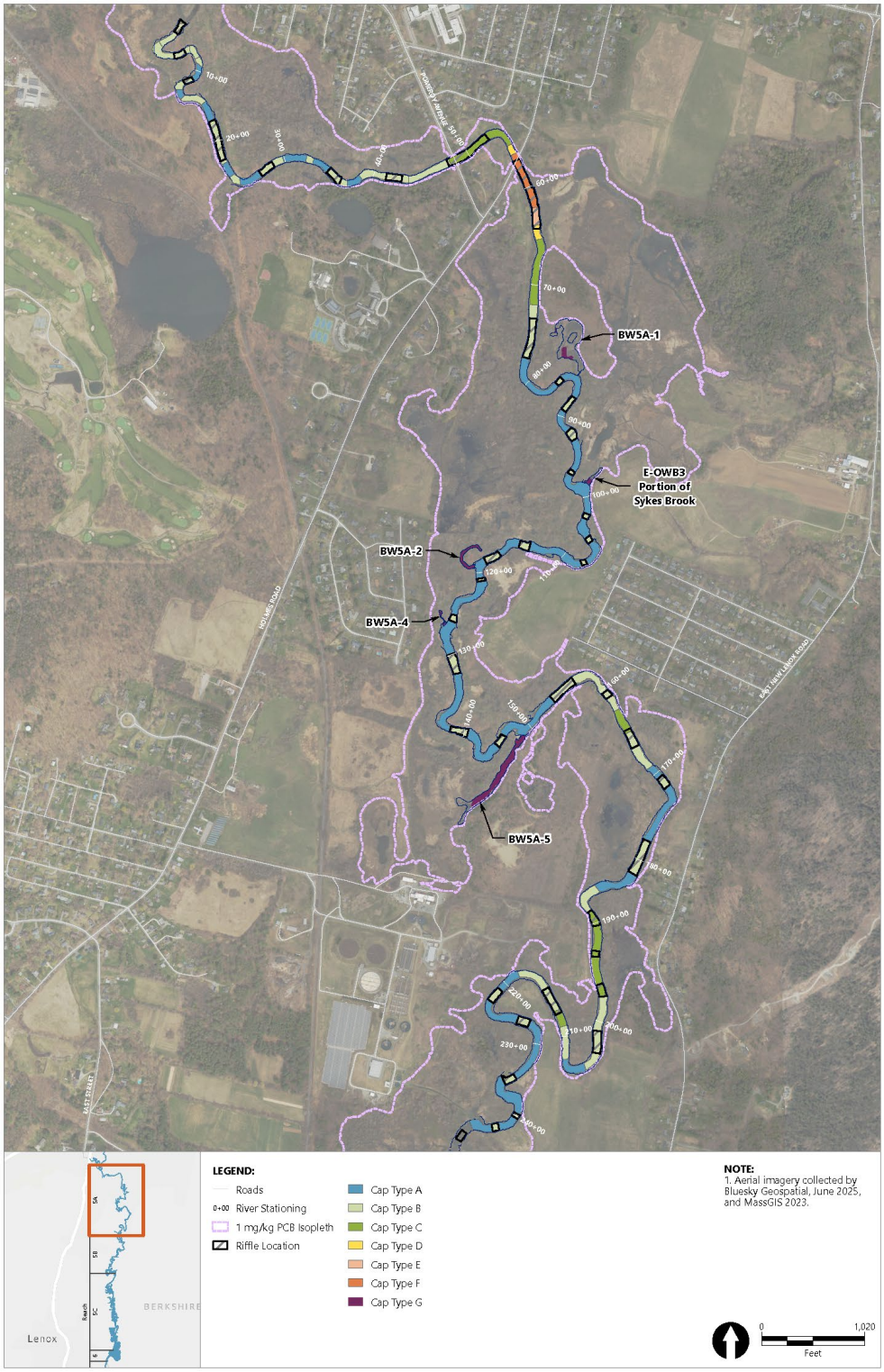
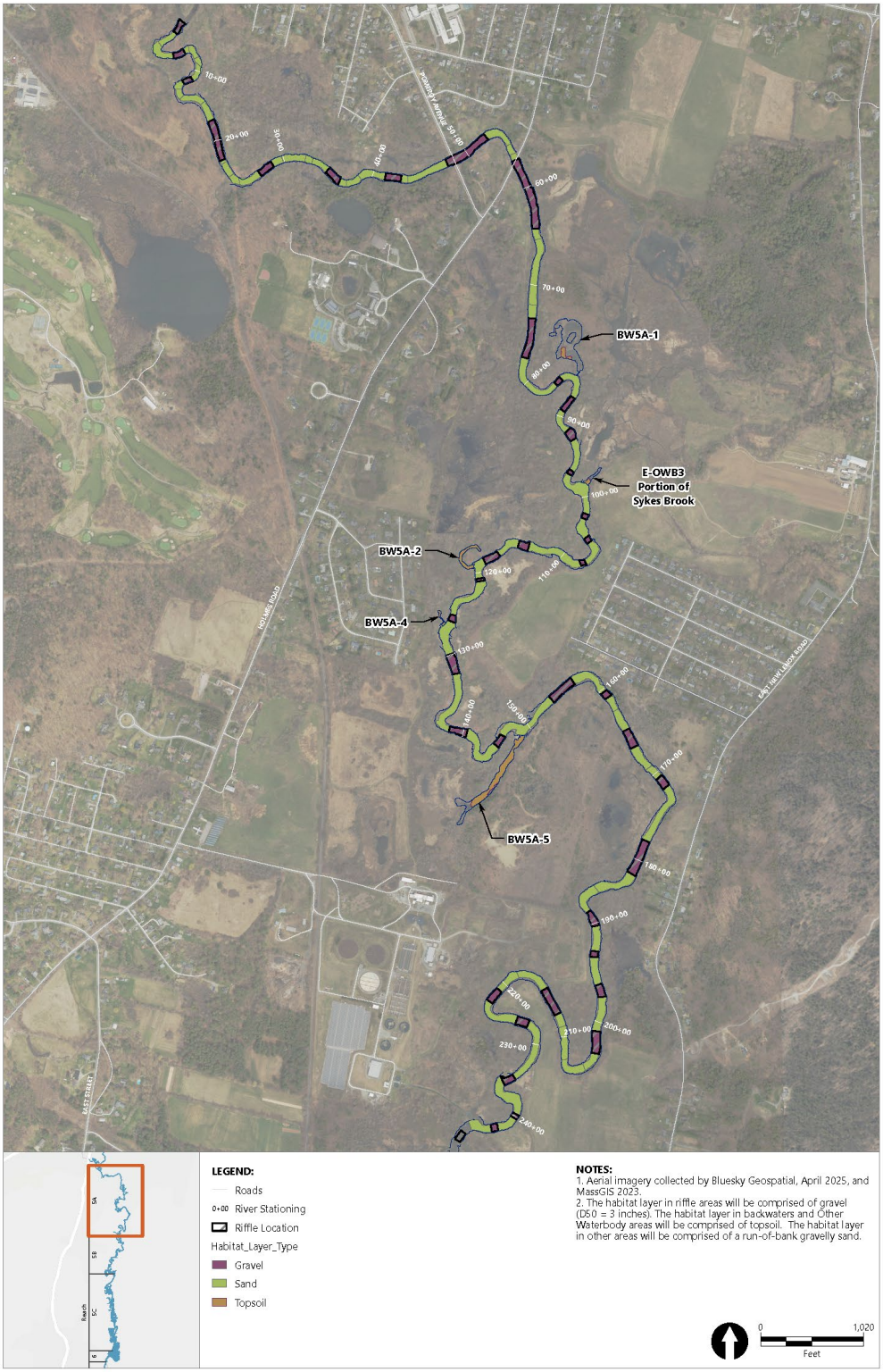


Figure 5-2
Habitat Layer Materials for Reach 5A



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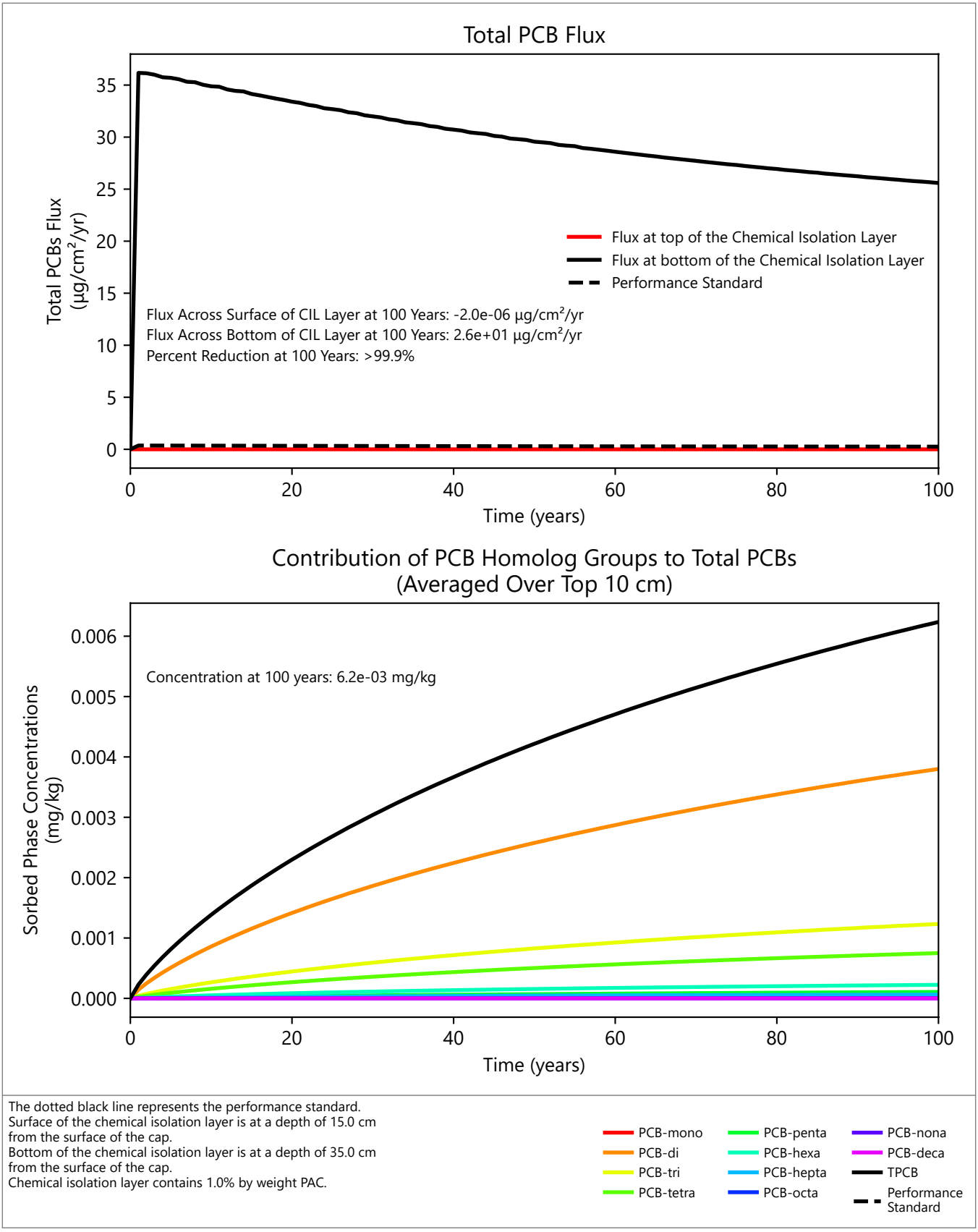
Figures



The dotted black line represents the performance standard.
Surface of the chemical isolation layer is at a depth of 15.0 cm from the surface of the cap.
Bottom of the chemical isolation layer is at a depth of 35.0 cm from the surface of the cap.
Chemical isolation layer contains 1.0% by weight PAC.

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Figure 3-8a
Model-Predicted PCB Flux and Concentration Compared to Performance Standards for Main Channel Reach 5A-1 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

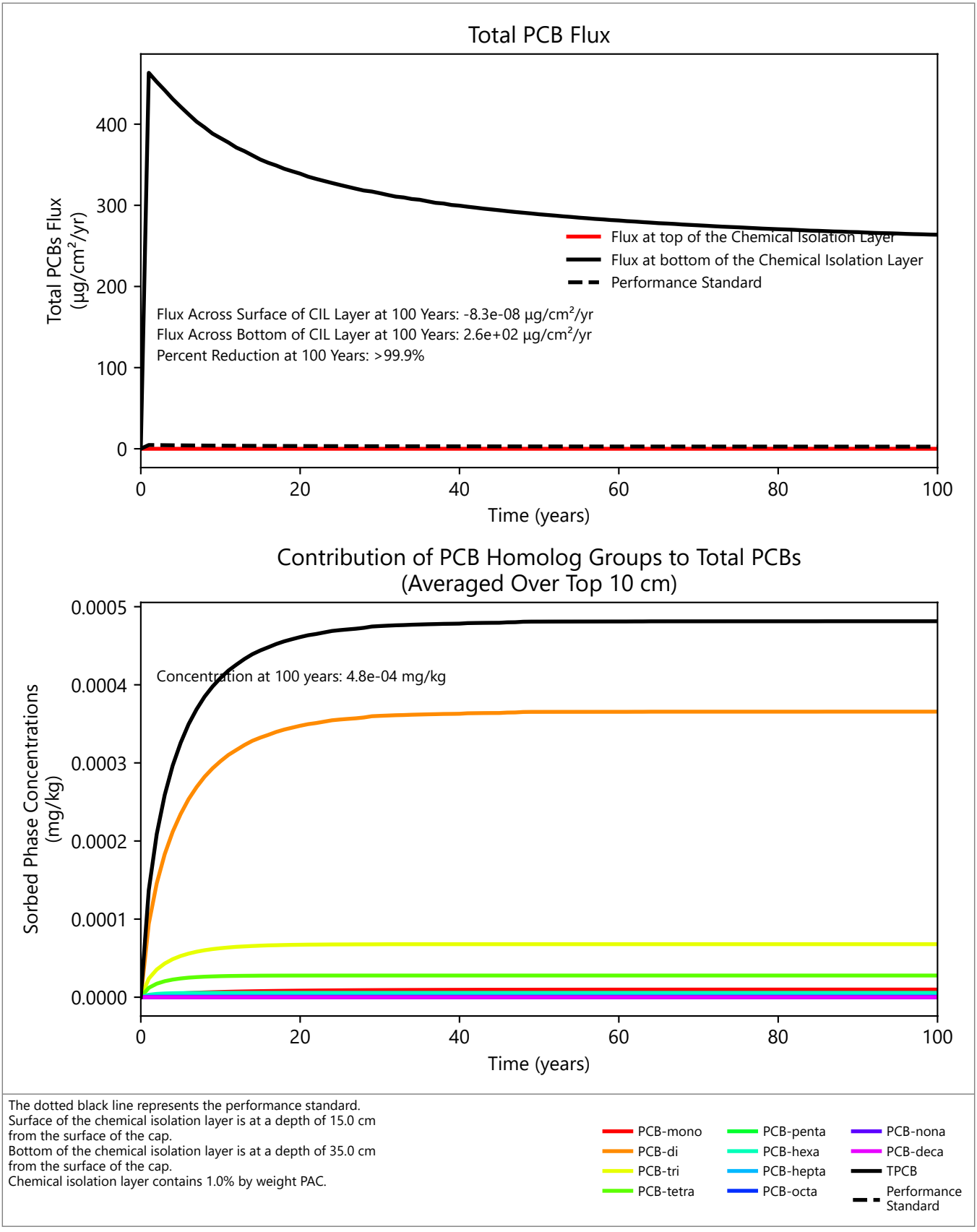

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Figure 3-8b
Model-Predicted PCB Flux and Concentration Compared to Performance Standards for Main Channel Reach 5A-2 (Sand with 1% PAC)

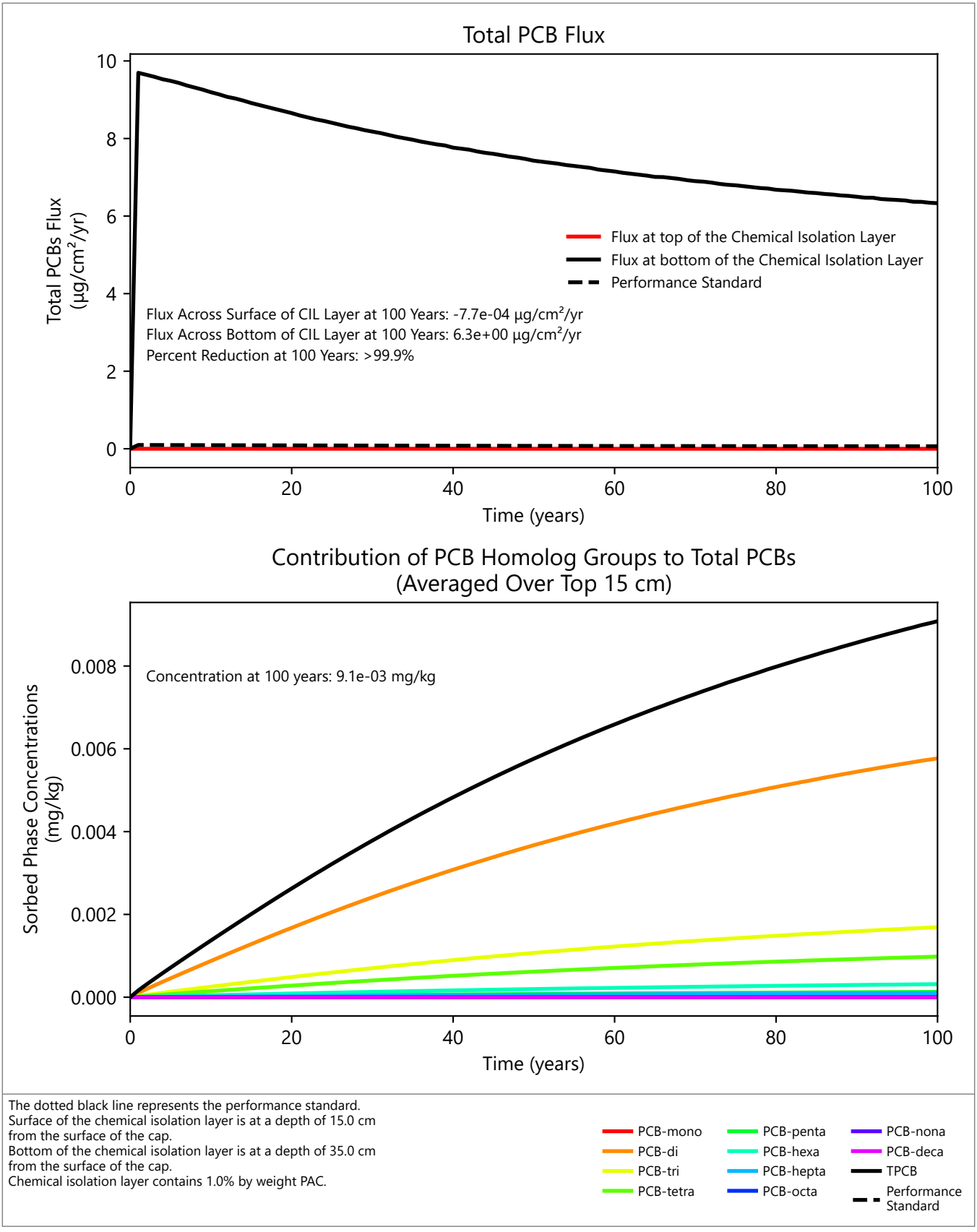

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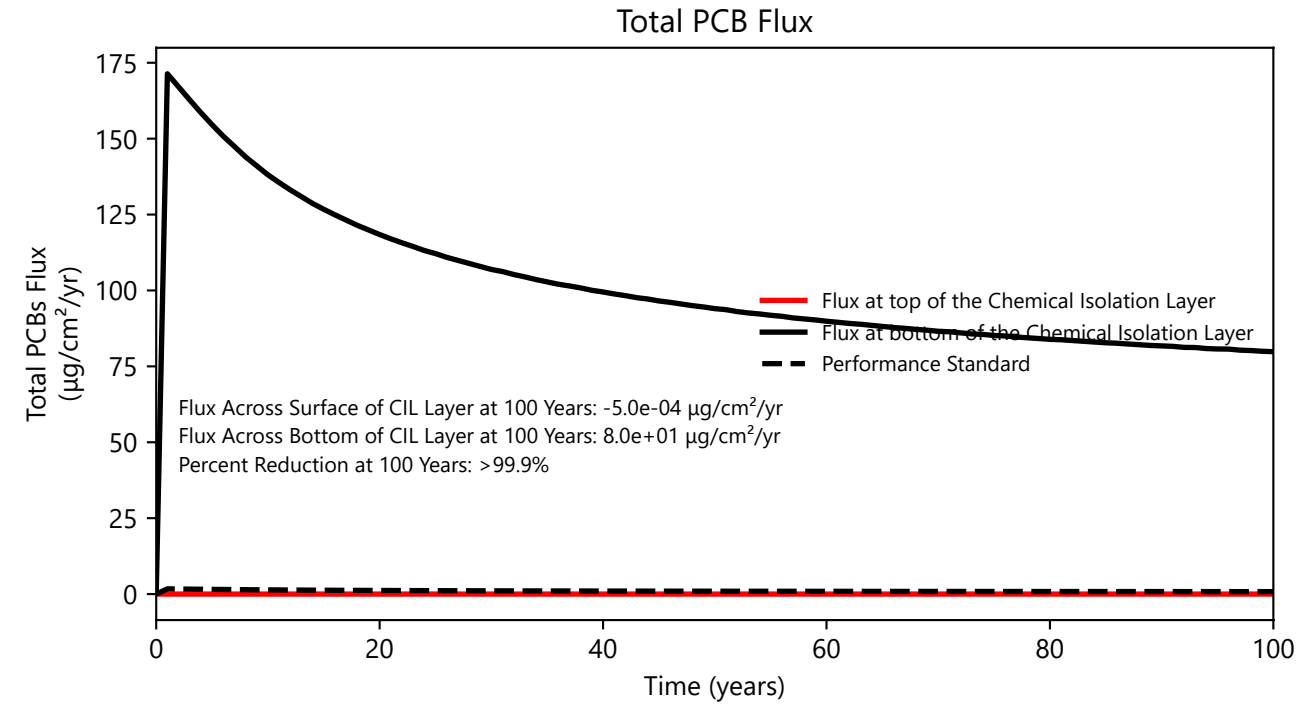
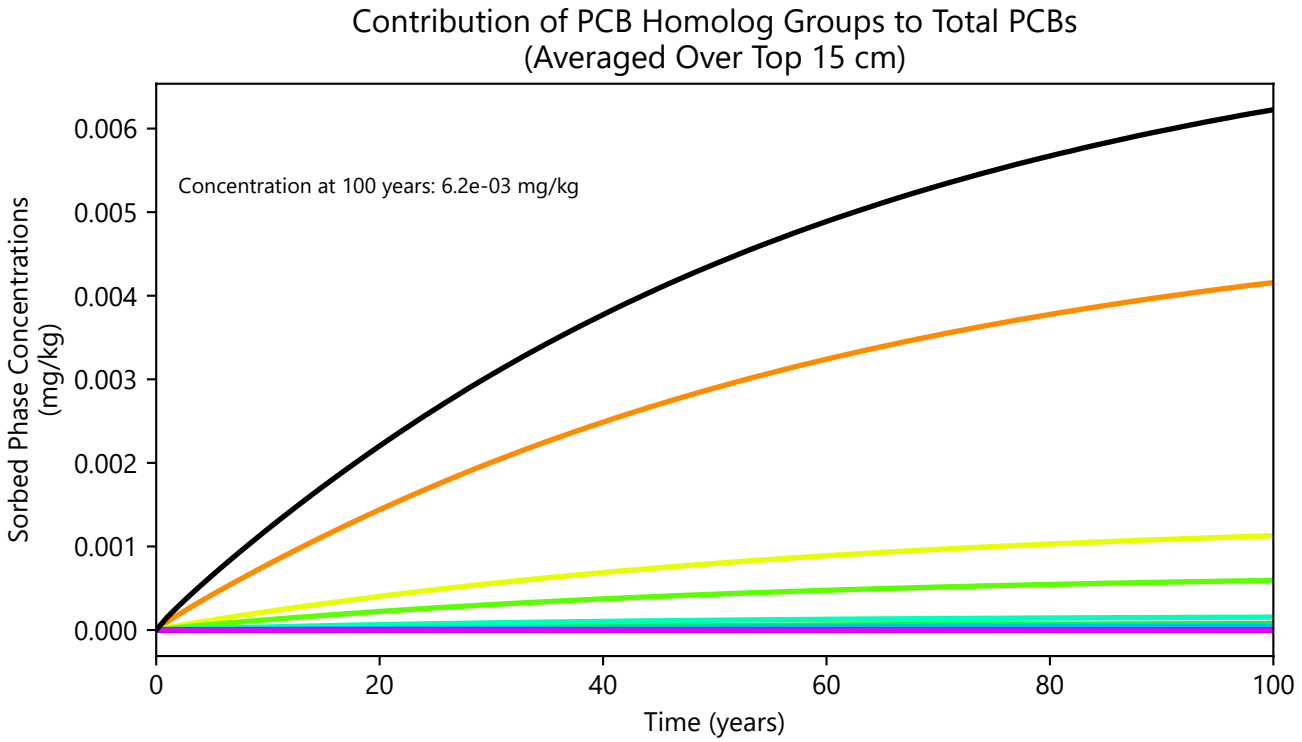
Figure 3-8c
Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-1 (Sand with 1% PAC)





The dotted black line represents the performance standard.
Surface of the chemical isolation layer is at a depth of 15.0 cm from the surface of the cap.
Bottom of the chemical isolation layer is at a depth of 35.0 cm from the surface of the cap.
Chemical isolation layer contains 1.0% by weight PAC.

PCB-mono
PCB-di
PCB-tri
PCB-tetra
PCB-penta
PCB-hexa
PCB-hepta
PCB-octa
PCB-nona
PCB-deca
TPCB
Performance Standard

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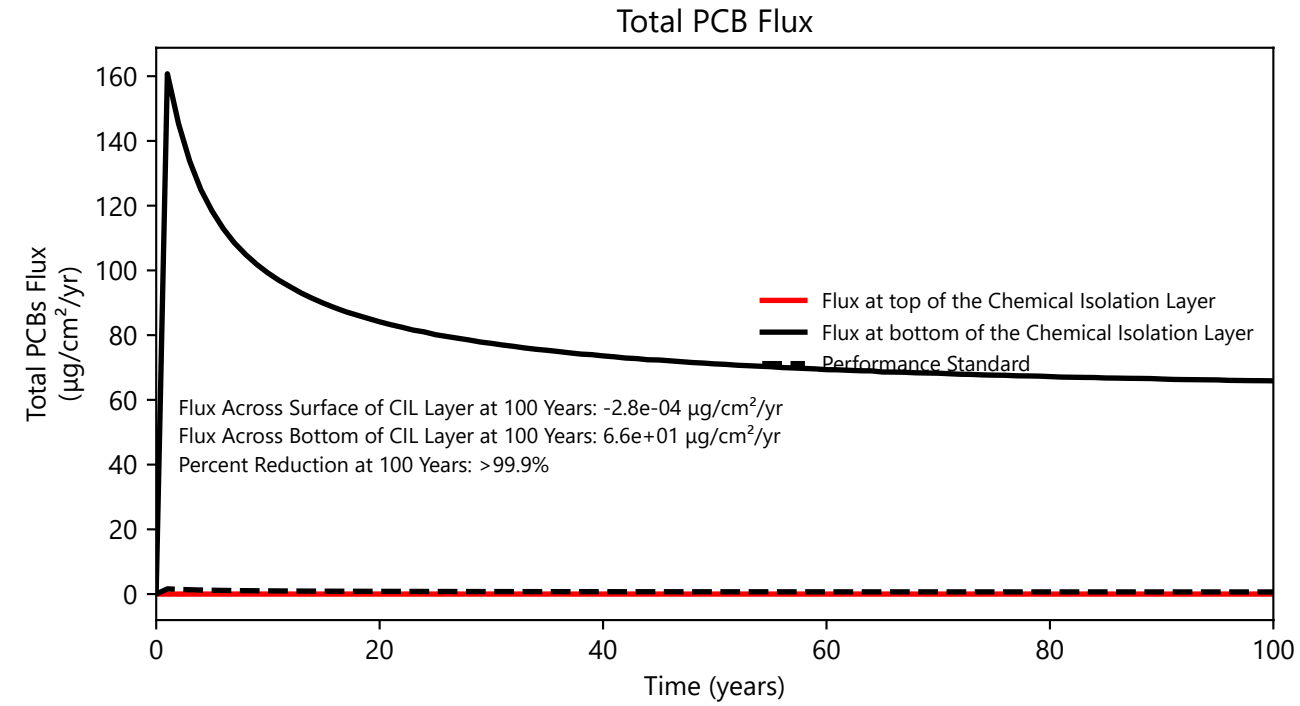
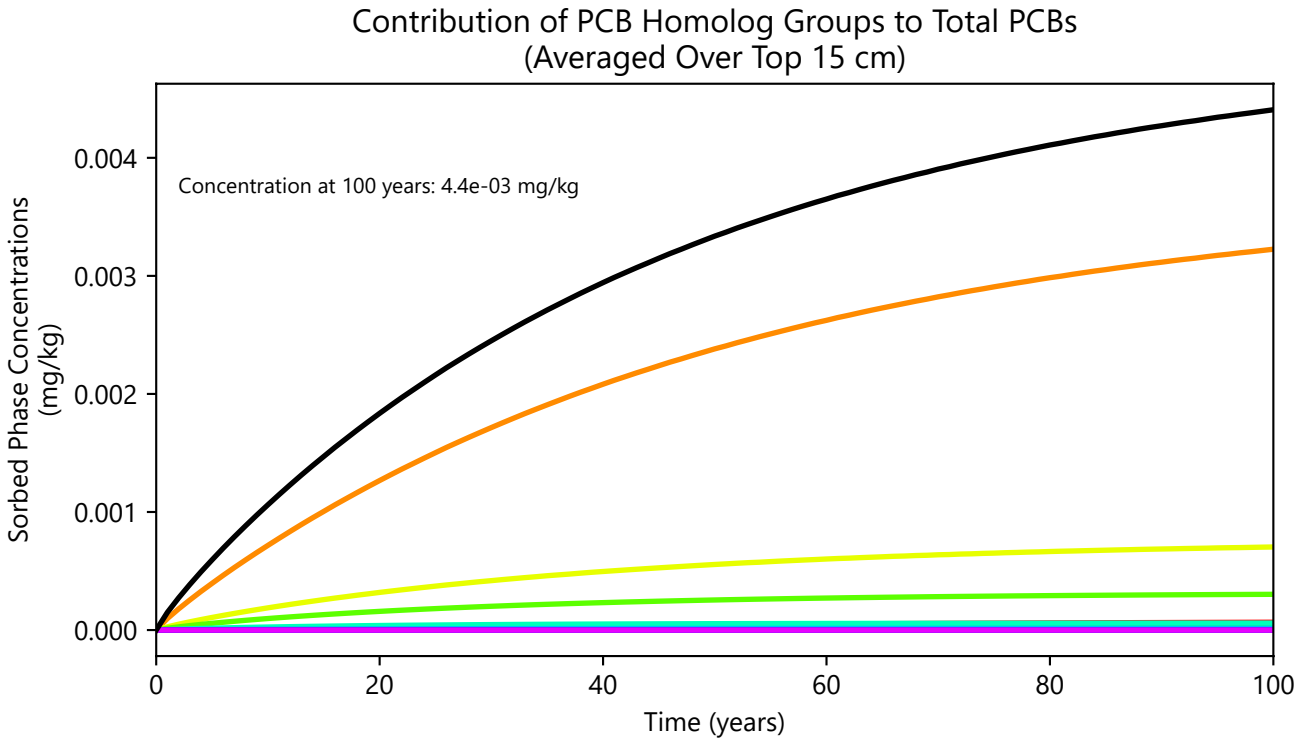
ANCHOR QEA

Figure 3-8d
Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-2 and BW5A-4 (Sand with 1% PAC)





The dotted black line represents the performance standard.
Surface of the chemical isolation layer is at a depth of 15.0 cm from the surface of the cap.
Bottom of the chemical isolation layer is at a depth of 35.0 cm from the surface of the cap.
Chemical isolation layer contains 1.0% by weight PAC.

PCB-mono
PCB-di
PCB-tri
PCB-tetra
PCB-penta
PCB-hexa
PCB-hepta
PCB-octa
PCB-nona
PCB-deca
TPCB
Performance Standard

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ANCHOR QEA

Figure 3-8e
Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-5 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

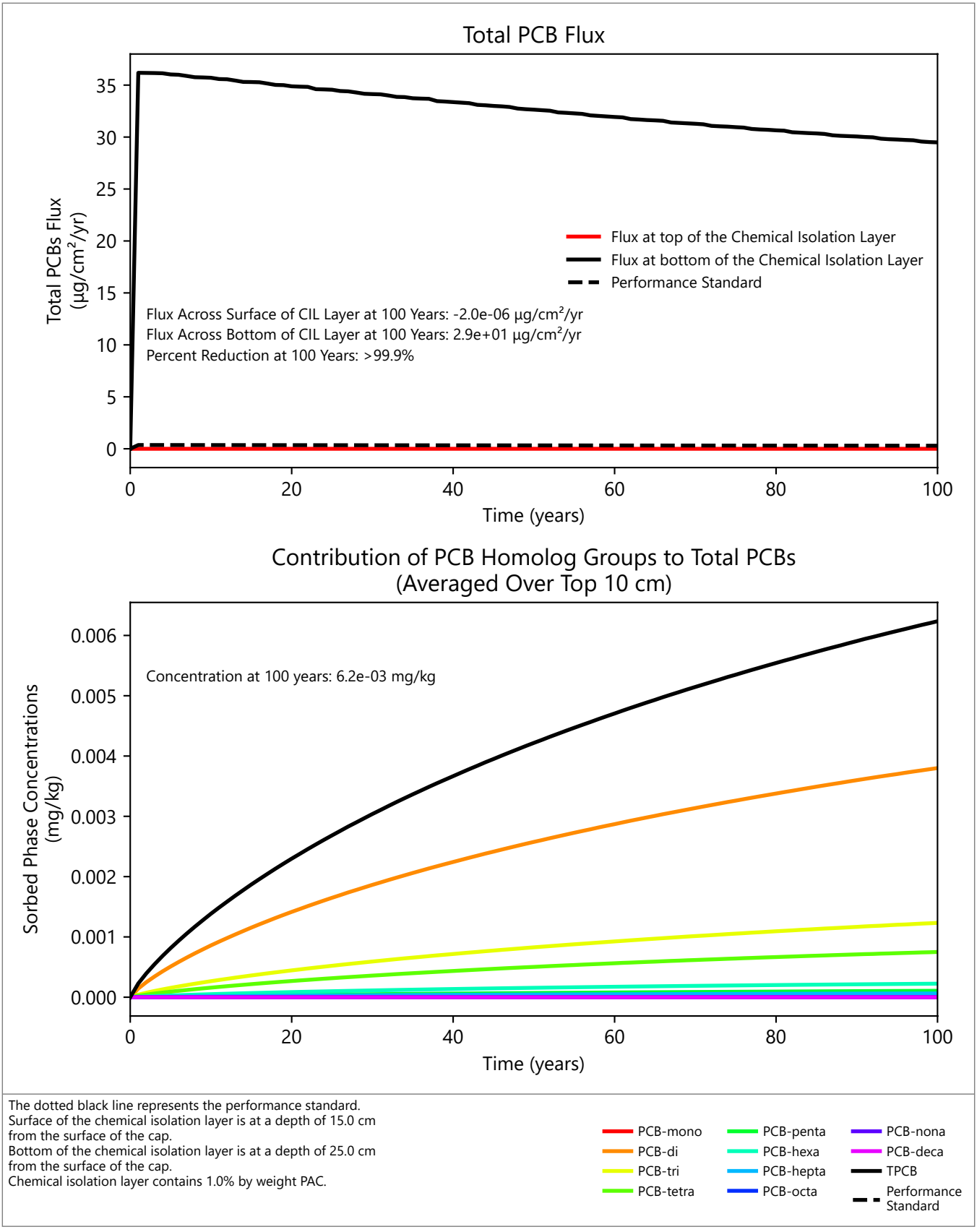

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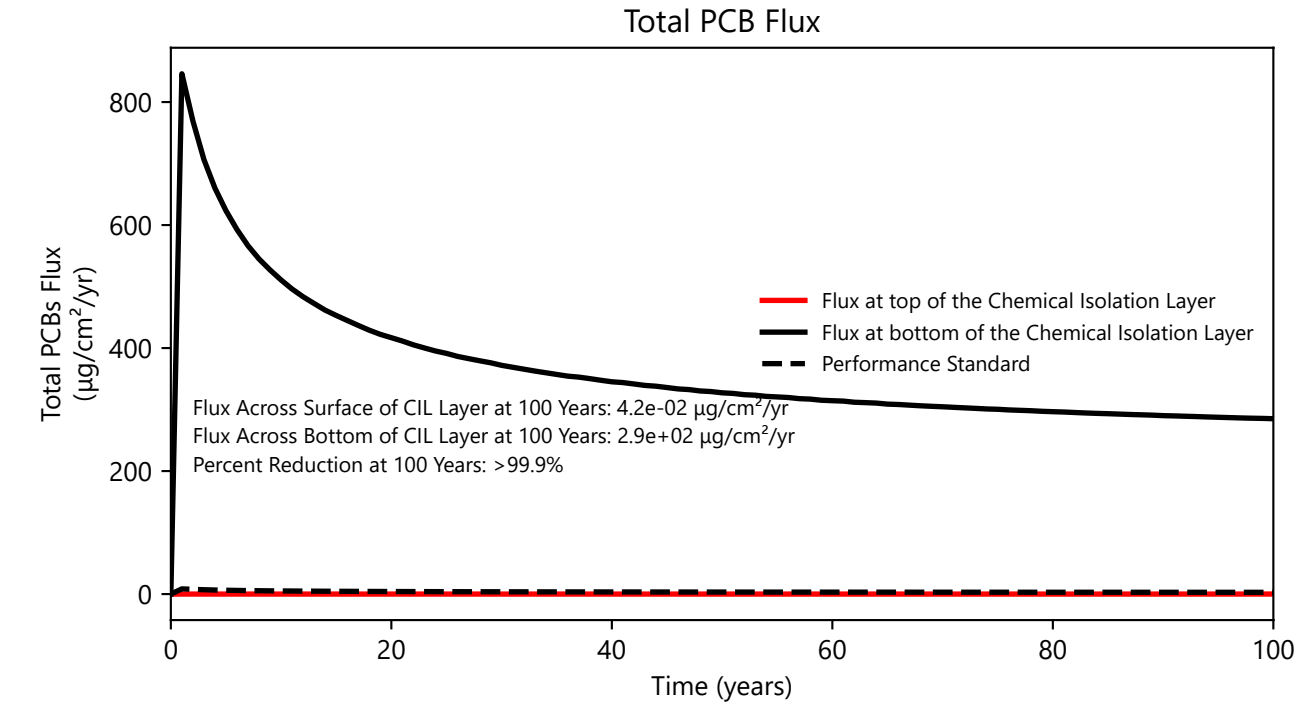
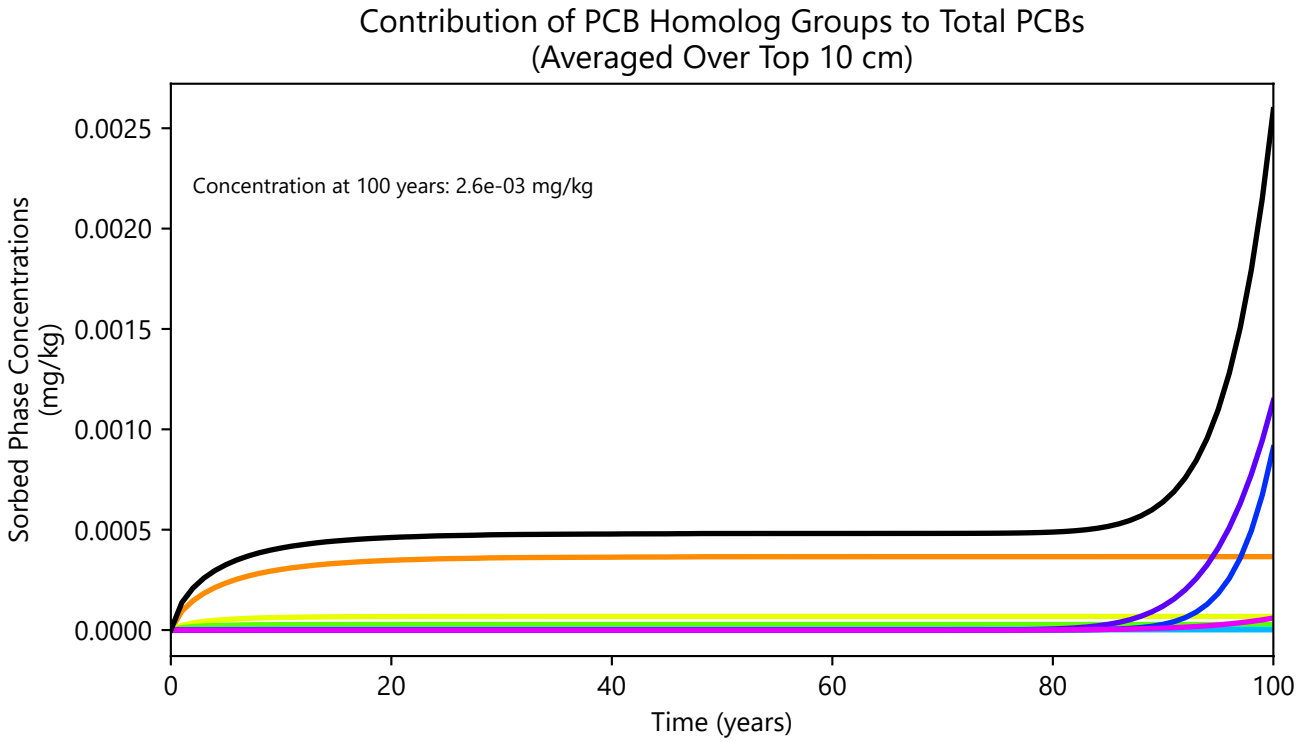
Figure 3-9a
Mixed Zone Approach Sensitivity Analysis: Model-Predicted PCB Flux and Concentration Compared to Performance Standards for Main Channel Reach 5A-1 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River





The dotted black line represents the performance standard.
Surface of the chemical isolation layer is at a depth of 15.0 cm from the surface of the cap.
Bottom of the chemical isolation layer is at a depth of 25.0 cm from the surface of the cap.
Chemical isolation layer contains 1.0% by weight PAC.

PCB-mono
PCB-di
PCB-tri
PCB-tetra
PCB-penta
PCB-hexa
PCB-hepta
PCB-octa
PCB-nona
PCB-deca
TPCB
Performance Standard

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Figure 3-9b
Mixed Zone Approach Sensitivity Analysis: Model-Predicted PCB Flux and Concentration Compared to Performance Standards for Main Channel Reach 5A-2 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

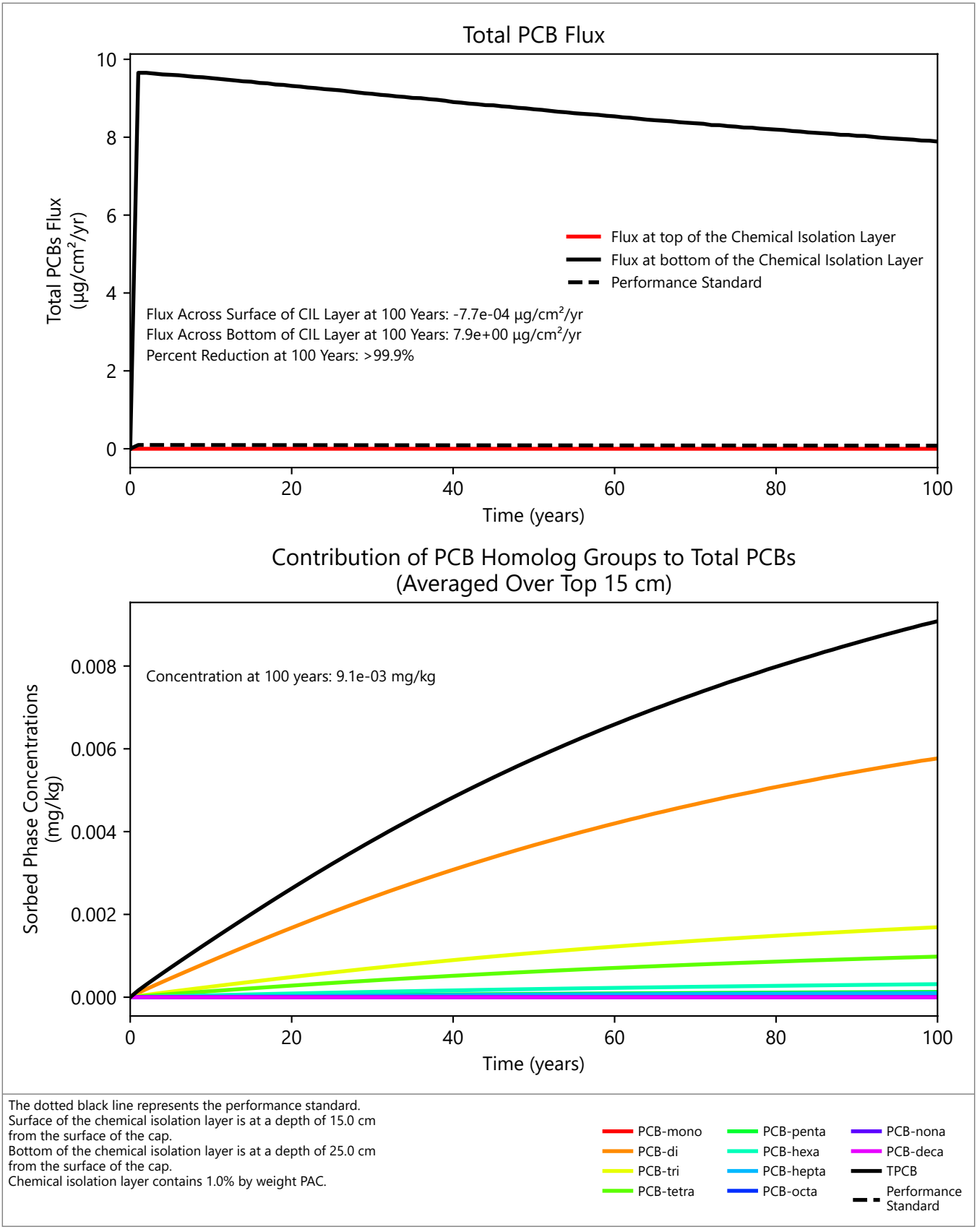

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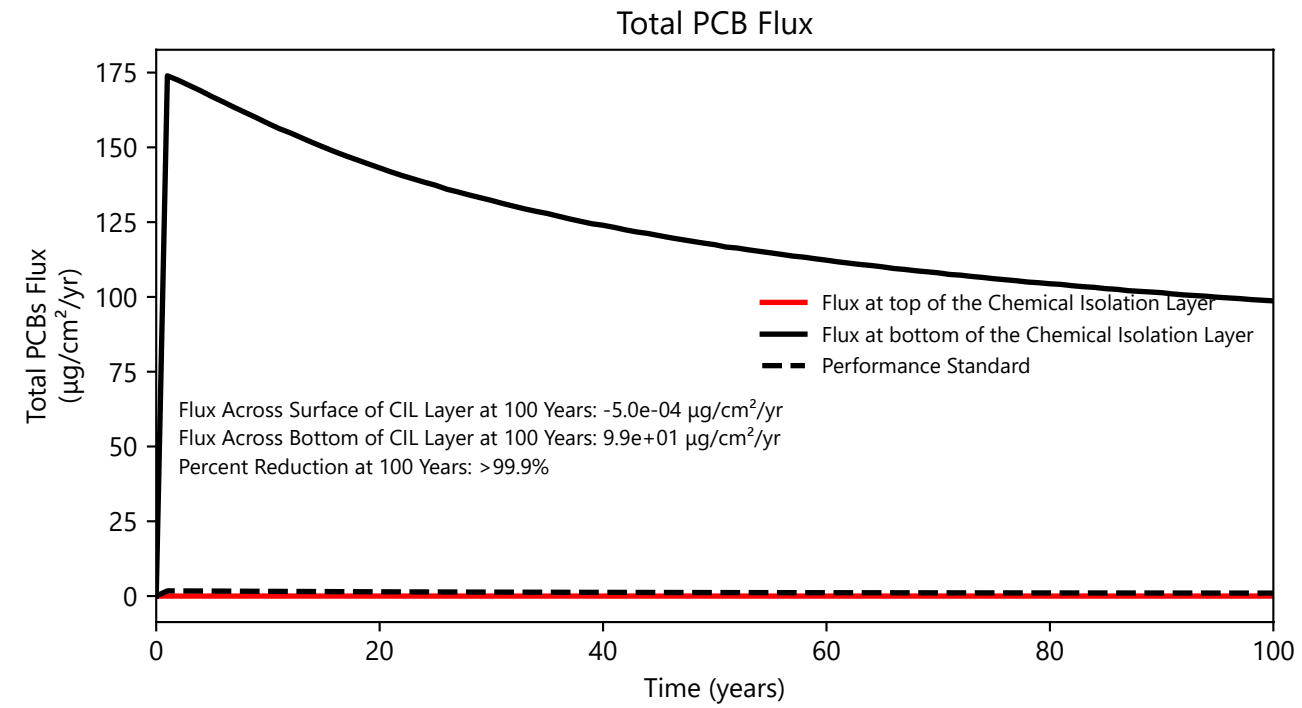
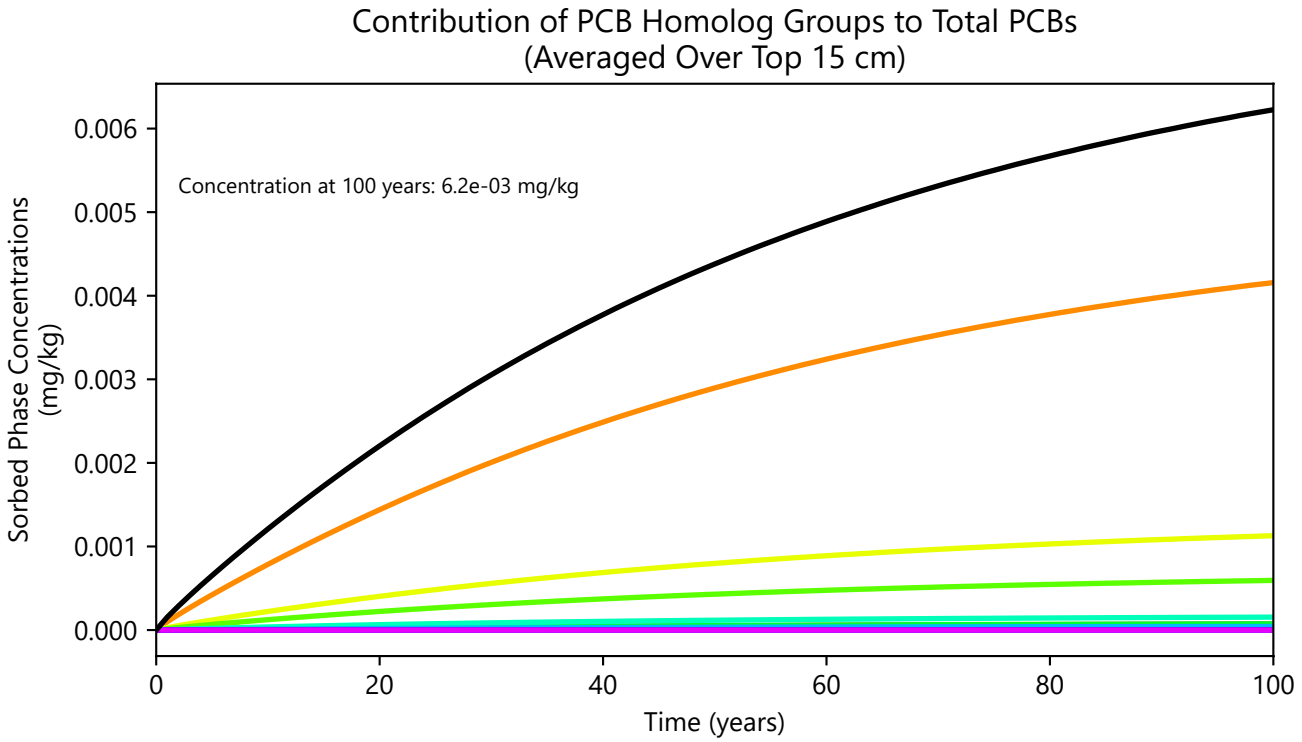
Figure 3-9c
Mixed Zone Approach Sensitivity Analysis: Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-1 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River





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Bottom of the chemical isolation layer is at a depth of 25.0 cm from the surface of the cap.
Chemical isolation layer contains 1.0% by weight PAC.

PCB-mono
PCB-di
PCB-tri
PCB-tetra
PCB-penta
PCB-hexa
PCB-hepta
PCB-octa
PCB-nona
PCB-deca
TPCB
Performance Standard

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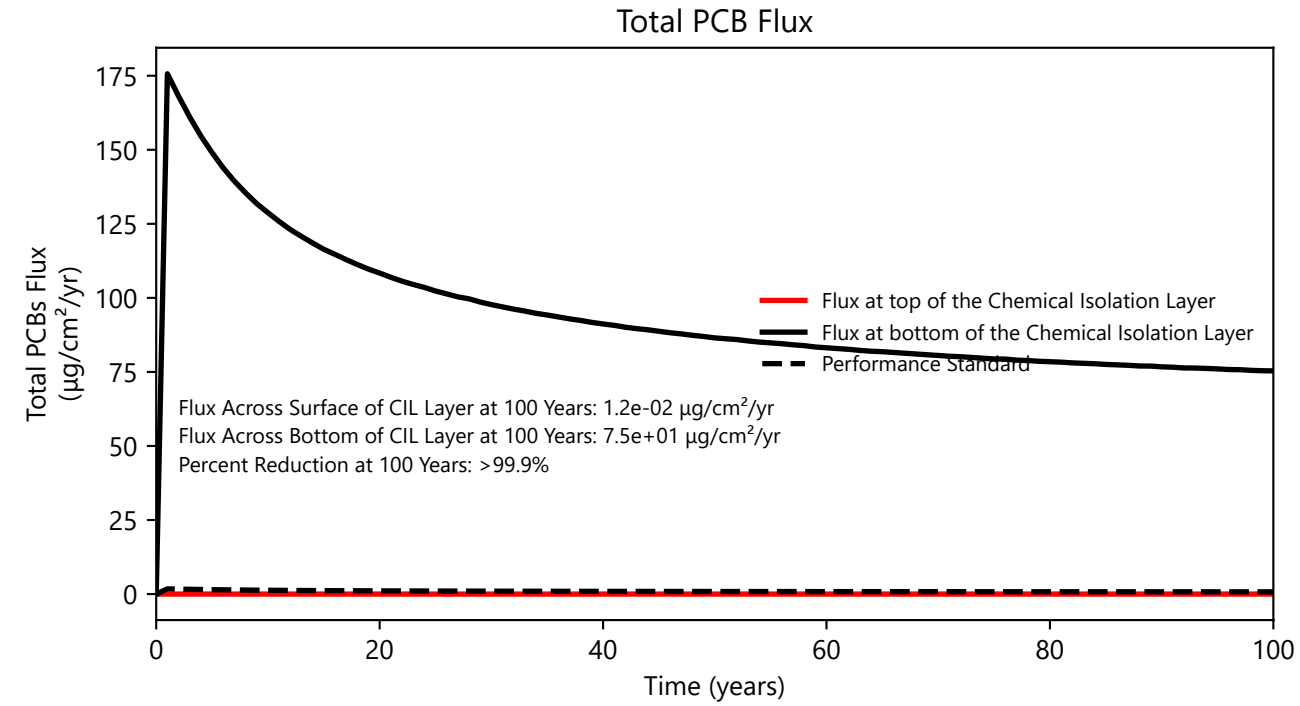
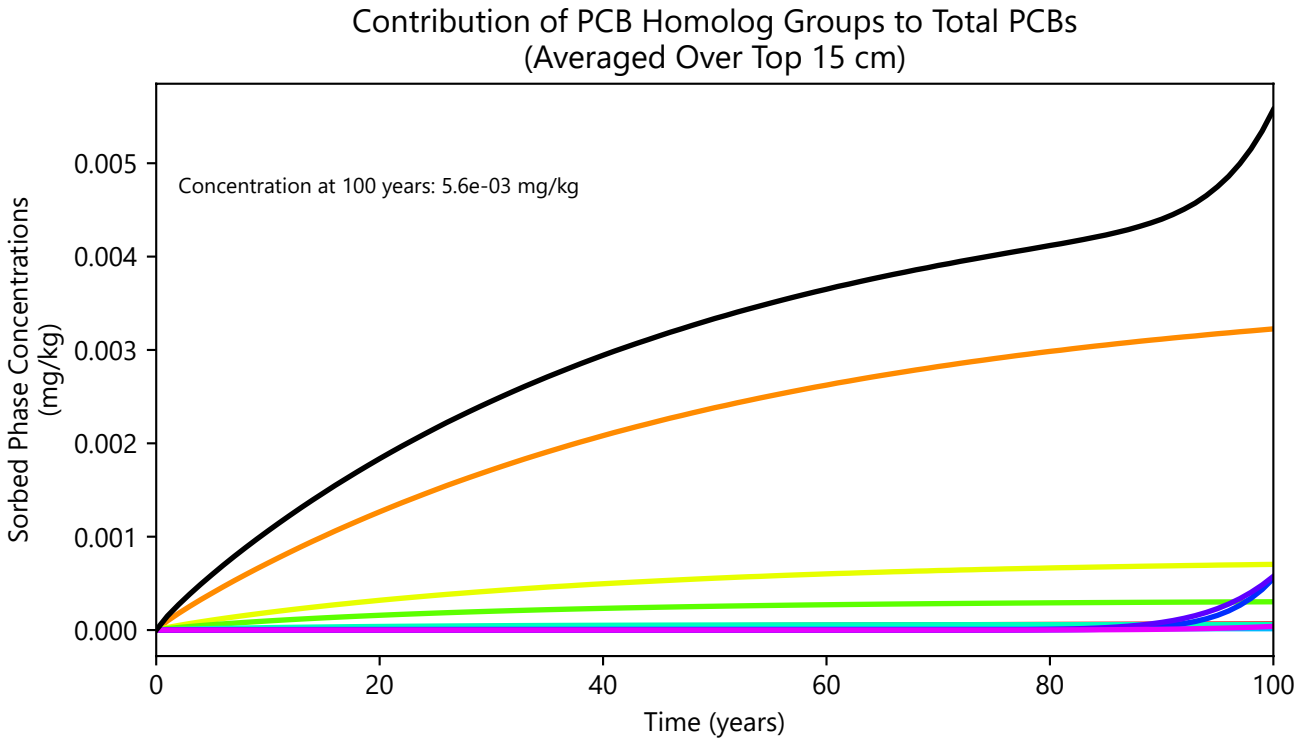
Figure 3-9d
Mixed Zone Approach Sensitivity Analysis: Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-2 and BW5A-4 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River





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Chemical isolation layer contains 1.0% by weight PAC.

PCB-mono, PCB-di, PCB-tri, PCB-tetra, PCB-penta, PCB-hexa, PCB-hepta, PCB-octa, PCB-nona, PCB-deca, TPCB, Performance Standard

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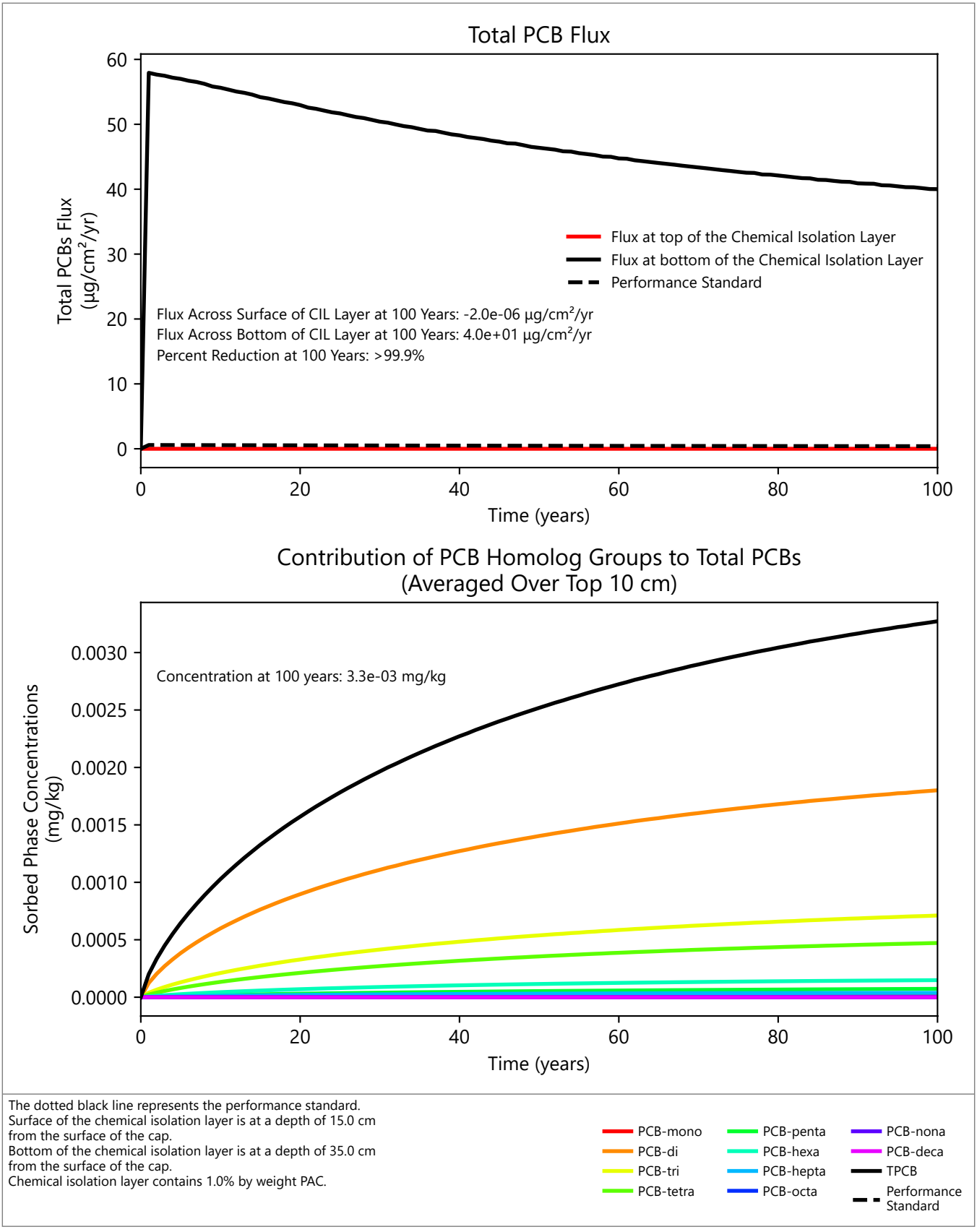
Figure 3-9e
Mixed Zone Approach Sensitivity Analysis: Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-5 (Sand with 1% PAC)



The dotted black line represents the performance standard.
Surface of the chemical isolation layer is at a depth of 15.0 cm from the surface of the cap.
Bottom of the chemical isolation layer is at a depth of 35.0 cm from the surface of the cap.
Chemical isolation layer contains 1.0% by weight PAC.

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Figure 3-10a
OC Partitioning Coefficient Sensitivity Analysis (Log KOC - 2 SE): Model-Predicted PCB Flux and Concentration Compared to Performance Standards for Main Channel 5A-1 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

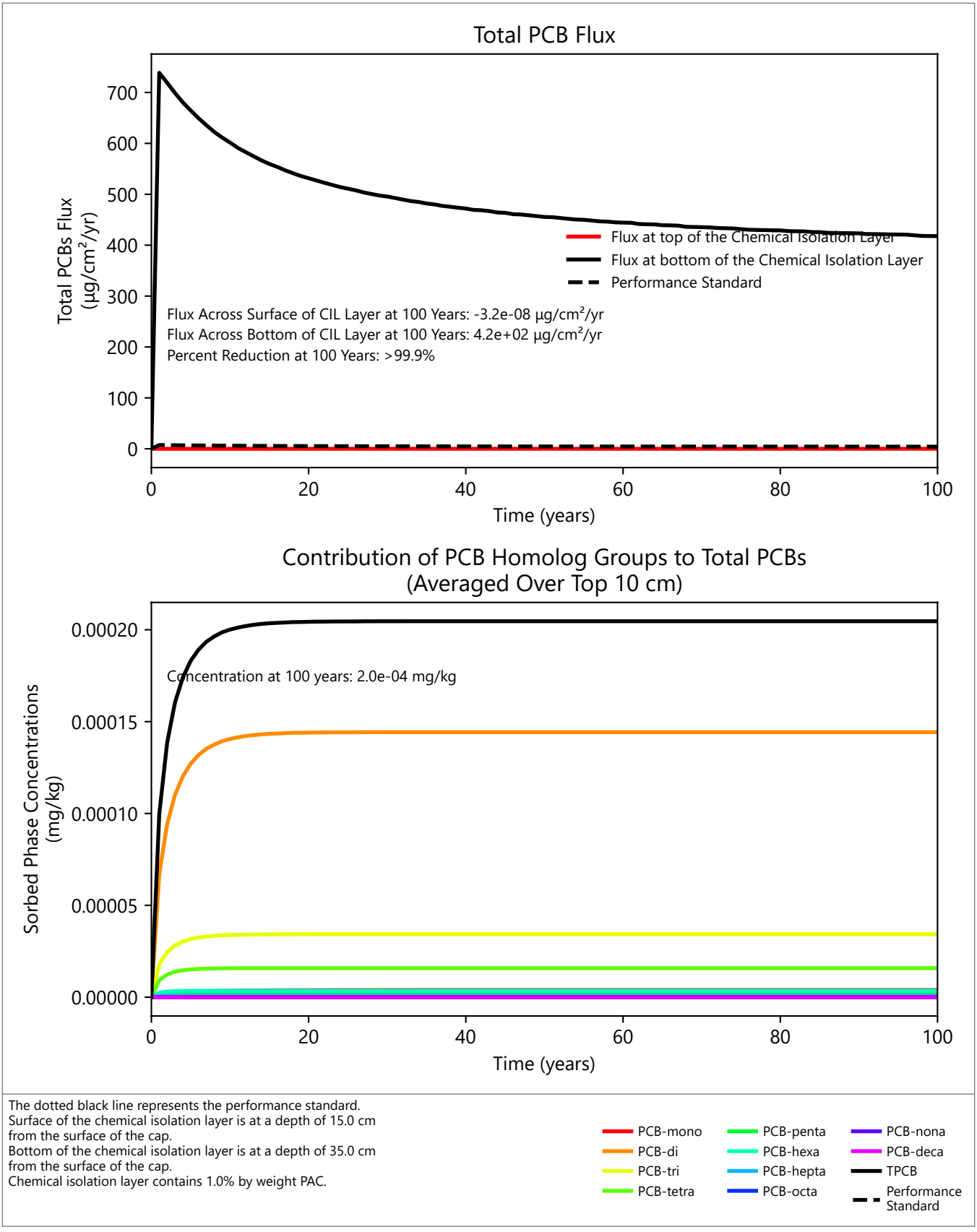

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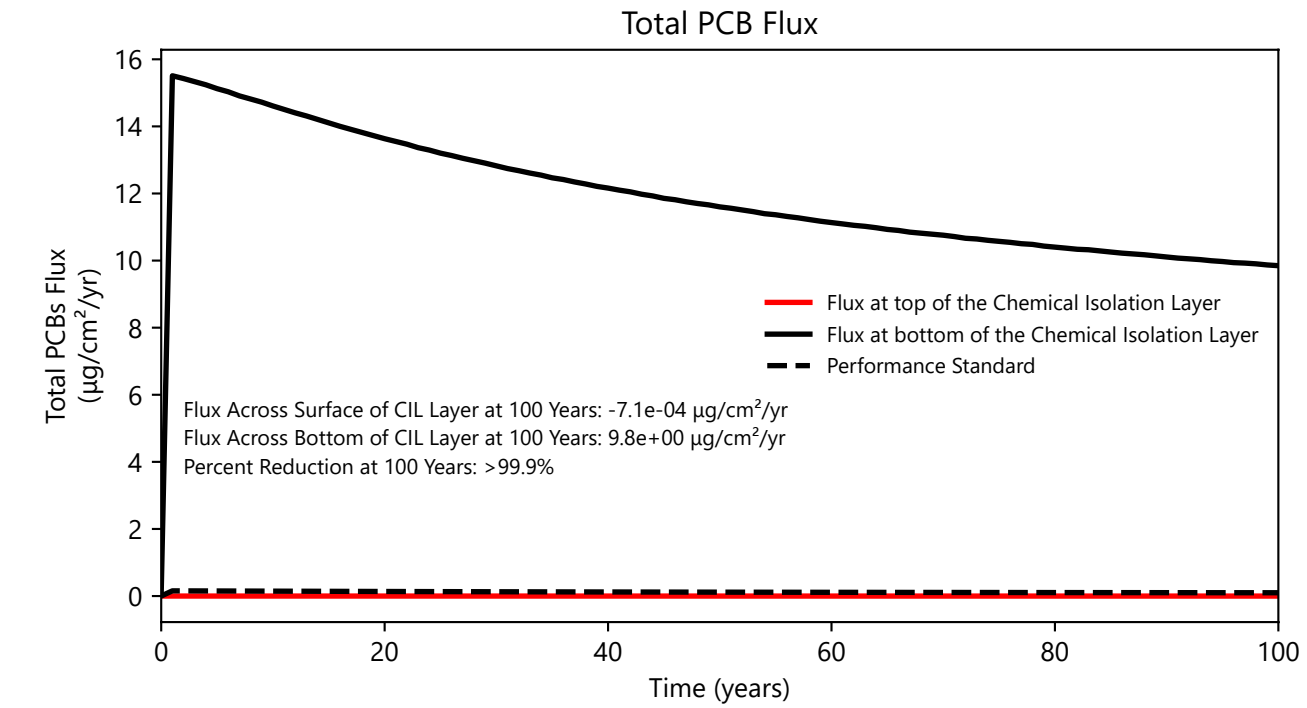
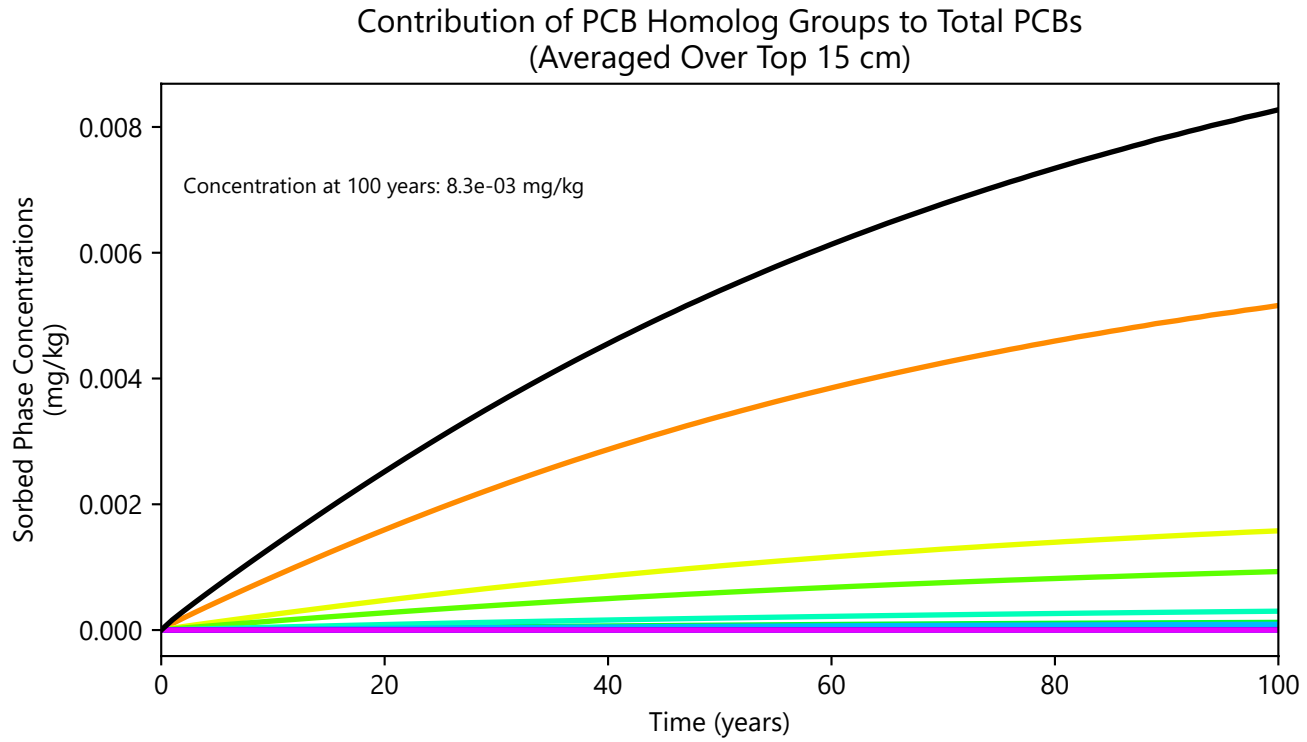
Figure 3-10b
OC Partitioning Coefficient Sensitivity Analysis (Log KOC - 2 SE): Model-Predicted PCB Flux and Concentration Compared to Performance Standards for Main Channel 5A-2 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River





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PCB-mono, PCB-di, PCB-tri, PCB-tetra, PCB-penta, PCB-hexa, PCB-hepta, PCB-octa, PCB-nona, PCB-deca, TPCB, Performance Standard

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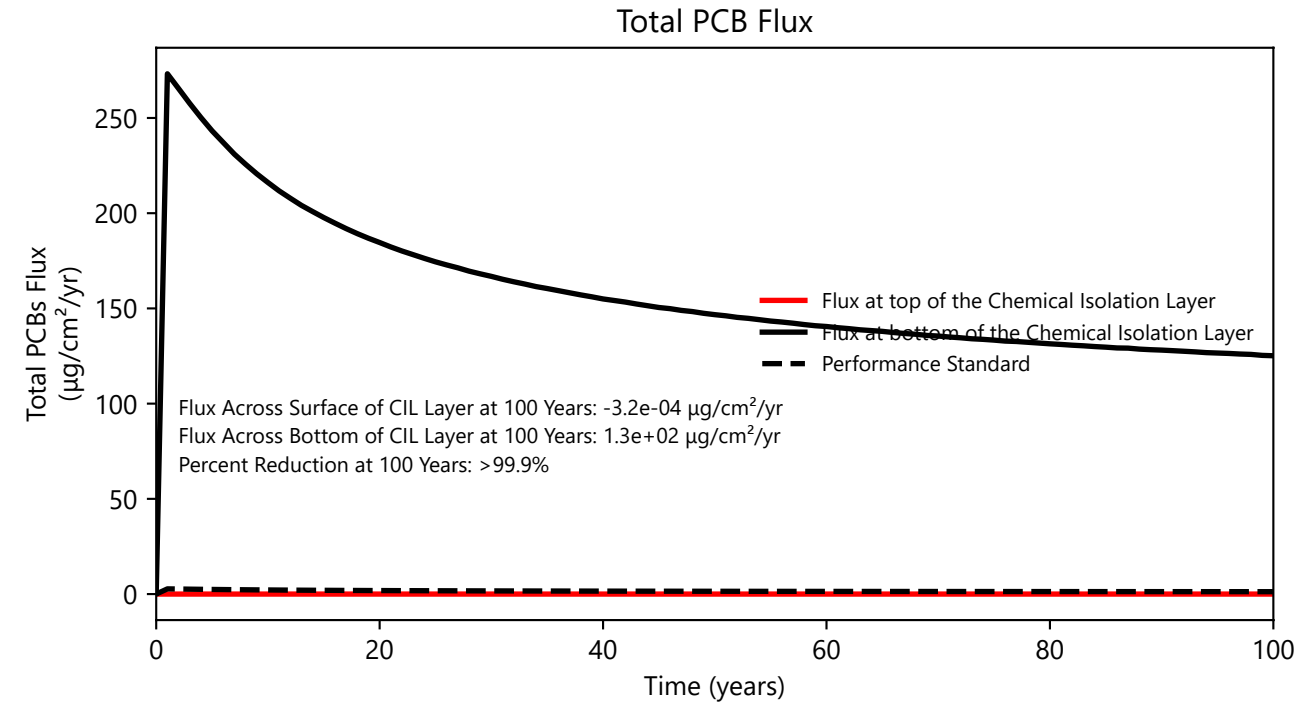
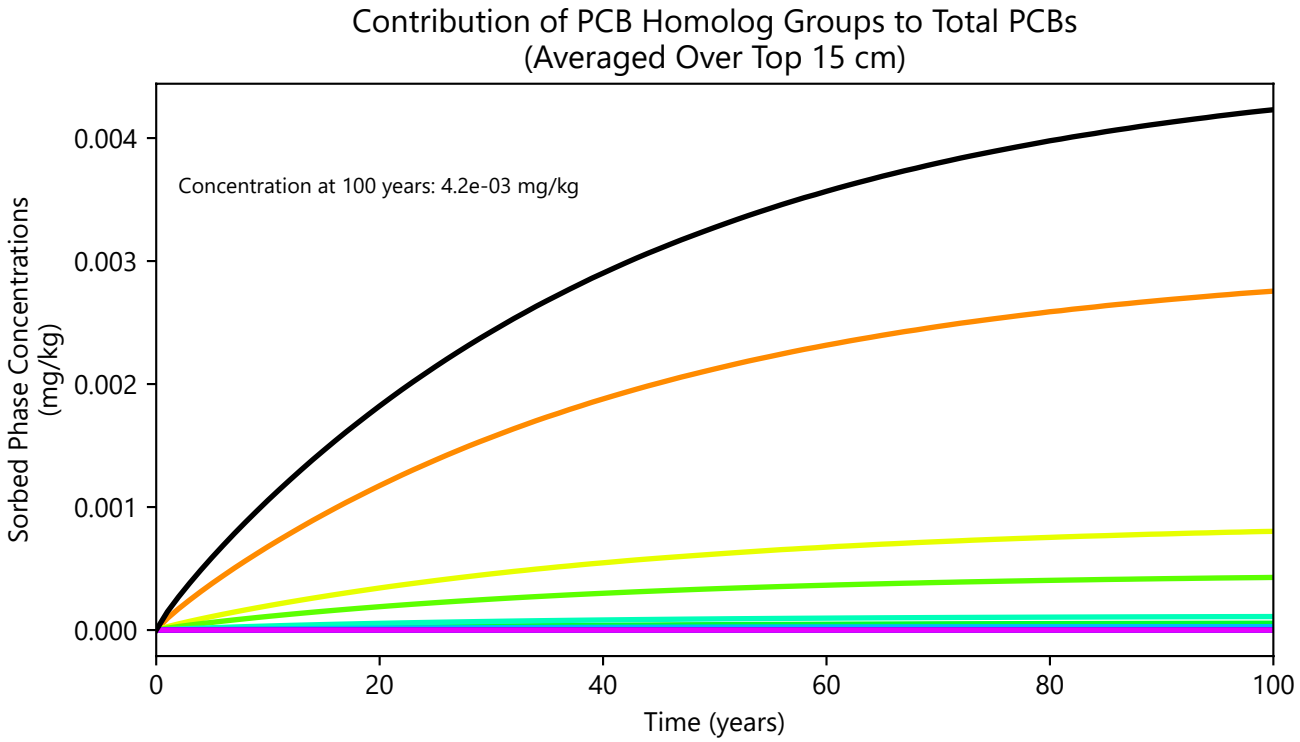
Figure 3-10c
OC Partitioning Coefficient Sensitivity Analysis (Log KOC - 2 SE): Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-1 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River





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PCB-mono, PCB-di, PCB-tri, PCB-tetra, PCB-penta, PCB-hexa, PCB-hepta, PCB-octa, PCB-nona, PCB-deca, TPCB, Performance Standard

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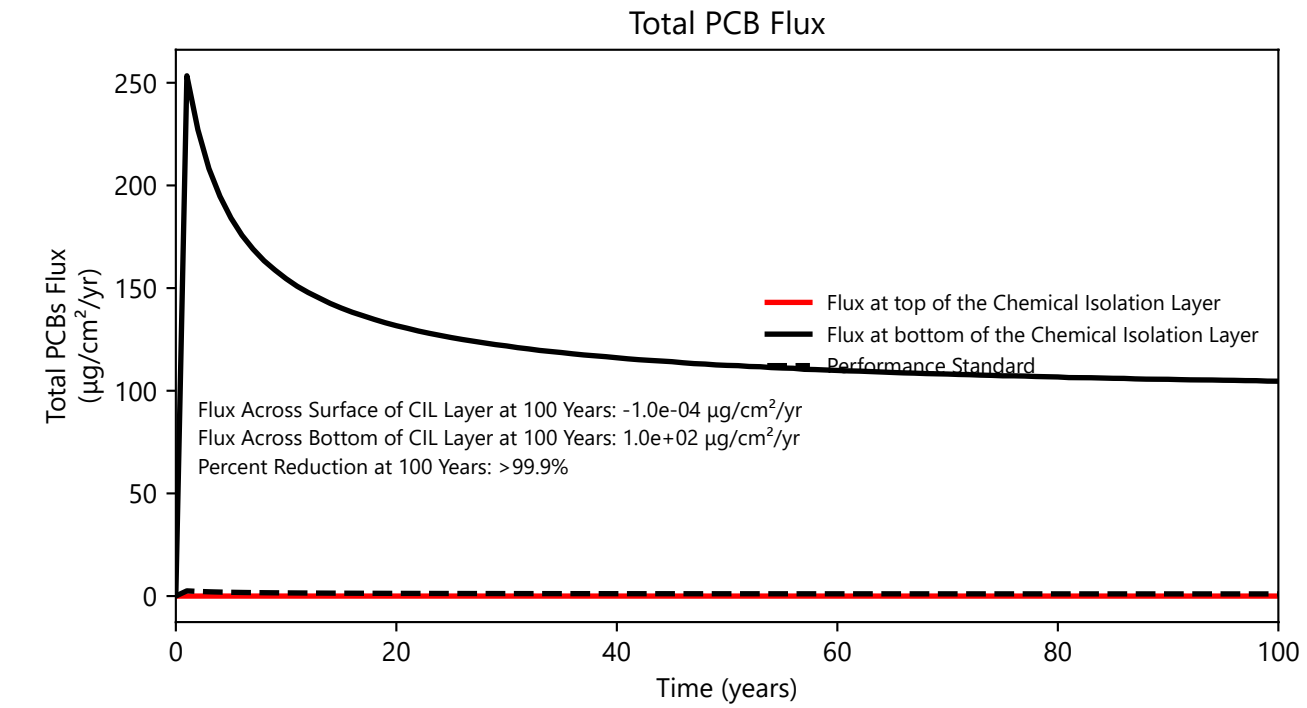
Figure 3-10d
OC Partitioning Coefficient Sensitivity Analysis (Log KOC - 2 SE): Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-2 and BW5A-4 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



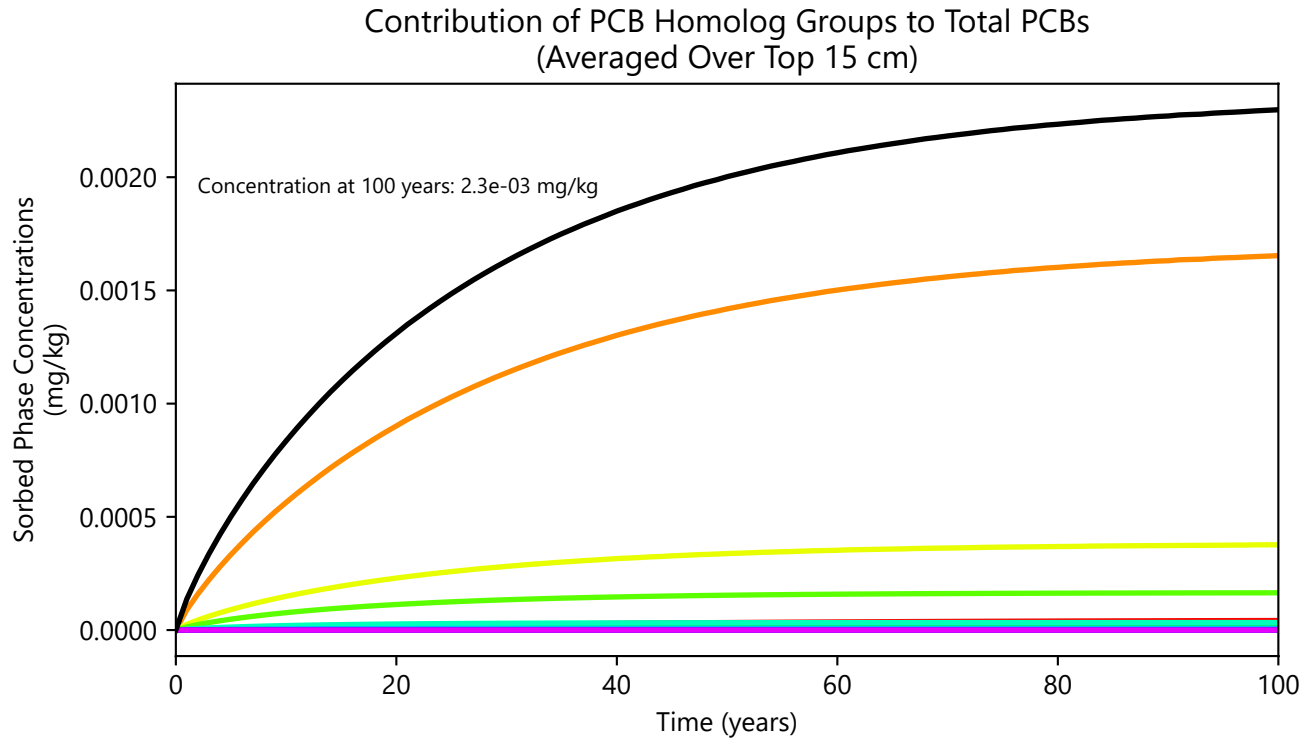


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Figure 3-10e
OC Partitioning Coefficient Sensitivity Analysis (Log KOC - 2 SE): Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-5 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

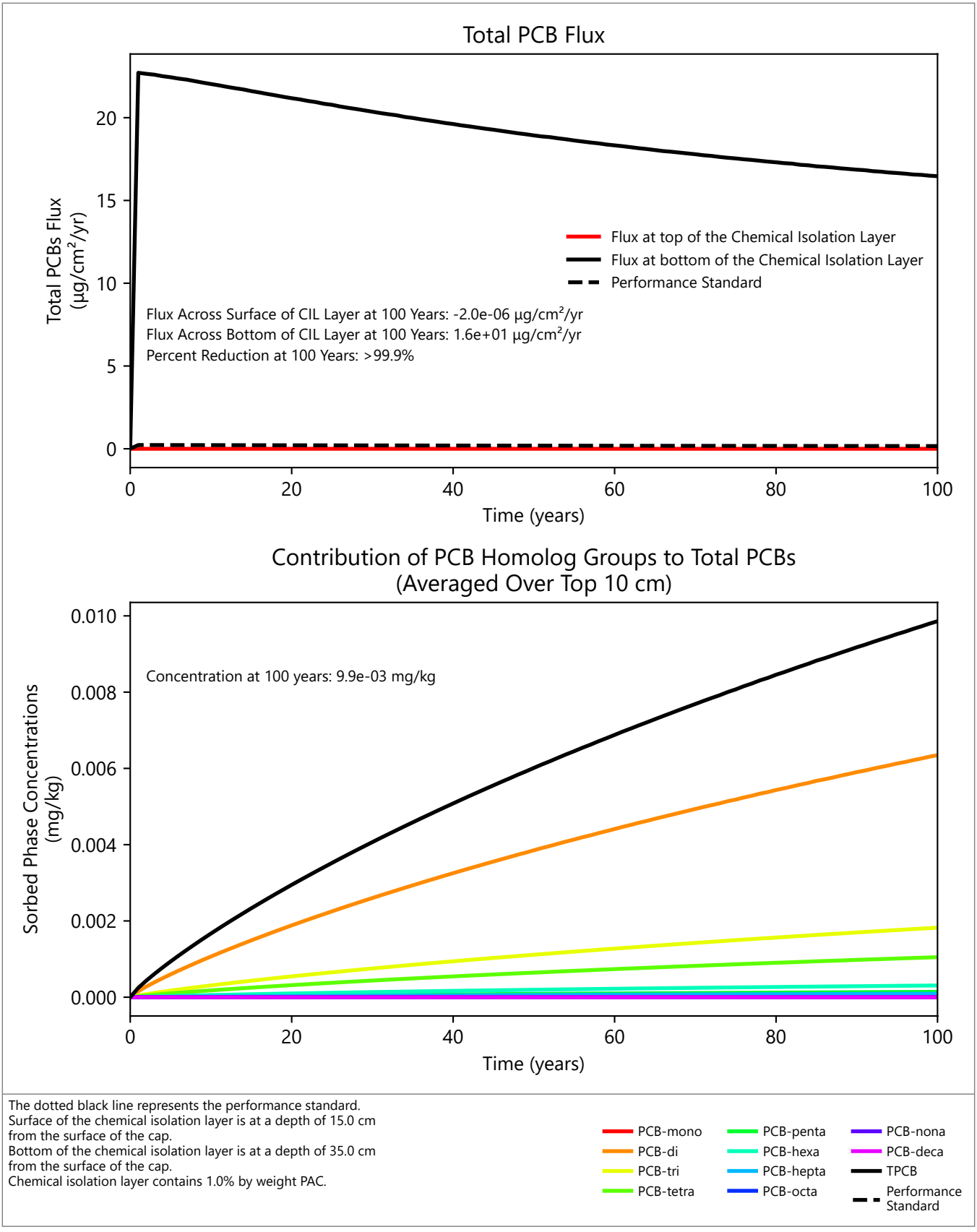

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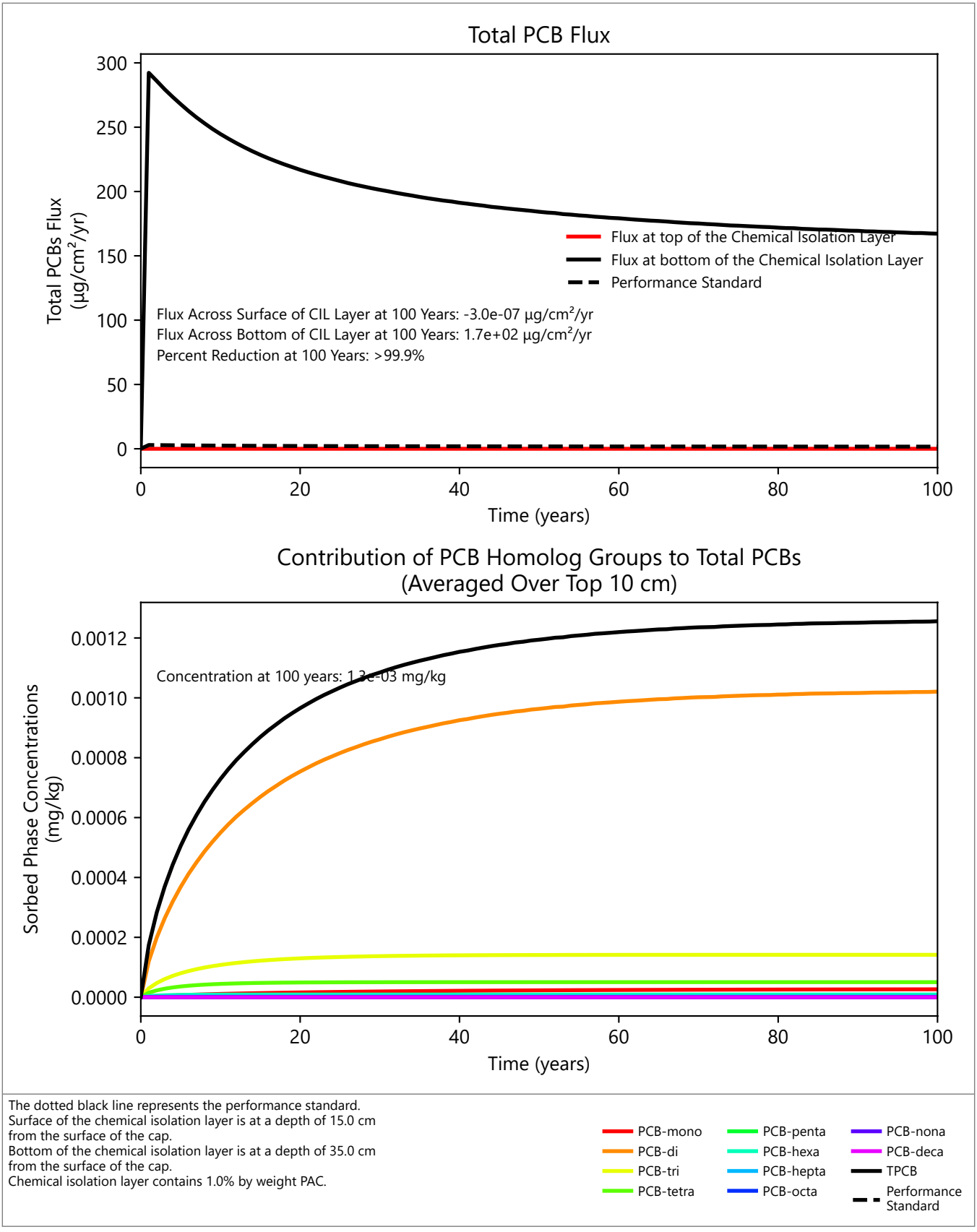
Figure 3-11a
OC Partitioning Coefficient Sensitivity Analysis (Log KOC + 2 SE): Model-Predicted PCB Flux and Concentration Compared to Performance Standards for Main Channel 5A-1 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



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Bottom of the chemical isolation layer is at a depth of 35.0 cm from the surface of the cap.
Chemical isolation layer contains 1.0% by weight PAC.

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Figure 3-11b
OC Partitioning Coefficient Sensitivity Analysis (Log KOC + 2 SE): Model-Predicted PCB Flux and Concentration Compared to Performance Standards for Main Channel 5A-2 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

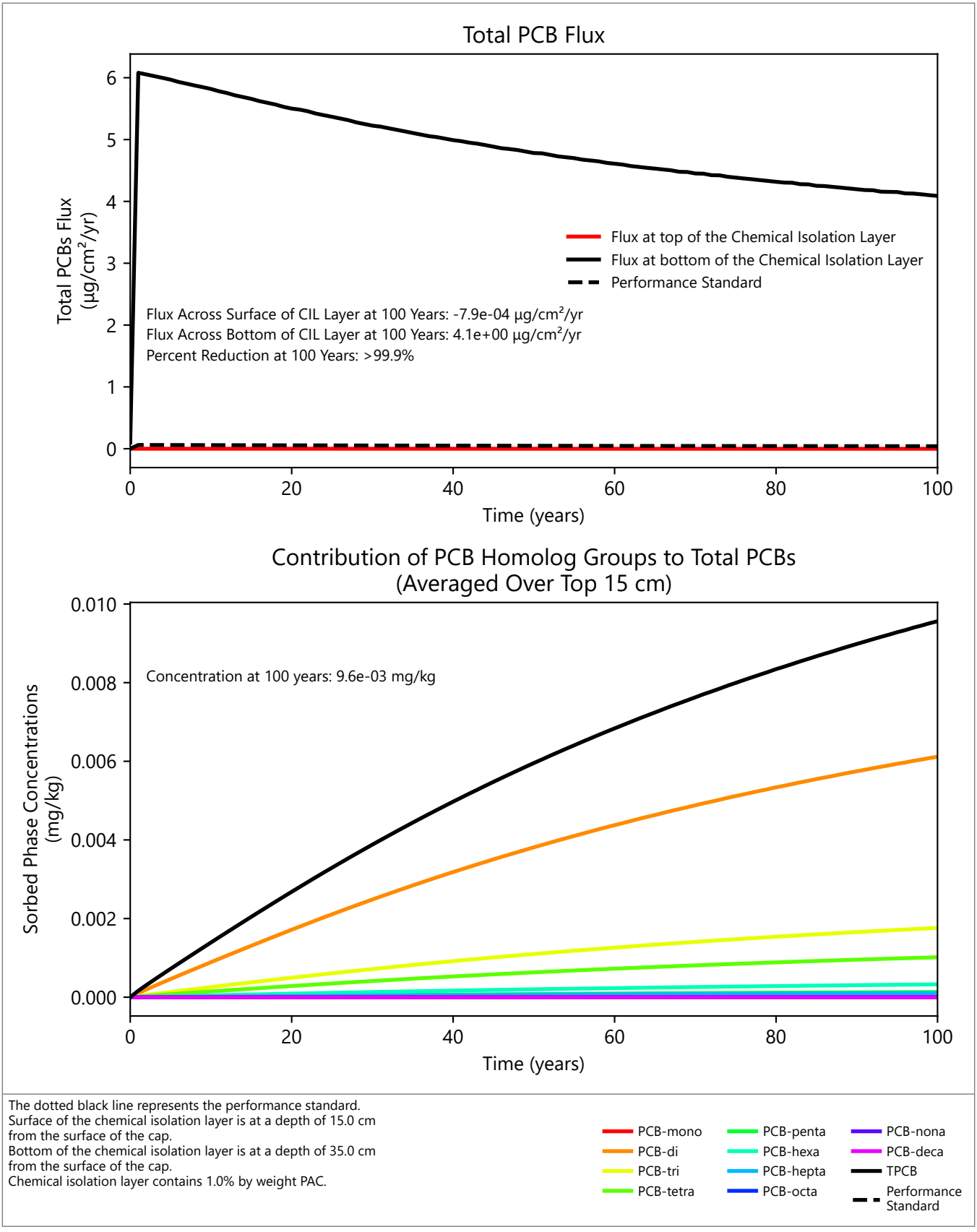

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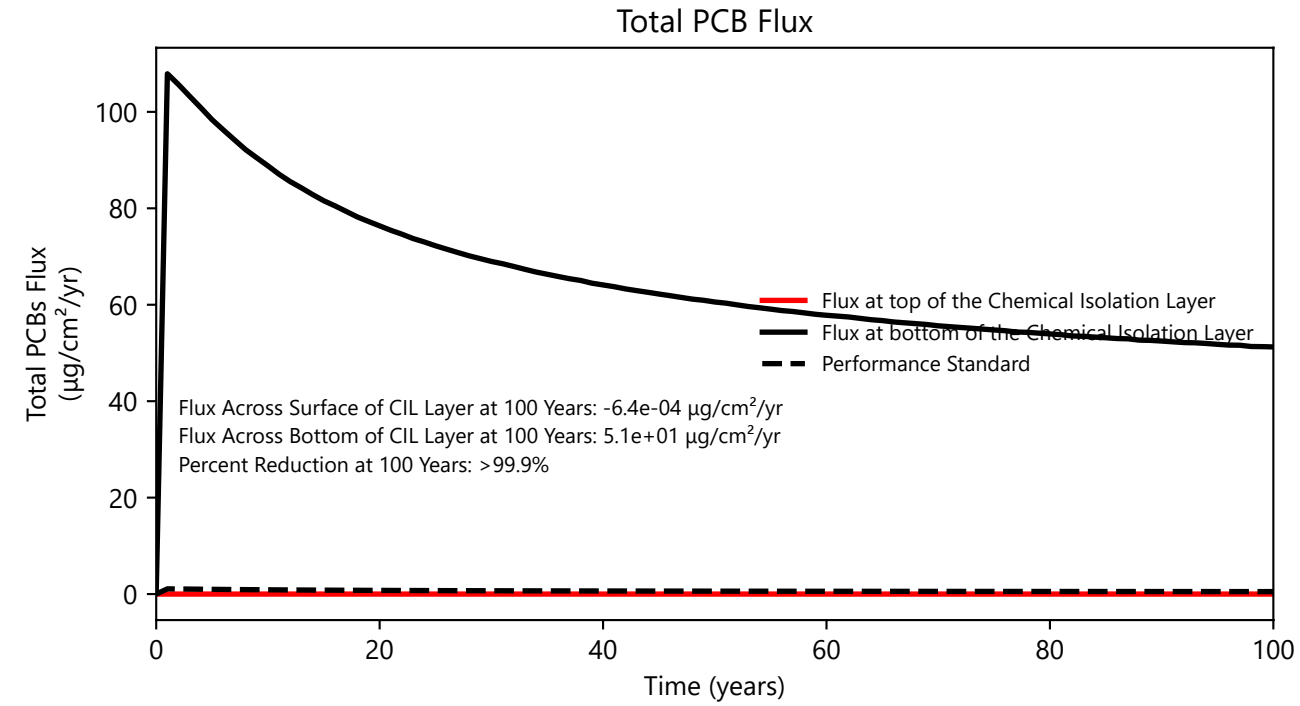
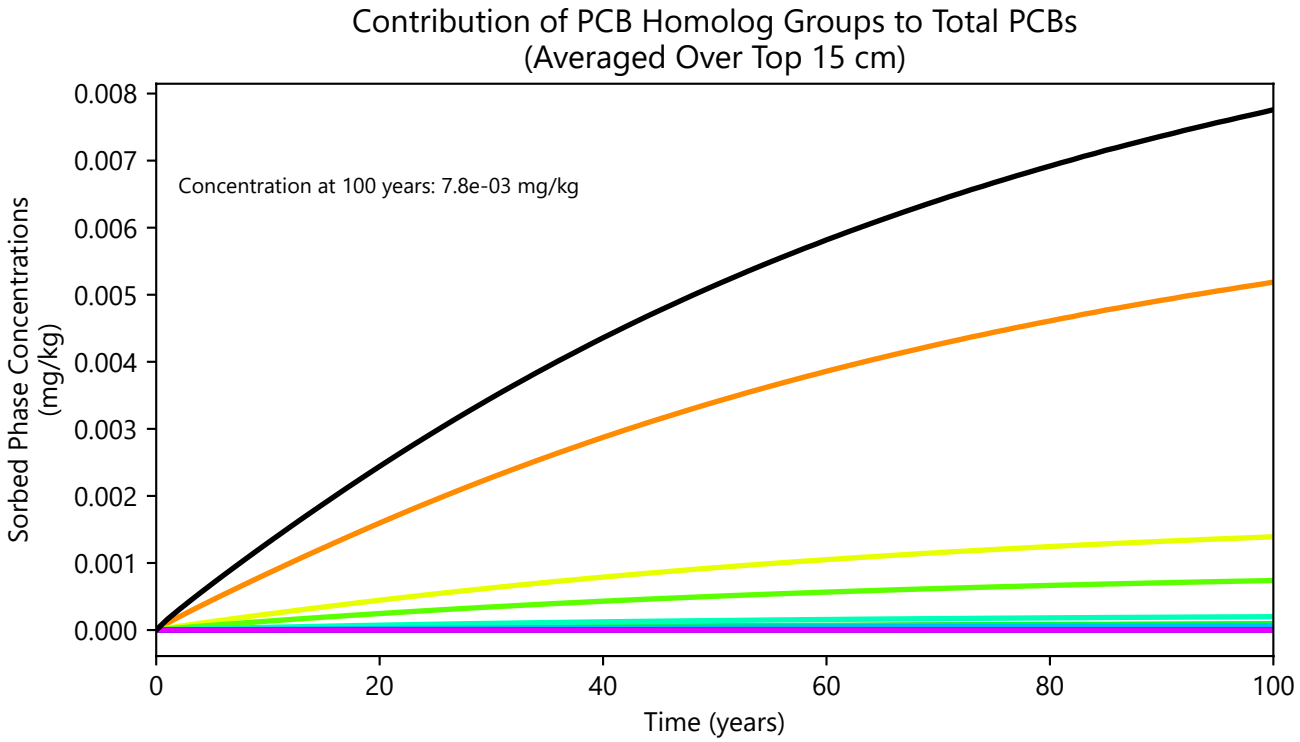
Figure 3-11c
OC Partitioning Coefficient Sensitivity Analysis (Log KOC + 2 SE): Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-1 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River





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Chemical isolation layer contains 1.0% by weight PAC.

PCB-mono, PCB-di, PCB-tri, PCB-tetra, PCB-penta, PCB-hexa, PCB-hepta, PCB-octa, PCB-nona, PCB-deca, TPCB, Performance Standard

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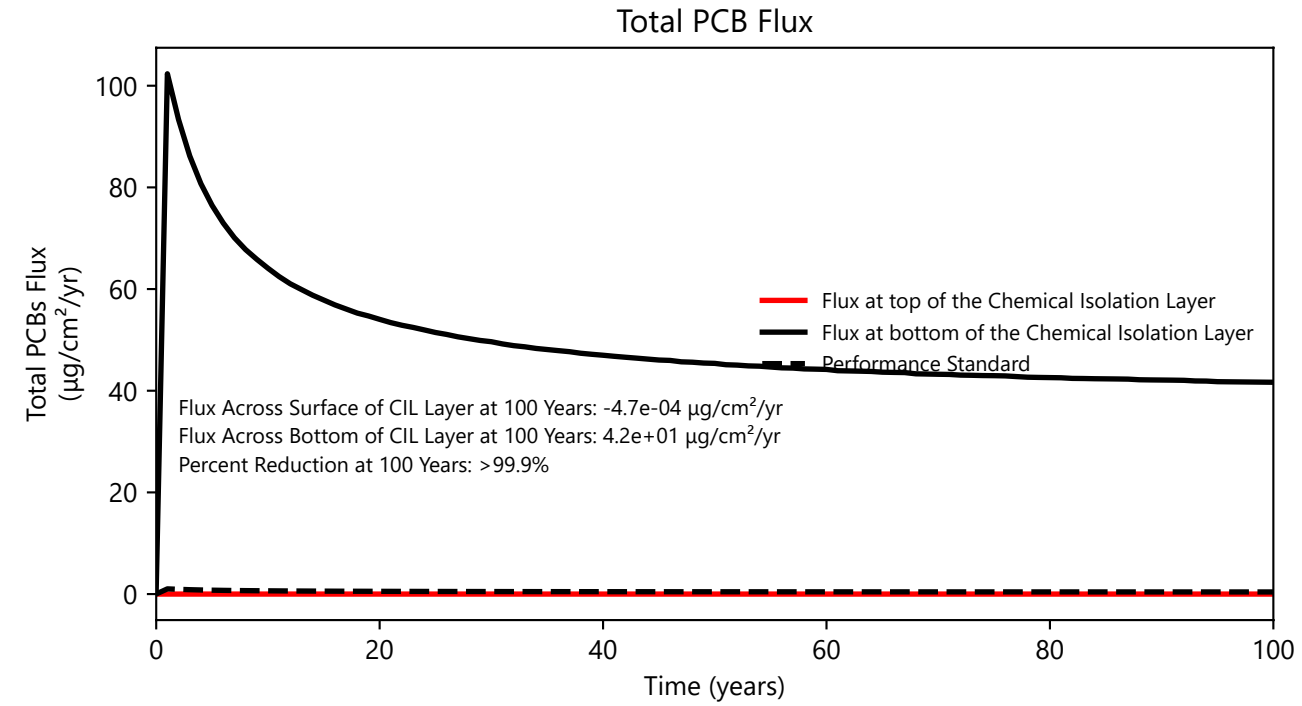
Figure 3-11d
OC Partitioning Coefficient Sensitivity Analysis (Log KOC + 2 SE): Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-2 and BW5A-4 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



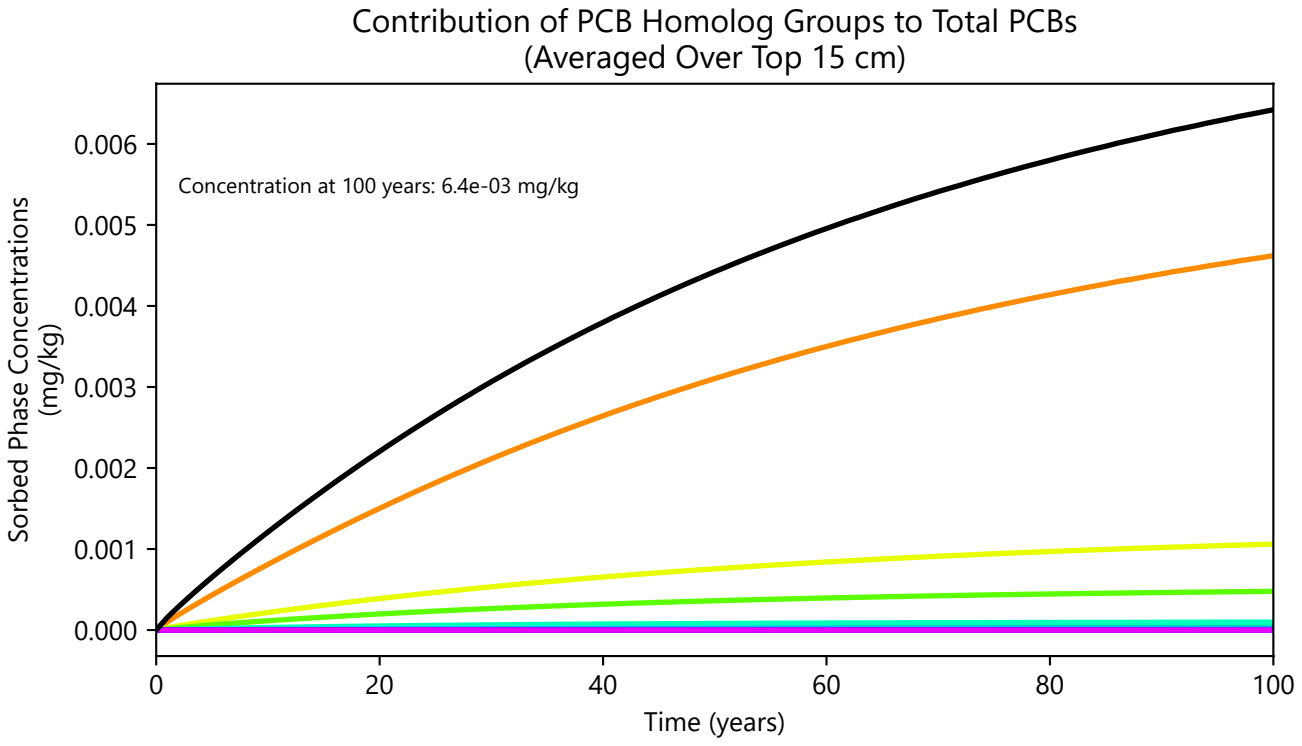


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Figure 3-11e
OC Partitioning Coefficient Sensitivity Analysis (Log KOC + 2 SE): Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-5 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

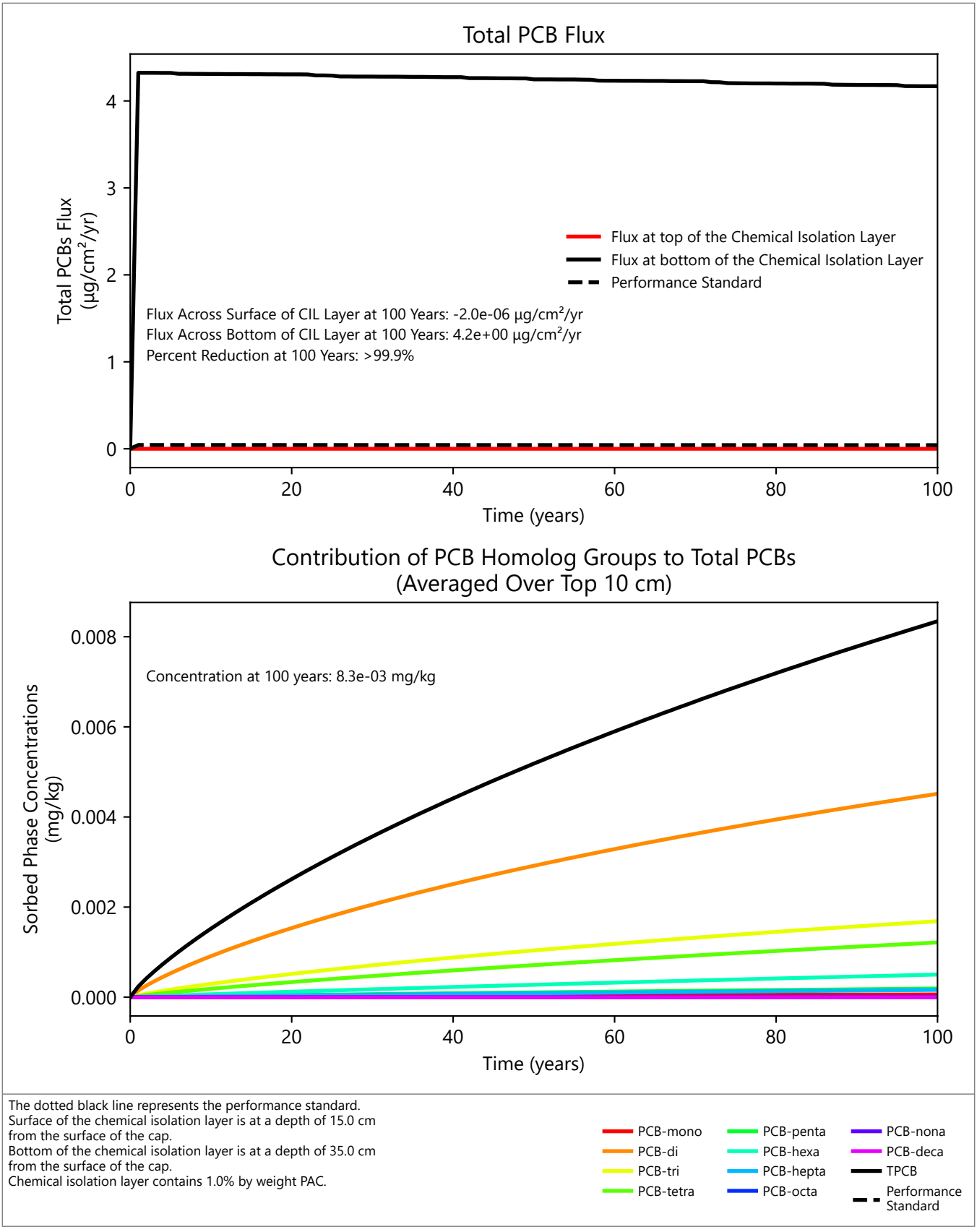

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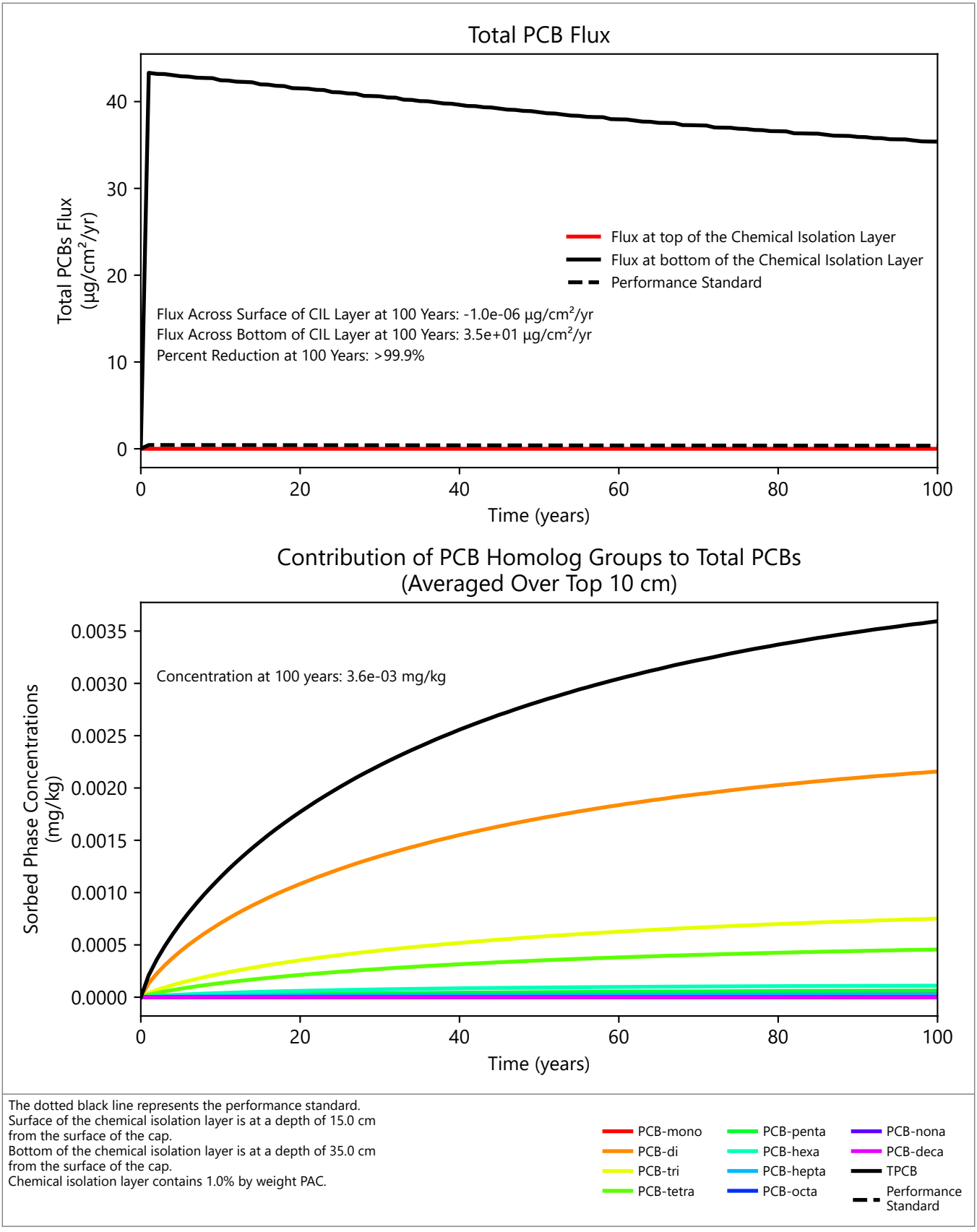
Figure 3-12a
DOC Partitioning Coefficient Sensitivity Analysis: Model-Predicted PCB Flux and Concentration Compared to Performance Standards for Main Channel Reach 5A-1 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



The dotted black line represents the performance standard.
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Bottom of the chemical isolation layer is at a depth of 35.0 cm from the surface of the cap.
Chemical isolation layer contains 1.0% by weight PAC.

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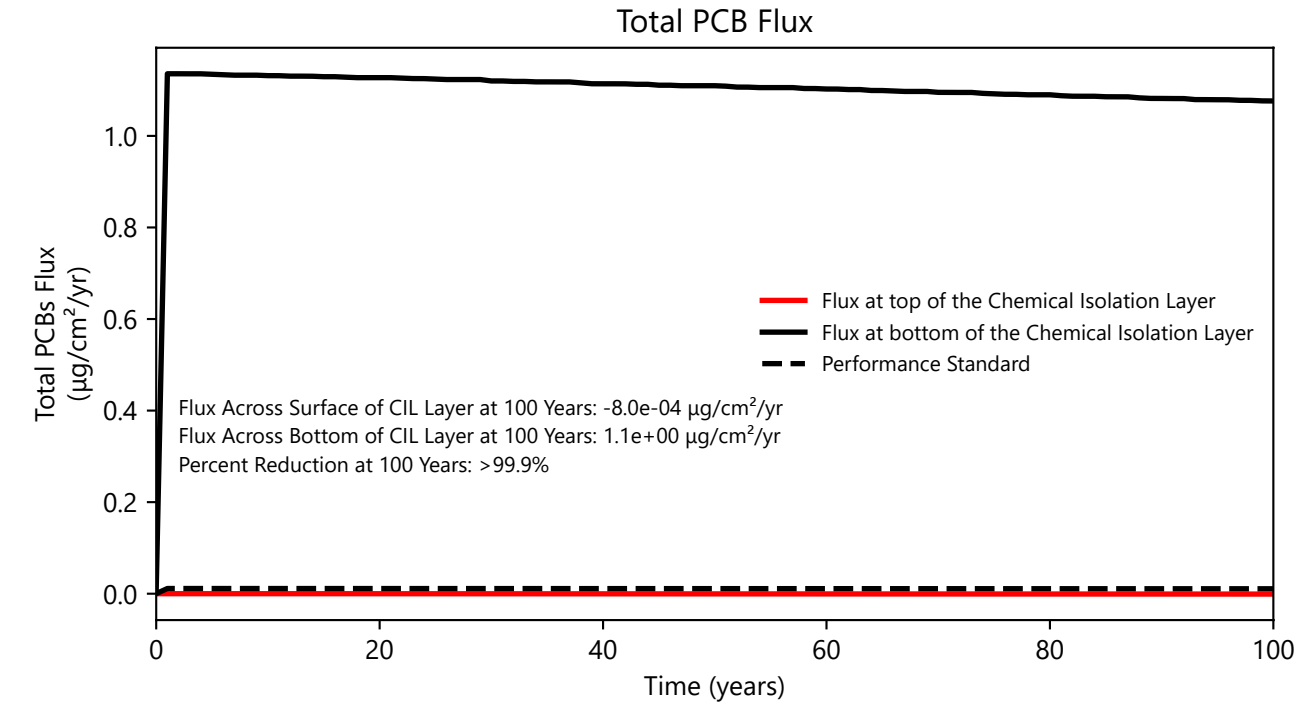
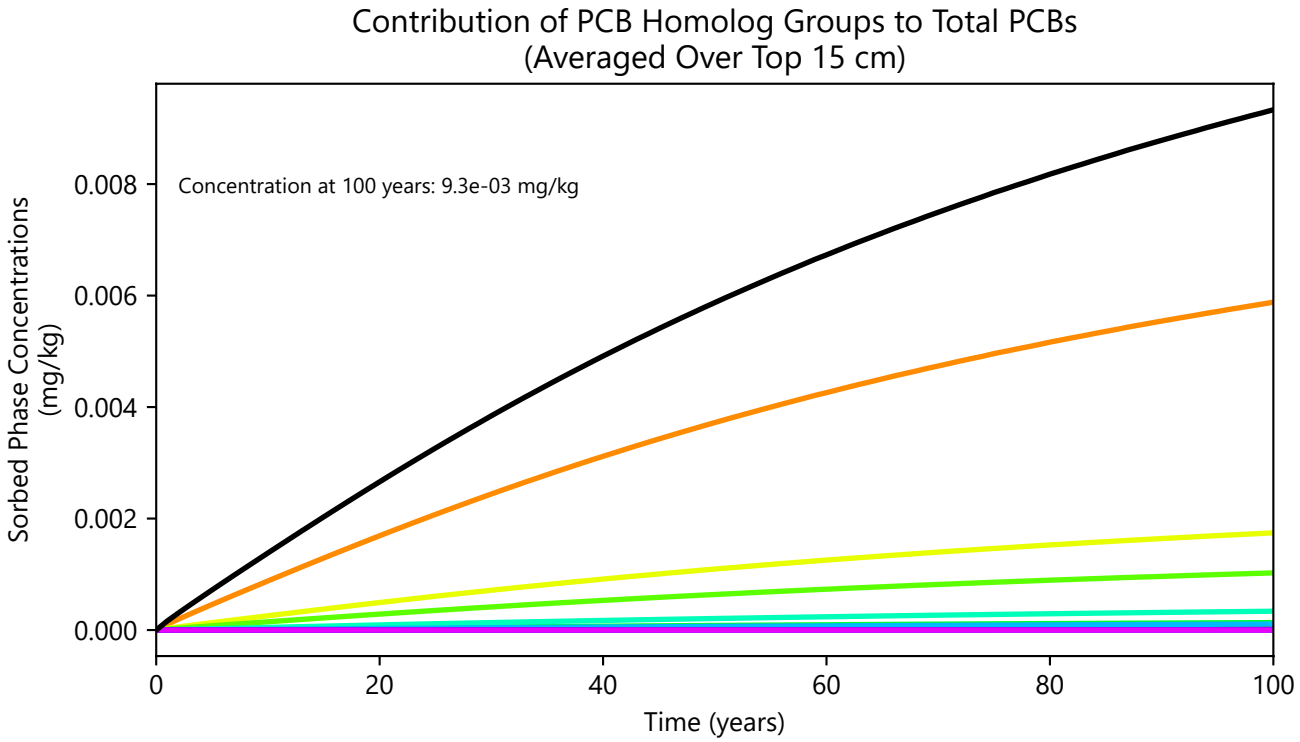
Figure 3-12b
DOC Partitioning Coefficient Sensitivity Analysis: Model-Predicted PCB Flux and Concentration Compared to Performance Standards for Main Channel Reach 5A-2 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River





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Chemical isolation layer contains 1.0% by weight PAC.

PCB-mono, PCB-di, PCB-tri, PCB-tetra, PCB-penta, PCB-hexa, PCB-hepta, PCB-octa, PCB-nona, PCB-deca, TPCB, Performance Standard

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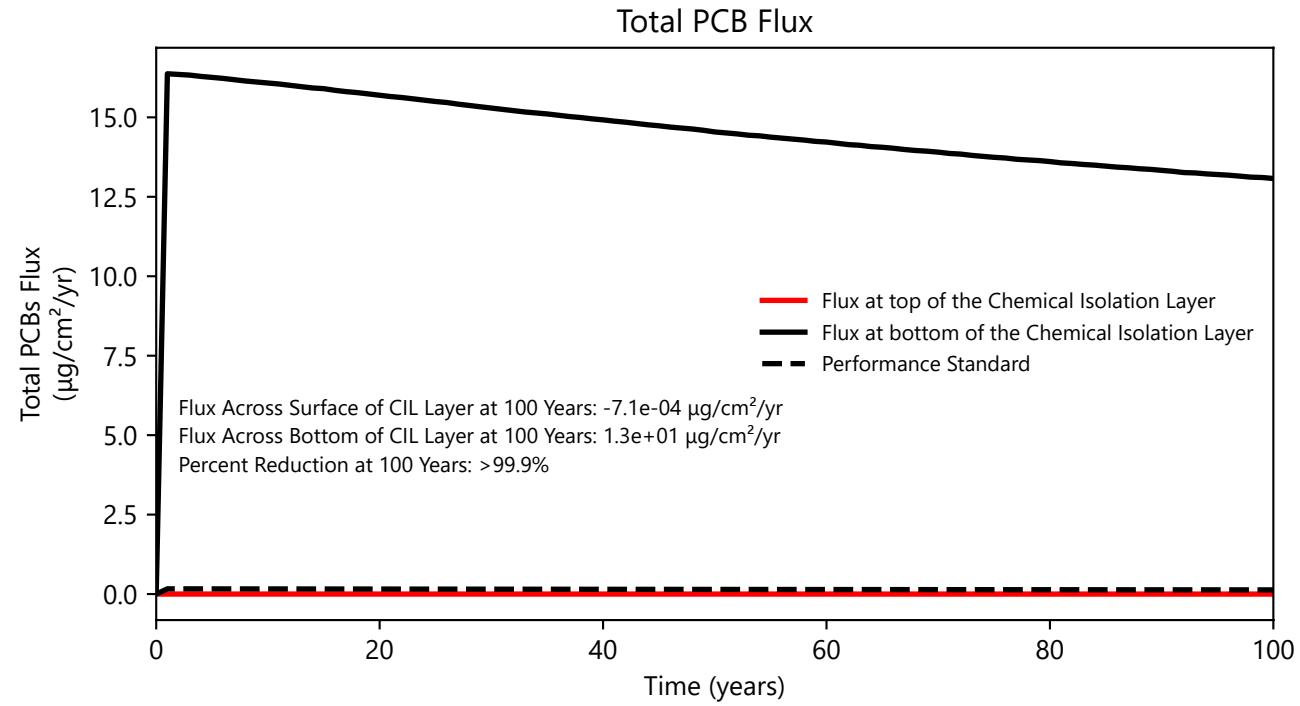
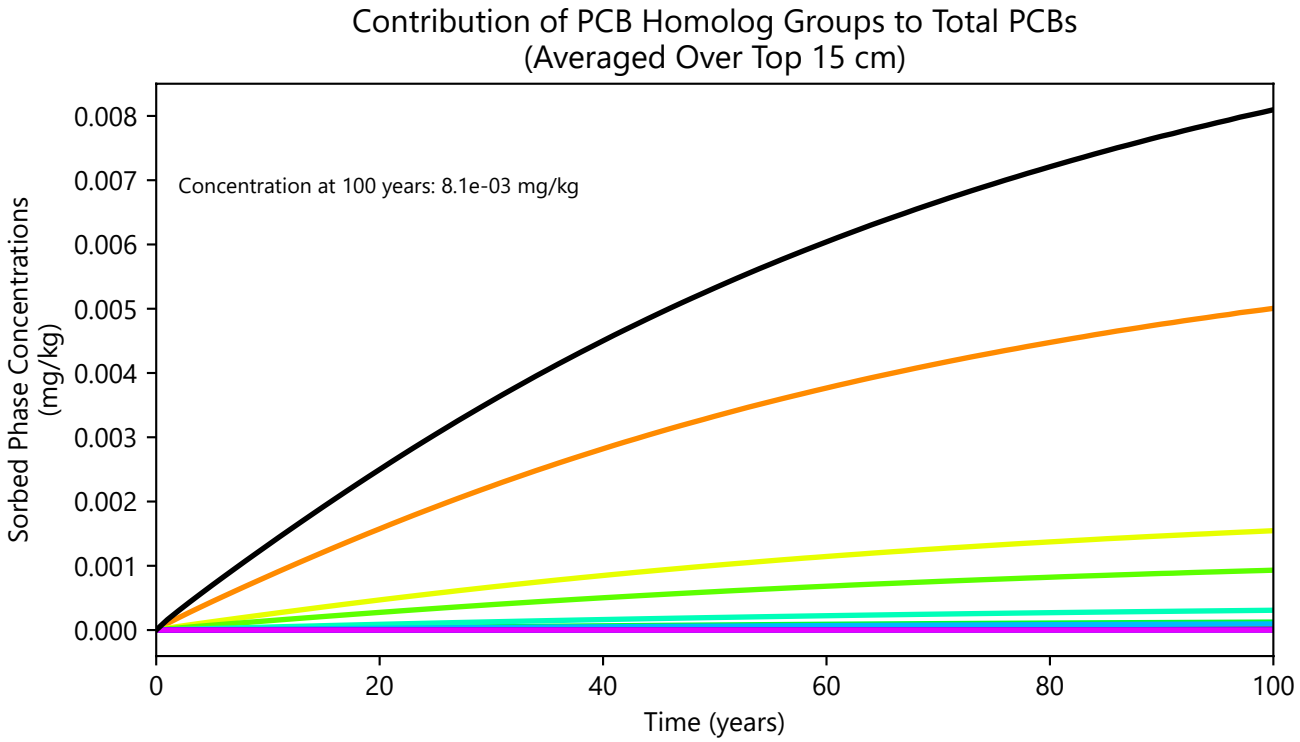
ANCHOR QEA

Figure 3-12c
DOC Partitioning Coefficient Sensitivity Analysis: Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-1 (Sand with 1% PAC)





The dotted black line represents the performance standard.
Surface of the chemical isolation layer is at a depth of 15.0 cm from the surface of the cap.
Bottom of the chemical isolation layer is at a depth of 35.0 cm from the surface of the cap.
Chemical isolation layer contains 1.0% by weight PAC.

PCB-mono, PCB-di, PCB-tri, PCB-tetra, PCB-penta, PCB-hexa, PCB-hepta, PCB-octa, PCB-nona, PCB-deca, TPCB, Performance Standard

Publish Date: 04/29/2026 16:51 PM | User: SAR-AHER
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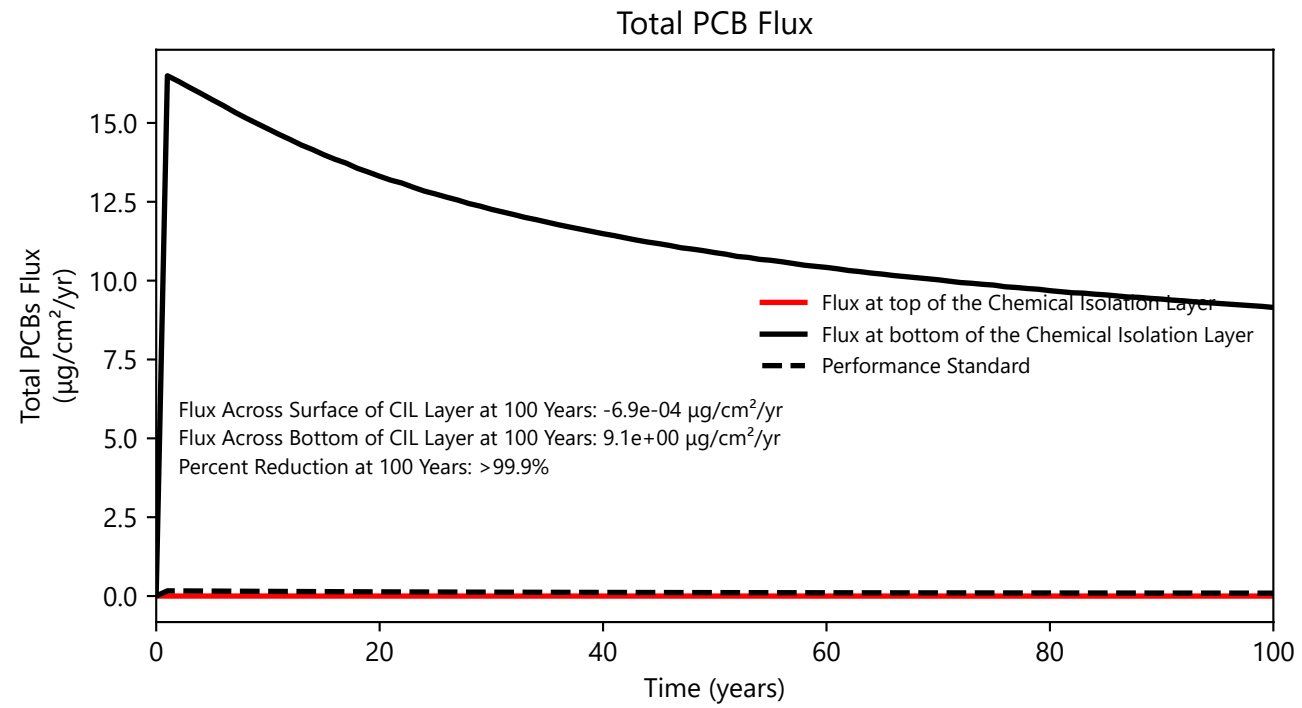
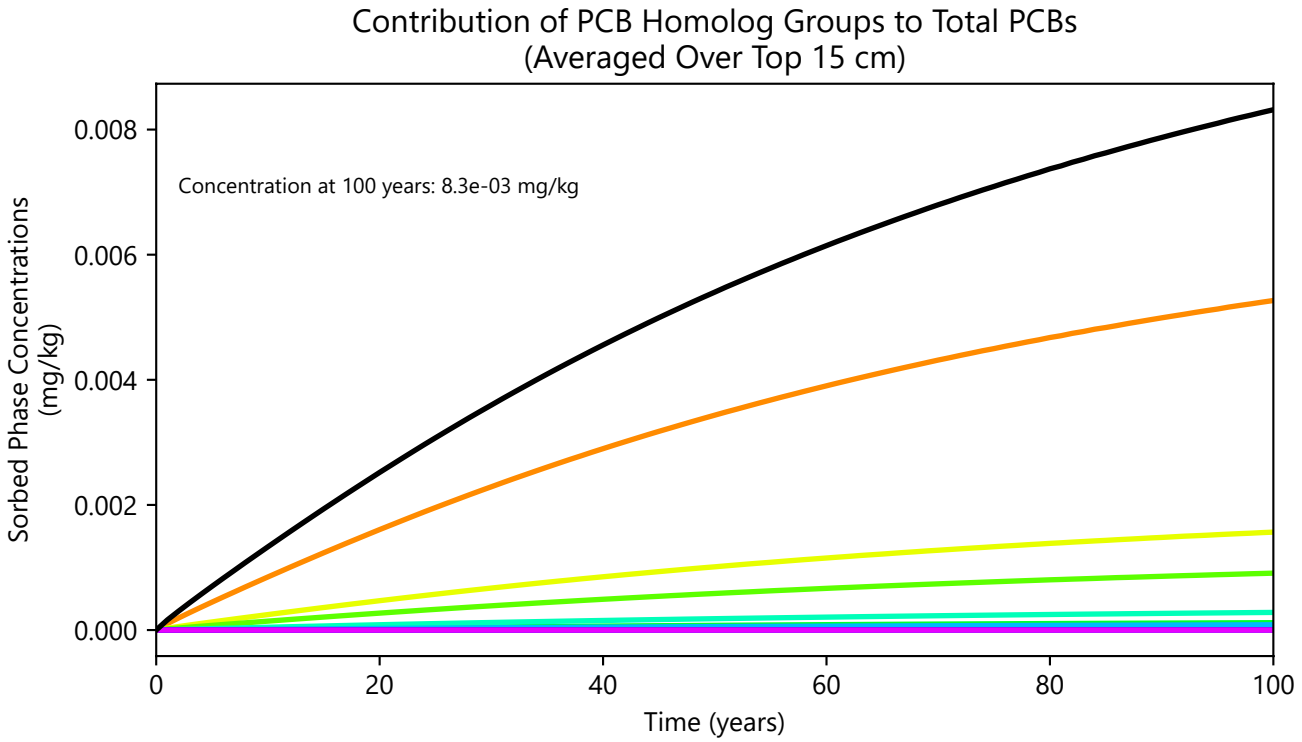
ANCHOR QEA

Figure 3-12d
DOC Partitioning Coefficient Sensitivity Analysis: Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-2 and BW5A-4 (Sand with 1% PAC)

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River





The dotted black line represents the performance standard.
Surface of the chemical isolation layer is at a depth of 15.0 cm from the surface of the cap.
Bottom of the chemical isolation layer is at a depth of 35.0 cm from the surface of the cap.
Chemical isolation layer contains 1.0% by weight PAC.

PCB-mono
PCB-di
PCB-tri
PCB-tetra
PCB-penta
PCB-hexa
PCB-hepta
PCB-octa
PCB-nona
PCB-deca
TPCB
Performance Standard

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ANCHOR QEA

Figure 3-12e
DOC Partitioning Coefficient Sensitivity Analysis: Model-Predicted PCB Flux and Concentration Compared to Performance Standards for BW5A-5 (Sand with 1% PAC)

Attachment 1
HEC-RAS Model Results and Stable Particle Size Calculation

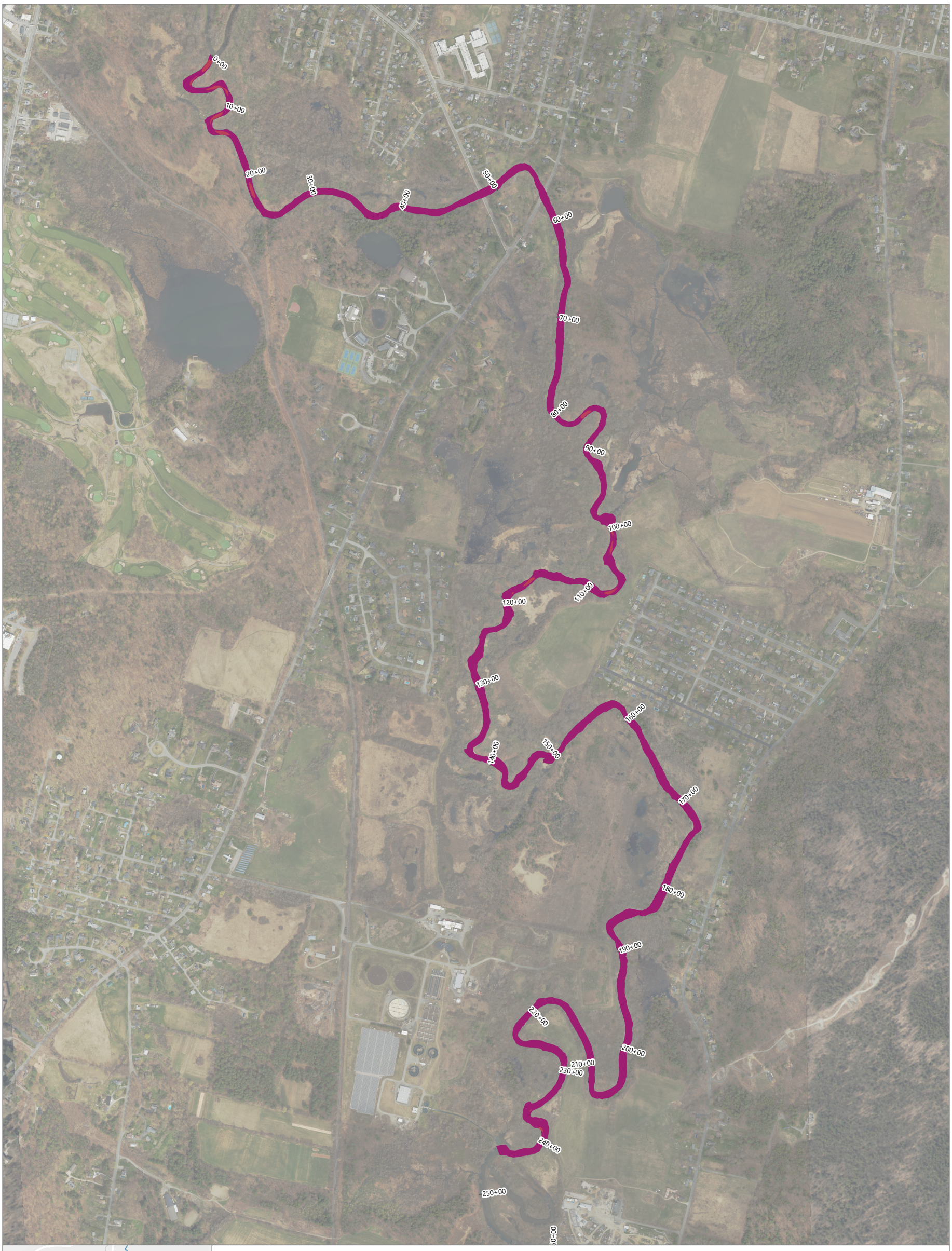

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Figure 1a
Calculated Stable Particle Sizing (D50) under 1-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

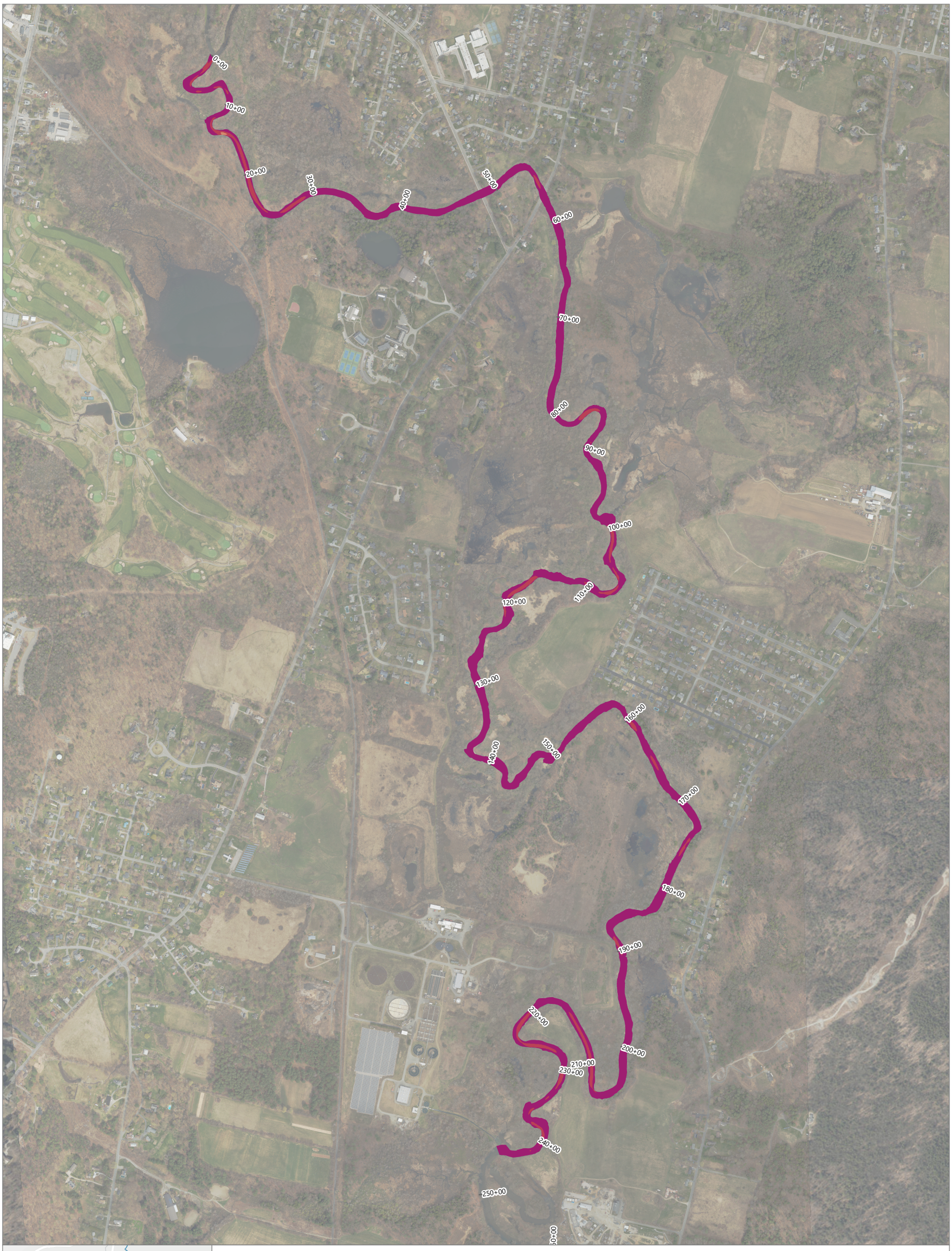

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Figure 1b
Calculated Stable Particle Sizing (D50) under Bankfull Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

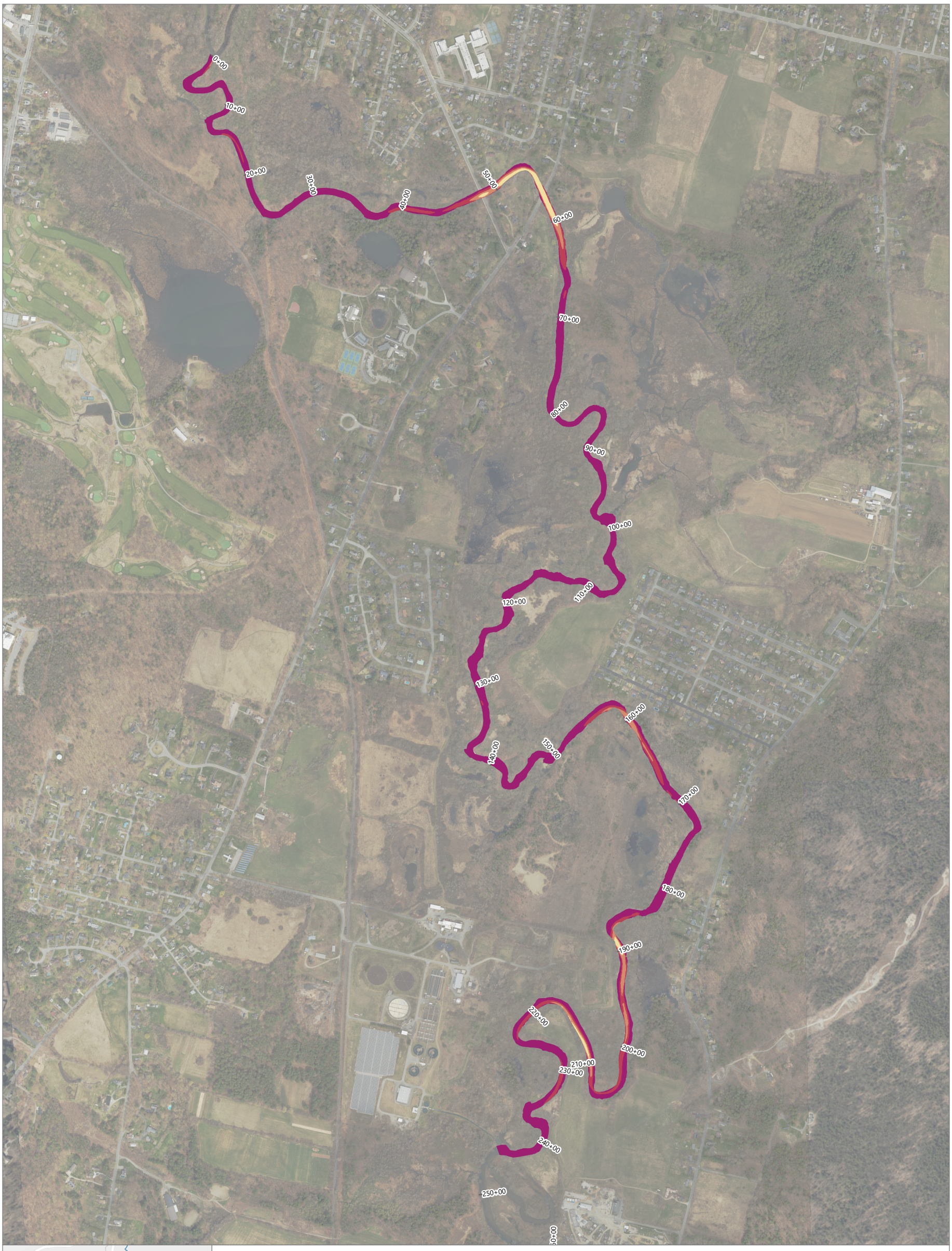

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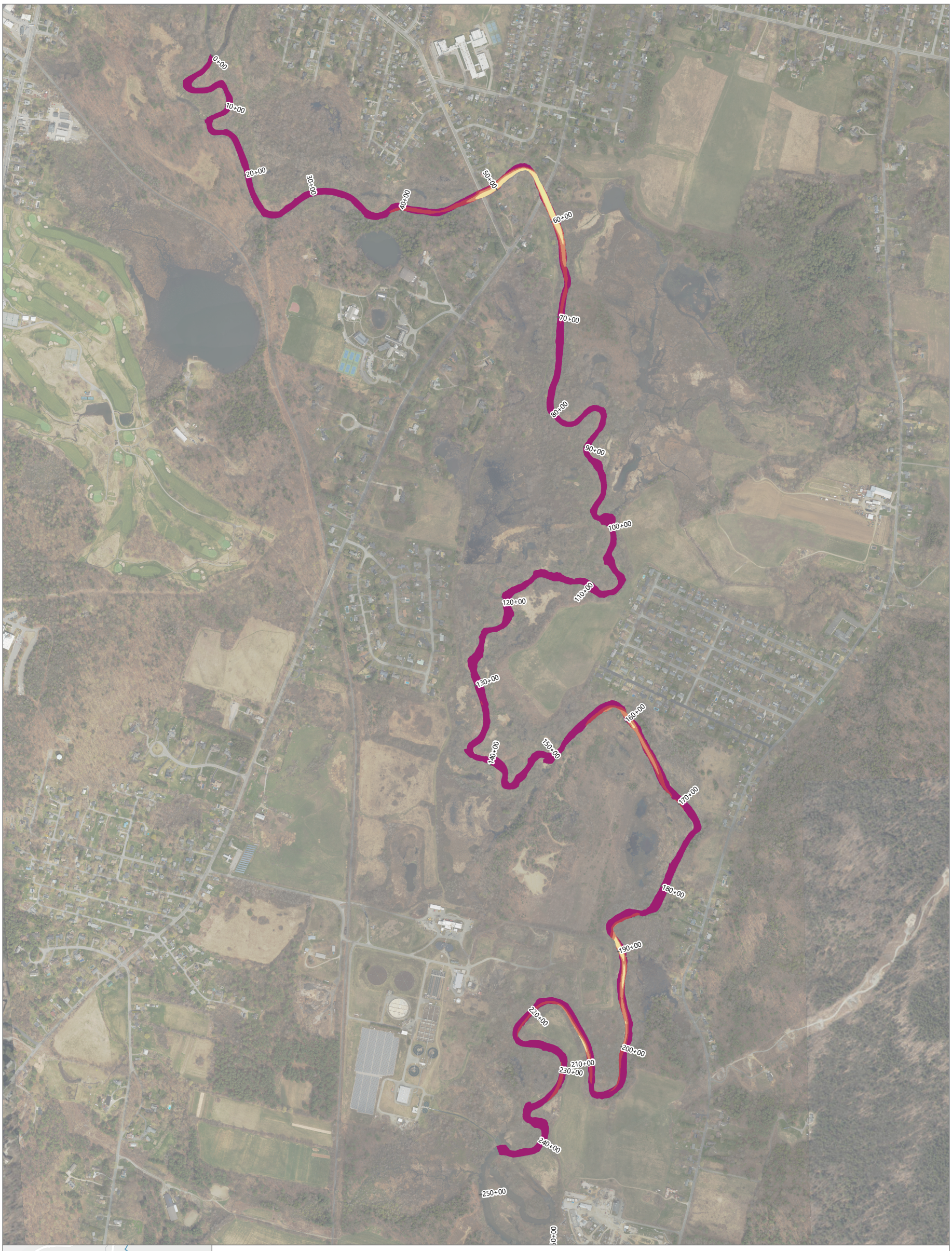
Figure 1c
Calculated Stable Particle Sizing (D50) under 5-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



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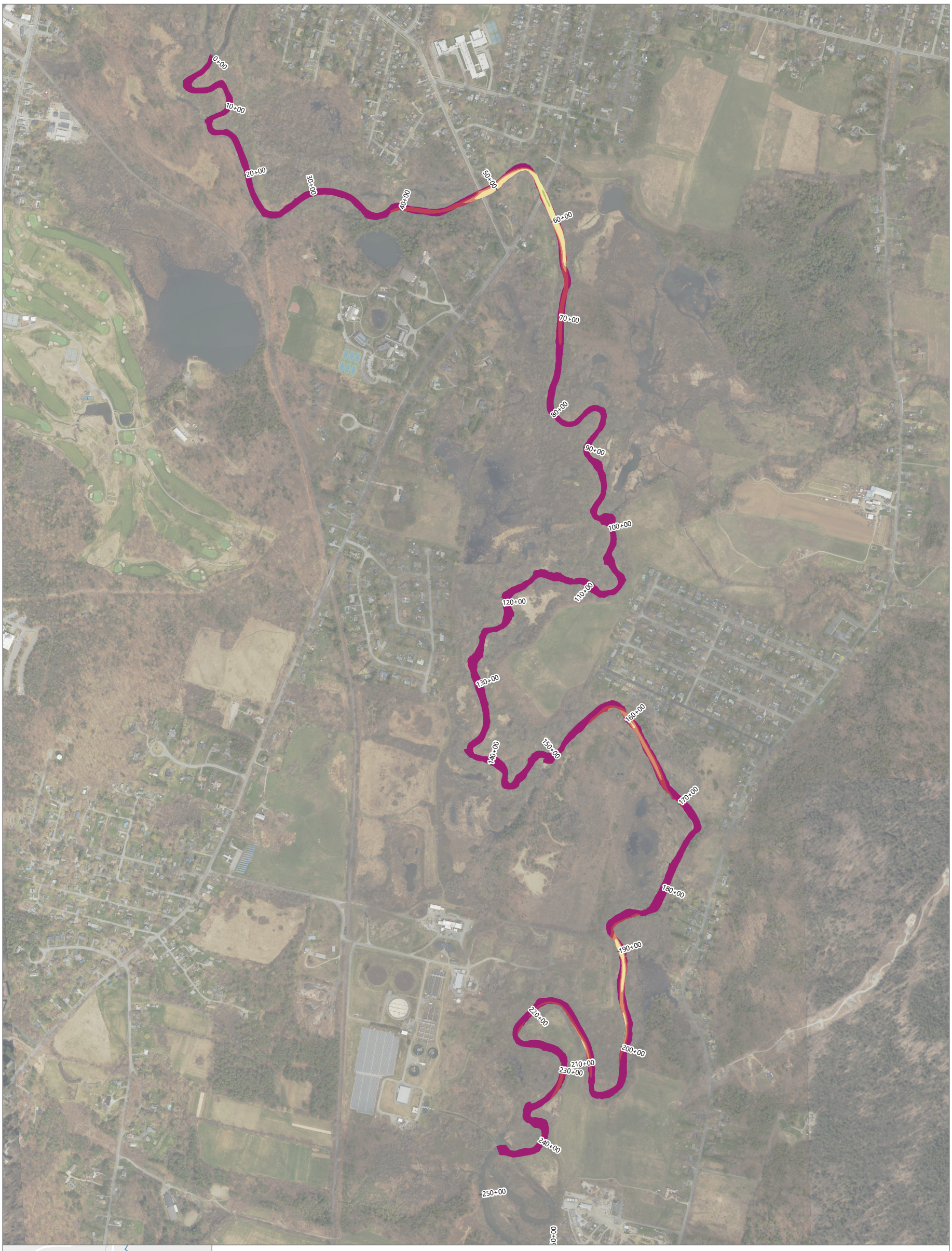
ANCHOR QEA

Figure 1d
Calculated Stable Particle Sizing (D50) under 10-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



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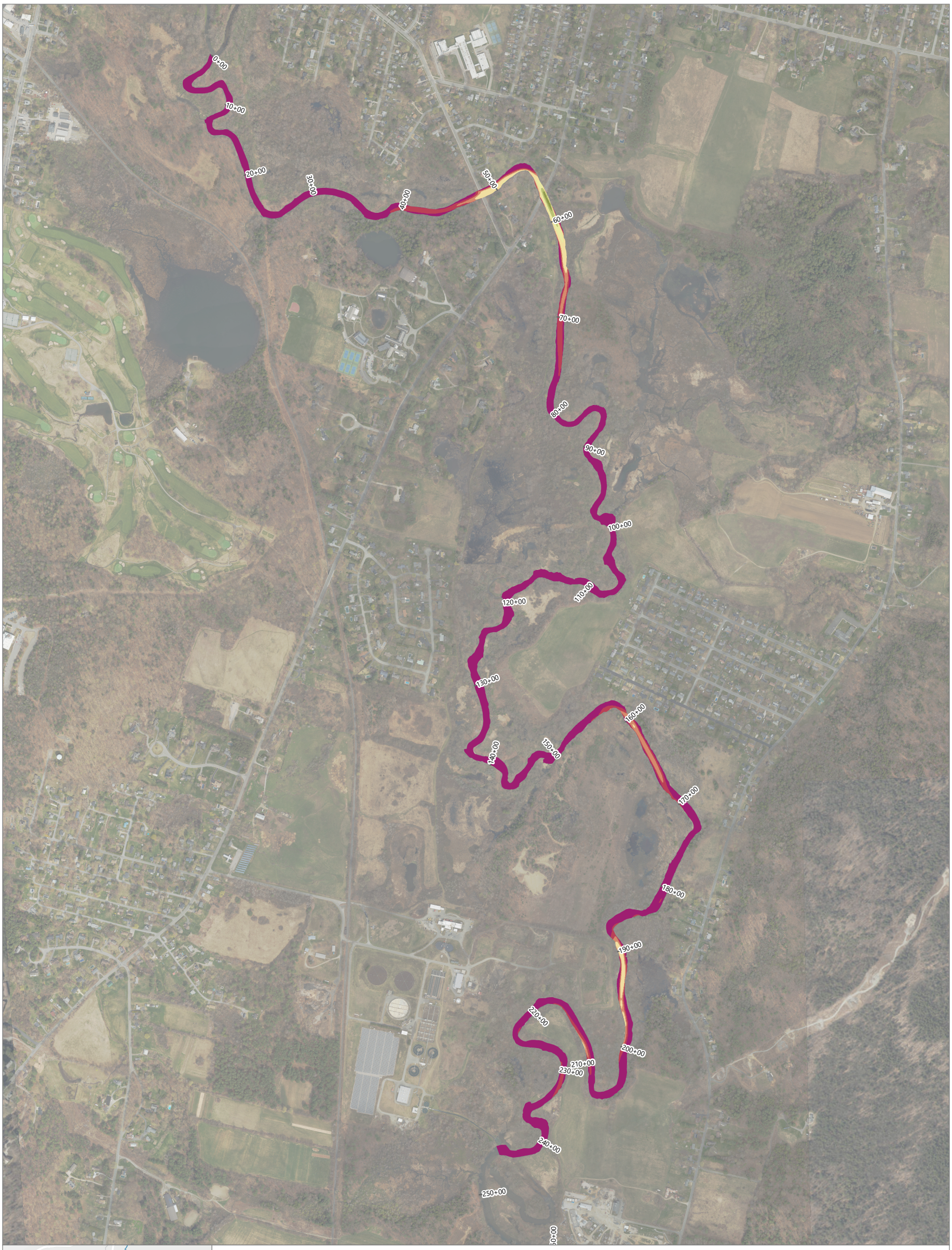
ANCHOR QEA

Figure 1e
Calculated Stable Particle Sizing (D50) under 25-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



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ANCHOR QEA

Figure 1f
Calculated Stable Particle Sizing (D50) under 50-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

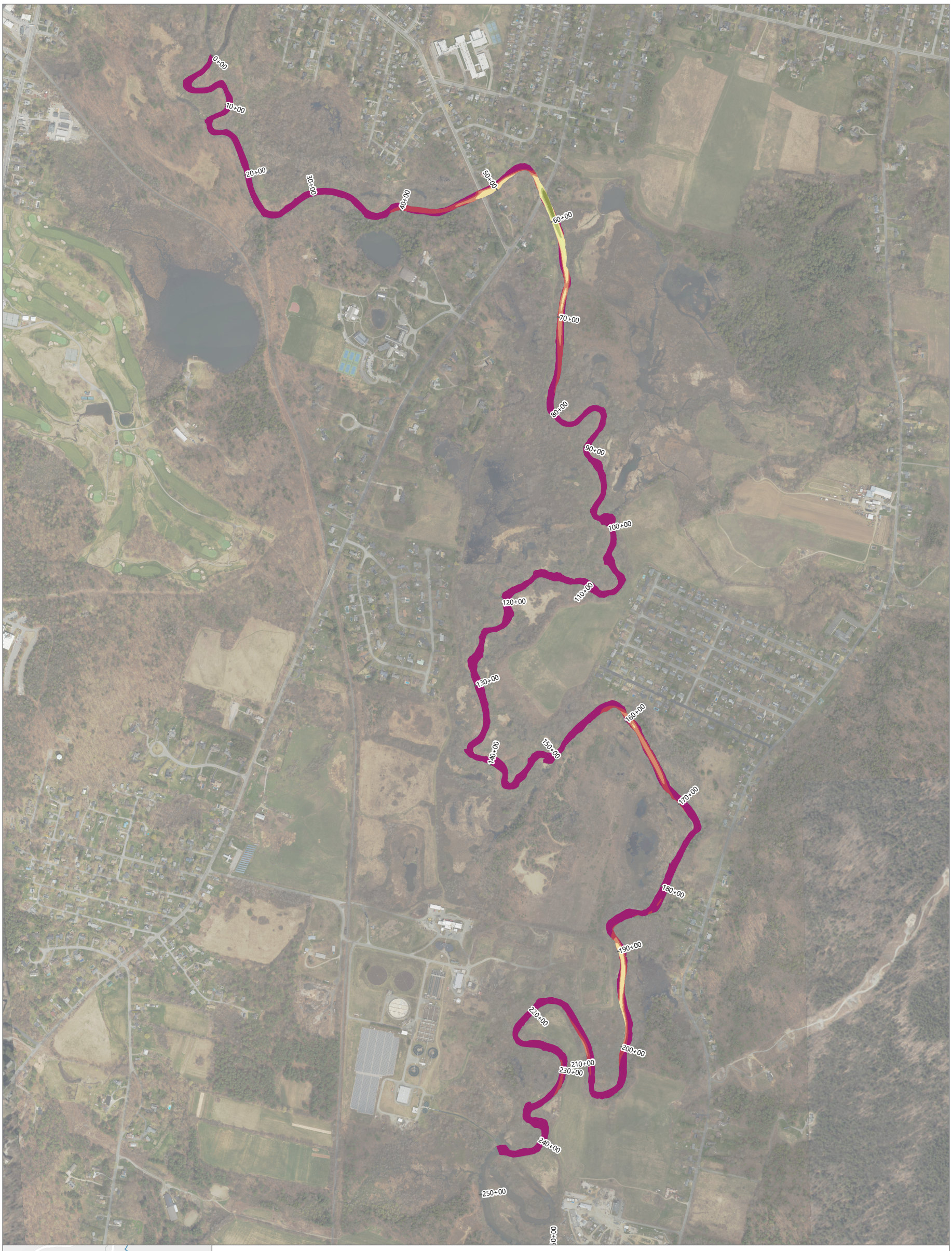

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Figure 1g
Calculated Stable Particle Sizing (D50) under100-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

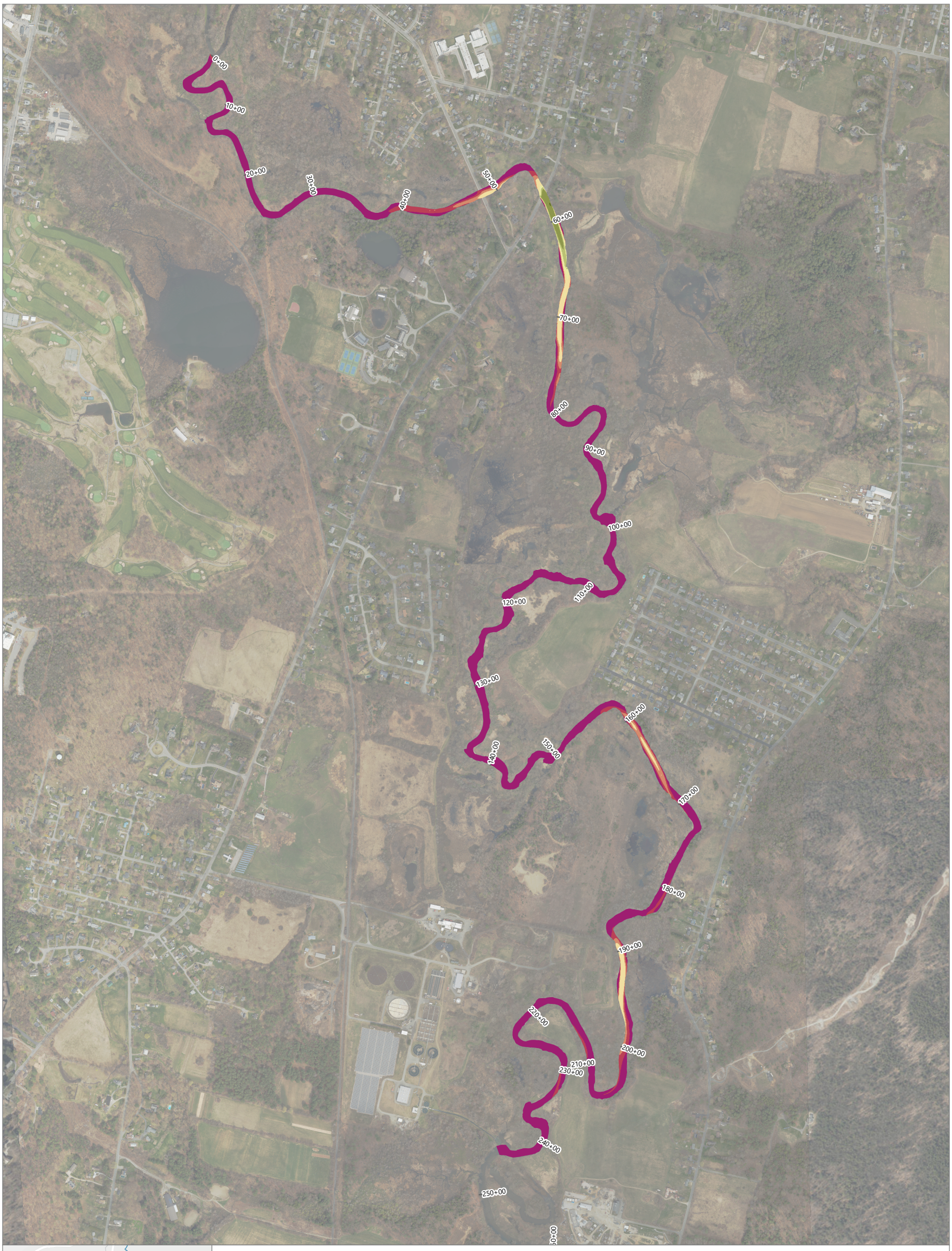

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Figure 1h
Calculated Stable Particle Sizing (D50) under Trend-Adjusted 100-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



LEGEND:

HEC-RAS Model Calculated Velocities under 1-Year Return Flow

ft/s

- 0-1
- 1-2
- 2-5
- 5-10
- >10

NOTE:

1. Aerial imagery collected by Bluesky Geospatial, June 2025, and MassGIS 2023
2. Downstream of Station 48+00, the HEC-RAS model uses a preliminary post-restoration terrain that may be subject to revision as the final design progresses for these areas.

0 1,000

Feet

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Figure 2a

HEC-RAS Model Calculated Velocities under 1-Year Return Flow

Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



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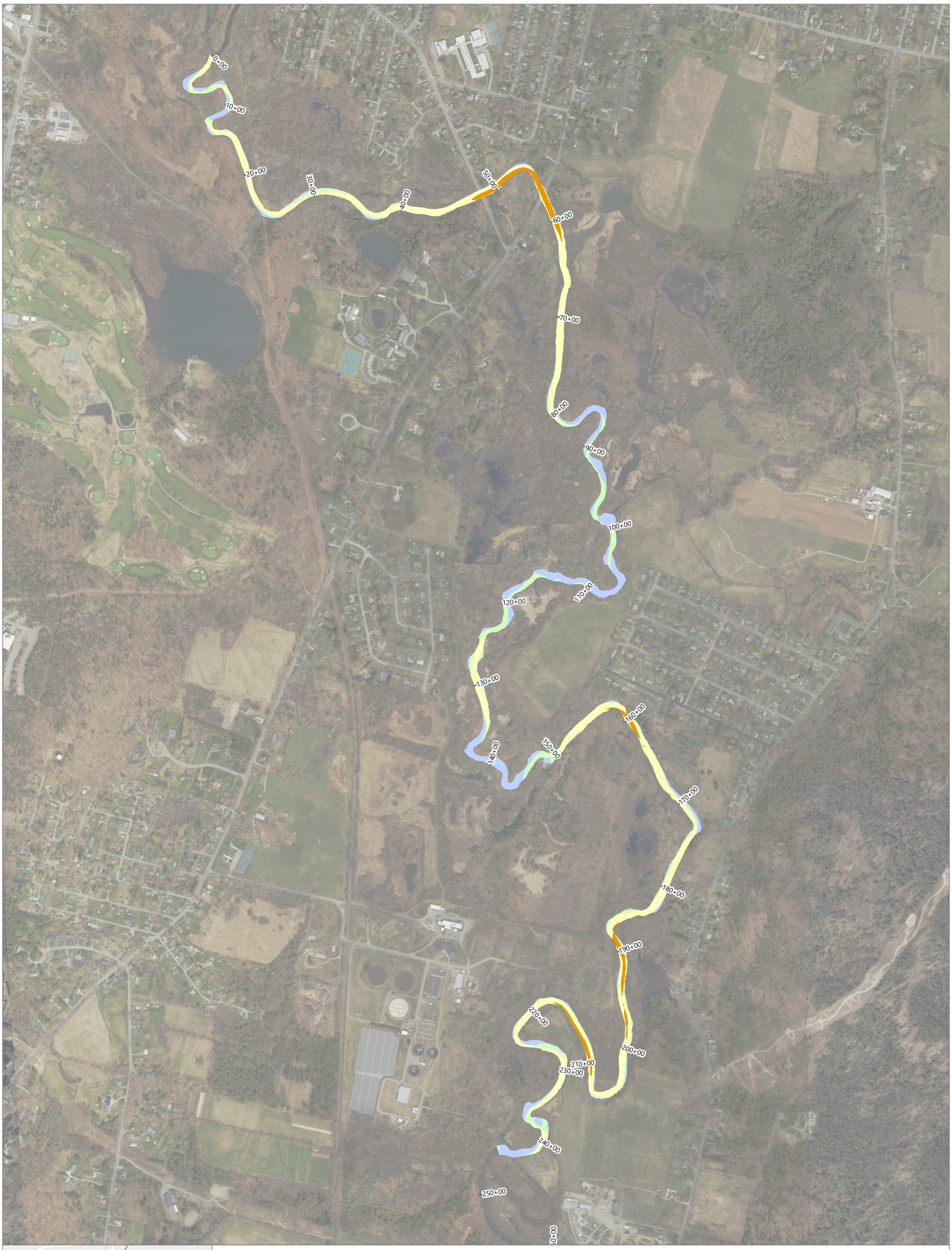
Figure 2b
HEC-RAS Model Calculated Velocities under Bankfull Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



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ANCHOR QEA

Figure 2c
HEC-RAS Model Calculated Velocities under 5-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

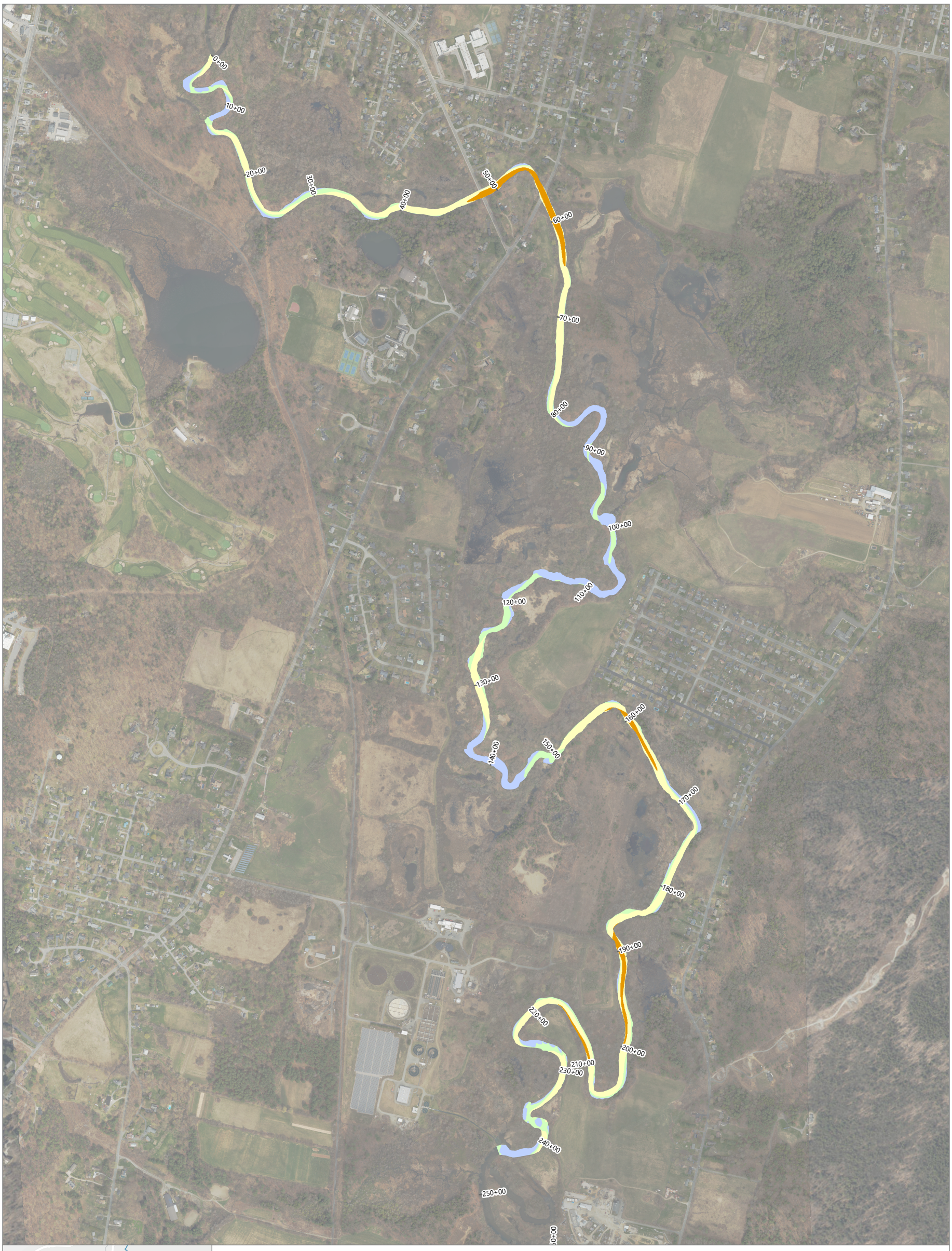

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Figure 2d
HEC-RAS Model Calculated Velocities under 10-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

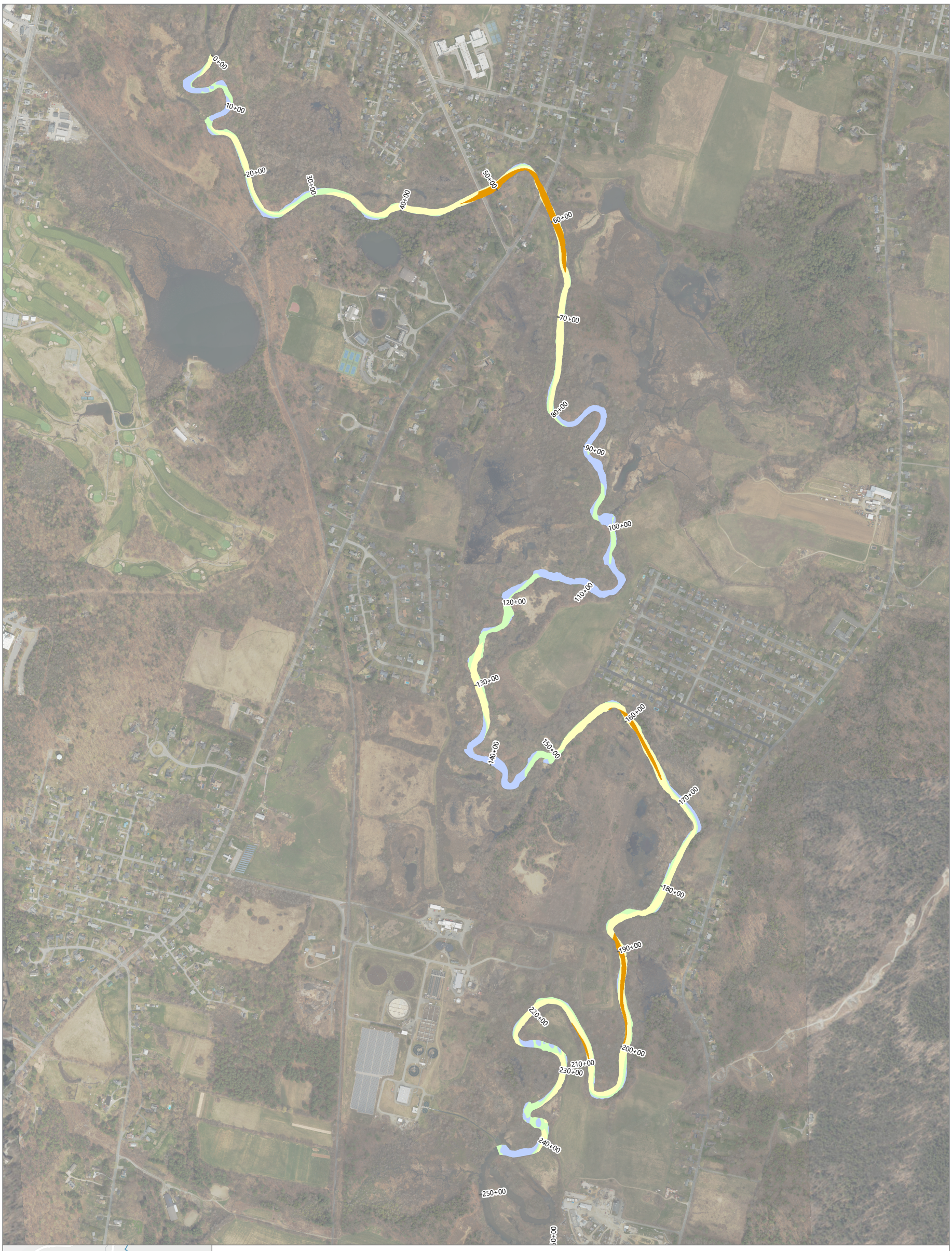

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Figure 2e
HEC-RAS Model Calculated Velocities under 25-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

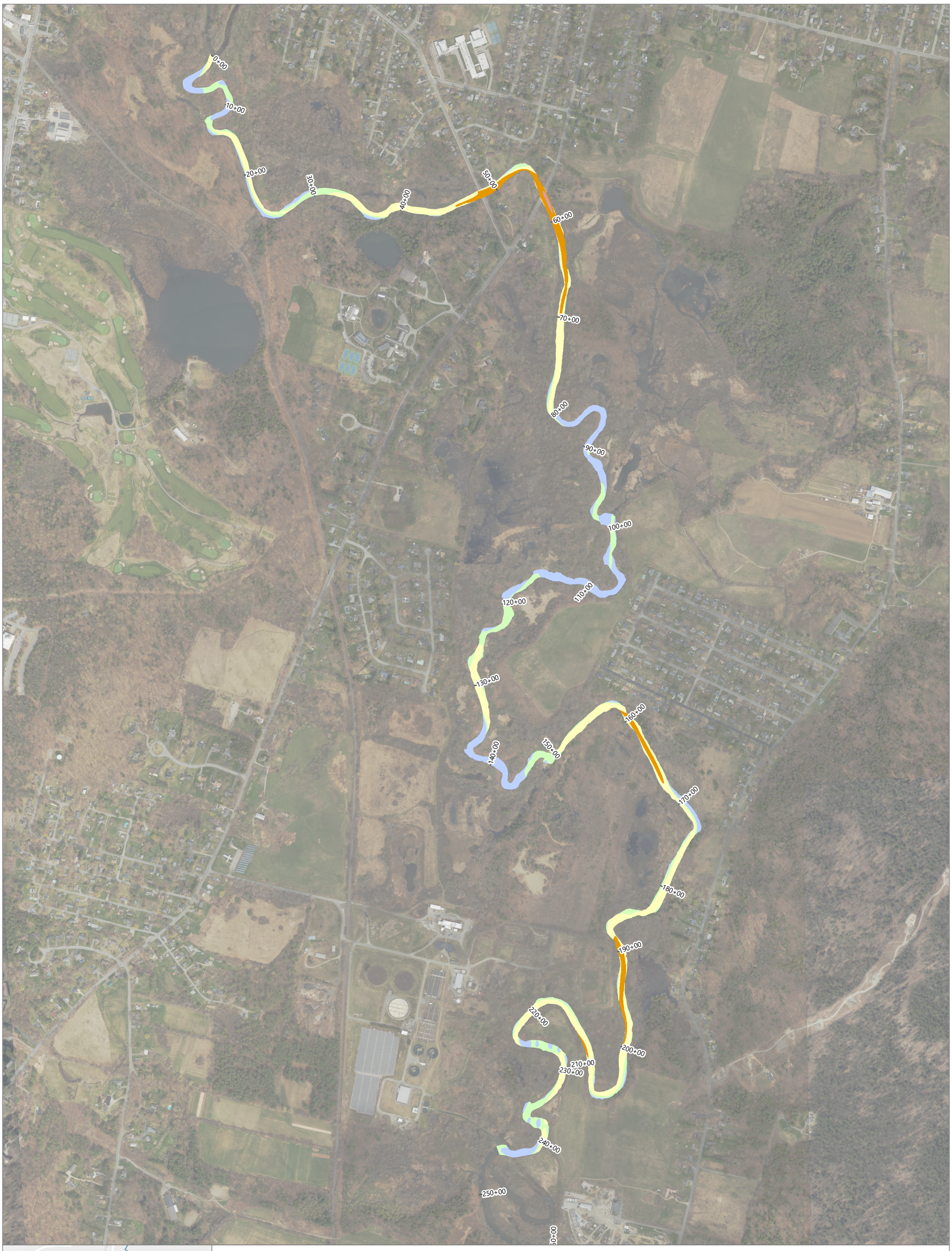

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Figure 2f
HEC-RAS Model Calculated Velocities under 50-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

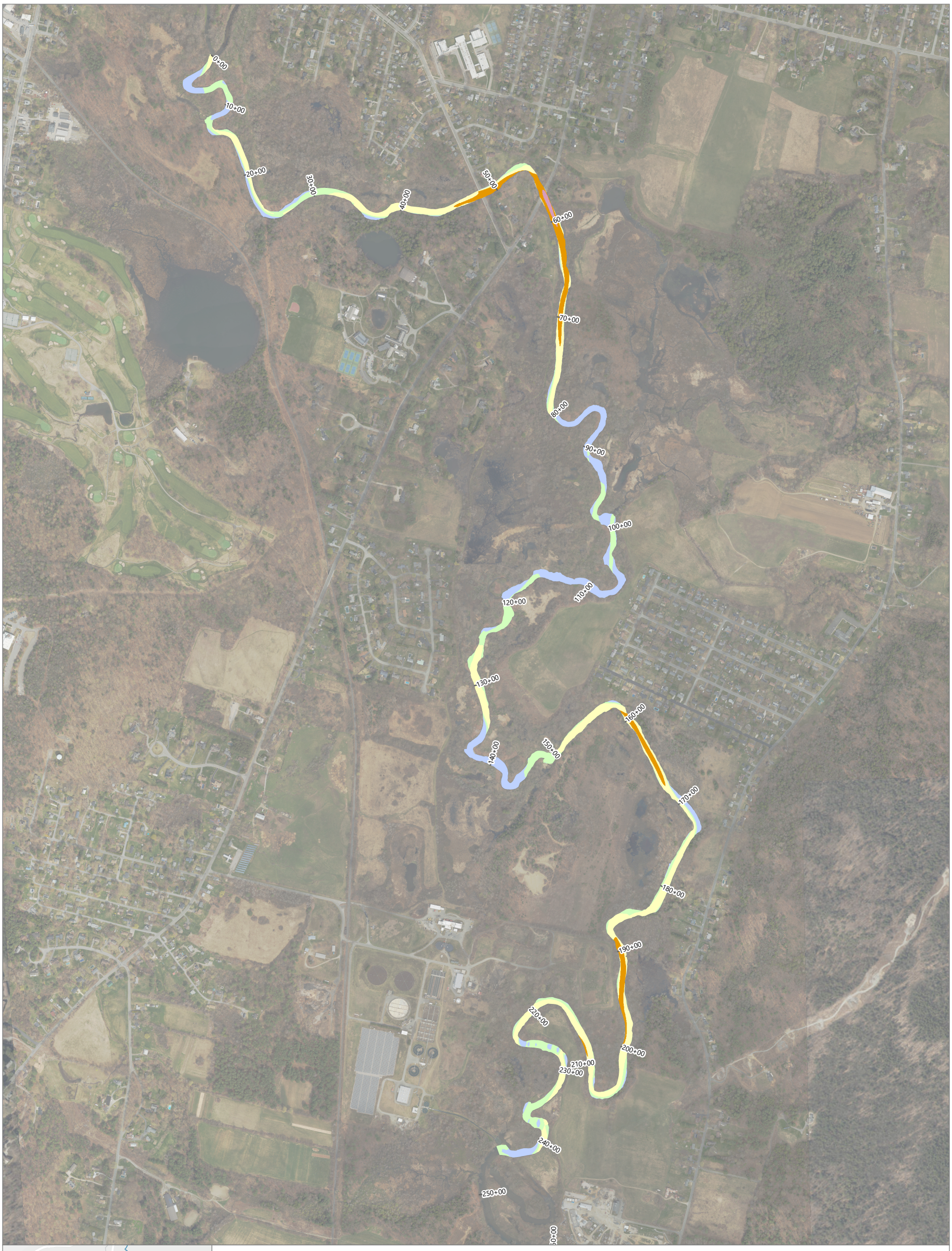

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Figure 2g
HEC-RAS Model Calculated Velocities under 100-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

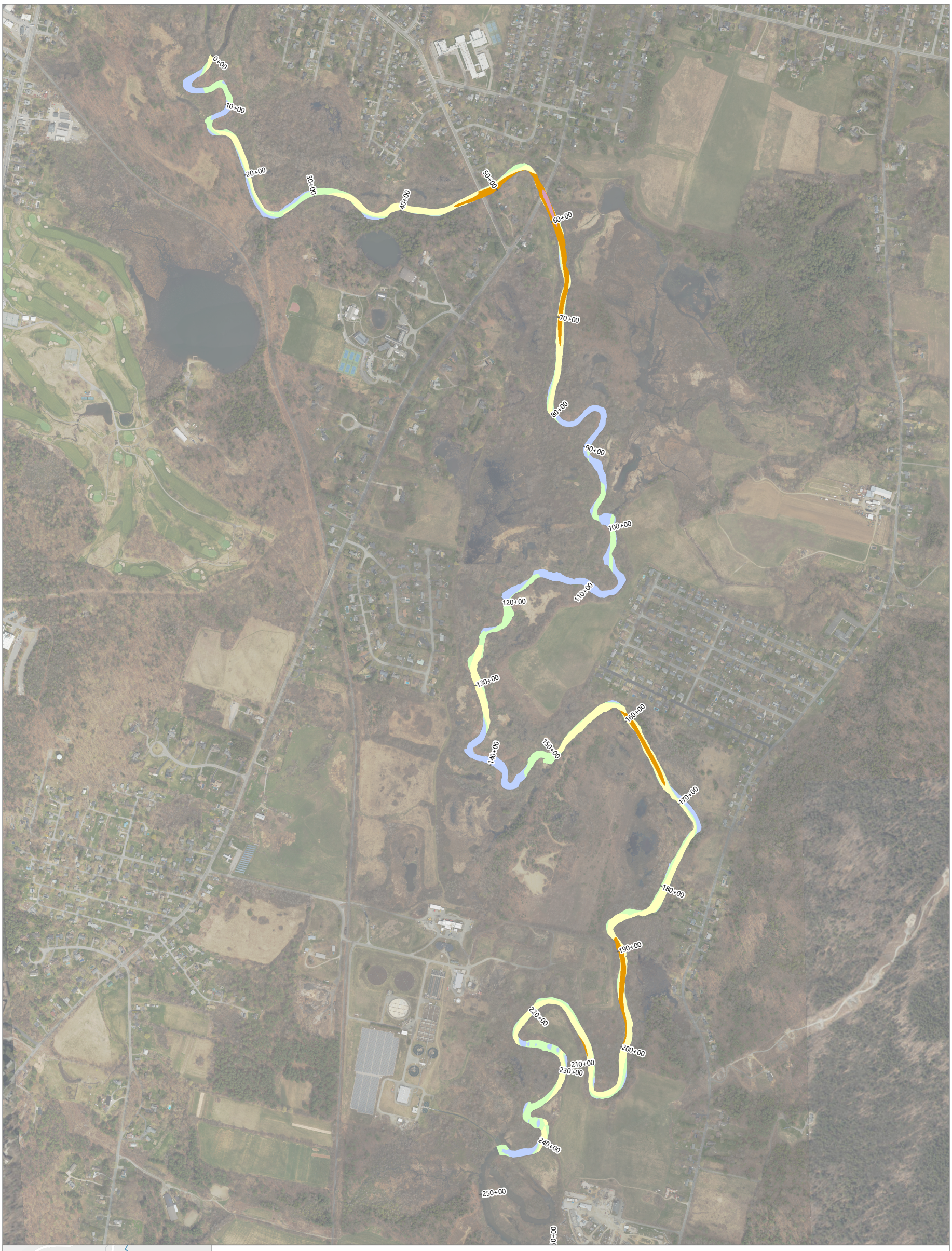

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Figure 2h
HEC-RAS Model Calculated Velocities under Trend-Adjusted 100-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



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Figure 3a
HEC-RAS Model Calculated Water Depths under 1-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

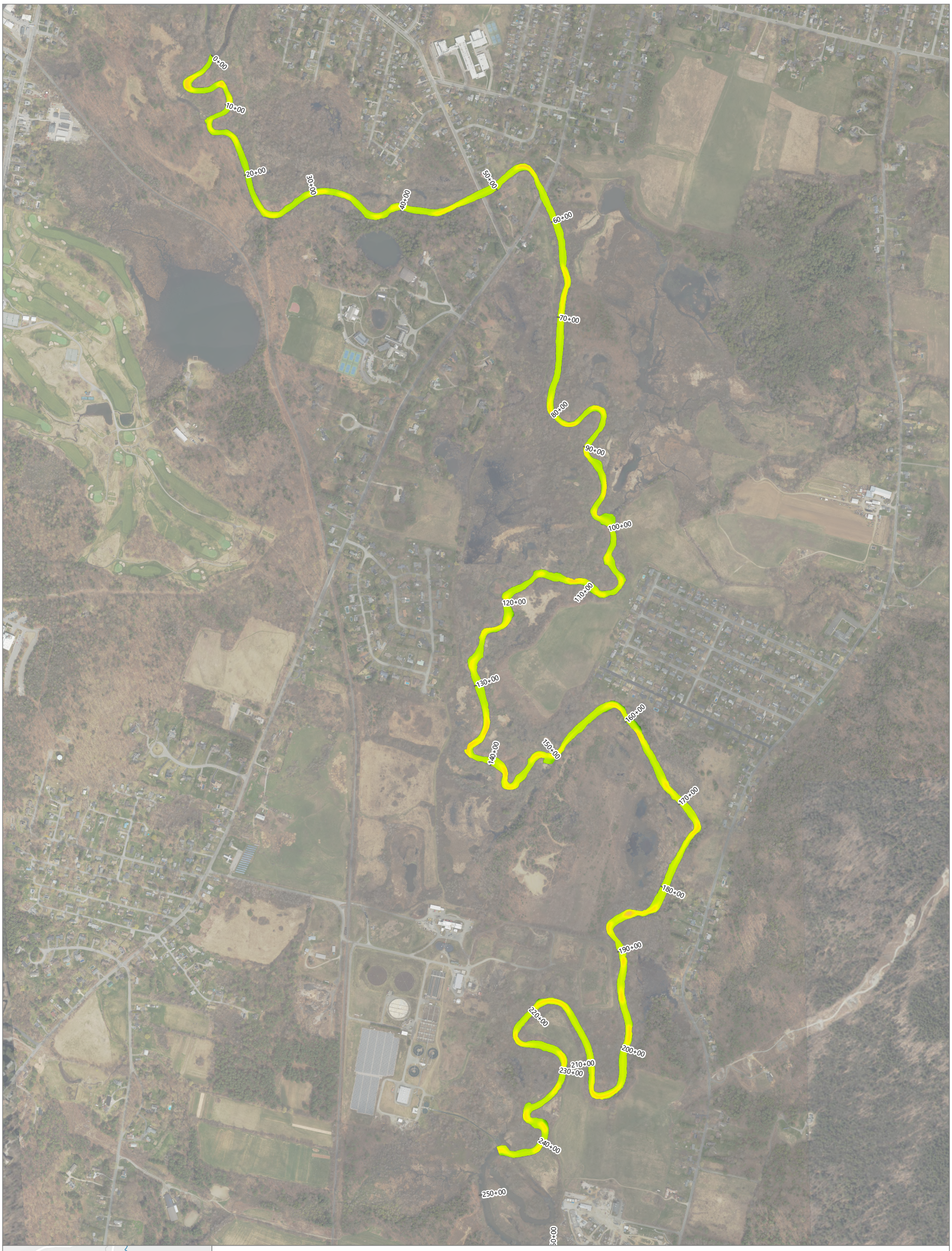

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Figure 3b
HEC-RAS Model Calculated Water Depths under Bankfull Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

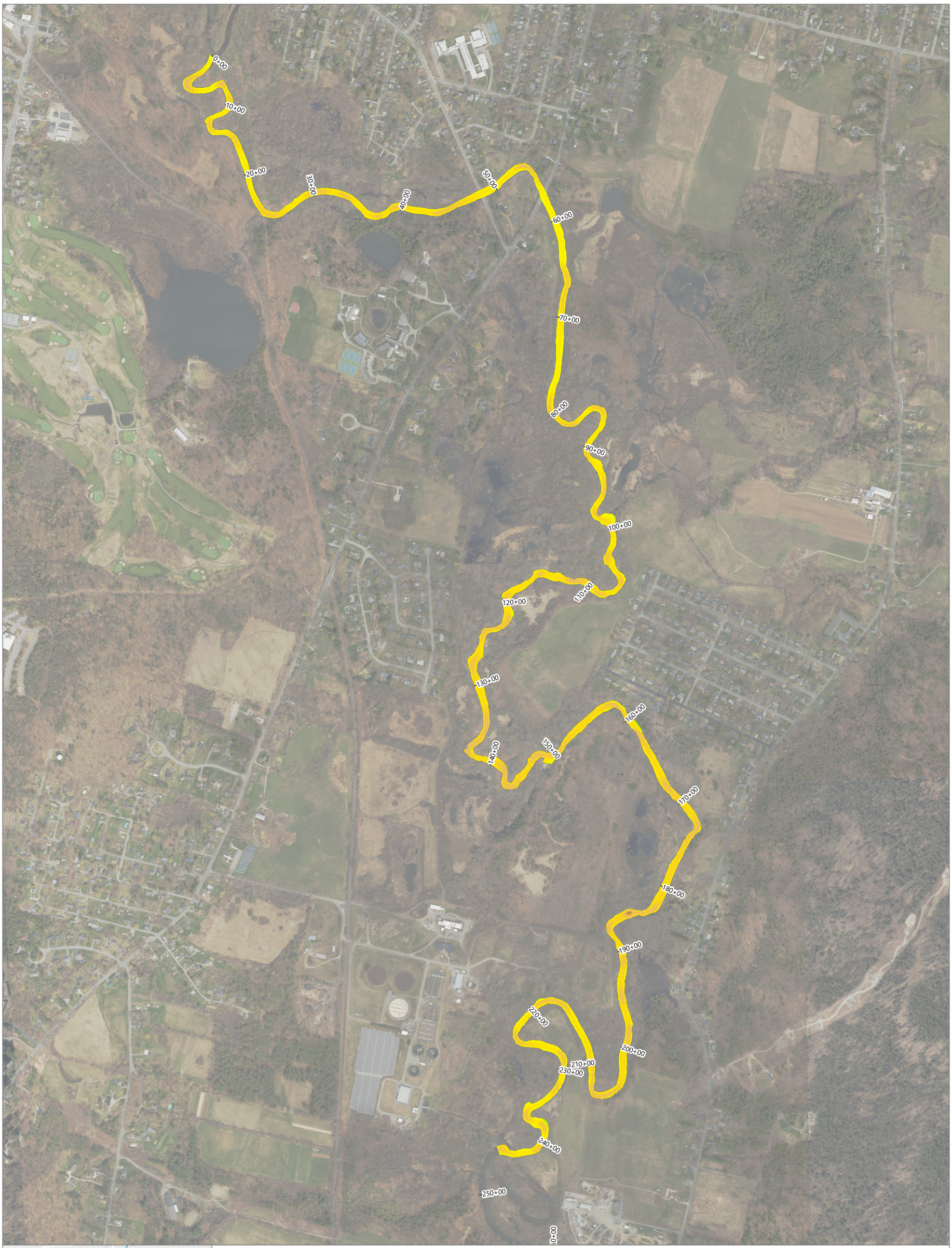

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Figure 3c
HEC-RAS Model Calculated Water Depths under 5-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

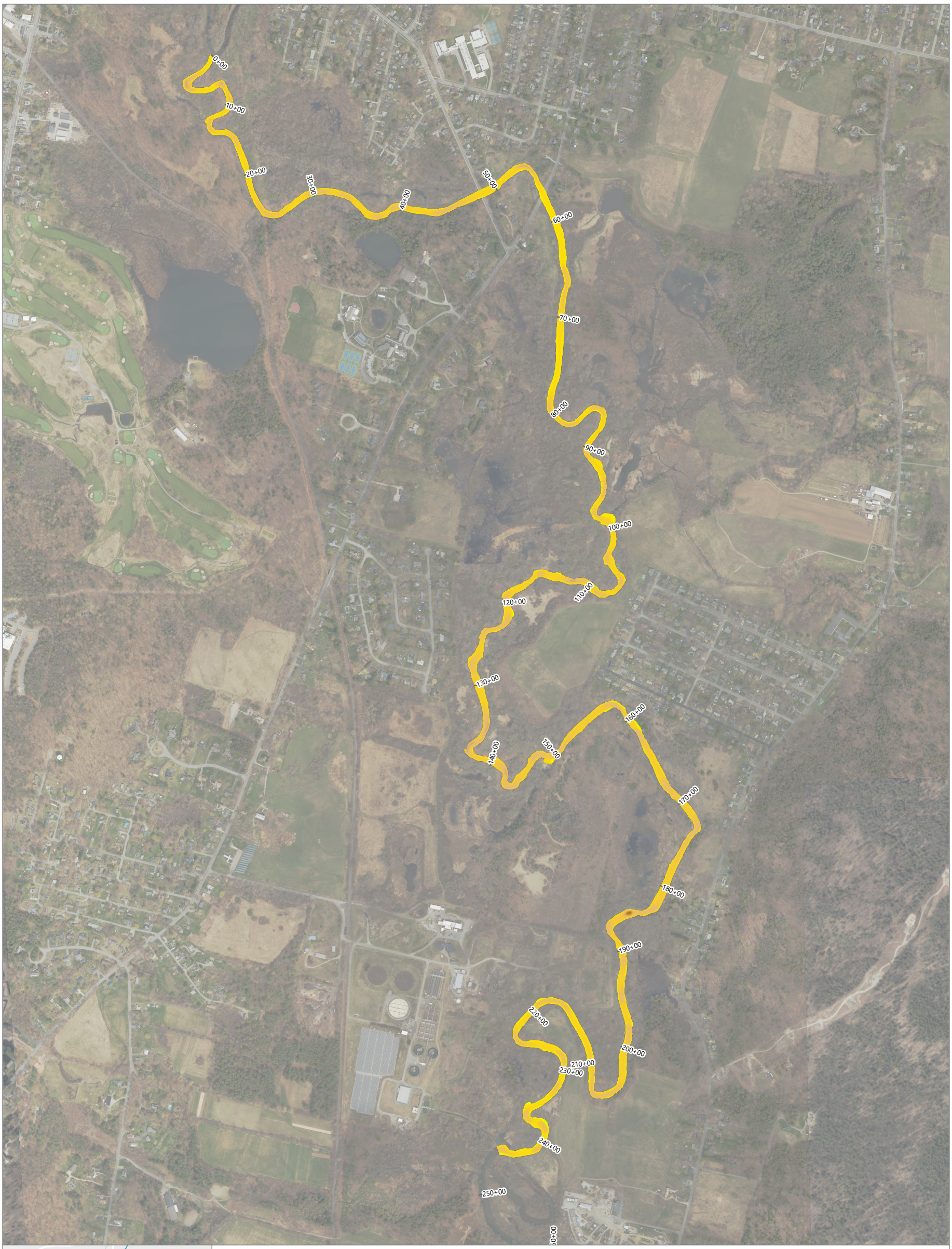

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Figure 3d
HEC-RAS Model Calculated Water Depths under 10-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

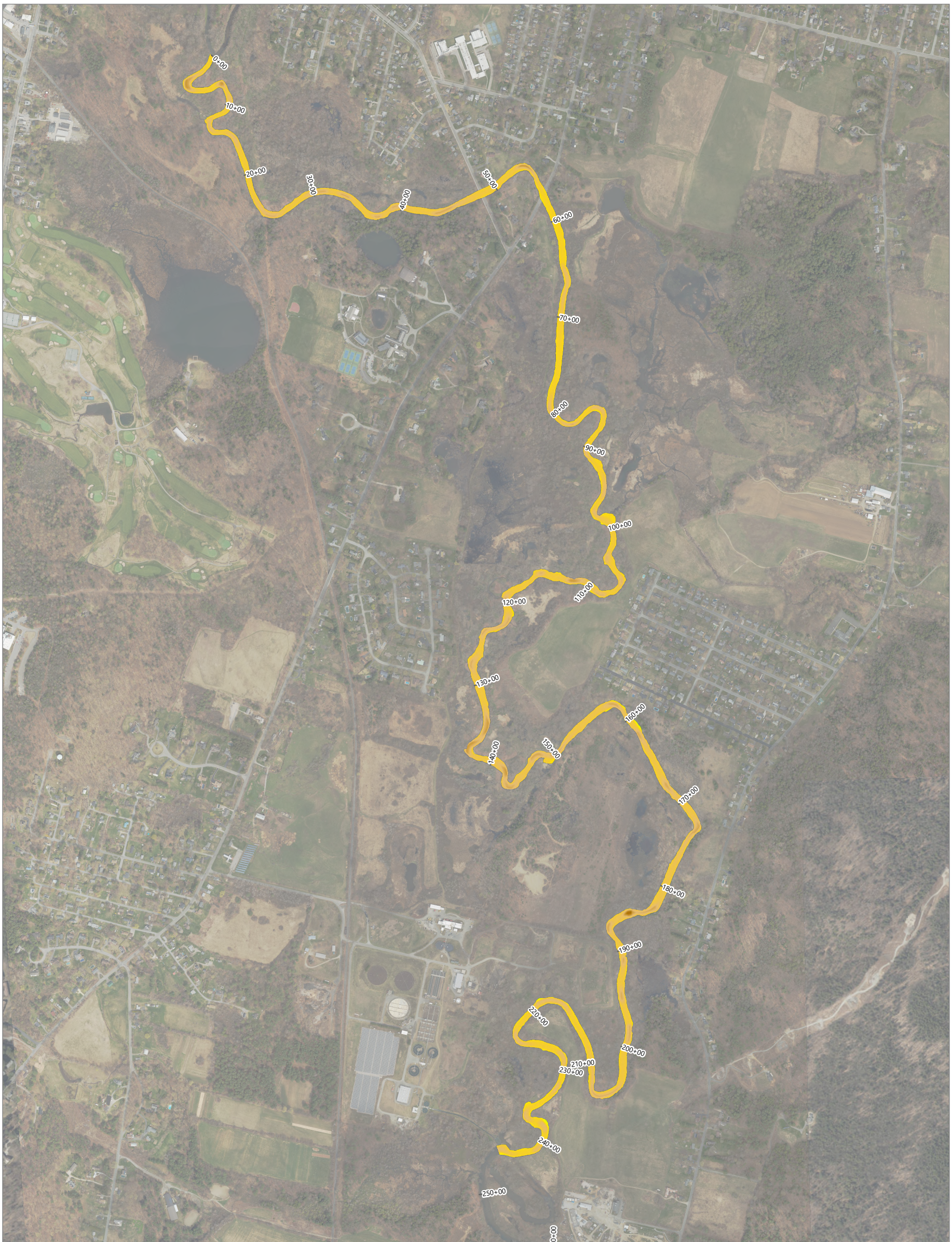

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Figure 3e
HEC-RAS Model Calculated Water Depths under 25-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



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Figure 3f
HEC-RAS Model Calculated Water Depths under 50-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



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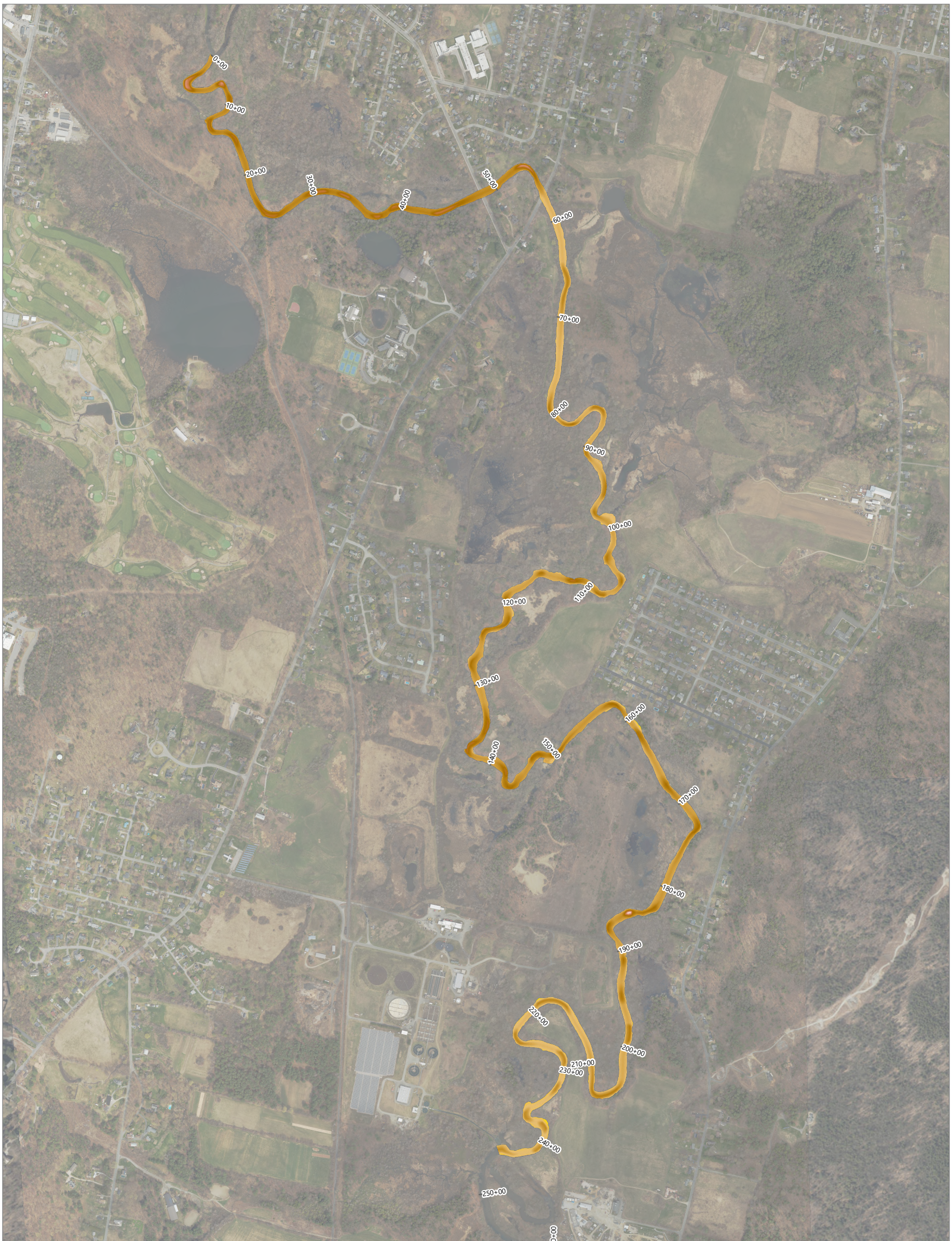
Figure 3g
HEC-RAS Model Calculated Water Depths under 100-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River



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ANCHOR QEA

Figure 3h
HEC-RAS Model Calculated Water Depths under Trend-Adjusted 100-Year Return Flow
Engineered Cap Modeling and Design Evaluations
Housatonic River - Rest of River

Attachment 2
Groundwater Seepage Rates

Groundwater Seepage Rates

1 Introduction

This document describes data collection and evaluation to estimate groundwater seepage rates within Reach 5A. Seepage rates were estimated by measuring the vertical hydraulic gradient and vertical hydraulic conductivity within the top several feet of sediment. The product of these two parameters is the groundwater seepage rate expressed as a Darcy flux, with units of length per unit time. Also, seepage meters were used to measure seepage rates for periods of up to four days at four locations.

Vertical hydraulic gradient data were measured using pairs of piezometers installed at 10 locations along Reach 5A. Each pair included a shallow piezometer screened across the mudline and a deep piezometer screened several feet below the mudline. Hydraulic head data were recorded using pressure transducers for approximately 10 to 11 months. These long temporal datasets capture short-term and seasonal fluctuations and, therefore, are useful for calculating long-term average vertical hydraulic gradients covering a wide range of temporal conditions. Vertical hydraulic conductivity data were measured using sediment core samples via a gravity drainage test procedure.

The resulting seepage rate estimates were used to support the cap modeling described in the document titled *Engineered Cap Modeling and Design Evaluations* (an Appendix H to the *Final Remedial Design/Remedial Action Work Plan for Reach 5A*) to which this document is Attachment 2.

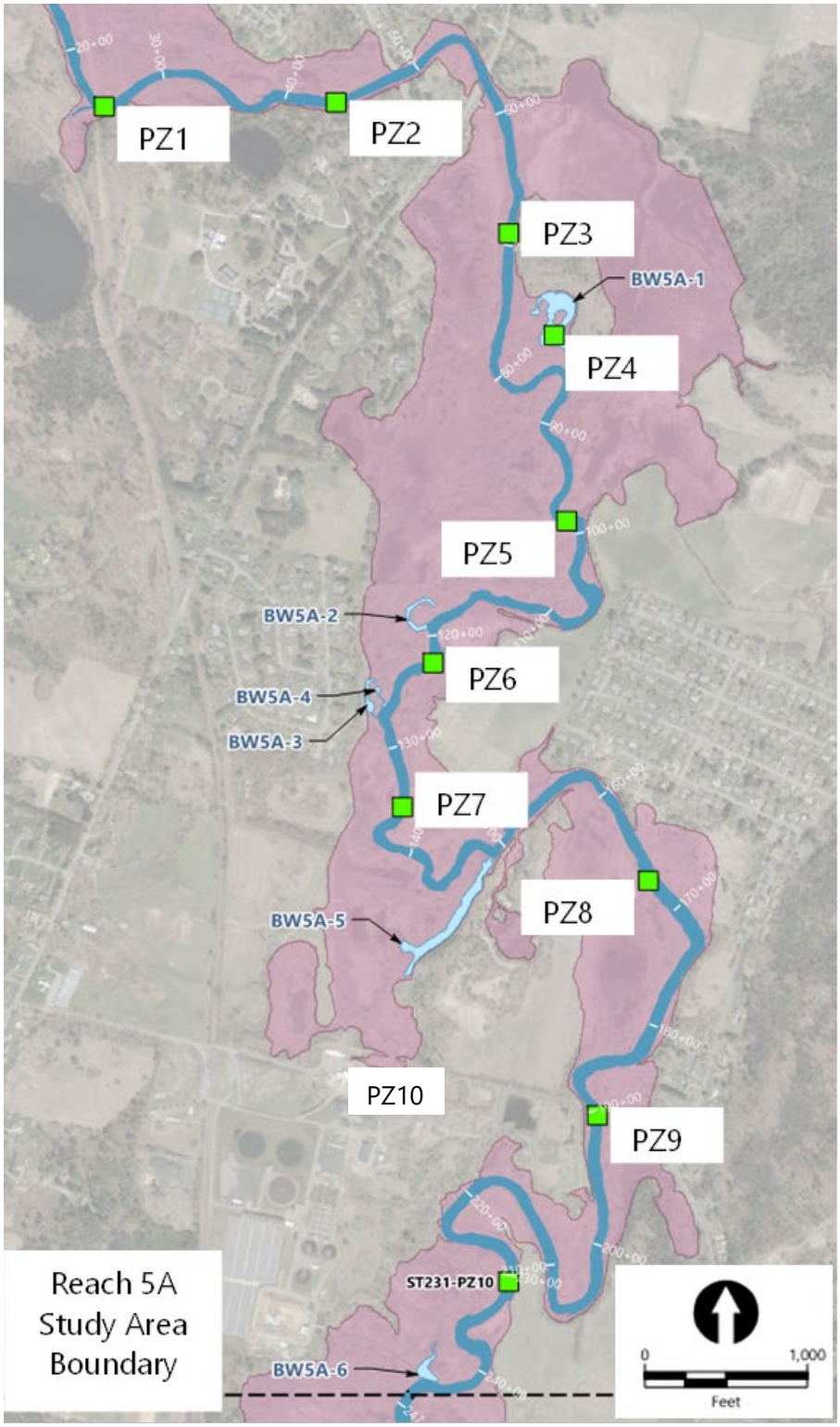
The remainder of this attachment discusses seepage data collection and evaluation processes.

2 Vertical Hydraulic Gradient

2.1 Vertical Hydraulic Gradient Data Collection

Piezometer pairs were installed at 10 locations within Reach 5A to measure vertical hydraulic gradients in sediment beneath the river (see Figure 1).

Figure 1
Piezometer Pair Locations in Reach 5A



An initial deployment of piezometers occurred in September 2022, recording data nearly continuously until approximately July 2025. Due to unanticipated issues with the deployed field equipment, data collected between September 2022 and approximately August 2024 were not included in the final dataset.[1] The final dataset presented in this document was collected during the last deployment period from approximately August 2024 to July 2025, which did not experience the equipment issues identified in the earlier deployment periods.

Each piezometer pair was constructed using two-inch (inner diameter) Schedule 40 PVC materials and included one "shallow" piezometer and one "deep" piezometer. Pressure transducers were placed in the piezometers, and the piezometers were tightly capped to measure hydraulic heads beneath the river. Shallow piezometers were installed with one-foot-long screens vertically centered approximately 0.1 foot below the sediment surface, and the deep piezometers were installed with one-foot-long screens vertically centered approximately 5.5 feet below the sediment surface. The shallow piezometer screen intervals extend above the sediment surface and record the hydraulic head of the river at sediment surface. Each deep piezometer had a 0.010-inch slotted screen at the bottom, and they were pushed to the target depth in the sediment. The top of each piezometer was cut approximately 0.5 to 1.5 feet above the mudline and capped with a water-tight, pressure-fit well cap; the cap was removed as required to perform transducer calibration and retrieve the transducer for data downloading.

Self-contained pressure transducers with internal dataloggers were programmed to record pressure data every five minutes; each transducer was connected to a tether and lowered to the bottom of the piezometer. The tether length allowed the transducer to rest on the bottom of each piezometer so the transducer's vertical position remained consistent during data collection.

Data were downloaded from the transducers by field staff in accordance with the Standard Operating Procedure (SOP) for Vertical Hydraulic Gradient and Hydraulic Conductivity Data Collection in Sediment, which is Appendix K to GE's 2023 *Field Sampling Plan/Quality Assurance Project Plan* (Arcadis 2023). Transducers were deployed between August 21 and August 30, 2024, and recorded until transducer data were downloaded between June 23, 2025, and August 28, 2025.[2]

During the transducer deployment period, each piezometer was tightly capped, allowing the transducers to record the pressure surrounding the piezometer screen. However, the piezometer caps were removed for transducer data collection and calibration. The data measured during each

[1] Equipment issues included losses of one or two piezometer risers, inconsistencies during calibration periods that caused discontinuities in the datasets between deployments, and transducers that malfunctioned and failed to collect a complete record of pressures.

[2] Transducer data were also collected from September 2022 to August 2024 but were not used in subsequent analysis due to equipment issues, as previously described.

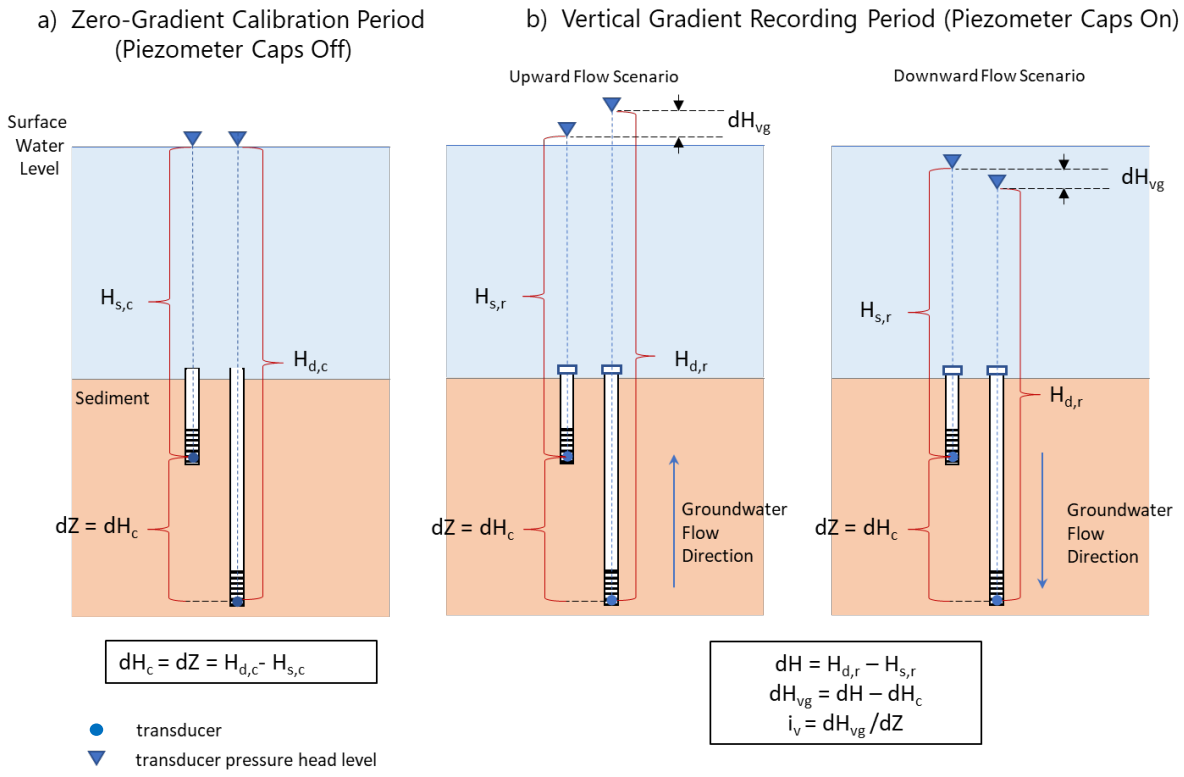
vertical hydraulic gradient (i_v) recording period and calibration period were used to calculate the i_v within the sediment. Calculations and results are discussed further in the next section.

2.2 Vertical Hydraulic Gradient Calculation

Figure 2 illustrates conditions during the "zero-gradient" calibration period and the i_v data-recording period. During the "zero-gradient" calibration period (Figure 2, left diagram), the piezometer caps were removed for a minimum of one hour, with each transducer at the bottom of the piezometer. During this period, the inside of each piezometer was directly connected to the river so the pressure values recorded by the shallow transducer ($H_{s,c}$) and deep transducer ($H_{d,c}$) simply indicate the depth of each transducer below the river surface. The average hydraulic head difference during this period (dH_c) is used in calculating i_v and represents the vertical separation distance between the shallow and deep piezometer screens (dZ).

During the i_v data-recording period, the piezometers were tightly capped. The pressures recorded by the shallow transducer ($H_{s,r}$) and the deep transducer ($H_{d,r}$) under this condition represent the hydraulic head in the sediment surrounding each piezometer screen. In the case of upward porewater flow, the hydraulic heads in the sediment increase with increasing depth below the river and are greater than the head of the river (Figure 2, middle diagram). In the case of downward flow, the converse occurs (Figure 2, right diagram). The total hydraulic head difference between the transducers during this period was dH. By subtracting dH_c from dH, the gradient-induced head difference (dH_{vg}) can be calculated, which is caused by the vertical component of the hydraulic gradient associated with seepage to or from the river.

Figure 2
Schematic of Piezometer Pairs During Calibration and Vertical Gradient Recording Periods



Equation 1 was used to calculate the i_v for the routine data collection period. i_v values were calculated for each pair of transducer measurements, which were collected every five minutes at the shallow piezometer and the adjacent deep piezometer.

Equation 1

$$i_v = (dH - dH_c) / dZ$$

where:

i_v	=	vertical hydraulic gradient (calculated every five minutes) [dimensionless]
dH	=	head difference measured with piezometers tightly sealed (pressure recorded in deep piezometer minus pressure recorded in shallow piezometer, expressed as equivalent feet of water) [feet]
dH_c	=	calibrated "zero-gradient" head difference [feet]
dZ	=	vertical separation between piezometer screen midpoints [feet]

2.3 Vertical Hydraulic Gradient Results

Hydrographs presented in Annex A show the water level data and resulting i_v measured every five minutes throughout the routine data collection period at eight of the 10 data collection locations. Damage to the piezometers and issues with the transducers hindered data collection at locations PZ5 and PZ9; therefore, no hydrographs were prepared for those piezometer pairs. The hydrograph datasets include the following information:

- **Relative River Level Data:** The top panel in the hydrographs in Annex A shows the relative changes in river level during the transducer data collection period. These data are provided for reference and can be compared to the hydraulic heads recorded at the piezometers and the calculated hydraulic gradient values. The shallow piezometers were installed with screened intervals that extend into the water column of the river, which provides a direct hydraulic connection to the overlying surface water and provides the relative river level data shown in the figures. During the data collection period, the relative river level changes recorded at the shallow piezometers were similar to those recorded by the U.S. Geological Survey river gage at Coltsville.
- **Water Level Above Transducer:** The second panel on the hydrographs in Annex A summarizes the transducer pressures (or hydraulic heads) recorded during the gradient recording period, converted into an equivalent water level height above the transducer in each piezometer. These charts show that both transducers in each pair recorded similar pressure changes throughout the data-recording period, which confirms that they are hydraulically connected via the sediment column. Also, the general magnitudes of pressure changes measured at the piezometers closely matched those of the river.
- **Gradient-Induced Head Difference:** The third panel on the hydrographs in Annex A summarizes the gradient-induced head difference between the two piezometers, which is equivalent to the numerator of Equation 1.
- **Vertical Hydraulic Gradient:** The fourth panel on the hydrographs in Annex A summarizes the i_v, as calculated by Equation 1. The i_v values shown in the plots exclude recording periods during piezometer servicing and zero-gradient calibration periods, which do not accurately reflect ambient hydraulic gradient conditions. The results from each measurement period and the full dataset, excluding calibration periods, were arithmetically averaged to determine the average i_v values summarized in Table 1.

Table 1
Arithmetic Average Vertical Hydraulic Gradients for August 2024 to July 2025 Deployment

Piezometer	Average Vertical Hydraulic Gradient (i_v)[c]
PZ1 – ST25	+9.0E-03
PZ2 – ST43	+5.7E-03
PZ3 – ST69	+7.5E-03
PZ4 – BW5A1	-3.5E-02
PZ5 – ST98[a]	NA
PZ6 – ST122	+3.6E-04
PZ7 – ST134[b]	+4.6E-02
PZ8 –ST167	+1.3E-03
PZ9 – ST190[a]	NA
PZ10 – ST230	+4.9E-03

Notes:

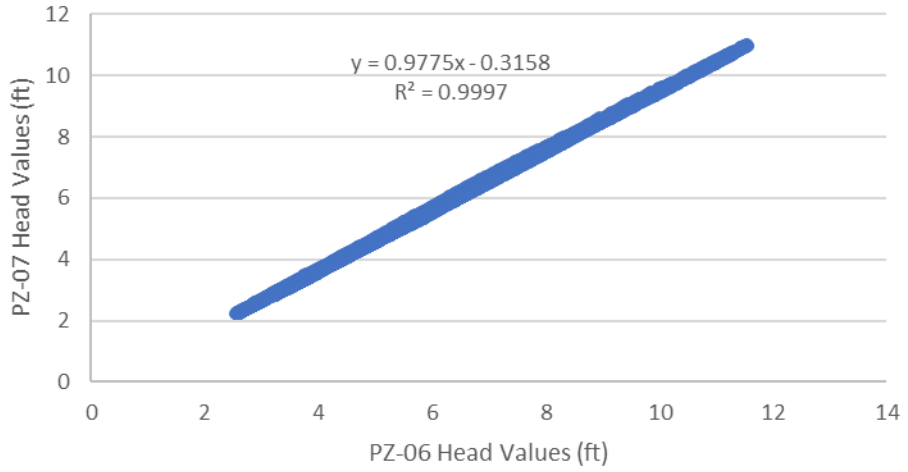
a. Not applicable. As noted previously, piezometer damage and equipment malfunction hindered data collection at locations PZ5 and PZ9.
b. A regression analysis was used to derive the average vertical gradient at PZ7, which is explained in detail in this section.
c. Positive values indicate net upward seepage; negative values indicate net downward seepage.

NA: not applicable

Annex B summarizes vertical hydraulic conductivity, seepage meter, and i_v data for each location and the resulting seepage value for each data collection location.

At Station ST134 (PZ7), the shallow transducer malfunctioned and did not provide usable data for the deployment period from August 2024 to July 2025. The deep transducer at this location operated correctly. A regression analysis was therefore performed to assess whether nearby shallow transducer data from PZ6 or PZ8 could be used to calculate an accurate surrogate dataset for the missing shallow transducer data at PZ7. These regressions were performed using data previously recorded at these three shallow piezometers (prior to August 2024; these specific data were unaffected by the aforementioned equipment issues).

Figure 3
Regression Plot for Comparison of Shallow Transducer Readings for PZ6 and PZ7



Note: The data collection period used in the regression analysis was between September 8, 2023, and May 13, 2024.

The regression analysis, shown in Figure 3, showed a strong linear correlation between the readings at PZ7 and PZ6 (r^2>0.99). Using the best-fit relationship between PZ7 and PZ6, the shallow transducer recordings from PZ6 were converted to generate surrogate shallow transducer data for PZ7 for the period of August 2024 to July 2025.

PZ4 is located at a backwater station outside the river boundary and experienced periods when the river water level decreased below the sediment surface. When this occurred, the shallow transducer could not accurately record water level data because it was directly exposed to the atmosphere. To correct for periods during which the water level was insufficiently deep to provide accurate readings at PZ4, the data were censored to avoid using instances during which the water level was below a depth of one foot. This is reflected in the hydrographs in Annex A for PZ4, which show which data were used to derive the average vertical hydraulic gradient and which data were excluded due to insufficient water depth.

Average vertical hydraulic gradients at locations PZ5 and PZ9 were not calculated due to piezometer damage and equipment malfunction as discussed previously. However, at these locations, seepage meters were deployed between June 19 and 22, 2023. Therefore, the average seepage meter results were used as the estimated seepage rates for locations PZ5 and PZ9.

Most of the average hydraulic gradient values listed in Table 1 were positive, indicating average seepage from sediment upward into the river. PZ4, which is located in a backwater station outside the river boundaries, was the only location that recorded a negative average hydraulic gradient, indicating downward net seepage from the backwater into the sediment.

3 Vertical Hydraulic Conductivity

3.1 Data Collection and Evaluation

Vertical hydraulic conductivity (K_v) data were measured using sediment core samples collected at each seepage data collection location, in accordance with GE's SOP for Vertical Hydraulic Gradient and Hydraulic Conductivity Data Collection in Sediment (referenced above in Section 2.1). These sediment cores were initially collected in August 2022 using two-inch-diameter rigid plastic liners from the mudline to a target depth of approximately six feet below mudline. The target core collection depth was set to match the installation depth of the piezometers and was intended to provide a full-length, representative core of the subsurface sediments. Cores collected in August 2022 experienced low recovery rates and shallow penetration depths. Cores were collected again in September 2024 using three-inch-diameter aluminum core tubes, with substantially improved recovery compared to the 2022 cores. K_v testing results from 2022 were replaced with testing results from the cores collected in 2024, except the BW5A1 – PZ4 location, which was not accessible during core drilling in 2024. Target depth intervals, core penetration, and recovery lengths at each sampling location, as collected in the 2024 coring event, are summarized in Table 2.

Table 2
Summary of Sediment Core Target Intervals, Penetration, and Recovery

Location ID	Target Interval (feet)	Penetration (feet)	Recovery (feet)
ST25-PZ1	0 to 6	6.7	4.0
ST43-PZ2	0 to 6	6.3	5.7
ST69-PZ3	0 to 6	2.9	2.3
BW5A1-PZ4[1]	0 to 3	3.0	1.2
	3 to 6	6.0	2.6
ST98-PZ5	0 to 6	6.1	5.5
ST122-PZ6	0 to 6	6.1	5.1
ST134-PZ7	0 to 6	8.5	7.9
ST167-PZ8	0 to 6	6.7	6.2
ST190-PZ9	0 to 6	6.4	5.7
ST230-PZ10	0 to 6	6.5	6.1

Note:

1. PZ4 was the only location where cores were not collected in 2024 due to unstable subgrade access for the drilling equipment. Values from the 2022 core collection are shown here.

The 2024 core recovery for the piezometer locations averaged 86% of the penetration depth, which was a considerable improvement over the recovery from the 2022 core collection and provided final samples for K_v data measurements.

PZ3 was the only 2024 core sampling location where the core-tube penetration depth did not reach the target depth, introducing some uncertainty as to whether the core fully represents the interval between the piezometer screens. Despite this limitation, the calculated K_v at PZ3 is within an order of magnitude of K_v values calculated for the adjacent locations; thus, the PZ3 K_v value is considered suitable for use in estimating the seepage rate.

After collecting each sediment core sample, the core tube was capped, maintained in a vertical position, and transported to Building 59 at the GE facility in Pittsfield, Massachusetts, to conduct the K_v tests. The core tube was then secured in place vertically. The bottom cap on the liner was replaced with a perforated cap lined with steel wool, and the core sample was allowed to drain freely under the force of gravity. Water that drained from the core tube was collected in a measuring cup and then periodically transferred into a graduated cylinder to measure the volume of drained water.

The volume of water that drained from the samples during these tests ranged from 20 milliliters (mL) to 112 mL over a period of one hour or more. The hydraulic gradient within the test core liner was maintained relatively constant by the force of gravity and the limited volume of flow. The following data were measured and recorded during the drainage period:

- **dH:** Total height of water above the liner bottom, including saturated core material and water column above sediment (by visual inspection from outside of liner). These data were measured and recorded at the beginning and end of the period of flow rate data collection.
- **dL:** Length of sediment sample in core tube.
- **Q:** Flow rate of water by free gravity drainage from the bottom of the core, calculated from the following:
  - Start time and stop time (expressed as HH:MM:SS)
  - Volume of water collected between start time and stop time

The data bulleted above were tabulated and used to calculate K_v for each sample. These data and the results are summarized in tables and graphs in Annex C.

The K_v of each tested sediment sample was calculated as follows using a form of Darcy's Law:

Equation 2

$$K_v = Q/(A\ i_v)$$

where:

K_v	=	vertical hydraulic conductivity of test sample [cm/s]
Q	=	average flow rate during period of approximately constant flow [cm^3/s]
A	=	circular area of the bottom of the cylindrical core sample [cm^2]
i_v	=	vertical hydraulic gradient through the test sample [dimensionless]

The vertical hydraulic gradient during each K_v test was calculated as follows:

Equation 3

$$i_v = dH/dL$$

where:

dH	=	head difference between the top and the bottom of the saturated sediment sample, which is equal to the height of the water level in the liner, measured from the bottom of the liner [cm]
dL	=	vertical length of the sediment sample [cm]

Each dataset was plotted as cumulative flow volume versus time. The data typically showed an initial period of drainage before steady-state flow was observed (orange data points in graphs in Annex C), after which the drainage rate stabilized, as indicated by a linear data trend with a relatively constant slope (blue data on graphs in Annex C). The linear portion of the data, which indicated steady-state flow conditions, were used to calculate K_v.

In cases when the water level in the liner was above the top of the saturated sediment sample, i_v was greater than 1.0. When the water level reached the top of the sample, dH and dL become equal, making i_v equal to 1.0.

Hydraulic gradients measured during the period of linear data (steady-state flow) decreased by between 0% and 10% for the various tests, with larger changes observed in samples that drained larger volumes of water. The average i_v value during the period of steady-state flow was used in calculating K_v, so the maximum error in the gradient value (between the maximum or minimum i_v value and the average i_v value) was 5%. The calculated K_v value is proportional to i_v, so the maximum

error in K_v that could occur due to i_v changes is 5%. Given that K_v values for geologic materials range by several orders of magnitude, this error is considered negligible, supporting the use of the steady-state flow relationship in Equation 2.

Individual K_v values were calculated for each sediment core. For location PZ4, the representative bulk K_v value was calculated using the test results for two sediment depth increments and the weighted harmonic mean formula shown in Equation 4.

Equation 4

$$K_v = \frac{Z}{\sum \frac{Z_i}{K_{vi}}}$$

where:

K_v	=	representative, bulk vertical hydraulic conductivity for the sediment between the shallow and deep piezometer [cm/s]
Z	=	representative total depth interval of sampled sediment (for example, 0-foot to six-foot depth interval) [cm]
Z_i	=	vertical length of each individual test sample [cm]
K_{vi}	=	measured vertical hydraulic conductivity of either the shallow or deep sediment sample [cm/s]

In calculating the weighted harmonic mean for PZ4, two different methods were used regarding the values of Z_i and Z to account for the fact that the length of recovered sediment samples differed from the three-foot-long, core-tube push length. In the first case, it was assumed that each sample represented the full three-foot-long interval from which it was collected. In this case, Z_i was assumed to be equal to three, and Z was assumed to be equal to six. In the second case, Z_i was assumed to be equal to only the recovered interval length, and Z was assumed to be equal to the sum of the recovered lengths of both samples. After calculating harmonic mean K_v values using both methods, the average of those two results was calculated and is considered the representative bulk K_v value.

3.2 Vertical Hydraulic Conductivity Results

The calculated K_v values (in centimeters per second) are shown in Table 3.

Table 3
Calculated Vertical Hydraulic Conductivity Values

Piezometer ID	K_v (cm/sec)
PZ1 – ST25	6.6E-05

Piezometer ID	K_v (cm/sec)
PZ2 – ST43	1.2E-04
PZ3 – ST69	5.9E-05
PZ4 – BW5A1[1]	4.3E-04
PZ5 – ST98	3.9E-04
PZ6 – ST122	4.0E-05
PZ7 – ST134	7.3E-05
PZ8 – ST167	1.1E-04
PZ9 – ST190	3.3E-05
PZ10 – ST230	1.6E-03

Note:

1. The K_v value for PZ4 was calculated using the harmonic mean of two separate cores. PZ4 included two cores representing zero to three feet and three to six feet below sediment surface. The harmonic mean was used to calculate the representative K_v value over the entire length of the coring depth. Two tests were performed on the zero- to three-foot core collected at PZ01 and on the three- to six-foot core collected at PZ4. The two test results were averaged to determine the representative K_v value for those collection intervals.

Given that K_v values for geologic materials range by several orders of magnitude, these results are reasonably consistent (within approximately two orders of magnitude) and are consistent with expectations based on the sediment texture (sands and gravels with some fines).

4 Seepage Rates

Based on the i_v and K_v results discussed in the two preceding sections, the seepage rate (also referred to as Darcy flux, porewater discharge, or groundwater discharge) within the sediment was calculated using Equation 5.

Equation 5

$$q = K_v \, i_v$$

where:

q	=	seepage rate [cm/s]
K_v	=	representative, bulk vertical hydraulic conductivity between shallow and deep piezometers [cm/s]
i_v	=	average vertical hydraulic gradient measured using shallow and deep piezometers [dimensionless]

The resulting seepage rates are listed in Table 4.

Table 4
Summary of Seepage Rate Values

Piezometer ID	K_v (cm/sec)	i_v (feet/feet)	Seepage Rate (cm/year)
PZ01 – ST25	6.6E-05	9.0E-03	1.9E+01
PZ02 – ST43	1.2E-04	5.7E-03	2.1E+01
PZ03 – ST69	5.9E-05	7.5E-03	1.4E+01
PZ04 – BW5A1	4.3E-04	-3.5E-02	-4.7E+02
PZ05 – ST98[1]	3.9E-04	NA	-8.8E+01
PZ06 – ST122	4.0E-05	3.6E-04	5.0E-01
PZ07 – ST134	7.3E-05	4.6E-02	1.1E+02
PZ08 – ST167	1.1E-04	1.3E-03	4.4E+00
PZ09 – ST190[1]	3.3E-05	NA	-1.1E+00
PZ10 – ST230	1.6E-03	4.9E-03	2.5E+02

Note:

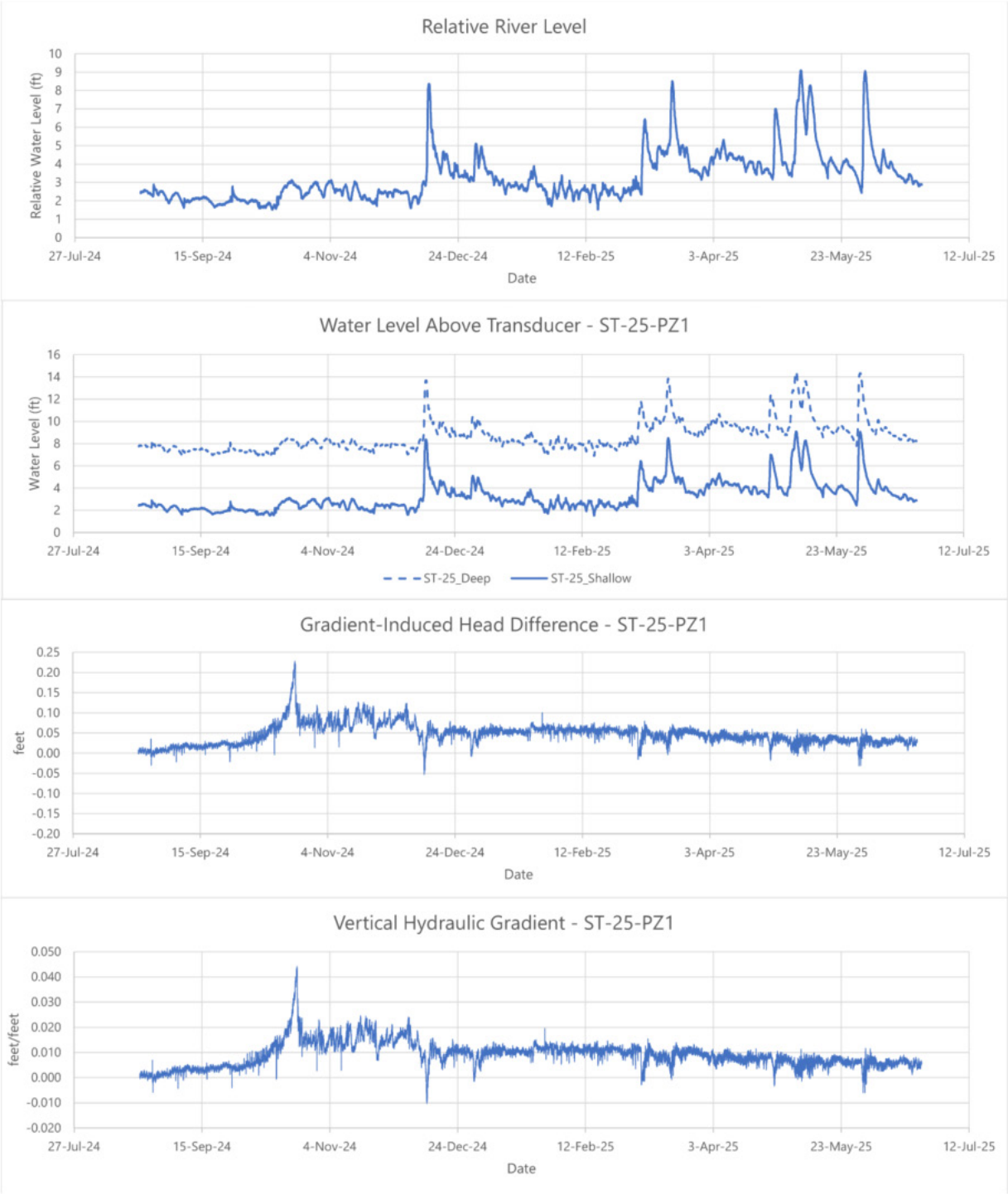
1. As noted previously, damage and equipment malfunction resulted in no direct gradient data being collected at PZ5 or PZ9. Seepage rate values shown for PZ5 and PZ9 are the average results from seepage meters deployed in June 2023.

5 References

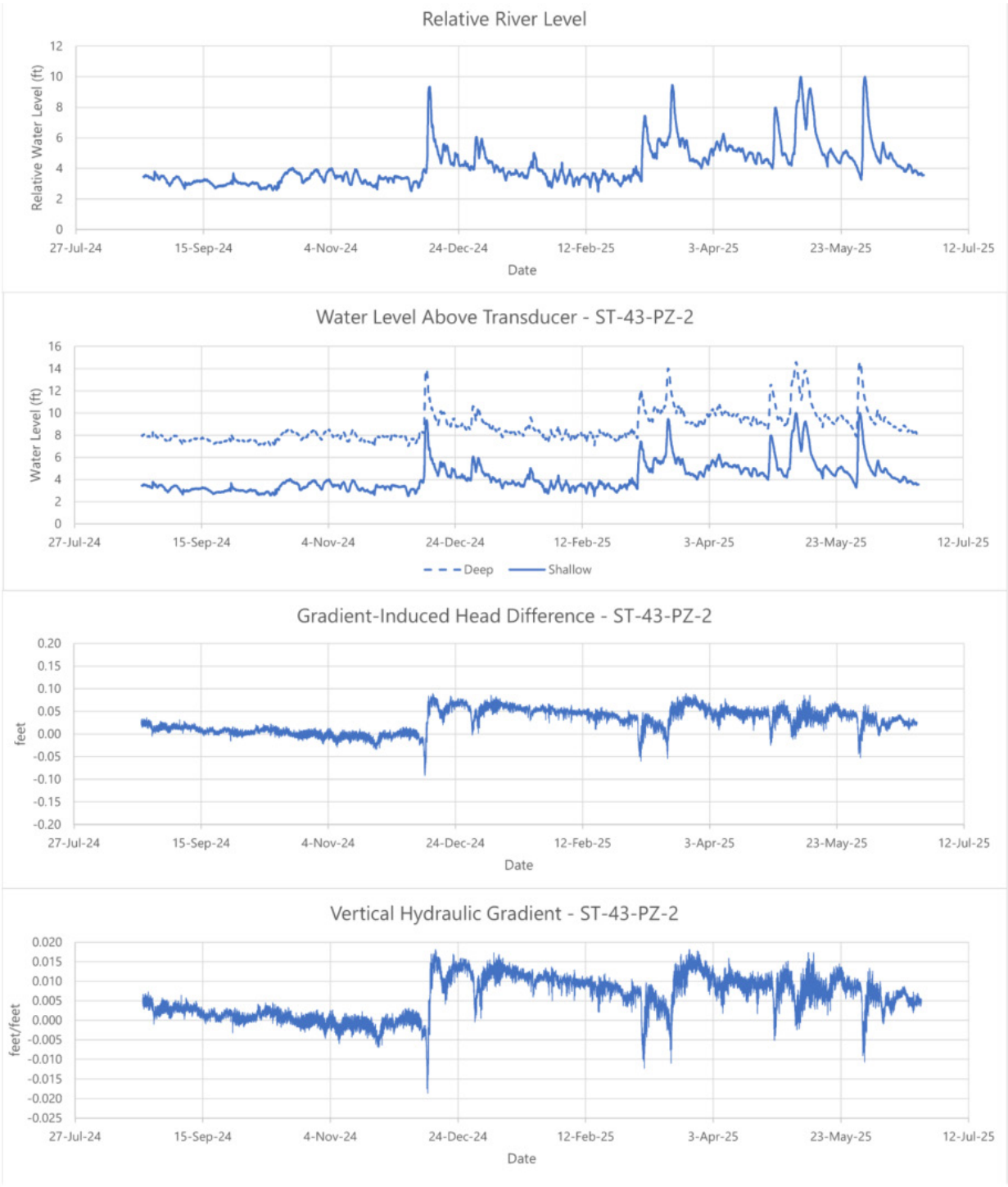
Anchor QEA and AECOM, 2022. *Revised Pre-Design Investigation Work Plan for Reach 5A Sediment and Riverbanks*. Housatonic River – Rest of River. Prepared for General Electric Company, Pittsfield, Massachusetts. May 2, 2022.

Arcadis, 2023. *Field Sampling Plan/Quality Assurance Project Plan*. GE-Pittsfield/Housatonic River Site. Prepared for General Electric Company, Pittsfield, Massachusetts. Revised July 2023.

Annex A
Vertical Hydraulic Gradient Hydrographs



Notes:
Dashed line in second panel from top corresponds to the deep piezometer.
Gradient-induced head difference plotted in the third panel from the top calculated by taking the difference in water level elevations between the shallow and deep piezometers during the gradient measurement periods and subtracting the average zero-gradient head difference.
A positive vertical gradient equals upward flow and a negative vertical gradient equals downward flow.
Data shown in the Relative River Level plot is based on transducer data from the Shallow piezometer.



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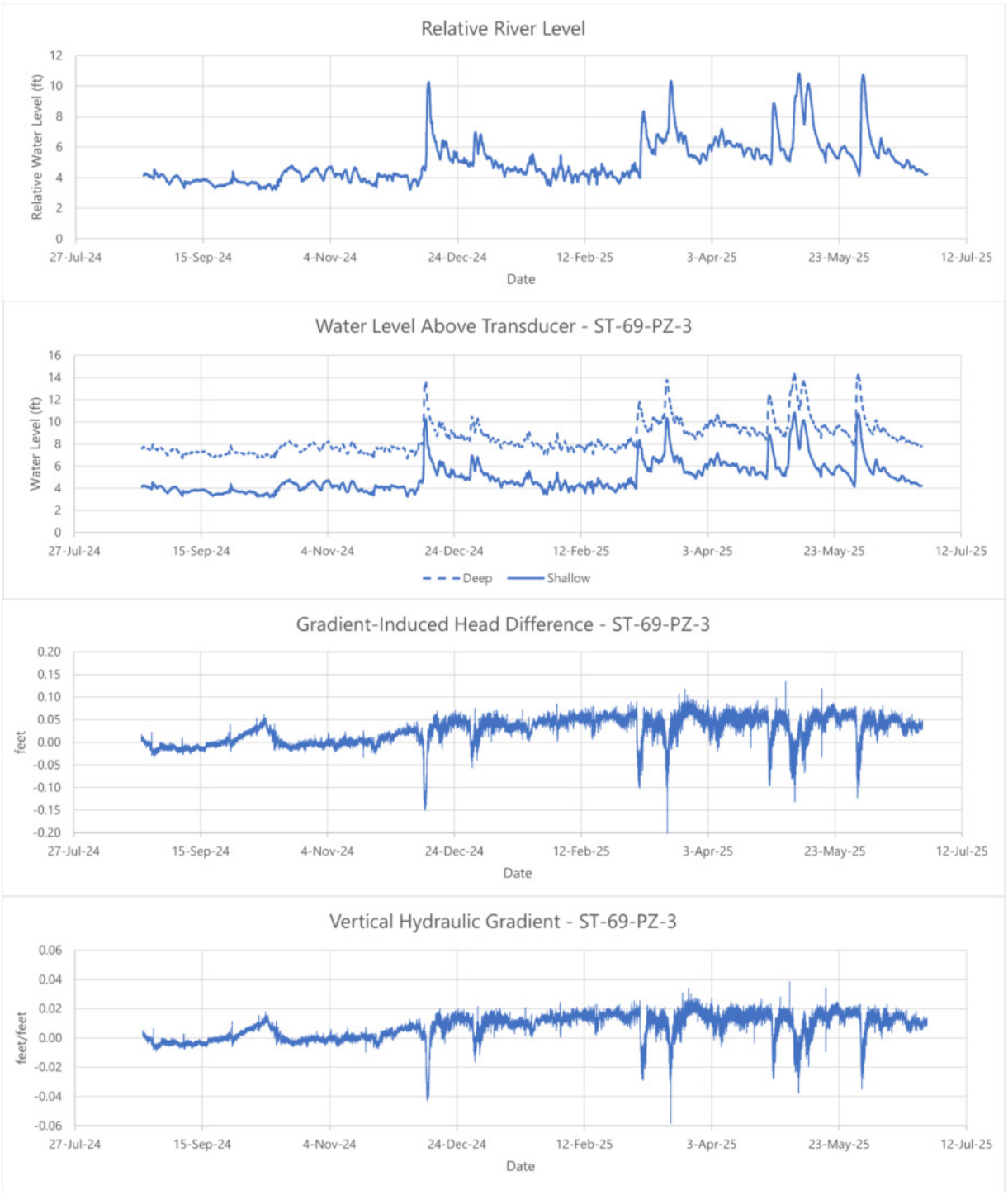

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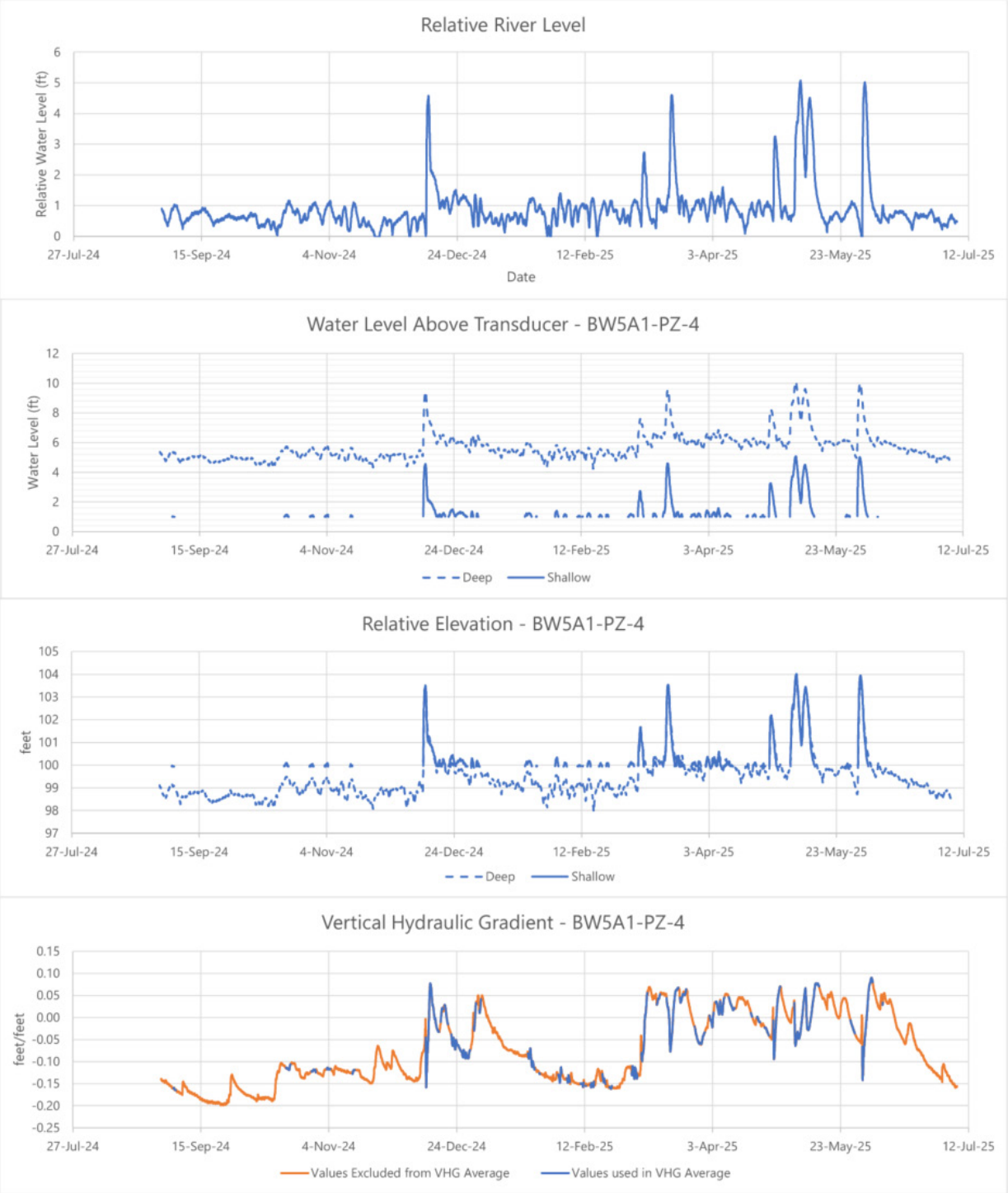
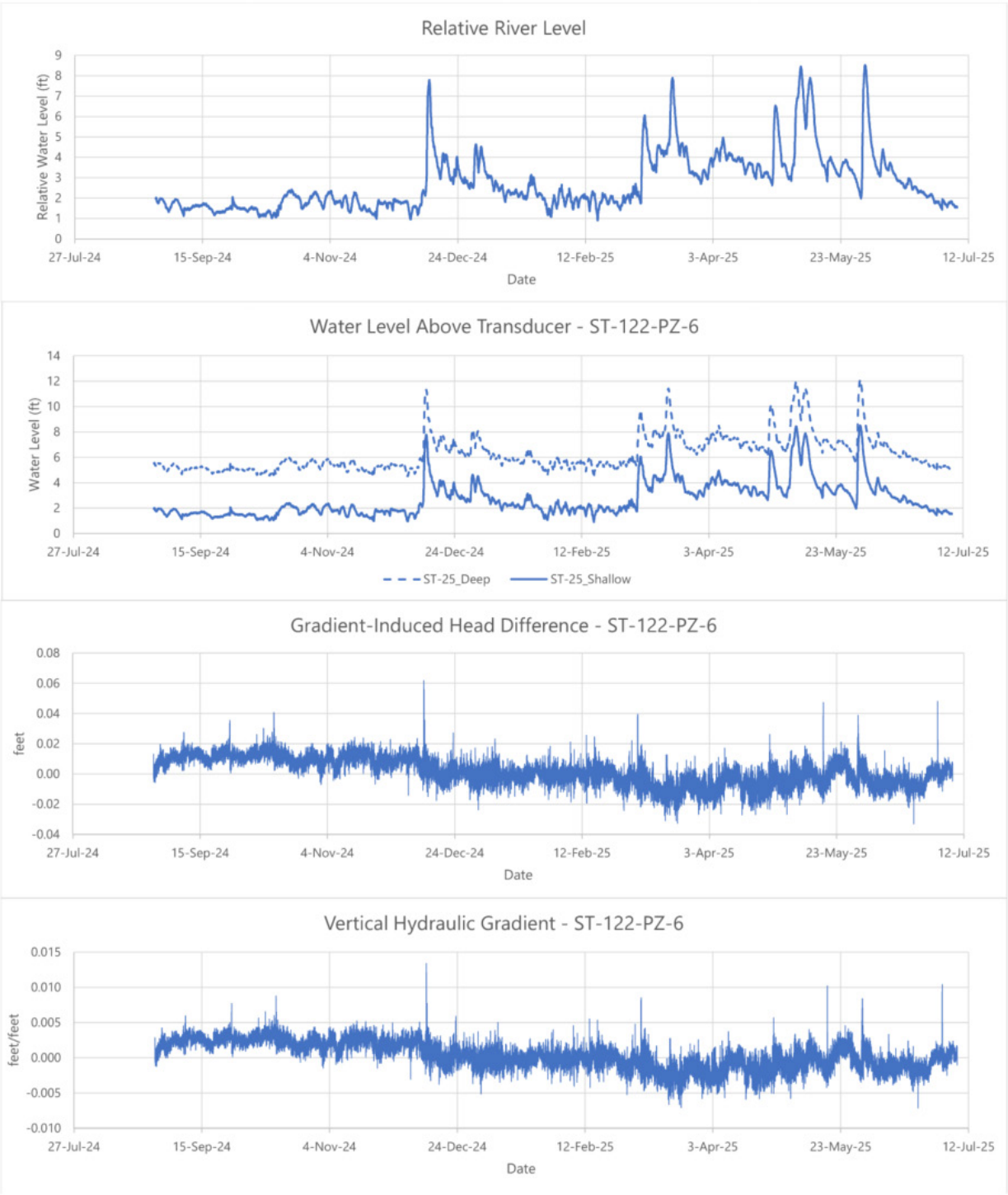


Notes:
Dashed line in second panel from top corresponds to the deep piezometer.
The third panel from the top represents the elevation of each transducer referenced against an arbitrary datum. The procedure for processing PZ4 data was different than other locations due to the low water levels experienced at this location.
A positive vertical gradient equals upward flow and a negative vertical gradient equals downward flow.



Notes:
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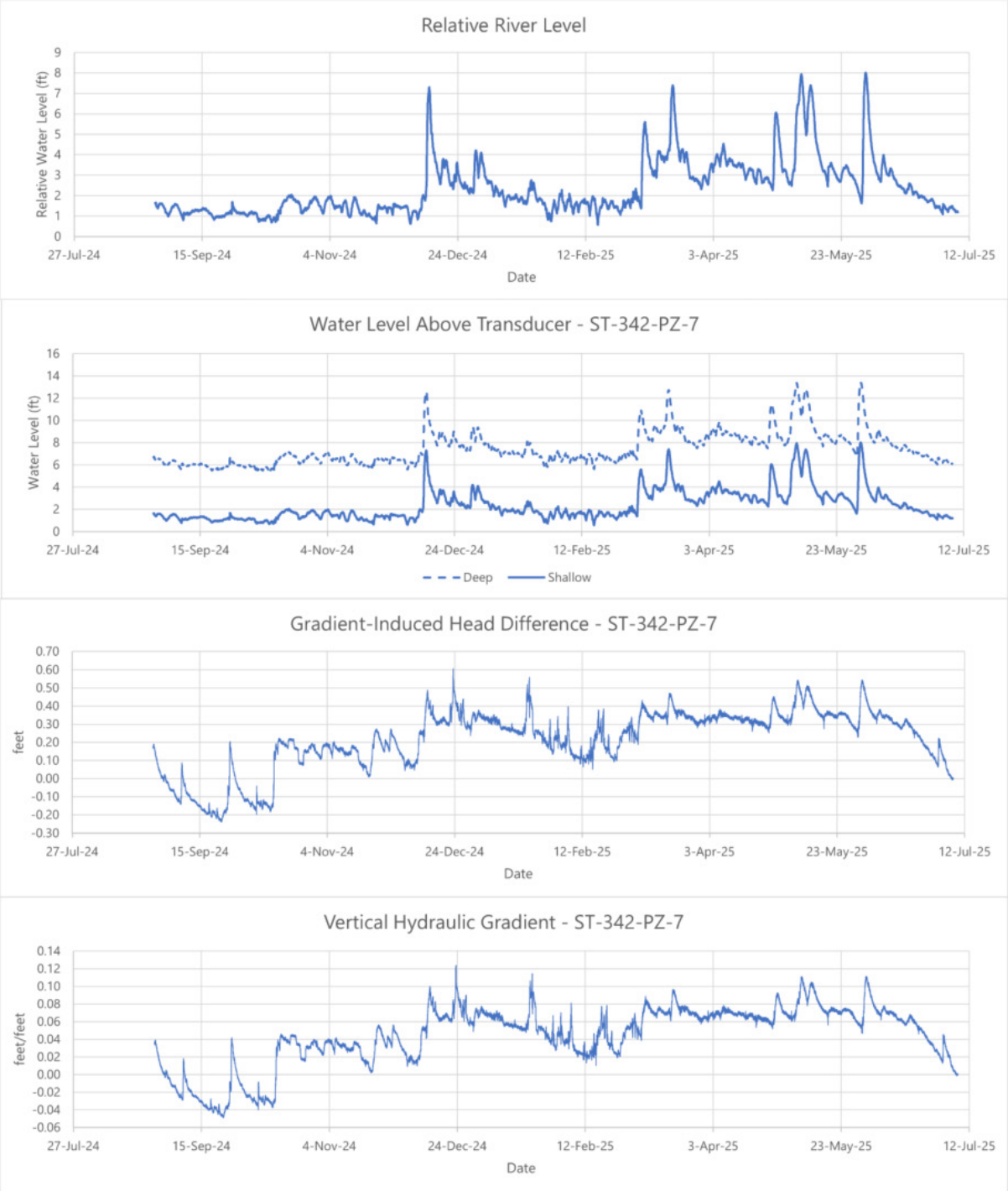

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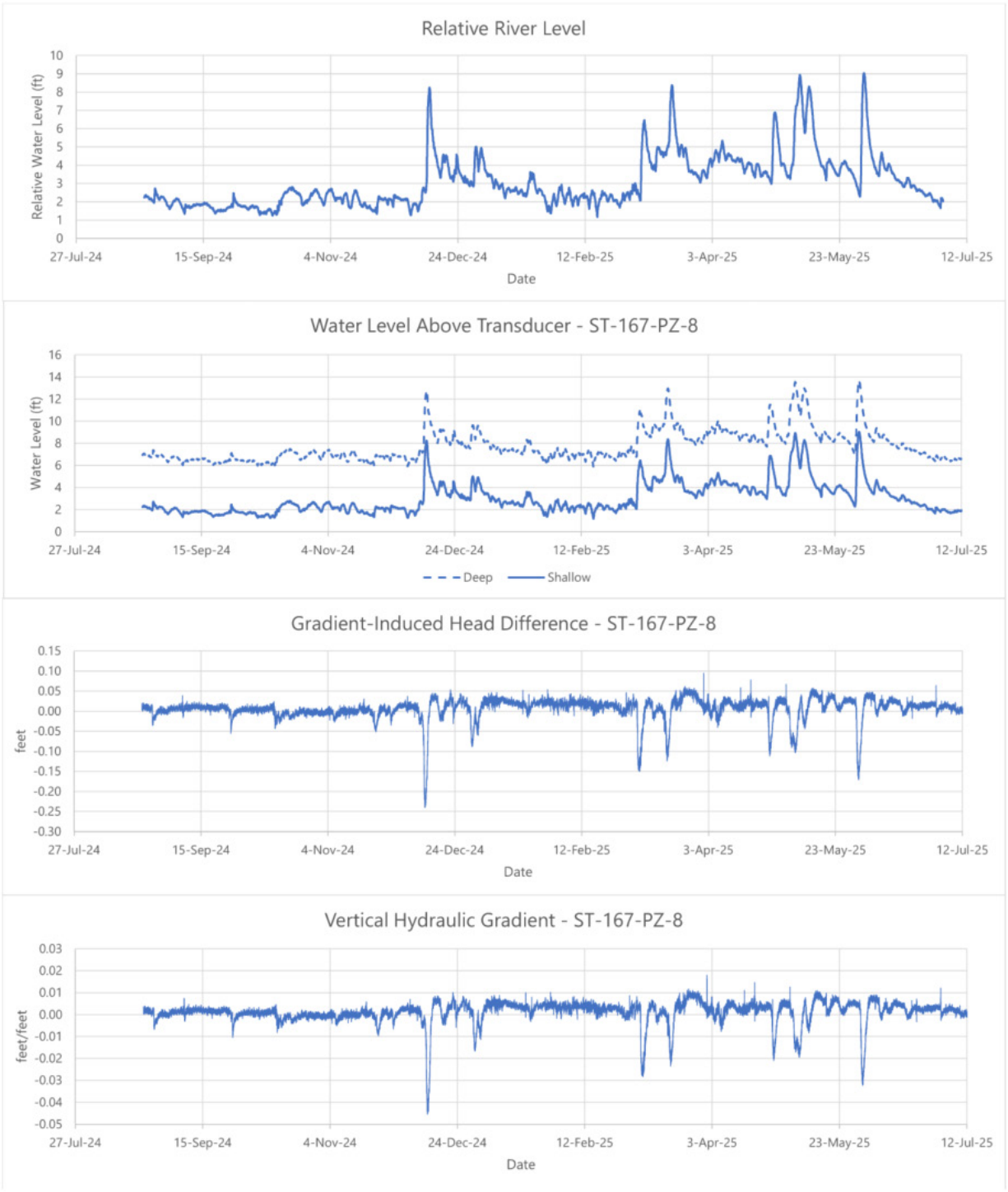

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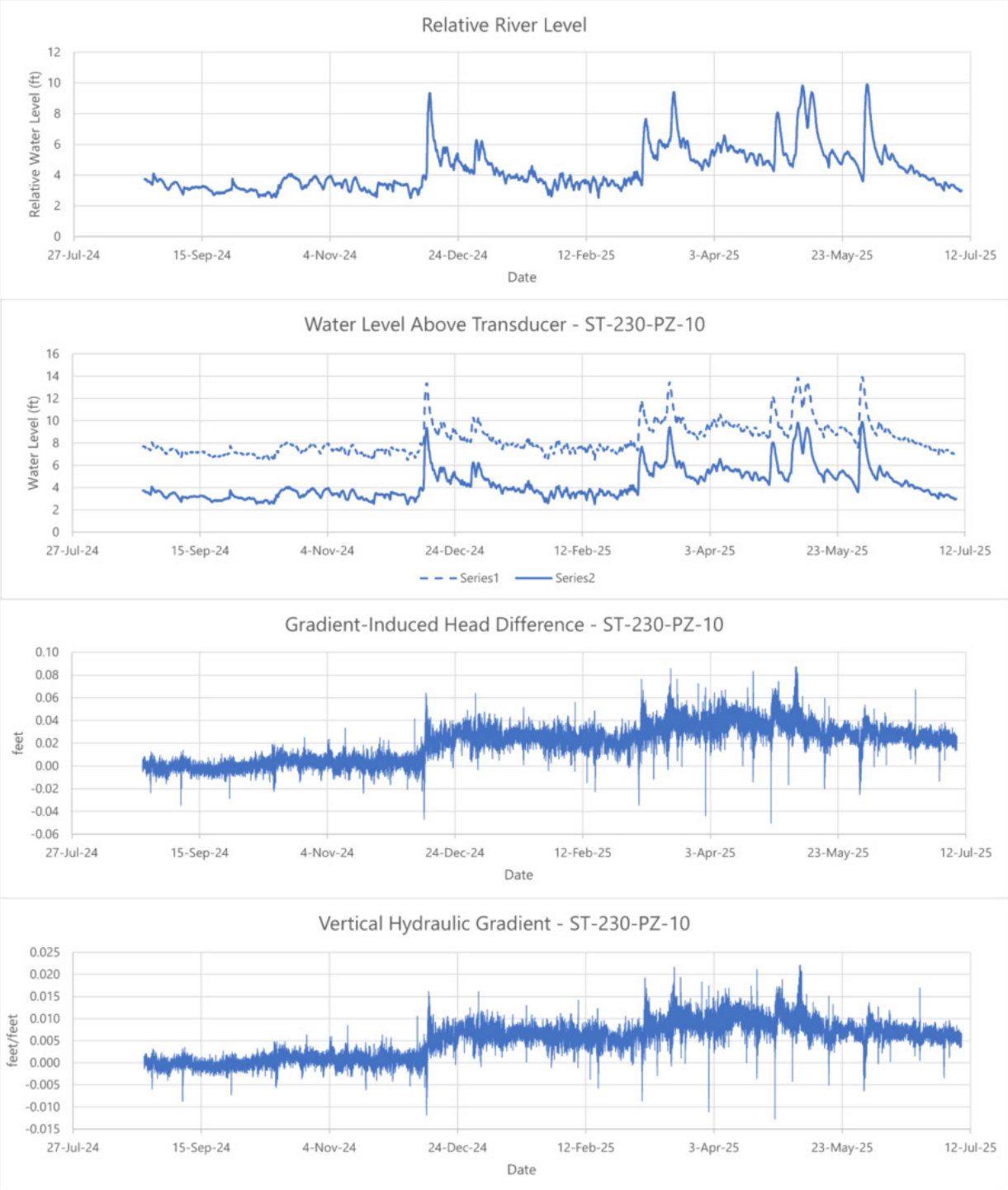

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Annex B
Detailed Summary of Seepage Data and Results

Annex B
Detailed Summary of Seepage Data and Results

Parameter	Data Recording Period	Unit	PZ1 ST-25	PZ2 ST-43	PZ3 ST-69	PZ4 BW5A1	PZ5[1] ST-98	PZ6 ST-122	PZ7[2] ST-134	PZ8 ST-167	PZ9[1] ST-190	PZ10 ST-230
Vertical Hydraulic Conductivity (K_v)	NA	cm/sec	6.6E-05	1.2E-04	5.9E-05	4.3E-04	3.9E-04	4.0E-05	7.3E-05	1.1E-04	3.3E-05	1.6E-03
Seepage Meter Data	Jun '23	cm/day	NA	0.14000	NA	NA	-0.2400	NA	NA	NA	-0.003	0.070
Average Vertical Gradient (i_v)	Aug '24 - Jul '25	--	0.00900	0.0057	0.008	-0.04	NA	0.00036	0.0460	0.0013	NA	0.005
Average Seepage Rate (i_v*K_v)	Aug '24 - Jul '25	cm/day	0.05165	0.0583	0.038	-1.30	-0.2400	0.00126	0.2911	0.01213	-0.003	0.691

Notes:

1. PZ-05 or PZ-09 had piezometer damage and equipment issues that hindered hydraulic gradient data collection. Seepage values for those two locations are from seepage meter measurements recorded in 2023.

2. No shallow transducer data are available for PZ-07 in the 2024-2025 deployment. A regression analysis was performed to compare shallow transducer data measured at PZ-07 versus those measured at PZ-06 and PZ-08. The PZ-06 regression with PZ-07 was better, and was used to estimate the shallow transducer data at PZ-07 for the 2024-2025 deployment period. Those calculated values were subsequently used to calculate the vertical hydraulic gradient and seepage rate for PZ-07.

Annex C
Vertical Hydraulic Conductivity Measurements

ANCHOR QEA

Calculation of Vertical Hydraulic Conductivity by Gravity Drainage
GE - Housatonic

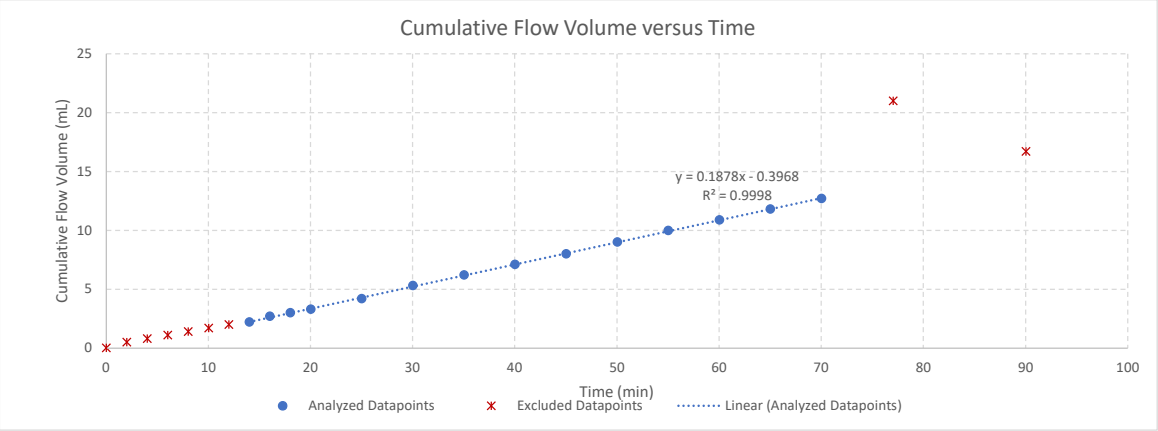
Core ID: PZ-01

Staff: A. Olsen, J. Ramey-Lariviere

Sample Depth In (Ft)	**0-6.0**	**feet**
Sediment Sample Length (ft)	**4.00**	**feet**
Total Core Tube Length (ft)	**4.17**	**feet**
Core Diameter (in)	**3.00**	**inches**
Core Diameter (in)	**7.62**	**cm**
Flow Area (A)	**45.6**	**cm^2**

Kv Calculation (cm/sec)
Kv = Q / (AI)
6.6E-05

Time									**Flow Volume (mL)**	
Incremental			**Cumulative**		**Water Level**					
Date	**Time Elapsed (HH:MM:SS)**	**Seconds**	**Seconds**	**Minutes**	**From Top (in)**	**From Top (Feet)**	**From Bottom (Feet)**	**Hydraulic Gradient**	**Incremental**	**Cumulative**
1/23/2025	11:48:15	0.00	0.00	0	0			1.04	0	0
1/23/2025	11:50:15	120.00	120.00	2					0.5	0.5
1/23/2025	11:52:15	120.00	240.00	4					0.3	0.8
1/23/2025	11:54:15	120.00	360.00	6					0.3	1.1
1/23/2025	11:56:15	120.00	480.00	8					0.3	1.4
1/23/2025	11:58:15	120.00	600.00	10					0.3	1.7
1/23/2025	12:00:15	120.00	720.00	12					0.3	2
1/23/2025	12:02:15	120.00	840.00	14					0.2	2.2
1/23/2025	12:04:15	120.00	960.00	16					0.5	2.7
1/23/2025	12:06:15	120.00	1080.00	18					0.3	3
1/23/2025	12:08:15	120.00	1200.00	20					0.3	3.3
1/23/2025	12:13:15	300.00	1500.00	25					0.9	4.2
1/23/2025	12:18:15	300.00	1800.00	30					1.1	5.3
1/23/2025	12:23:15	300.00	2100.00	35					0.9	6.2
1/23/2025	12:28:15	300.00	2400.00	40					0.9	7.1
1/23/2025	12:33:15	300.00	2700.00	45					0.9	8
1/23/2025	12:38:15	300.00	3000.00	50					1	9
1/23/2025	12:43:15	300.00	3300.00	55					1.0	10
1/23/2025	12:48:15	300.00	3600.00	60					0.9	10.9
1/23/2025	12:53:15	300.00	3900.00	65					0.9	11.8
1/23/2025	12:58:15	300.00	4200.00	70					0.9	12.7
1/23/2025	13:18:15	1200.00	5400.00	90					4	16.7
1/23/2025	13:40:15	1320.00	4620.00	77	0.07			1.025	4.3	21
Best-Fit Line		Final Time	5400.00			Average Hydraulic Gradient (I):		**1.03**	Final Volume	21
Best-Fit Line Y Intercept:			-0.03968			Best-Fit Flow Rate (Q, mL/sec):		0.0031		



Note: Test and calculation methods described in Gefell, M.J., M. LaRue, and K. Russell, 2019. "Vertical Hydraulic Conductivity Measurement by Gravity Drainage." *Groundwater* 57(4):511–516.

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Calculation of Vertical Hydraulic Conductivity by Gravity Drainage

GE - Housatonic

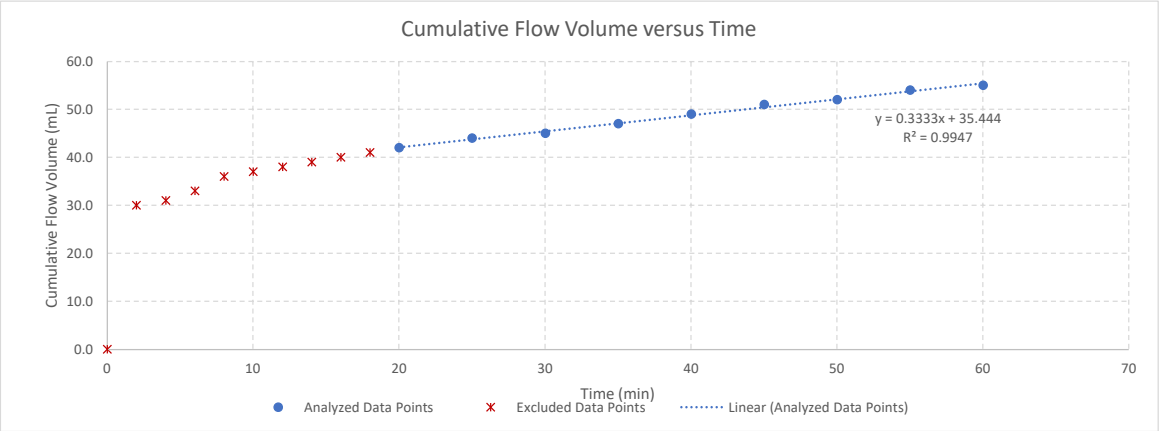
Core ID: PZ-02

Staff: A. Olsen, J. Ramey-Lariviere

Sample Depth In (Ft)	**0-6.0**	**feet**
Sediment Sample Length (ft)	**5.68**	**feet**
Total Core Tube Length (ft)	**5.85**	**feet**
Core Diameter (in)	**3.00**	**inches**
Core Diameter (in)	**7.62**	**cm**
Flow Area (A)	**45.6**	**cm^2**

Kv Calculation (cm/sec)
Kv = Q / (AI)
1.2E-04

Time									Flow Volume (mL)	
Incremental			Cumulative		Water Level					
Date	Time Elapsed (HH:MM:SS)	Seconds	Seconds	Minutes	From Top (in)	From Top (Feet)	From Bottom (Feet)	Hydraulic Gradient	Incremental	Cumulative
9/9/2024	19:02:00	0.00	0.00	0				1.03	0.0	0.0
9/9/2024	19:04:00	120.00	120.00	2				1.03	30.0	30.0
9/9/2024	19:06:00	120.00	240.00	4				1.03	1.0	31.0
9/9/2024	19:08:00	120.00	360.00	6				1.03	2.0	33.0
9/9/2024	19:10:00	120.00	480.00	8				1.03	3.0	36.0
9/9/2024	19:12:00	120.00	600.00	10				1.03	1.0	37.0
9/9/2024	19:14:00	120.00	720.00	12				1.03	1.0	38.0
9/9/2024	19:16:00	120.00	840.00	14				1.03	1.0	39.0
9/9/2024	19:18:00	120.00	960.00	16				1.03	1.0	40.0
9/9/2024	19:20:00	120.00	1080.00	18				1.03	1.0	41.0
9/9/2024	19:22:00	120.00	1200.00	20				1.03	1.0	42.0
9/9/2024	19:27:00	300.00	1500.00	25				1.03	2.0	44.0
9/9/2024	19:32:00	300.00	1800.00	30				1.03	1.0	45.0
9/9/2024	19:37:00	300.00	2100.00	35				1.03	2.0	47.0
9/9/2024	19:42:00	300.00	2400.00	40				1.03	2.0	49.0
9/9/2024	19:47:00	300.00	2700.00	45				1.03	2.0	51.0
9/9/2024	19:52:00	300.00	3000.00	50				1.03	1.0	52.0
9/9/2024	19:57:00	300.00	3300.00	55				1.03	2.0	54.0
9/9/2024	20:02:00	300.00	3600.00	60				1.03	1.0	55.0
Best-Fit Line		Final Time	3600.00			Average Hydraulic Gradient (I):		**1.03**	Final Volume	55.0
Best-Fit Line Y Intercept:			35.444			Best-Fit Flow Rate (Q, mL/sec):		0.0056		



Note: Test and calculation methods described in Gefell, M.J., M. LaRue, and K. Russell, 2019. "Vertical Hydraulic Conductivity Measurement by Gravity Drainage." *Groundwater* 57(4):511–516.

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Calculation of Vertical Hydraulic Conductivity by Gravity Drainage
GE - Housatonic

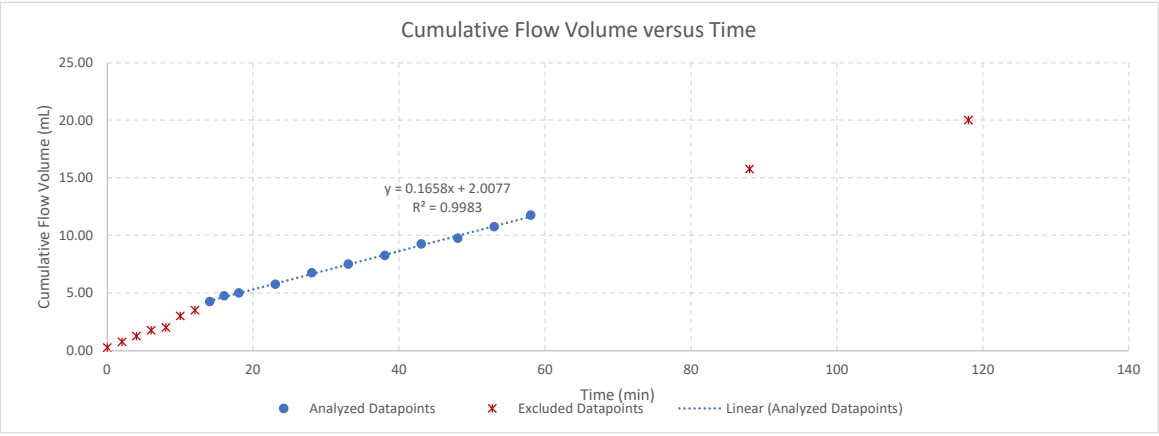
Core ID: PZ-03

Staff: A. Olsen, J. Ramey-Lariviere

Sample Depth In (Ft)	0-10	feet
Sediment Sample Length (ft)	6.38	feet
Total Core Tube Length (ft)	6.60	feet
Core Diameter (in)	3.00	inches
Core Diameter (in)	7.62	cm
Flow Area (A)	45.6	cm^2

Kv Calculation (cm/sec)
Kv = Q / (AI)
5.9E-05

Time									Flow Volume (mL)	
Incremental			Cumulative		Water Level					
Date	Time Elapsed (HH:MM:SS)	Seconds	Seconds	Minutes	From Top (in)	From Top (Feet)	From Bottom (Feet)	Hydraulic Gradient	Incremental	Cumulative
3/12/2025	0	0.00	0	0	0			1.04	0	0.0
3/12/2025	0:02:00	0.00	0.00	0					0.25	0.25
3/12/2025	0:04:00	120.00	120.00	2					0.50	0.75
3/12/2025	0:06:00	120.00	240.00	4					0.50	1.25
3/12/2025	0:08:00	120.00	360.00	6					0.50	1.75
3/12/2025	0:10:00	120.00	480.00	8					0.25	2.00
3/12/2025	0:12:00	120.00	600.00	10					1.00	3.00
3/12/2025	0:14:00	120.00	720.00	12					0.50	3.50
3/12/2025	0:16:00	120.00	840.00	14					0.75	4.25
3/12/2025	0:18:00	120.00	960.00	16					0.50	4.75
3/12/2025	0:20:00	120.00	1080.00	18					0.25	5.00
3/12/2025	0:25:00	300.00	1380.00	23					0.75	5.75
3/12/2025	0:30:00	300.00	1680.00	28					1.00	6.75
3/12/2025	0:35:00	300.00	1980.00	33					0.75	7.50
3/12/2025	0:40:00	300.00	2280.00	38					0.75	8.25
3/12/2025	0:45:00	300.00	2580.00	43					1.00	9.25
3/12/2025	0:50:00	300.00	2880.00	48					0.50	9.75
3/12/2025	0:55:00	300.00	3180.00	53					1.00	10.75
3/12/2025	1:00:00	300.00	3480.00	58					1.00	11.75
3/12/2025	1:30:00	1800.00	5280.00	88					4.00	15.75
3/12/2025	2:00:00	1800.00	7080.00	118	0.021			1.032	4.25	20.00
Best-Fit Line		Final Time	7080.00			Average Hydraulic Gradient (I):		**1.03**	Final Volume	20.0
		Best-Fit Line Y Intercept:	1.7577			Best-Fit Flow Rate (Q, mL/sec):		0.0028		



Note: Test and calculation methods described in Gefell, M.J., M. LaRue, and K. Russell, 2019. "Vertical Hydraulic Conductivity Measurement by Gravity Drainage." *Groundwater* 57(4):511–516.

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Calculation of Vertical Hydraulic Conductivity by Gravity Drainage

GE - Housatonic

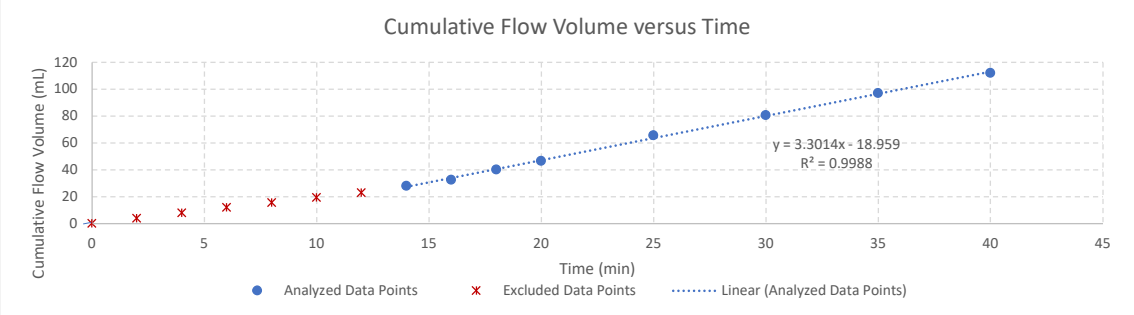
Core ID: BW5A1-PZ4

Staff: A. Olsen, J. Ramey-Lariviere

Sample Depth In (Ft)	**0-3**	**feet**
Sediment Sample Length (ft)	**1.21**	**feet**
Total Core Tube Length (ft)	**3.00**	**feet**
Core Diameter (in)	**2.00**	**inches**
Core Diameter (in)	**5.08**	**cm**
Flow Area (A)	**20.3**	**cm^2**

Kv Calculation (cm/sec)
Kv = Q / (AI)
2.6E-03

Time									Flow Volume (mL)	
Incremental			Cumulative		Water Level					
Date	**Time Elapsed (HH:MM:SS)**	**Seconds**	**Seconds**	**Minutes**	**From Top (in)**	**From Top (Feet)**	**From Bottom (Feet)**	**Hydraulic Gradient**	**Incremental**	**Cumulative**
8/12/2022	0:00:00	0	0	0.0	19 1/4	1.60	1.40	1.15	0	0
8/12/2022	0:02:00	120	120	2.0	19 1/2	1.62	1.38	1.14	4.0	4
8/12/2022	0:04:00	120	240	4.0	19 5/8	1.63	1.37	1.13	4.0	8
8/12/2022	0:06:00	120	360	6.0	19 2/3	1.64	1.36	1.12	4.0	12
8/12/2022	0:08:00	120	480	8.0	19 3/4	1.65	1.35	1.12	3.5	15.5
8/12/2022	0:10:00	120	600	10.0	19 4/5	1.65	1.35	1.12	4.0	19.5
8/12/2022	0:12:00	120	720	12.0	19 4/5	1.65	1.35	1.12	3.5	23
8/12/2022	0:14:00	120	840	14.0	19 13/16	1.65	1.35	1.12	5.0	28
8/12/2022	0:16:00	120	960	16.0	19 15/16	1.66	1.34	1.11	4.5	32.5
8/12/2022	0:18:00	120	1080	18.0	20 1/16	1.67	1.33	1.10	7.5	40
8/12/2022	0:20:00	120	1200	20.0	20 3/16	1.68	1.32	1.09	6.5	46.5
8/12/2022	0:25:00	300	1500	25.0	20 5/8	1.72	1.28	1.06	19.0	65.5
8/12/2022	0:30:00	300	1800	30.0	21	1.75	1.25	1.03	15.0	80.5
8/12/2022	0:35:00	300	2100	35.0	21 3/8	1.78	1.22	1.01	16.5	97
8/12/2022	0:40:00	300	2400	40.0	21 13/16	1.82	1.18	0.98	15.0	112
Best-Fit Line		Final Time	2400			Average Hydraulic Gradient (I):		**1.06**	Final Volume	112
		Best-Fit Line Y Intercept:	-14.128			Best-Fit Flow Rate (Q, mL/sec):		0.0550		



Note: Test and calculation methods described in Gefell, M.J., M. LaRue, and K. Russell, 2019. "Vertical Hydraulic Conductivity Measurement by Gravity Drainage."*Groundwater* 57(4):511–516.

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Calculation of Vertical Hydraulic Conductivity by Gravity Drainage

GE - Housatonic

Core ID: BW5A1-PZ4

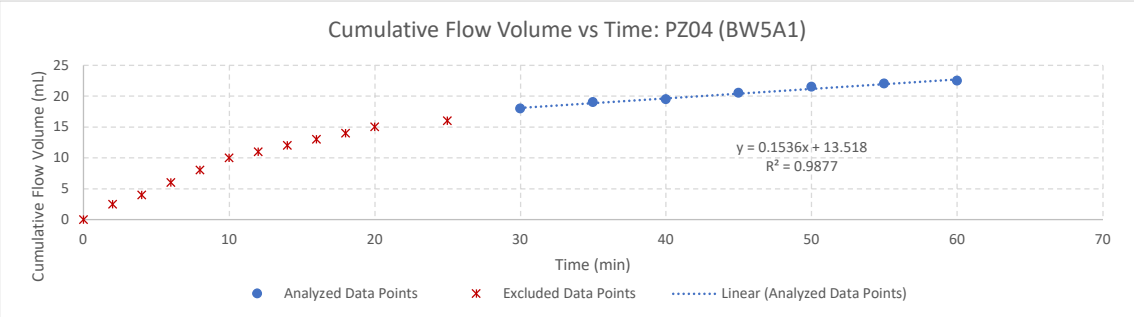
Note: Analysis No. 1

Staff: A. Olsen, J. Ramey-Lariviere

Sample Depth In (Ft)	**3-6**	**feet**
Sediment Sample Length (ft)	**2.59**	**feet**
Total Core Tube Length (ft)	**3.00**	**feet**
Core Diameter (in)	**2.00**	**inches**
Core Diameter (in)	**5.08**	**cm**
Flow Area (A)	**20.3**	**cm^2**

Kv Calculation (cm/sec)
Kv = Q / (AI)
1.3E-04

Time									**Flow Volume (mL)**	
Incremental			**Cumulative**		**Water Level**					
Date	**Time Elapsed (HH:MM:SS)**	**Seconds**	**Seconds**	**Minutes**	**From Top (in)**	**From Top (Feet)**	**From Bottom (Feet)**	**Hydraulic Gradient**	**Incremental**	**Cumulative**
8/12/2022	0:00:00	0	0	0.0	4 1/2	0.37	2.63	1.01	0	0
8/12/2022	0:02:00	120	120	2.0	4 5/8	0.39	2.61	1.01	2.5	2.5
8/12/2022	0:04:00	120	240	4.0	4 2/3	0.39	2.61	1.01	1.5	4
8/12/2022	0:06:00	120	360	6.0	4 2/3	0.39	2.61	1.01	2.0	6
8/12/2022	0:08:00	120	480	8.0	4 4/5	0.40	2.60	1.00	2.0	8
8/12/2022	0:10:00	120	600	10.0	4 4/5	0.40	2.60	1.00	2.0	10
8/12/2022	0:12:00	120	720	12.0	4 7/8	0.41	2.59	1.00	1.0	11
8/12/2022	0:14:00	120	840	14.0	4 7/8	0.41	2.59	1.00	1.0	12
8/12/2022	0:16:00	120	960	16.0	4 7/8	0.41	2.59	1.00	1.0	13
8/12/2022	0:18:00	120	1080	18.0	4 15/16	0.41	2.59	1.00	1.0	14
8/12/2022	0:20:00	120	1200	20.0	4 15/16	0.41	2.59	1.00	1.0	15
8/12/2022	0:25:00	300	1500	25.0	4 15/16	0.41	2.59	1.00	1.0	16
8/12/2022	0:30:00	300	1800	30.0	5	0.42	2.58	1.00	2.0	18
8/12/2022	0:35:00	300	2100	35.0	5 1/16	0.42	2.58	1.00	1.0	19
8/12/2022	0:40:00	300	2400	40.0	5	0.42	2.58	1.00	0.5	19.5
8/12/2022	0:45:00	300	2700	45.0	5 1/8	0.43	2.57	1.00	1.0	20.5
8/12/2022	0:50:00	300	3000	50.0	5 1/8	0.43	2.57	1.00	1.0	21.5
8/12/2022	0:55:00	300	3300	55.0	5 1/8	0.43	2.57	1.00	0.5	22
8/12/2022	1:00:00	300	3600	60.0	5 1/8	0.43	2.57	1.00	0.5	22.5
Best-Fit Line		Final Time	3600			Average Hydraulic Gradient (I):		**1.00**	Final Volume	22.5
Best-Fit Line Y Intercept:			13.518			Best-Fit Flow Rate (Q, mL/sec):		0.0026		



Note: Test and calculation methods described in Gefell, M.J., M. LaRue, and K. Russell, 2019. "Vertical Hydraulic Conductivity Measurement by Gravity Drainage."*Groundwater* 57(4):511–516.

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Calculation of Vertical Hydraulic Conductivity by Gravity Drainage

GE - Housatonic

Core ID: BW5A1-PZ4

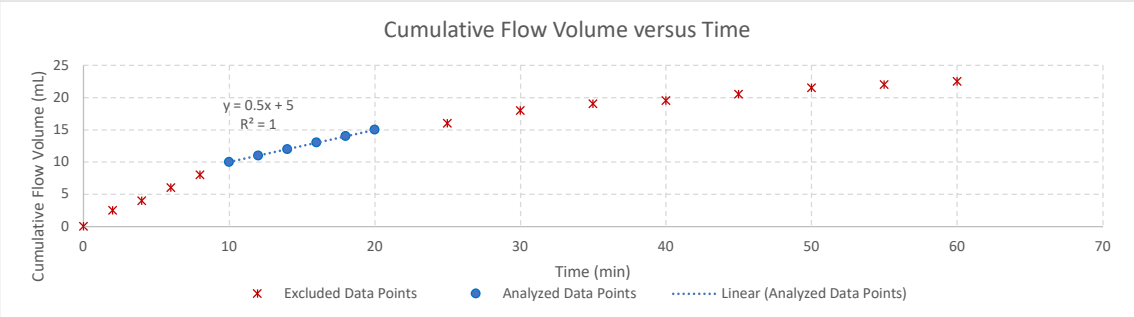
Note: Analysis No.2

Staff: A. Olsen, J. Ramey-Lariviere

Sample Depth In (Ft)	**3-6**	**feet**
Sediment Sample Length (ft)	**2.59**	**feet**
Total Core Tube Length (ft)	**3.00**	**feet**
Core Diameter (in)	**2.00**	**inches**
Core Diameter (in)	**5.08**	**cm**
Flow Area (A)	**20.3**	**cm^2**

Kv Calculation (cm/sec)
Kv = Q / (AI)
4.1E-04

Time									Flow Volume (mL)	
Incremental			Cumulative		Water Level					
Date	Time Elapsed (HH:MM:SS)	Seconds	Seconds	Minutes	From Top (in)	From Top (Feet)	From Bottom (Feet)	Hydraulic Gradient	Incremental	Cumulative
8/12/2022	0:00:00	0	0	0.0	4 1/2	0.37	2.63	1.01	0	0
8/12/2022	0:02:00	120	120	2.0	4 5/8	0.39	2.61	1.01	2.5	2.5
8/12/2022	0:04:00	120	240	4.0	4 2/3	0.39	2.61	1.01	1.5	4
8/12/2022	0:06:00	120	360	6.0	4 2/3	0.39	2.61	1.01	2.0	6
8/12/2022	0:08:00	120	480	8.0	4 4/5	0.40	2.60	1.00	2.0	8
8/12/2022	0:10:00	120	600	10.0	4 4/5	0.40	2.60	1.00	2.0	10
8/12/2022	0:12:00	120	720	12.0	4 7/8	0.41	2.59	1.00	1.0	11
8/12/2022	0:14:00	120	840	14.0	4 7/8	0.41	2.59	1.00	1.0	12
8/12/2022	0:16:00	120	960	16.0	4 7/8	0.41	2.59	1.00	1.0	13
8/12/2022	0:18:00	120	1080	18.0	4 15/16	0.41	2.59	1.00	1.0	14
8/12/2022	0:20:00	120	1200	20.0	4 15/16	0.41	2.59	1.00	1.0	15
8/12/2022	0:25:00	300	1500	25.0	4 15/16	0.41	2.59	1.00	1.0	16
8/12/2022	0:30:00	300	1800	30.0	5	0.42	2.58	1.00	2.0	18
8/12/2022	0:35:00	300	2100	35.0	5 1/16	0.42	2.58	1.00	1.0	19
8/12/2022	0:40:00	300	2400	40.0	5	0.42	2.58	1.00	0.5	19.5
8/12/2022	0:45:00	300	2700	45.0	5 1/8	0.43	2.57	1.00	1.0	20.5
8/12/2022	0:50:00	300	3000	50.0	5 1/8	0.43	2.57	1.00	1.0	21.5
8/12/2022	0:55:00	300	3300	55.0	5 1/8	0.43	2.57	1.00	0.5	22
8/12/2022	1:00:00	300	3600	60.0	5 1/8	0.43	2.57	1.00	0.5	22.5
Best-Fit Line		Final Time	3600			Average Hydraulic Gradient (I):		**1.00**	Final Volume	22.5
Best-Fit Line Y Intercept:			6.1422			Best-Fit Flow Rate (Q, mL/sec):		0.0083		



Note: Test and calculation methods described in Gefell, M.J., M. LaRue, and K. Russell, 2019. "Vertical Hydraulic Conductivity Measurement by Gravity Drainage."*Groundwater* 57(4):511–516.

CALCULATION OF HARMONIC MEAN VERTICAL HYDRAULIC CONDUCTIVITY FROM GRAVITY DRAINAGE TEST RESULTS

General Electric Company – Housatonic River Reach 5A

BW5A1-PZ4

Sample Depth Interval (ft)			Sample Length	Kv	Midpoint	Based on Whole Sample Depth Interva	Based on Recovered Sample Length Only	**Average of Harmonic Mean Values**
Top	Bottom	Interval Length Z	ft z	cm/sec	Depth (ft)	Z / Kv	z / Kv	
0	3	3	1.21	2.6E-03	1.5	1.2E+03	4.7E+02	
3	6	3	2.59	2.7E-04	4.5	1.1E+04	9.6E+03	
Total		6	3.80	**Harmonic Mean Kv (cm/sec)-->**		4.9E-04	3.8E-04	**4.3E-04**

Notes:

1) Kv for 3-6 foot inteval is average of two analyses.

2) Average of harmonic mean values used in seepage calculations.

ANCHOR QEA

Calculation of Vertical Hydraulic Conductivity by Gravity Drainage

GE - Housatonic

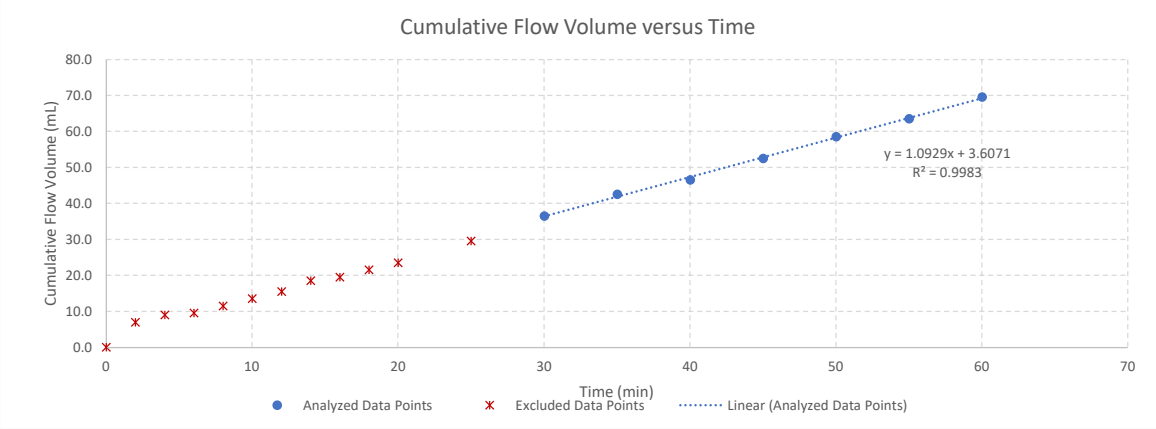
Core ID: PZ-05

Staff: A. Olsen, J. Ramey-Lariviere

Sample Depth In (Ft)	**0-6.0**	**feet**
Sediment Sample Length (ft)	**5.45**	**feet**
Total Core Tube Length (ft)	**5.55**	**feet**
Core Diameter (in)	**3.00**	**inches**
Core Diameter (in)	**7.62**	**cm**
Flow Area (A)	**45.6**	**cm^2**

Kv Calculation (cm/sec)
Kv = Q / (AI)
3.9E-04

Time									**Flow Volume (mL)**	
Incremental			**Cumulative**		**Water Level**					
Date	**Time Elapsed (HH:MM:SS)**	**Seconds**	**Seconds**	**Minutes**	**From Top (in)**	**From Top (Feet)**	**From Bottom (Feet)**	**Hydraulic Gradient**	**Incremental**	**Cumulative**
9/10/2024	10:55:00	0.00	0.00	0				1.02	0.0	0.0
9/10/2024	10:57:00	120.00	120.00	2				1.02	7.0	7.0
9/10/2024	10:59:00	120.00	240.00	4				1.02	2.0	9.0
9/10/2024	11:01:00	120.00	360.00	6				1.02	0.5	9.5
9/10/2024	11:03:00	120.00	480.00	8				1.02	2.0	11.5
9/10/2024	11:05:00	120.00	600.00	10				1.02	2.0	13.5
9/10/2024	11:07:00	120.00	720.00	12				1.02	2.0	15.5
9/10/2024	11:09:00	120.00	840.00	14				1.02	3.0	18.5
9/10/2024	11:11:00	120.00	960.00	16				1.02	1.0	19.5
9/10/2024	11:13:00	120.00	1080.00	18				1.02	2.0	21.5
9/10/2024	11:15:00	120.00	1200.00	20				1.02	2.0	23.5
9/10/2024	11:20:00	300.00	1500.00	25				1.02	6.0	29.5
9/10/2024	11:25:00	300.00	1800.00	30				1.02	7.0	36.5
9/10/2024	11:30:00	300.00	2100.00	35				1.02	6.0	42.5
9/10/2024	11:35:00	300.00	2400.00	40				1.02	4.0	46.5
9/10/2024	11:40:00	300.00	2700.00	45				1.02	6.0	52.5
9/10/2024	11:45:00	300.00	3000.00	50				1.02	6.0	58.5
9/10/2024	11:50:00	300.00	3300.00	55				1.02	5.0	63.5
9/10/2024	11:55:00	300.00	3600.00	60				1.02	6.0	69.5
Best-Fit Line		Final Time	3600.00			Average Hydraulic Gradient (I):		**1.02**	Final Volume	69.5
Best-Fit Line Y Intercept:			3.61			Best-Fit Flow Rate (Q, mL/sec):		0.0182		



Note: Test and calculation methods described in Gefell, M.J., M. LaRue, and K. Russell, 2019. "Vertical Hydraulic Conductivity Measurement by Gravity Drainage." *Groundwater* 57(4):511–516.

ANCHOR QEA

Calculation of Vertical Hydraulic Conductivity by Gravity Drainage

GE - Housatonic

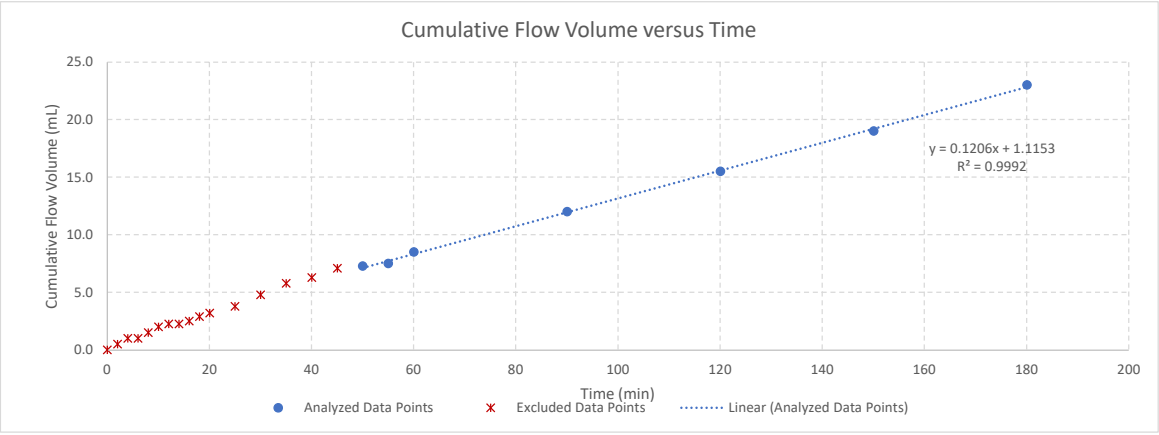
Core ID: PZ-06

Staff: A. Olsen, J. Ramey-Lariviere

Sample Depth In (Ft)	**0-5.7**	**feet**
Sediment Sample Length (ft)	**5.1**	**feet**
Total Core Tube Length (ft)	**5.6**	**feet**
Core Diameter (in)	**3.00**	**inches**
Core Diameter (in)	**7.62**	**cm**
Flow Area (A)	**45.6**	**cm^2**

Kv Calculation (cm/sec)
Kv = Q / (AI)
4.0E-05

Time									Flow Volume (mL)	
Incremental			Cumulative		Water Level					
Date	Time Elapsed (HH:MM:SS)	Seconds	Seconds	Minutes	From Top (in)	From Top (Feet)	From Bottom (Feet)	Hydraulic Gradient	Incremental	Cumulative
2/10/2025	0:00:00	0.00	0.00	0	0			1.10	0.0	0.0
2/10/2025	0:02:00	120.00	120.00	2					0.5	0.5
2/10/2025	0:04:00	120.00	240.00	4					0.5	1.0
2/10/2025	0:06:00	120.00	360.00	6					0.0	1.0
2/10/2025	0:08:00	120.00	480.00	8					0.5	1.5
2/10/2025	0:10:00	120.00	600.00	10					0.5	2.0
2/10/2025	0:12:00	120.00	720.00	12					0.3	2.3
2/10/2025	0:14:00	120.00	840.00	14					0.0	2.3
2/10/2025	0:16:00	120.00	960.00	16					0.3	2.5
2/10/2025	0:18:00	120.00	1080.00	18					0.4	2.9
2/10/2025	0:20:00	120.00	1200.00	20					0.3	3.2
2/10/2025	0:25:00	300.00	1500.00	25					0.6	3.8
2/10/2025	0:30:00	300.00	1800.00	30					1.0	4.8
2/10/2025	0:35:00	300.00	2100.00	35					1.0	5.8
2/10/2025	0:40:00	300.00	2400.00	40					0.5	6.3
2/10/2025	0:45:00	300.00	2700.00	45					0.8	7.1
2/10/2025	0:50:00	300.00	3000.00	50					0.2	7.3
2/10/2025	0:55:00	300.00	3300.00	55					0.2	7.5
2/10/2025	1:00:00	300.00	3600.00	60					1.0	8.5
2/10/2025	1:30:00	1800.00	5400.00	90					3.5	12.0
2/10/2025	2:00:00	1800.00	7200.00	120					3.5	15.5
2/10/2025	2:30:00	1800.00	9000.00	150					3.5	19.0
2/10/2025	3:00:00	1800.00	10800.00	180	0.08			1.08	4.0	23.0
Best-Fit Line		Final Time	10800.00			Average Hydraulic Gradient (I):		**1.09**	Final Volume	23.0
Best-Fit Line Y Intercept:			1.1153			Best-Fit Flow Rate (Q, mL/sec):		0.0020		



Note: Test and calculation methods described in Gefell, M.J., M. LaRue, and K. Russell, 2019. "Vertical Hydraulic Conductivity Measurement by Gravity Drainage." *Groundwater* 57(4):511–516.

ANCHOR QEA

Calculation of Vertical Hydraulic Conductivity by Gravity Drainage

GE - Housatonic

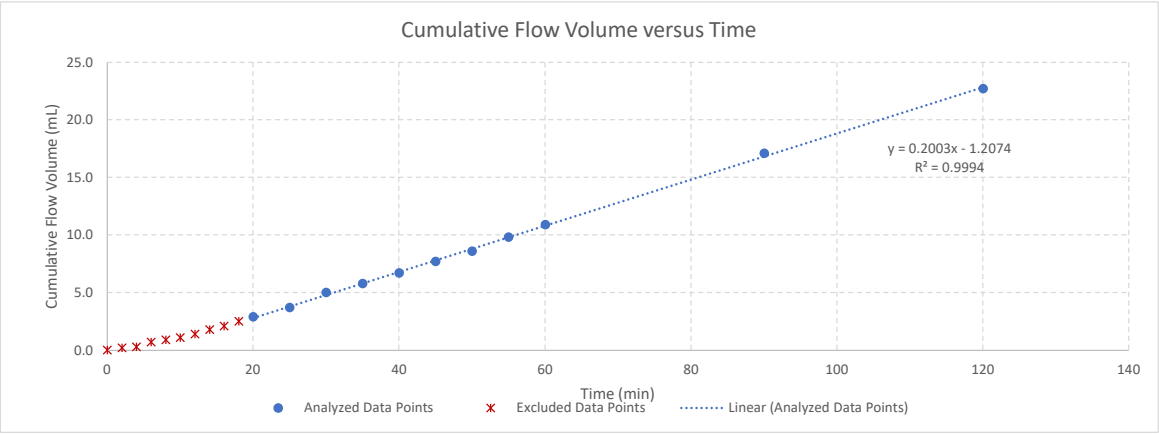
Core ID: PZ-07

Staff: A. Olsen, J. Ramey-Lariviere

Sample Depth In (Ft)	**0-6.0**	**feet**
Sediment Sample Length (ft)	**6.00**	**feet**
Total Core Tube Length (ft)	**6.00**	**feet**
Core Diameter (in)	**3.00**	**inches**
Core Diameter (in)	**7.62**	**cm**
Flow Area (A)	**45.6**	**cm^2**

Kv Calculation (cm/sec)
Kv = Q / (AI)
7.3E-05

Time									**Flow Volume (mL)**	
Incremental			**Cumulative**		**Water Level**					
Date	**Time Elapsed (HH:MM:SS)**	**Seconds**	**Seconds**	**Minutes**	**From Top (in)**	**From Top (Feet)**	**From Bottom (Feet)**	**Hydraulic Gradient**	**Incremental**	**Cumulative**
1/24/2025	13:30:00	0.00	0.00	0				1	0.0	0.0
1/24/2025	13:32:00	120.00	120.00	2				1	0.2	0.2
1/24/2025	13:34:00	120.00	240.00	4				1	0.1	0.3
1/24/2025	13:36:00	120.00	360.00	6				1	0.4	0.7
1/24/2025	13:38:00	120.00	480.00	8				1	0.2	0.9
1/24/2025	13:40:00	120.00	600.00	10				1	0.2	1.1
1/24/2025	13:42:00	120.00	720.00	12				1	0.3	1.4
1/24/2025	13:44:00	120.00	840.00	14				1	0.4	1.8
1/24/2025	13:46:00	120.00	960.00	16				1	0.3	2.1
1/24/2025	13:48:00	120.00	1080.00	18				1	0.4	2.5
1/24/2025	13:50:00	120.00	1200.00	20				1	0.4	2.9
1/24/2025	13:55:00	300.00	1500.00	25				1	0.8	3.7
1/24/2025	14:00:00	300.00	1800.00	30				1	1.3	5.0
1/24/2025	14:05:00	300.00	2100.00	35				1	0.8	5.8
1/24/2025	14:10:00	300.00	2400.00	40				1	0.9	6.7
1/24/2025	14:15:00	300.00	2700.00	45				1	1.0	7.7
1/24/2025	14:20:00	300.00	3000.00	50				1	0.9	8.6
1/24/2025	14:25:00	300.00	3300.00	55				1	1.2	9.8
1/24/2025	14:30:00	300.00	3600.00	60				1	1.1	10.9
1/24/2025	15:00:00	1800.00	5400.00	90				1	6.2	17.1
1/24/2025	15:30:00	1800.00	7200.00	120				1	5.6	22.7
Best-Fit Line		Final Time	7200.00			Average Hydraulic Gradient (I):		**1.00**	Final Volume	22.7
Best-Fit Line Y Intercept:			-1.2074			Best-Fit Flow Rate (Q, mL/sec):		0.0033		



Note: Test and calculation methods described in Gefell, M.J., M. LaRue, and K. Russell, 2019. "Vertical Hydraulic Conductivity Measurement by Gravity Drainage." *Groundwater* 57(4):511–516.

ANCHOR QEA

Calculation of Vertical Hydraulic Conductivity by Gravity Drainage

GE - Housatonic

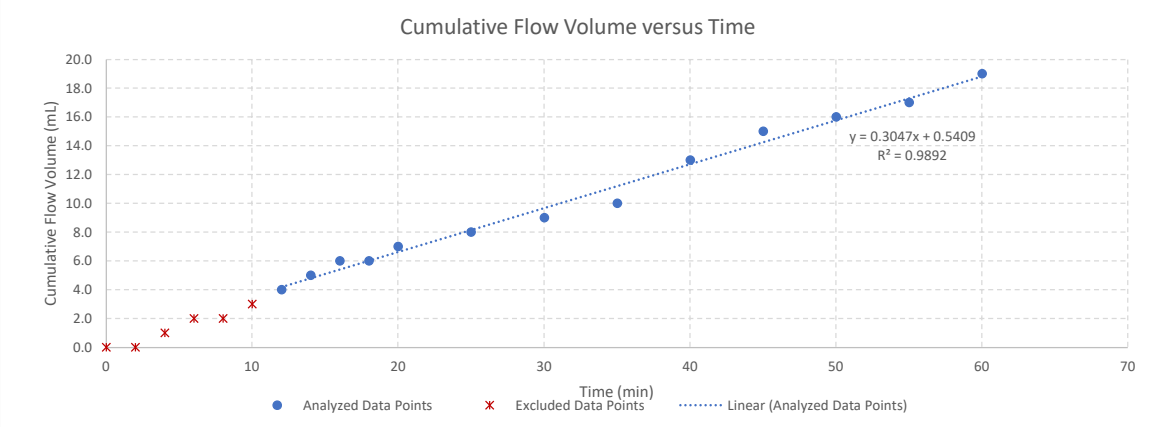
Core ID: PZ-08

Staff: A. Olsen, J. Ramey-Lariviere

Sample Depth In (Ft)	**0-10**	**feet**
Sediment Sample Length (ft)	**6.20**	**feet**
Total Core Tube Length (ft)	**6.30**	**feet**
Core Diameter (in)	**3.00**	**inches**
Core Diameter (in)	**7.62**	**cm**
Flow Area (A)	**45.6**	**cm^2**

Kv Calculation (cm/sec)
Kv = Q / (AI)
1.1E-04

Time									**Flow Volume (mL)**	
Incremental			**Cumulative**		**Water Level**					
Date	**Time Elapsed (HH:MM:SS)**	**Seconds**	**Seconds**	**Minutes**	**From Top (in)**	**From Top (Feet)**	**From Bottom (Feet)**	**Hydraulic Gradient**	**Incremental**	**Cumulative**
9/11/2024	11:22:30	0.00	0.00	0				1.02	0.0	0.0
9/11/2024	11:24:30	120.00	120.00	2				1.02	0.0	0.0
9/11/2024	11:26:30	120.00	240.00	4				1.02	1.0	1.0
9/11/2024	11:28:30	120.00	360.00	6				1.02	1.0	2.0
9/11/2024	11:30:30	120.00	480.00	8				1.02	0.0	2.0
9/11/2024	11:32:30	120.00	600.00	10				1.02	1.0	3.0
9/11/2024	11:34:30	120.00	720.00	12				1.02	1.0	4.0
9/11/2024	11:36:30	120.00	840.00	14				1.02	1.0	5.0
9/11/2024	11:38:30	120.00	960.00	16				1.02	1.0	6.0
9/11/2024	11:40:30	120.00	1080.00	18				1.02	0.0	6.0
9/11/2024	11:42:30	120.00	1200.00	20				1.02	1.0	7.0
9/11/2024	11:47:30	300.00	1500.00	25				1.02	1.0	8.0
9/11/2024	11:52:30	300.00	1800.00	30				1.02	1.0	9.0
9/11/2024	11:57:30	300.00	2100.00	35				1.02	1.0	10.0
9/11/2024	12:02:30	300.00	2400.00	40				1.02	3.0	13.0
9/11/2024	12:07:30	300.00	2700.00	45				1.02	2.0	15.0
9/11/2024	12:12:30	300.00	3000.00	50				1.02	1.0	16.0
9/11/2024	12:17:30	300.00	3300.00	55				1.02	1.0	17.0
9/11/2024	12:22:30	300.00	3600.00	60				1.02	2.0	19.0
Best-Fit Line		Final Time	3600.00			Average Hydraulic Gradient (I):		**1.02**	Final Volume	19.0
Best-Fit Line Y Intercept:			2.41			Best-Fit Flow Rate (Q, mL/sec):		0.0051		



Note: Test and calculation methods described in Gefell, M.J., M. LaRue, and K. Russell, 2019. "Vertical Hydraulic Conductivity Measurement by Gravity Drainage." *Groundwater* 57(4):511–516.

ANCHOR QEA

Calculation of Vertical Hydraulic Conductivity by Gravity Drainage

GE - Housatonic

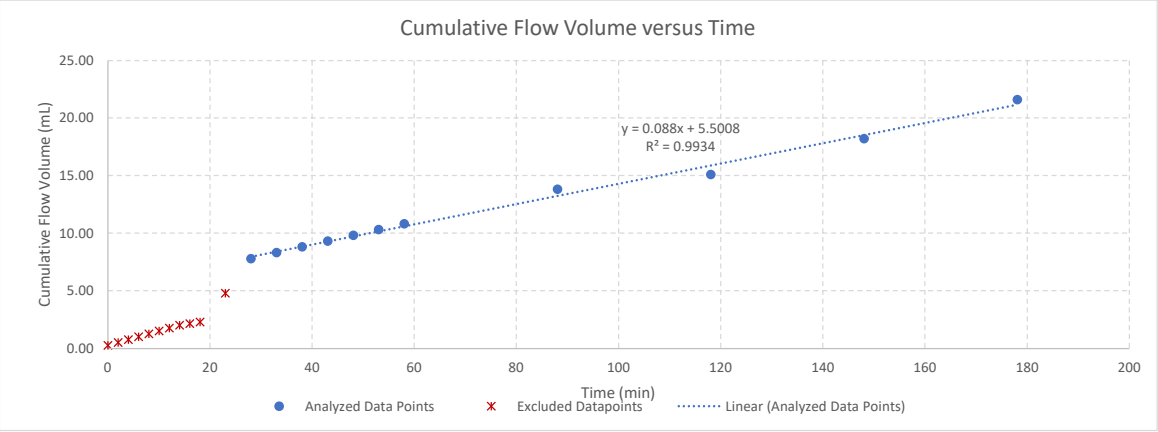
Core ID: PZ-09

Staff: A. Olsen, J. Ramey-Lariviere

Sample Depth In (Ft)	**0-6.0**	**feet**
Sediment Sample Length (ft)	**5.70**	**feet**
Total Core Tube Length (ft)	**5.60**	**feet**
Core Diameter (in)	**3.00**	**inches**
Core Diameter (in)	**7.62**	**cm**
Flow Area (A)	**45.6**	**cm^2**

Kv Calculation (cm/sec)
Kv = Q / (AI)
3.3E-05

Time									Flow Volume (mL)	
Incremental			Cumulative		Water Level					
Date	Time Elapsed (HH:MM:SS)	Seconds	Seconds	Minutes	From Top (in)	From Top (Feet)	From Bottom (Feet)	Hydraulic Gradient	Incremental	Cumulative
2/26/2025	0:02:00	0.00	0.00	0	0			0.98	0.25	0.25
2/26/2025	0:04:00	120.00	120.00	2					0.25	0.50
2/26/2025	0:06:00	120.00	240.00	4					0.25	0.75
2/26/2025	0:08:00	120.00	360.00	6					0.25	1.00
2/26/2025	0:10:00	120.00	480.00	8					0.25	1.25
2/26/2025	0:12:00	120.00	600.00	10					0.25	1.50
2/26/2025	0:14:00	120.00	720.00	12					0.25	1.75
2/26/2025	0:16:00	120.00	840.00	14					0.25	2.00
2/26/2025	0:18:00	120.00	960.00	16					0.15	2.15
2/26/2025	0:20:00	120.00	1080.00	18					0.15	2.30
2/26/2025	0:25:00	300.00	1380.00	23					2.50	4.80
2/26/2025	0:30:00	300.00	1680.00	28					3.00	7.80
2/26/2025	0:35:00	300.00	1980.00	33					0.50	8.30
2/26/2025	0:40:00	300.00	2280.00	38					0.50	8.80
2/26/2025	0:45:00	300.00	2580.00	43					0.50	9.30
2/26/2025	0:50:00	300.00	2880.00	48					0.50	9.80
2/26/2025	0:55:00	300.00	3180.00	53					0.50	10.30
2/26/2025	1:00:00	600.00	3480.00	58					0.50	10.80
2/26/2025	1:30:00	1800.00	5280.00	88					3.00	13.80
2/26/2025	2:00:00	1800.00	7080.00	118					3.30	15.10
2/26/2025	2:30:00	1800.00	8880.00	148					3.10	18.20
2/26/2025	3:00:00	5400.00	10680.00	178	0.02			0.98	3.40	21.60
Best-Fit Line		Final Time	10680.00			Average Hydraulic Gradient (I):		**0.98**	Final Volume	21.6
Best-Fit Line Y Intercept:			4.7744			Best-Fit Flow Rate (Q, mL/sec):		0.0015		



Note: Test and calculation methods described in Gefell, M.J., M. LaRue, and K. Russell, 2019. "Vertical Hydraulic Conductivity Measurement by Gravity Drainage." *Groundwater* 57(4):511–516.

ANCHOR QEA

Calculation of Vertical Hydraulic Conductivity by Gravity Drainage

GE - Housatonic

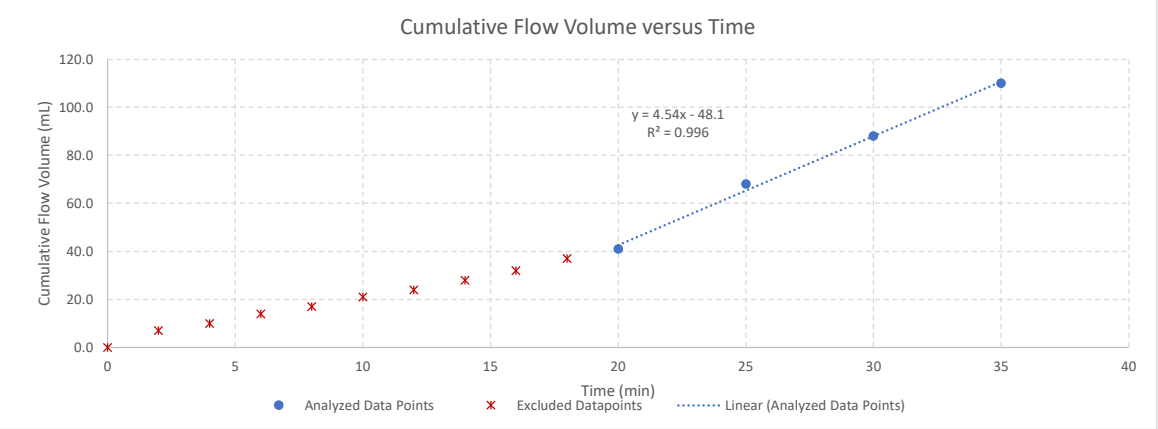
Core ID: PZ-10

Staff: A. Olsen, J. Ramey-Lariviere

Sample Depth In (Ft)	**0-6.0**	**feet**
Sediment Sample Length (ft)	**6.00**	**feet**
Total Core Tube Length (ft)	**6.10**	**feet**
Core Diameter (in)	**3.00**	**inches**
Core Diameter (in)	**7.62**	**cm**
Flow Area (A)	**45.6**	**cm^2**

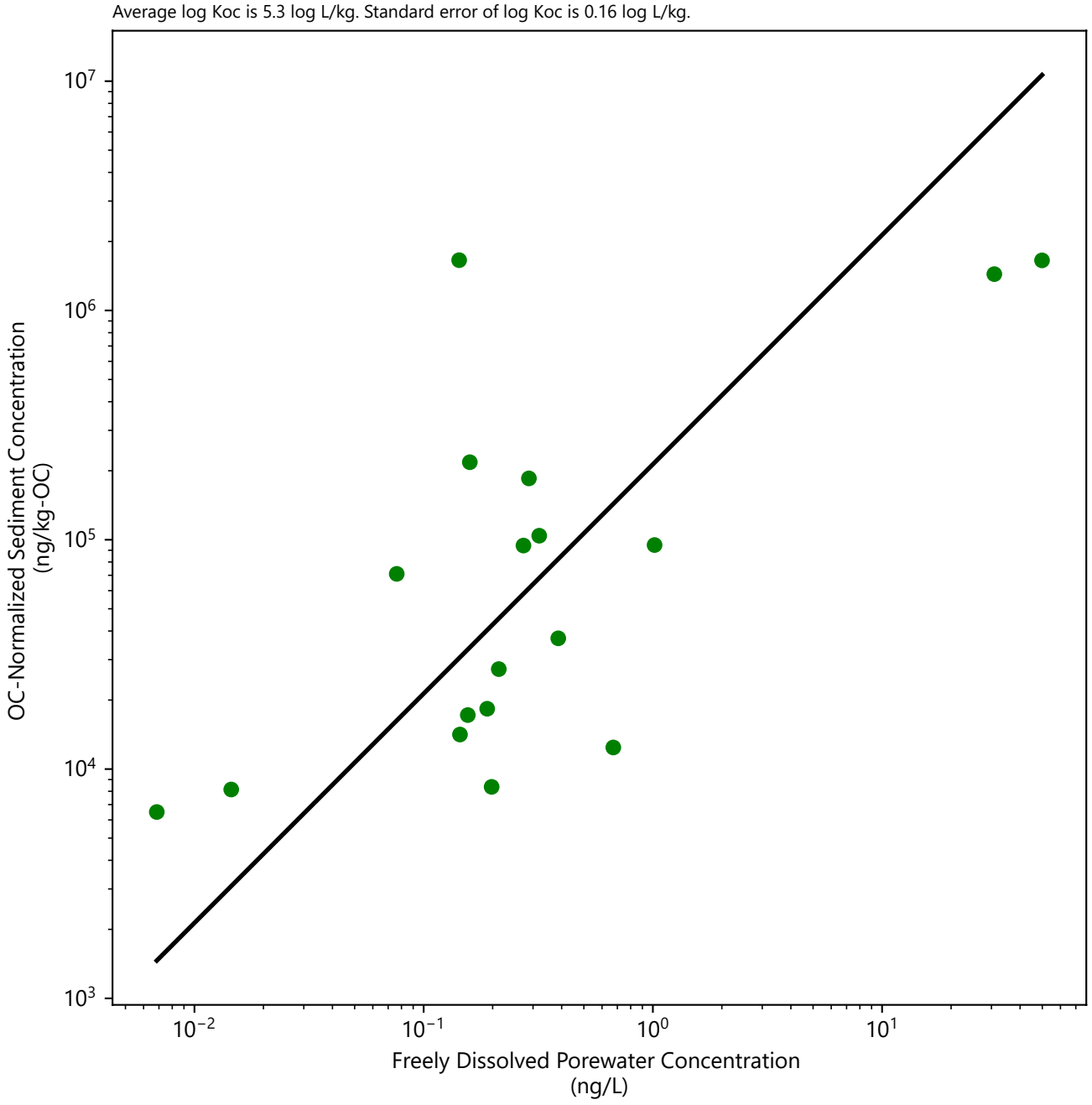
Kv Calculation (cm/sec)
Kv = Q / (AI)
1.6E-03

Time									**Flow Volume (mL)**	
Incremental			**Cumulative**		**Water Level**					
Date	**Time Elapsed (HH:MM:SS)**	**Seconds**	**Seconds**	**Minutes**	**From Top (in)**	**From Top (Feet)**	**From Bottom (Feet)**	**Hydraulic Gradient**	**Incremental**	**Cumulative**
9/11/2024	13:22:00	0.00	0.00	0				1.02	0.0	0.0
9/11/2024	13:24:00	120.00	120.00	2				1.02	7.0	7.0
9/11/2024	13:26:00	120.00	240.00	4				1.02	3.0	10.0
9/11/2024	13:28:00	120.00	360.00	6				1.02	4.0	14.0
9/11/2024	13:30:00	120.00	480.00	8				1.02	3.0	17.0
9/11/2024	13:32:00	120.00	600.00	10				1.02	4.0	21.0
9/11/2024	13:34:00	120.00	720.00	12				1.02	3.0	24.0
9/11/2024	13:36:00	120.00	840.00	14				1.02	4.0	28.0
9/11/2024	13:38:00	120.00	960.00	16				1.02	4.0	32.0
9/11/2024	13:40:00	120.00	1080.00	18				1.02	5.0	37.0
9/11/2024	13:42:00	120.00	1200.00	20				1.02	4.0	41.0
9/11/2024	13:47:00	300.00	1500.00	25				1.02	27.0	68.0
9/11/2024	13:52:00	300.00	1800.00	30				1.02	20.0	88.0
9/11/2024	13:57:00	300.00	2100.00	35				1.02	22.0	110.0
Best-Fit Line		Final Time	2100.00			Average Hydraulic Gradient (I):		**1.02**	Final Volume	110.0
Best-Fit Line Y Intercept:			1.64			Best-Fit Flow Rate (Q, mL/sec):		0.0757		



Note: Test and calculation methods described in Gefell, M.J., M. LaRue, and K. Russell, 2019. "Vertical Hydraulic Conductivity Measurement by Gravity Drainage." *Groundwater* 57(4):511–516. 6.

Attachment 3
PCB Homolog Partition Coefficients

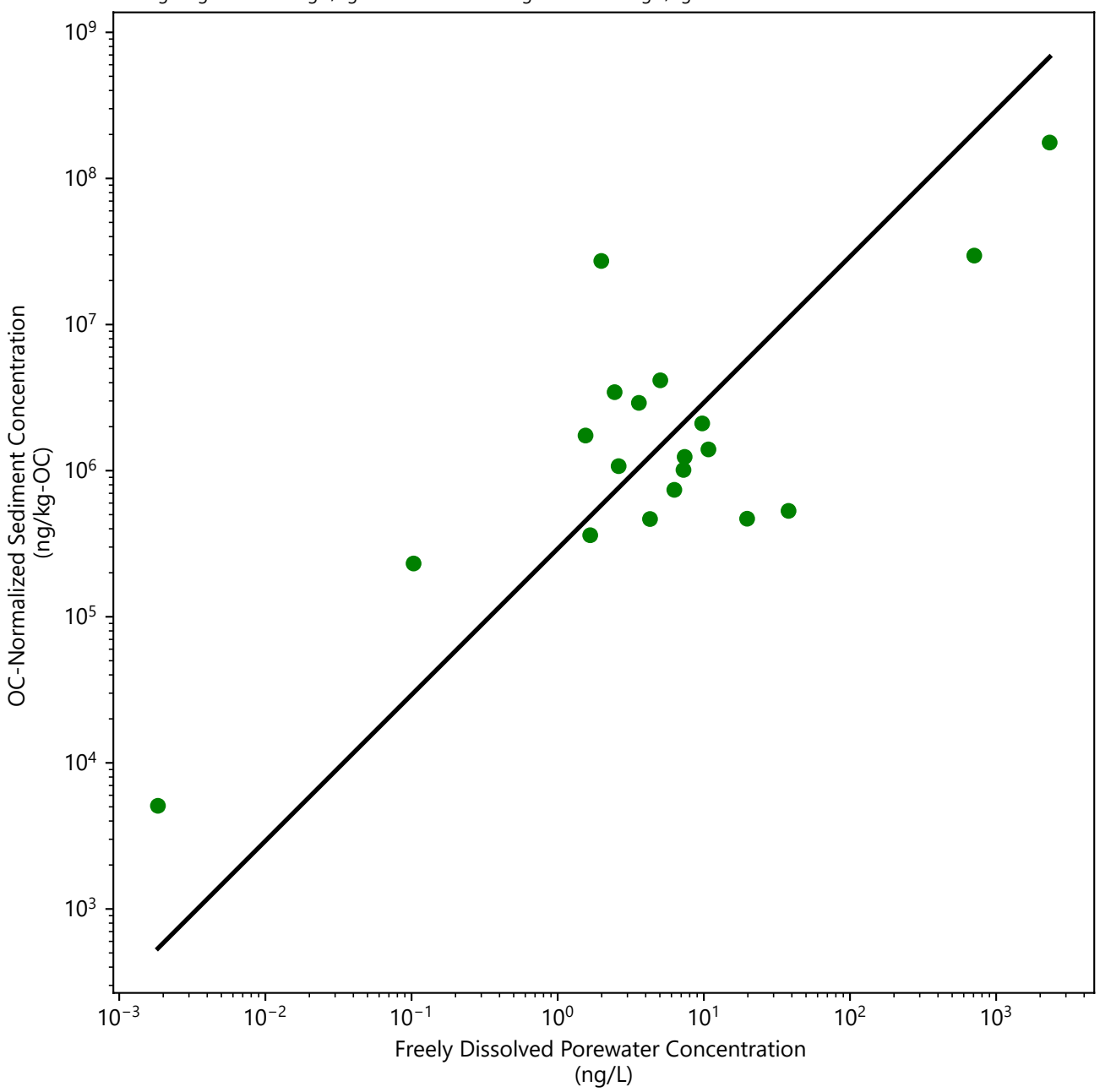


Notes:
1. TOC values less than 0.2% were set to 0.2%.
2. One-sided Grubbs test (alpha = 0.05) showed that sample BW5A5-PW13 is an outlier for penta-, hexa-, hepta-, octa-, nona-, deca-PCB homologs and total PCB. Although not an outlier for tri-PCB and tetra-PCB, this sample was removed from the regression evaluation for each homolog.
3. The black line represents the log-transformed regression based on Equation 3-2 in Appendix A.
4. Non-detect freely dissolved porewater or sediment concentrations were excluded from the analysis and not shown on the plots.

Publish Date: 09/21/2023 11:23 AM | User: SEA-JLIN2
\\WCL-FS1\Syracuse\Projects\GE\Housatonic_Rest-of-River\Remedial_Design\Reach_5A\ANALYSIS\Sediment\Partitioning\Partition calcs_Housatonic.py

ANCHOR QEA

Figure 1
Partitioning Evaluation - Monochlorobiphenyl
Engineered Cap Modeling and Design Evaluations
Housatonic River – Rest of River



Notes:
1. TOC values less than 0.2% were set to 0.2%.
2. One-sided Grubbs test (alpha = 0.05) showed that sample BW5A5-PW13 is an outlier for penta-, hexa-, hepta-, octa-, nona-, deca-PCB homologs and total PCB. Although not an outlier for tri-PCB and tetra-PCB, this sample was removed from the regression evaluation for each homolog.
3. The black line represents the log-transformed regression based on Equation 3-2 in Appendix A.
4. Non-detect freely dissolved porewater or sediment concentrations were excluded from the analysis and not shown on the plots.

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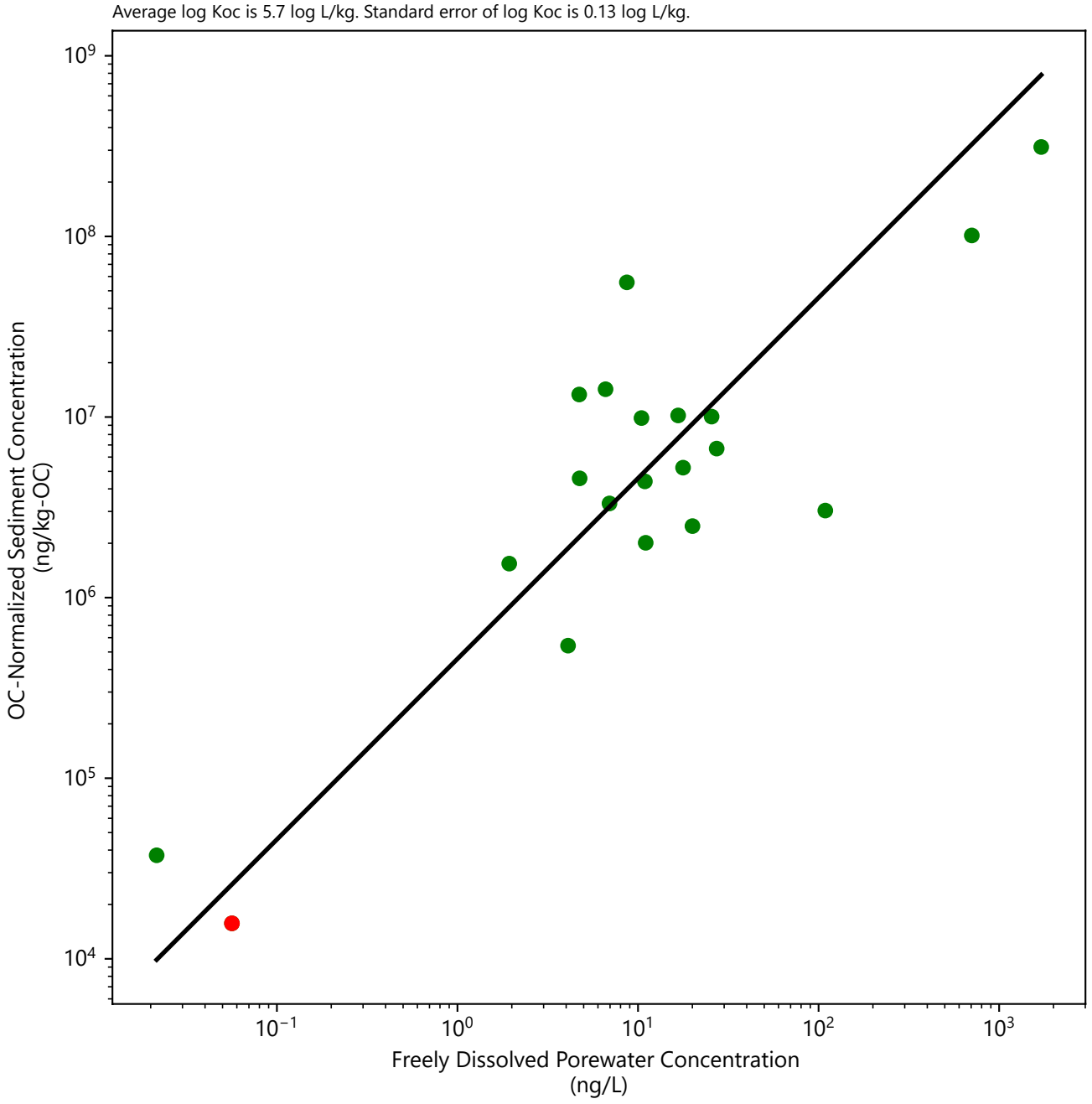
Figure 2
Partitioning Evaluation - Dichlorobiphenyl
Engineered Cap Modeling and Design Evaluations
Housatonic River – Rest of River



Notes:
1. TOC values less than 0.2% were set to 0.2%.
2. One-sided Grubbs test (alpha = 0.05) showed that sample BW5A5-PW13 is an outlier for penta-, hexa-, hepta-, octa-, nona-, deca-PCB homologs and total PCB. Although not an outlier for tri-PCB and tetra-PCB, this sample was removed from the regression evaluation for each homolog.
3. The black line represents the log-transformed regression based on Equation 3-2 in Appendix A.
4. Non-detect freely dissolved porewater or sediment concentrations were excluded from the analysis and not shown on the plots.

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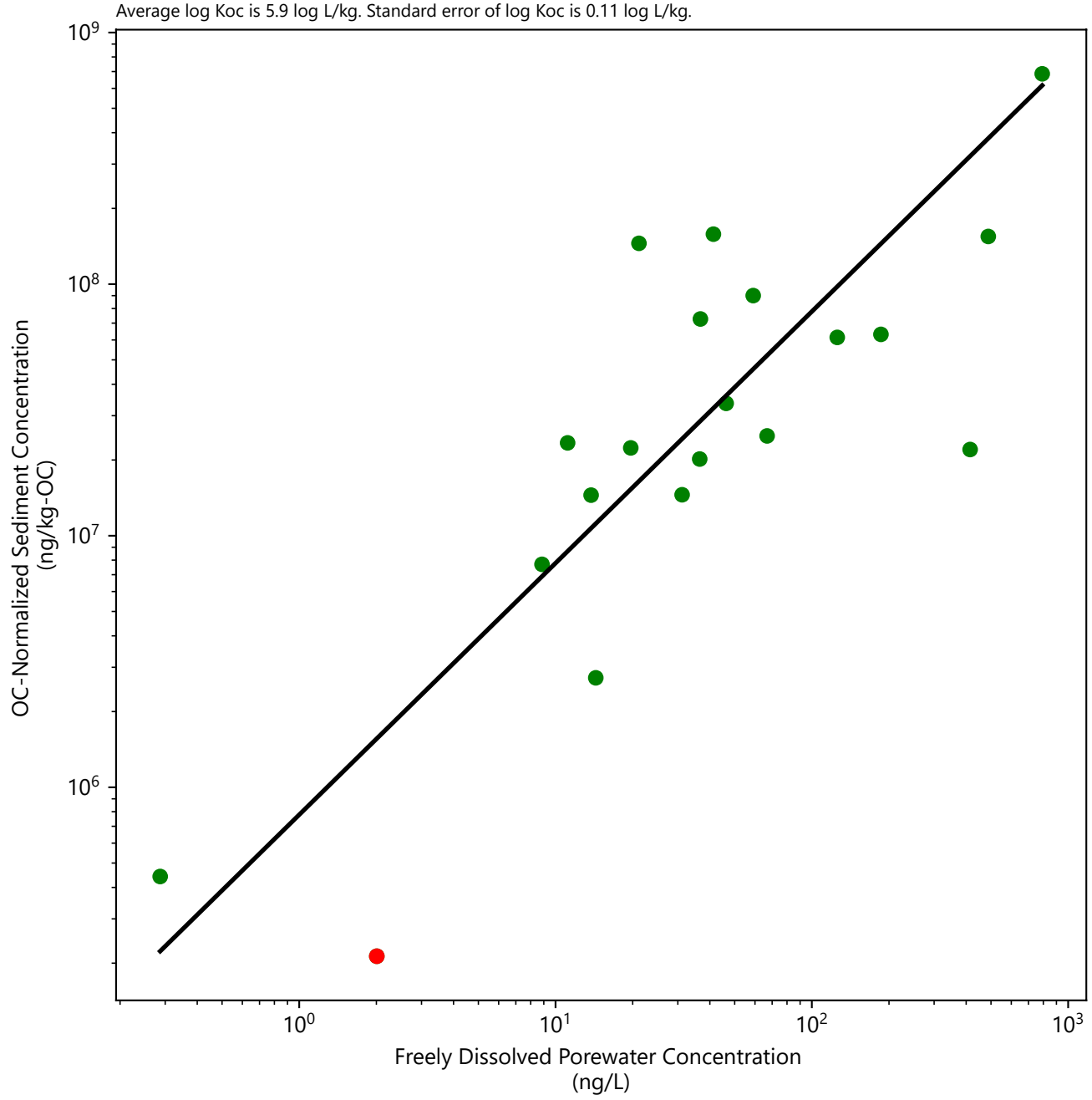
Figure 3
Partitioning Evaluation - Trichlorobiphenyl
Engineered Cap Modeling and Design Evaluations
Housatonic River – Rest of River



Notes:
1. TOC values less than 0.2% were set to 0.2%.
2. One-sided Grubbs test (alpha = 0.05) showed that sample BW5A5-PW13 is an outlier for penta-, hexa-, hepta-, octa-, nona-, deca-PCB homologs and total PCB. Although not an outlier for tri-PCB and tetra-PCB, this sample was removed from the regression evaluation for each homolog.
3. The black line represents the log-transformed regression based on Equation 3-2 in Appendix A.
4. Non-detect freely dissolved porewater or sediment concentrations were excluded from the analysis and not shown on the plots.

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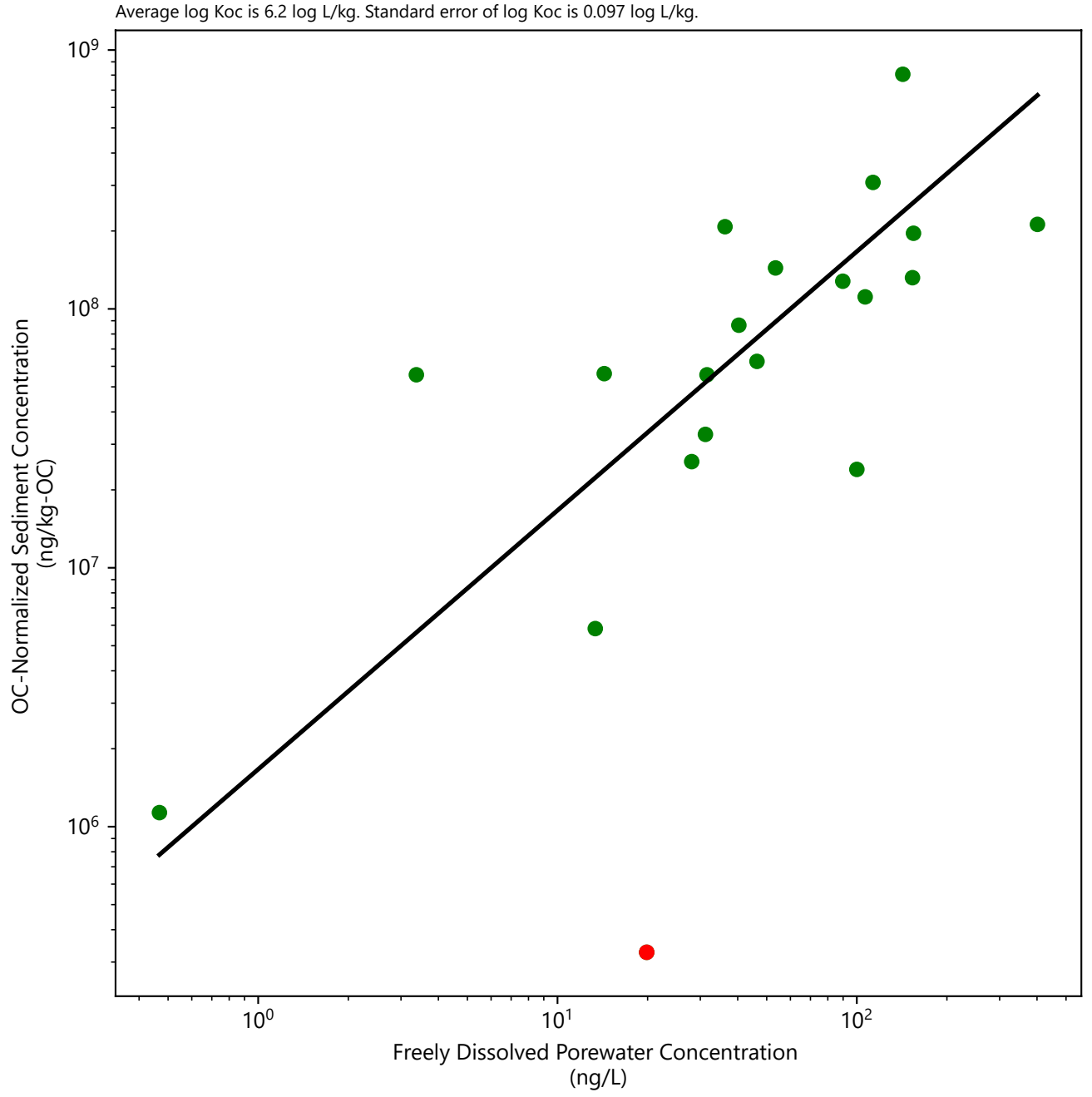
ANCHOR QEA

Figure 4
Partitioning Evaluation - Tetrachlorobiphenyl
Engineered Cap Modeling and Design Evaluations
Housatonic River – Rest of River



Notes:
1. TOC values less than 0.2% were set to 0.2%.
2. One-sided Grubbs test (alpha = 0.05) showed that sample BW5A5-PW13 is an outlier for penta-, hexa-, hepta-, octa-, nona-, deca-PCB homologs and total PCB. Although not an outlier for tri-PCB and tetra-PCB, this sample was removed from the regression evaluation for each homolog.
3. The black line represents the log-transformed regression based on Equation 3-2 in Appendix A.
4. Non-detect freely dissolved porewater or sediment concentrations were excluded from the analysis and not shown on the plots.

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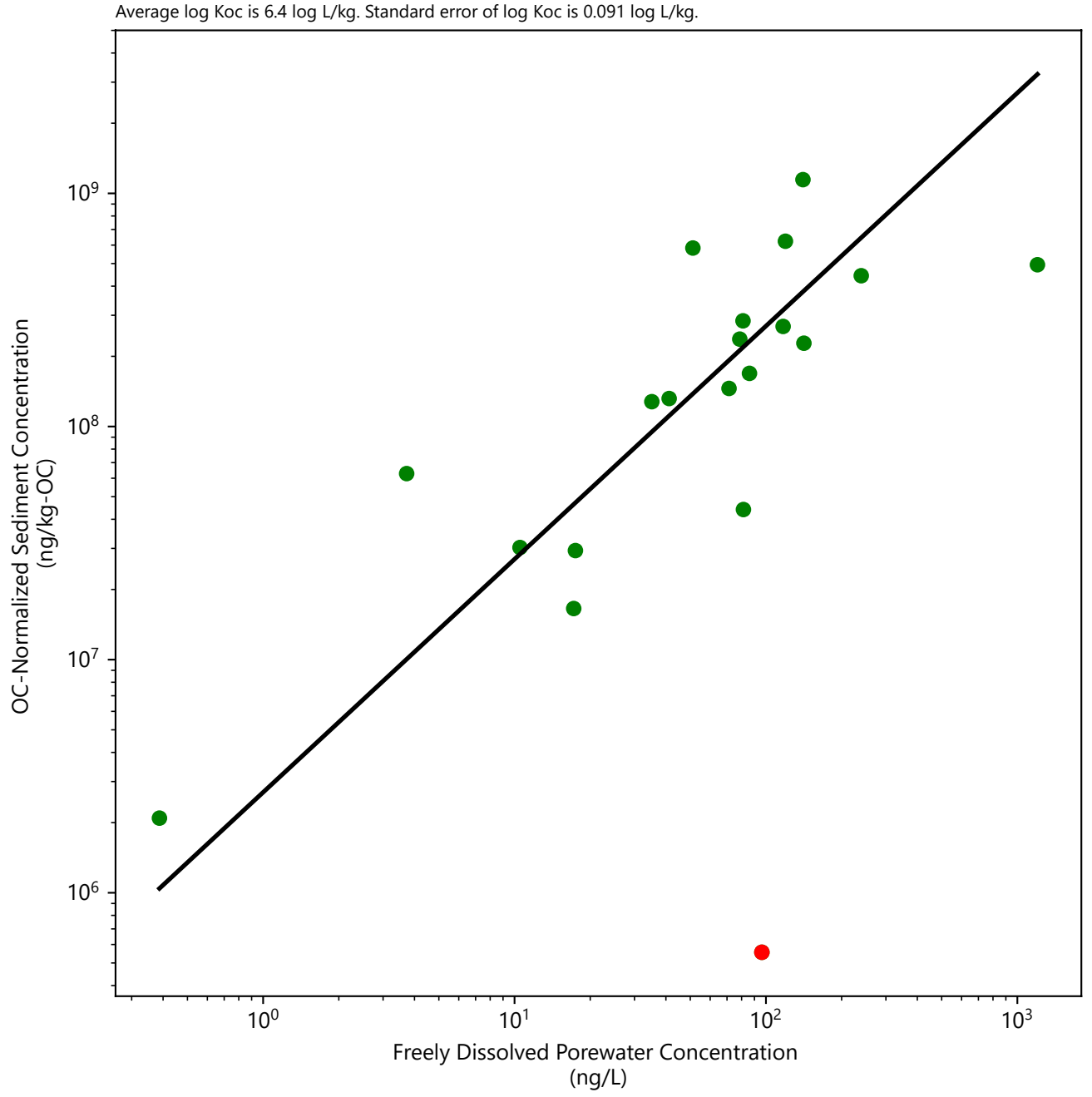
Figure 5
Partitioning Evaluation - Pentachlorobiphenyl
Engineered Cap Modeling and Design Evaluations
Housatonic River – Rest of River



Notes:
1. TOC values less than 0.2% were set to 0.2%.
2. One-sided Grubbs test (alpha = 0.05) showed that sample BW5A5-PW13 is an outlier for penta-, hexa-, hepta-, octa-, nona-, deca-PCB homologs and total PCB. Although not an outlier for tri-PCB and tetra-PCB, this sample was removed from the regression evaluation for each homolog.
3. The black line represents the log-transformed regression based on Equation 3-2 in Appendix A.
4. Non-detect freely dissolved porewater or sediment concentrations were excluded from the analysis and not shown on the plots.

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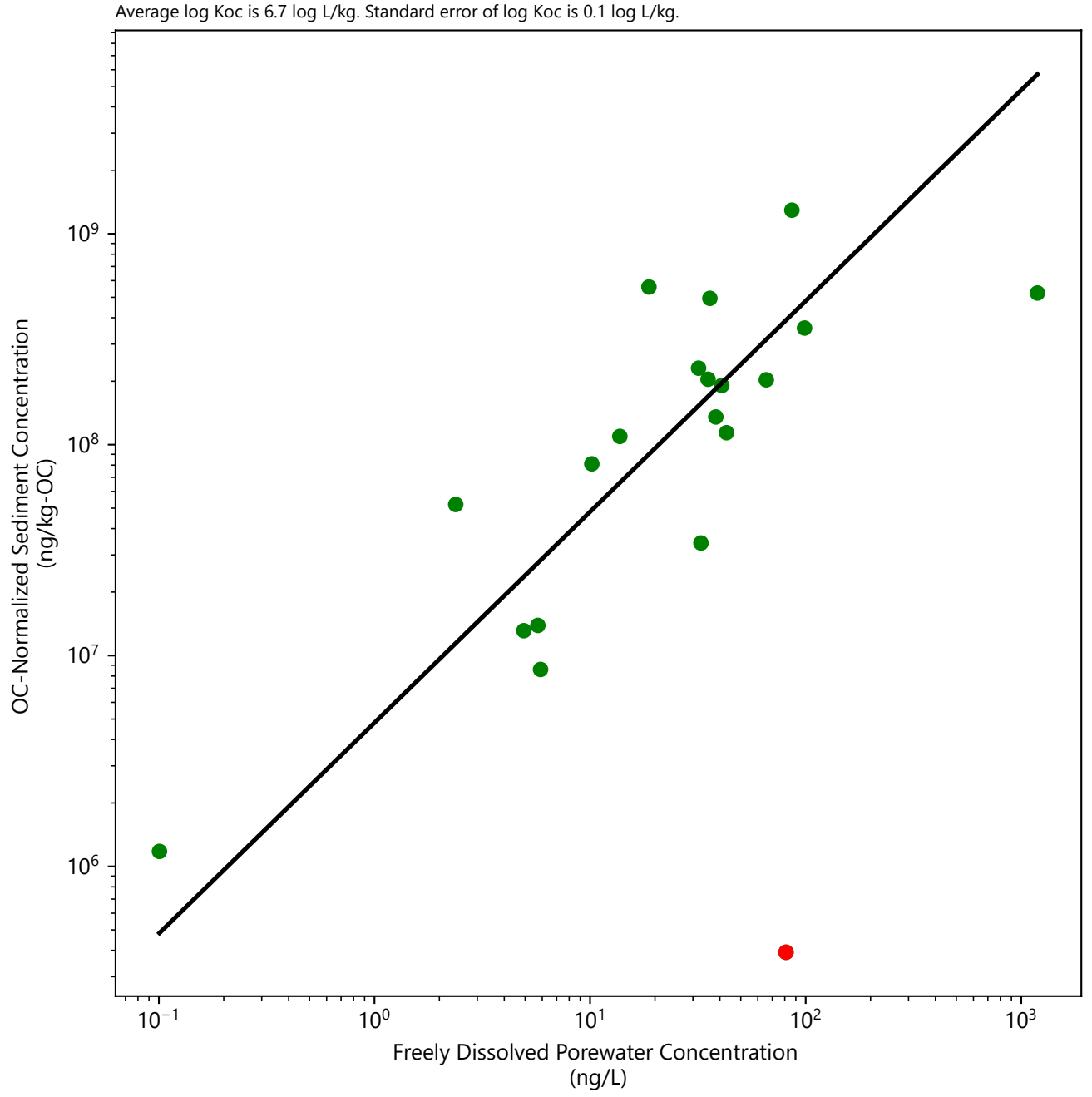
ANCHOR QEA

Figure 6
Partitioning Evaluation - Hexachlorobiphenyl
Engineered Cap Modeling and Design Evaluations
Housatonic River – Rest of River



Notes:
1. TOC values less than 0.2% were set to 0.2%.
2. One-sided Grubbs test (alpha = 0.05) showed that sample BW5A5-PW13 is an outlier for penta-, hexa-, hepta-, octa-, nona-, deca-PCB homologs and total PCB. Although not an outlier for tri-PCB and tetra-PCB, this sample was removed from the regression evaluation for each homolog.
3. The black line represents the log-transformed regression based on Equation 3-2 in Appendix A.
4. Non-detect freely dissolved porewater or sediment concentrations were excluded from the analysis and not shown on the plots.

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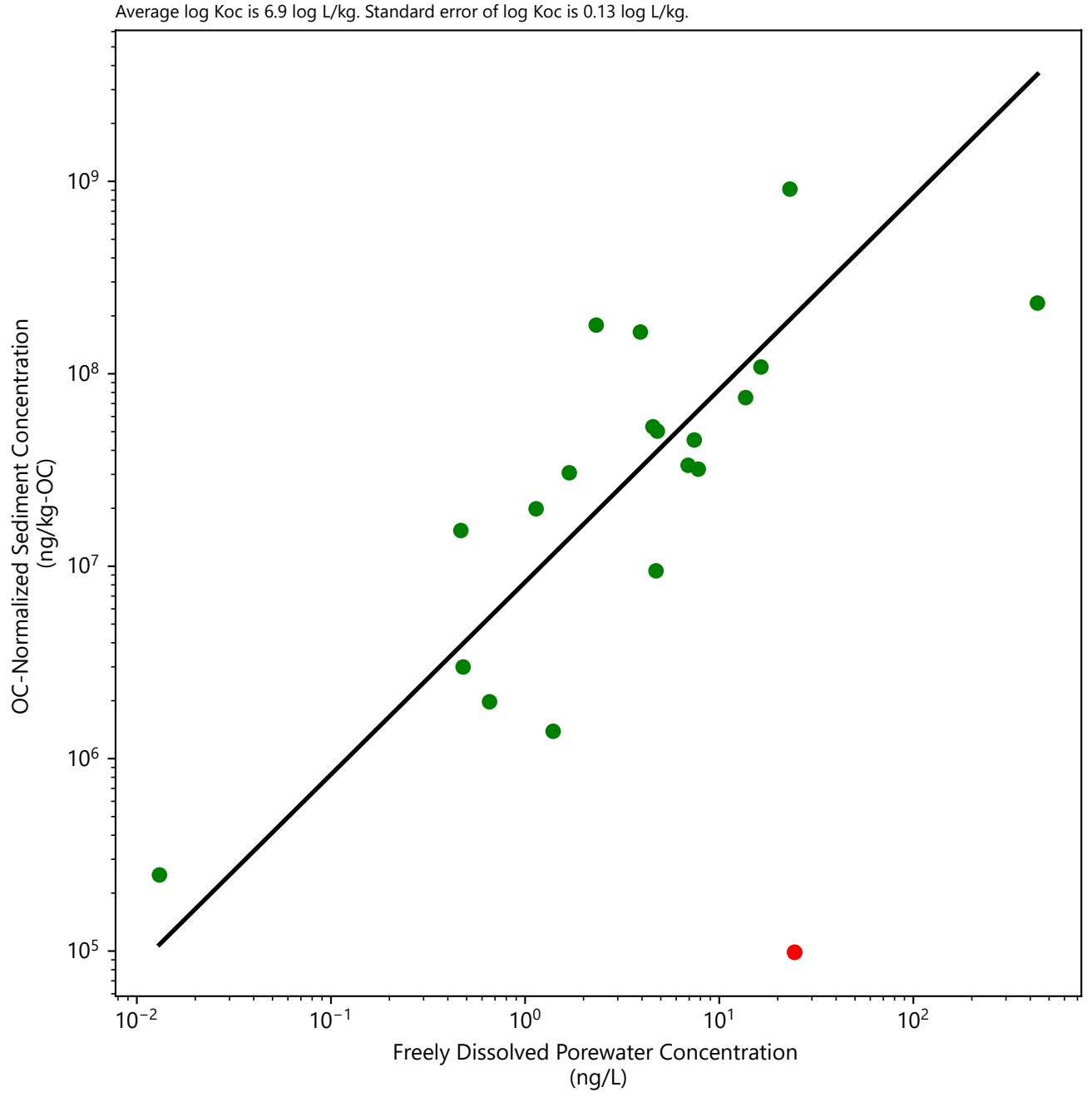
ANCHOR QEA

Figure 7
Partitioning Evaluation - Heptachlorobiphenyl
Engineered Cap Modeling and Design Evaluations
Housatonic River – Rest of River



Notes:
1. TOC values less than 0.2% were set to 0.2%.
2. One-sided Grubbs test (alpha = 0.05) showed that sample BW5A5-PW13 is an outlier for penta-, hexa-, hepta-, octa-, nona-, deca-PCB homologs and total PCB. Although not an outlier for tri-PCB and tetra-PCB, this sample was removed from the regression evaluation for each homolog.
3. The black line represents the log-transformed regression based on Equation 3-2 in Appendix A.
4. Non-detect freely dissolved porewater or sediment concentrations were excluded from the analysis and not shown on the plots.

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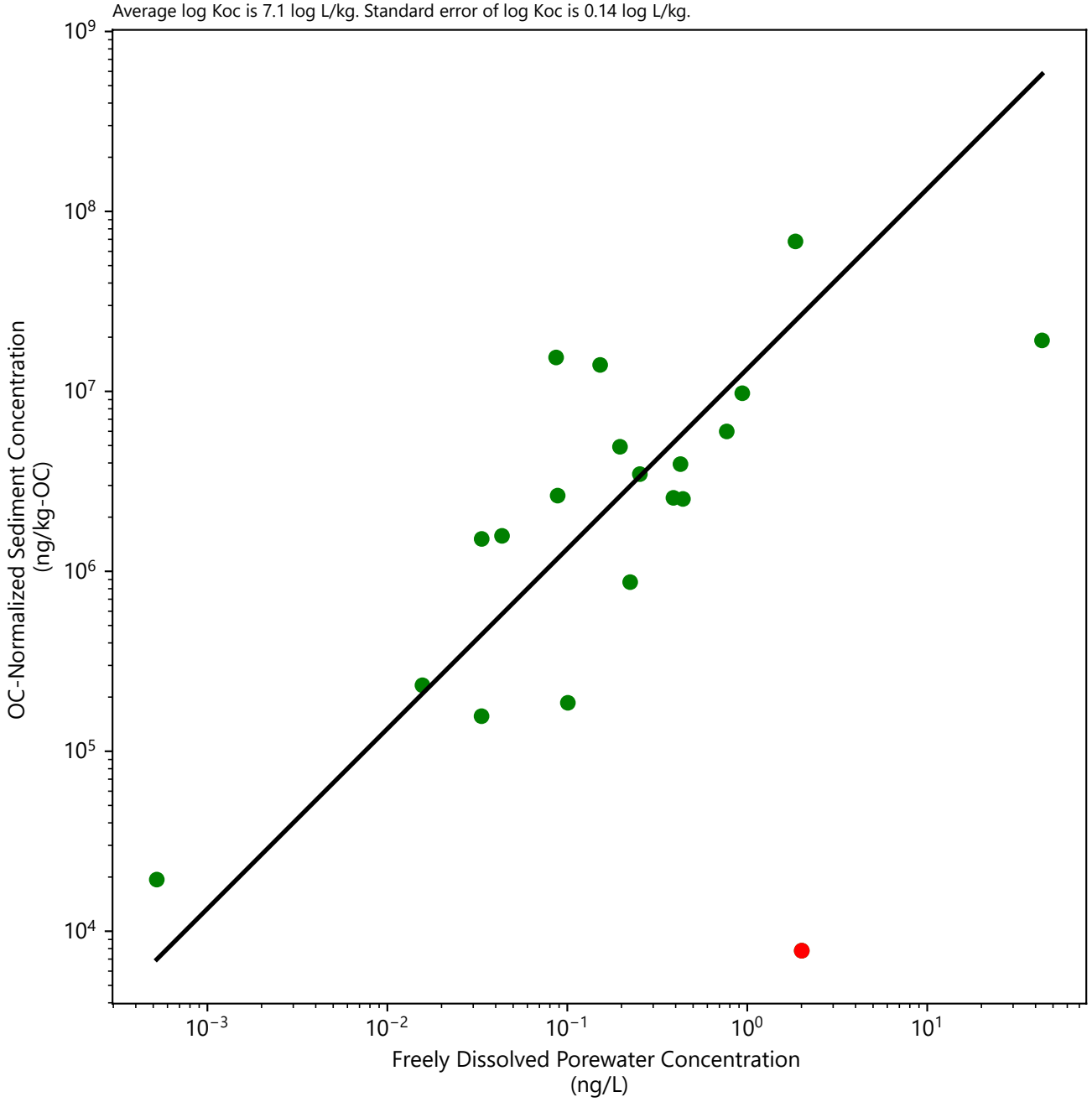
ANCHOR QEA

Figure 8
Partitioning Evaluation - Octachlorobiphenyl
Engineered Cap Modeling and Design Evaluations
Housatonic River – Rest of River



Notes:
1. TOC values less than 0.2% were set to 0.2%.
2. One-sided Grubbs test (alpha = 0.05) showed that sample BW5A5-PW13 is an outlier for penta-, hexa-, hepta-, octa-, nona-, deca-PCB homologs and total PCB. Although not an outlier for tri-PCB and tetra-PCB, this sample was removed from the regression evaluation for each homolog.
3. The black line represents the log-transformed regression based on Equation 3-2 in Appendix A.
4. Non-detect freely dissolved porewater or sediment concentrations were excluded from the analysis and not shown on the plots.

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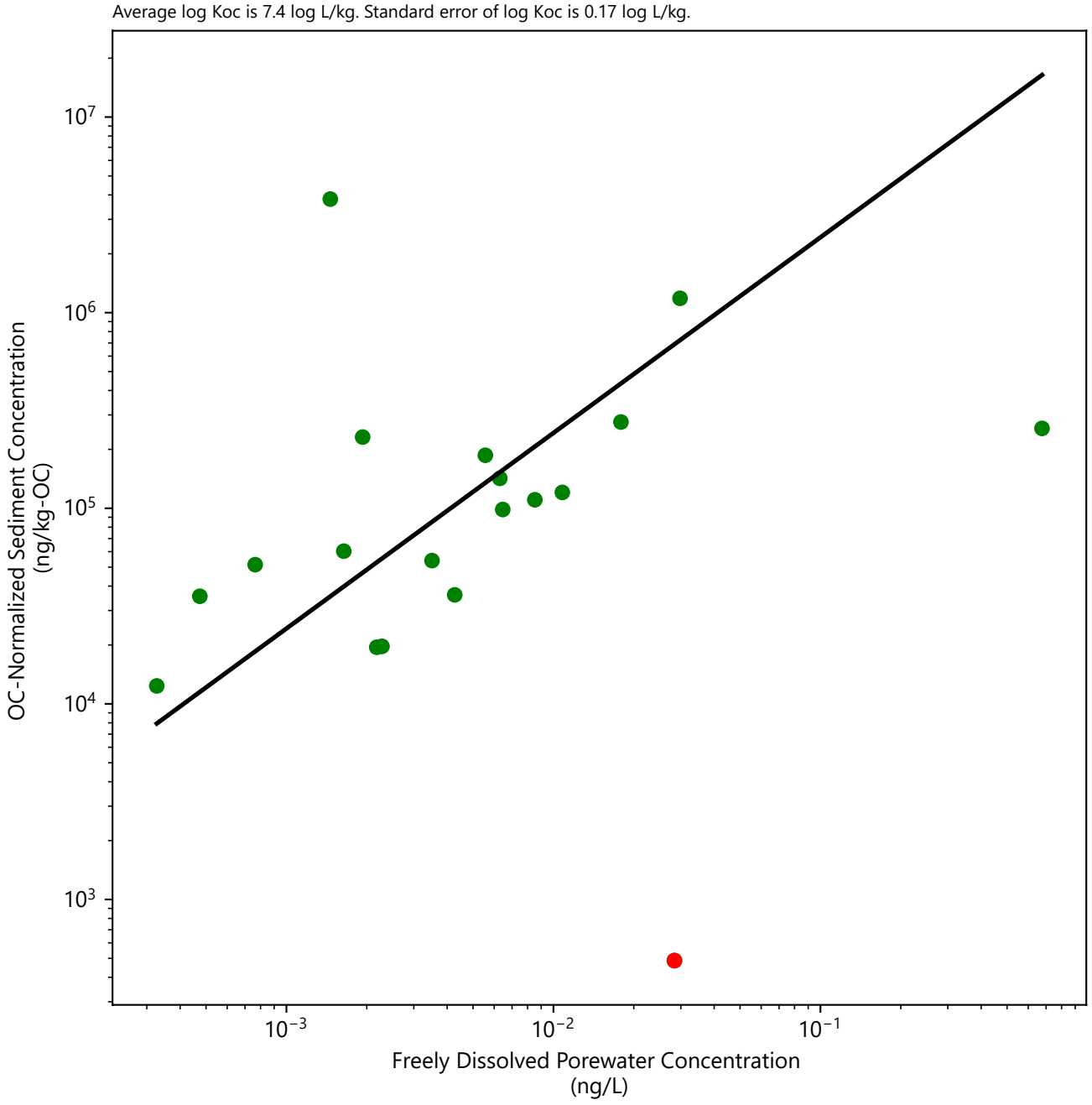
ANCHOR QEA

Figure 9
Partitioning Evaluation - Nonachlorobiphenyl
Engineered Cap Modeling and Design Evaluations
Housatonic River – Rest of River



Notes:
1. TOC values less than 0.2% were set to 0.2%.
2. One-sided Grubbs test (alpha = 0.05) showed that sample BW5A5-PW13 is an outlier for penta-, hexa-, hepta-, octa-, nona-, deca-PCB homologs and total PCB. Although not an outlier for tri-PCB and tetra-PCB, this sample was removed from the regression evaluation for each homolog.
3. The black line represents the log-transformed regression based on Equation 3-2 in Appendix A.
4. Non-detect freely dissolved porewater or sediment concentrations were excluded from the analysis and not shown on the plots.

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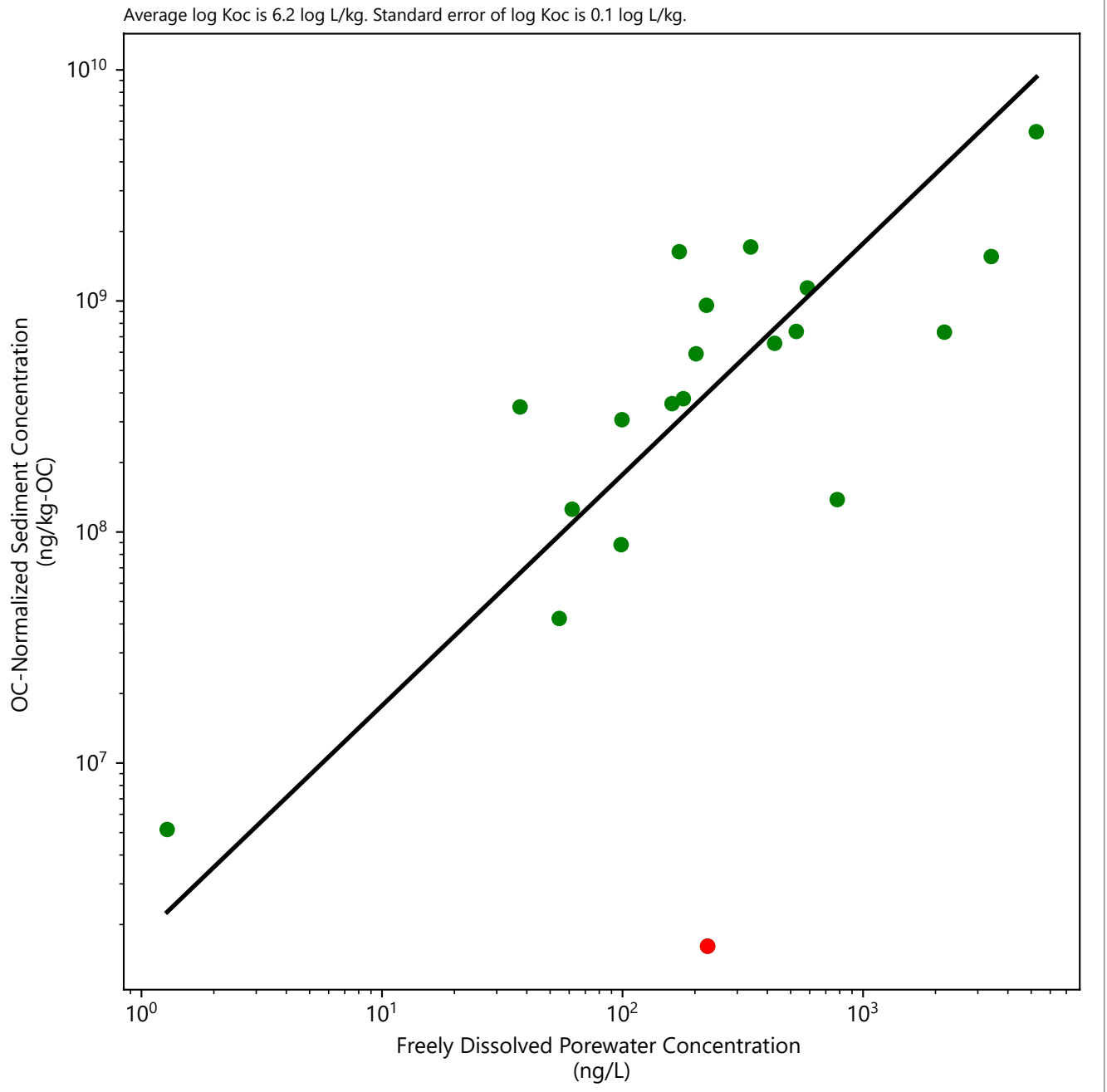
ANCHOR QEA

Figure 10
Partitioning Evaluation - Decachlorobiphenyl
Engineered Cap Modeling and Design Evaluations
Housatonic River – Rest of River



Notes:
1. TOC values less than 0.2% were set to 0.2%.
2. One-sided Grubbs test (alpha = 0.05) showed that sample BW5A5-PW13 is an outlier for penta-, hexa-, hepta-, octa-, nona-, deca-PCB homologs and total PCB. Although not an outlier for tri-PCB and tetra-PCB, this sample was removed from the regression evaluation for each homolog.
3. The black line represents the log-transformed regression based on Equation 3-2 in Appendix A.
4. Non-detect freely dissolved porewater or sediment concentrations were excluded from the analysis and not shown on the plots.

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Figure 11
Partitioning Evaluation - Total PCB (U=0)
Engineered Cap Modeling and Design Evaluations
Housatonic River – Rest of River

Attachment 4
Chemical Isolation Layer Mixed Zone Calculations

1 Introduction

As described in Section 1.2.2.1 of Appendix H, as a conservative assumption, the final remedial design for the Housatonic River Reach 5A sediment cap chemical isolation layer provided for some mixing to occur between the placed chemical isolation layer material and the underlying sediment during construction. Specifically, the bottom two inches of the placed chemical isolation layer was allotted to mixing with the native sediment during placement. This attachment describes the calculation used to establish the initial polychlorinated biphenyl (PCB) porewater concentrations of this mixed zone, which was an input to the cap design modeling documented in Appendix H.

The mixing calculation described herein relies on location-specific, sediment-specific, and chemical-specific properties, as described in Section 2 of this attachment. Section 3 of this attachment describes the stepwise materials balance calculations used to compute the resulting PCB homolog concentrations in the porewater that would be in equilibrium with the mixture composed of native sediment and cap material, which is a blend of sand and powdered activated carbon (PAC) amendment. Section 3 uses a detailed example of the calculation for one PCB homolog in one cap subarea of Reach 5A to illustrate the procedure.

The calculations were conducted following the procedure discussed in Section 3 for each PCB homolog group and each Reach 5A cap subarea for the base case model configuration used in the final design as well as two sensitivity analysis scenarios that evaluated upper and lower bound values for the organic carbon partition coefficient (K_{OC}; see Section 3.2.2 of Appendix H). The results from these calculations are provided in Section 4 of this attachment as well as in accompanying Microsoft Excel files.

2 Mixing Calculation Inputs

Table 1 lists the calculation inputs that describe the properties of the materials that are mixed. Consistent with the modeling evaluation presented in Appendix H, the calculations shown assume 50:50 mixing by weight between the native sediment and chemical isolation material, with the latter containing 1% PAC by weight.

Table 1
Material Properties and Assumptions for Each Component

Calculation Input	Units	Native Sediment Material	Cap Chemical Isolation Layer Material	
			Component Sand	Component Activated Carbon (AC)
Initial Unmixed PCB Concentration	mg/kg = µg/g	C_{SED} (Total PCB (mg/kg OC) × $F_{OC,SED}$; see Table 2)	C_{SAND} 0	C_{PAC} 0
Dry Bulk Density	g/cm^3 (= kg/L)	ρ_{SED} (See Table 2)	ρ_{SAND} 1.56 (Table 3-1 of Appendix H)	ρ_{PAC} 0.54 (Table 3-1 of Appendix H)
Porosity	unitless	ϕ_{SED} (See Table 2)	ϕ_{SAND} 0.4 (Table 3-1 of Appendix H)	ϕ_{PAC} 0.6 (Table 3-1 of Appendix H)
Sorption Coefficient	L/kg	$K_{OC,\ SED}$ (See log K_{OC} in Table 3-3 of Appendix H)	$K_{OC,\ SAND}$ (See log K_{OC} in Table 3-3 of Appendix H)	K_{PAC} (defined as PCB concentration sorbed to PAC divided by freely dissolved PCB concentration in porewater)
Fraction Organic Carbon	% by weight	$F_{OC,\ SED}$ (See Table 2)	$F_{OC,\ SAND}$ 0.1% (Table 3-1 of Appendix H)	NA
Material Mass Fraction within Mixed Zone	% by weight	f_{SED} 50%	f_{CIL} (100% - f_{SED} = 50%)	
Mass Fraction of Components in Cap Material	% by weight	NA	f_{SAND} = 99%	f_{PAC} = 1%

Notes:
The K_{AC} is determined through an iterative process, as discussed in Section 3.
NA – not applicable

Location- and sediment-specific properties used in the calculation include PCB concentration (calculated by multiplying OC-normalized PCB concentration by fraction organic carbon listed in Table 2), dry bulk density, and porosity of the (unmixed) sediment, also listed in Table 2. The sediment OC-normalized total PCB concentrations representative of each Reach 5A cap subarea were specified based on following Steps 1 and 2 detailed in Section 3.2.3 of Appendix H. These concentrations are listed in Table 2. Using the OC-normalized total PCB concentration for each subarea, the individual OC-normalized PCB homolog sediment concentrations were calculated following Steps 3 and 4 detailed in Section 3.2.3 of Appendix H. The resulting sediment OC-normalized PCB homolog concentrations are listed in Table 2 for each PCB homolog group and subarea.

The average fraction organic carbon values for sediments of each subarea are listed in Table 2 as well. The physical properties, dry bulk density and porosity, were calculated as averages for each subarea based on reported percent solids measured in subarea sediment samples using the following equations:

Equation 1

$$\rho_b = \frac{\rho_s \ \rho_w}{\rho_w + \left(\frac{\%M}{1-\%M}\right) \ \rho_s}$$

Equation 2

$$\phi \ = \frac{\rho_b}{\rho_w}\left(\frac{\%M}{1-\%M}\right)$$

where:

%M	=	percent moisture (equals 100% – percent solids)
ρ_b	=	dry bulk density (g/cm^3)
ϕ	=	porosity
ρ_s	=	solids density (g/cm^3; assumed value of 2.6 g/cm^3)
ρ_w	=	water density (g/cm^3; assumed value of 1 g/cm^3)

Table 2
Sediment Chemistry and Physical Properties

Parameter	Upper Portion Reach 5A	Lower Portion Reach 5A	BW5A-1	BW5A-2 & 4	BW5A-5
Chemistry					
Total PCB (mg/kg OC)[1]	6,480	5,690	1,290	6,630	1,160
PCB-Mono (mg/kg OC)	3.61	3.17	0.718	3.70	0.649
PCB-Di (mg/kg OC)	88.5	77.8	17.6	90.6	15.9
PCB-Tri (mg/kg OC)	269	236	53.4	275	48.3
PCB-Tetra (mg/kg OC)	1,200	1,060	239	1,230	216
PCB-Penta (mg/kg OC)	2,010	1,770	400	2,060	362
PCB-Hexa (mg/kg OC)	3,670	3,220	729	3,760	660
PCB-Hepta (mg/kg OC)	2,840	2,500	565	2,910	511
PCB-Octa (mg/kg OC)	850	746	169	869	153
PCB-Nona (mg/kg OC)	70.4	61.8	14.0	72.0	12.7
PCB-Deca (mg/kg OC)	3.43	3.01	0.681	3.51	0.616
$F_{OC, SED}$ (%)	1.1	1.2	8.8	1.7	5.3
Physical Parameters					
Dry Bulk Density (g/cm^3) (ρ_{SED})	1.56	1.56	0.780	1.04	0.780
Porosity (ϕ_{SED})	0.4	0.4	0.7	0.6	0.7

Notes:
Concentrations rounded to 3 significant figures

1. Total PCB concentrations based on values in Table 3-4 of Appendix H.

3 Mixing Calculation Procedures

Using the properties of the three materials that compose the mixed zone listed in Tables 1 and 2, the properties of the mixed zone (porosity, dry bulk density, and porewater PCB concentration,) were calculated using material balance and equilibrium partition formulations.

3.1 General Approach

Detailed in the remainder of this section is the sequential materials balance calculation procedure used to compute the properties of the mixture. The calculations begin with the physical properties of the mixed zone (masses, total volume, pore volume, porosity and dry bulk density), which are then in turn used to determine the PCB concentrations of sorbed and aqueous phases using equilibrium partitioning principles.

Based on the assumed mass fractions of 50% sediment and 50% chemical isolation material in the mixed zone, and considering the composition of the chemical isolation layer material (1% PAC and 99% sand by weight), the fractions by mass and volume of each individual component of the mixture was calculated. Based on those resulting component percentages, porosity of the mixture, dry bulk density of the mixture, and homolog dry weight PCB concentrations in the mixture were calculated. Finally, the porewater PCB homolog concentration of the mixture was calculated using the K_{OC} and foc for sediment and sand, and the K_{AC} for PAC.

3.2 Detailed Example Calculation

To illustrate the procedure, an example is presented in this section for one PCB homolog and subarea: the hexa PCB homolog in the upper main stem subarea of Reach 5A. As discussed in Section 4, this same procedure was used for all PCB homologs and subareas, including sensitivity analyses.

3.2.1 Mixed Zone Physical Properties

For a mixed zone that comprises 50% sediment and 50% chemical isolation layer material, with the chemical isolation layer material composed of 1% PAC and 99% sand by weight, the individual component mass fractions (*f*m) are calculated as follows:

Equation 3

$$fm_{SED}=0500\ \frac{g\ sediment}{g\ dry\ mixture}$$

Equation 4

$$fm_{SAND}=f_{\mathrm{SAND}}\times f_{\mathrm{CIL}}=0.990\times 0.500=0.495\ \frac{g\ sand}{g\ dry\ mixture}$$

Equation 5

$$fm_{PAC}=f_{\mathrm{PAC}}\times f_{\mathrm{CIL}}=0.010\times 0.500=0.005\ \frac{g\ PAC}{g\ dry\ mixture}$$

where:

fm_{SED}	=	mass fraction of sediment within the mixture (g sediment/g dry mixture)
fm_{SAND}	=	mass fraction of sand within the mixture(g sand/g dry mixture)
f_{SAND}	=	mass fraction of sand within the cap material (g sand/g chemical isolation layer [CIL])
f_{CIL}	=	CIL mass fraction within the mixture (g CIL/g mixture)
fm_{PAC}	=	mass fraction of PAC within the mixture (g PAC/g dry mixture)
f_{PAC}	=	mass fraction of PAC within the cap material (g PAC/g CIL)

Considering 1 gram of dry mixture for simplicity in this example, the masses (M) of each component that goes into the mixture were calculated as follows:

Equation 6

$$M_{SED} = fm_{SED} \times 1 \text{ g dry mixture} = 0.500 \frac{g\ sediment}{g\ dry\ mixture} \times 1 \text{ g dry mixture} = 0.500 \text{ g sediment}$$

Equation 7

$$M_{SAND} = fm_{SAND} \times 1 \text{ g dry mixture} = 0.495 \frac{g\ sand}{g\ dry\ mixture} \times 1 \text{ g dry mixture} = 0.495 \text{ g sand}$$

Equation 8

$$M_{PAC} = fm_{PAC} \times 1 \text{ g dry mixture} = 0.005 \frac{g\ PAC}{g\ dry\ mixture} \times 1 \text{ g dry mixture} = 0.005 \text{ g PAC}$$

where:

M_{SED} = mass of sediment within the mixture (g)
M_{SAND} = mass of sand within the mixture (g)
M_{PAC} = mass of PAC within the mixture (g)

Within that 1 gram of dry mixture, the volume (V) of each component that goes into the mixture was calculated as follows (assuming for simplicity that particle packing within the mixture is approximately the same as that within the individual components):[1]

[1] Given the similarity in grain size between the sediments and CIL sand, this assumption is reasonable. The particle arrangements of the PAC would be within pore spaces, but that would be the case for both the CIL material and sediment, and the much smaller mass and volume of the PAC make any error associated with this assumption second order at best.

Equation 10

$$V_{SED} = \frac{M_{SED}}{\rho_{SED}} = \frac{0.5 \text{ g sediment}}{1.56 \frac{g\ sediment}{cm^3 sediment}} = 0.321\ cm^3 sediment$$

Equation 11

$$V_{SAND} = \frac{M_{SAND}}{\rho_{SAND}} = \frac{0.495 \text{ g sand}}{1.56 \frac{g\ sand}{cm^3 sand}} = 0.317\ cm^3 sand$$

Equation 12

$$V_{AC} = \frac{M_{PAC}}{\rho_{PAC}} = \frac{0.005 \text{ g PAC}}{0.54 \frac{g\ PAC}{cm^3 PAC}} = 0.00926\ cm^3 PAC$$

where:

V_{SED} = volume of sediment within the mixture (cm^3)

V_{SAND} = volume of sand within the mixture (cm^3)

V_{PAC} = volume of PAC within the mixture (cm^3)

The total volume of the 1 gram of mixture is therefore the sum of each component volume:

Equation 13

$$V = 0.321\ cm^3 sediment + 0.317\ cm^3 sand + 0.00926\ cm^3 PAC = 0.647 cm^3$$

where:

V = total volume of the mixture (cm^3)

The volumetric fraction (*fv*) of each component within the mixture was calculated as follows:

Equation 14

$$fv_{SED} = \frac{V_{SED}}{V} = \frac{0.321\ cm^3 sediment}{0.647 cm^3 mixture} = 0.495 \frac{cm^3 sediment}{cm^3\ mixture}$$

Equation 15

$$fv_{SAND} = \frac{V_{SAND}}{V} = \frac{0.317 cm^3 sand}{0.647 cm^3 mixture} = 0.490 \frac{cm^3 sand}{cm^3\ mixture}$$

Equation 16

$$fv_{PAC} = \frac{V_{AC}}{V} = \frac{0.00926\ cm^3 PAC}{0.647 cm^3 mixture} = 0.0143 \frac{cm^3 PAC}{cm^3\ mixture}$$

where:

fv_{SED} = volumetric fraction of sediment within the mixture (cm^3 sediment/cm^3 mixture)

fv_{SAND} = volumetric fraction of sand within the mixture (cm^3 sand/cm^3 mixture)

fv_{PAC} = volumetric fraction of PAC within the mixture (cm^3 PAC/cm^3 sediment)

The dry bulk density of the mixture (ρ_{MIX}) was then calculated as the dry mass of the mixture (assumed 1 gram for this example) divided by the total volume of the mixture.

Equation 17

$$\rho_{MIX} = \frac{1\ g\ dry\ mixture}{0.647\ cm^3 mixture} = 1.55 \frac{g\ dry\ mixture}{cm^3\ dry\ mixture}$$

where:

ρ_{MIX} = dry bulk density of the mixture (g/cm^3)

The volume of voids (V_v) associated with each component in 1 gram of dry mixture is equal to the total volume of each component in 1 gram of mixture multiplied by the component's respective porosity, as follows:

Equation 18

$$V_{v,SED} = \phi_{SED} \times V_{SED} = 0.4 \frac{cm^3 voids}{cm^3\ sediment} \times 0.321\ cm^3 sediment = 0.128\ cm^3\ voids\ in\ sediment$$

Equation 19

$$V_{v,SAND} = \phi_{SAND} \times V_{SAND} = 0.4 \frac{cm^3 voids}{cm^3\ sand} \times 0.317\ cm^3 sand = 0.127\ cm^3\ voids\ in\ sand$$

Equation 20

$$V_{v,PAC} = \phi_{AC} \times V_{AC} = 0.6 \frac{cm^3 voids}{cm^3\ PAC} \times 0.00926\ cm^3 PAC = 0.00556\ cm^3\ voids\ in\ PAC$$

where:

$V_{v,SED}$	=	volume of voids associated with sediment in 1 gram of dry mixture (cm^3)
ϕ_{SED}	=	porosity of sediment (cm^3 voids/cm^3 sediment)
$V_{v,SAND}$	=	volume of voids associated with sand in 1 gram of dry mixture (cm^3)
ϕ_{SAND}	=	porosity of sand (cm^3 voids/cm^3 sand)
$V_{v,PAC}$	=	volume of voids associated with PAC in 1 gram of dry mixture (cm^3)
Φ_{PAC}	=	porosity of PAC (cm^3 voids/cm^3 mixture)

The mixed zone's porosity is then calculated as the total volume of voids in the mixture divided by the total volume:

Equation 21

$$\phi_{MIX} = \frac{V_{v,SED} + V_{v,SAND} + V_{v,AC}}{V}$$

$$= \frac{0.128 cm^3\ voids\ in\ sediment + 0.127 cm^3\ voids\ in\ sand + 0.00556 cm^3\ voids\ in\ AC}{0.647\ cm^3\ mixture}$$

$$= 0.403\ \frac{cm^3 voids\ in\ mixture}{cm^3\ mixture}$$

where:

ϕ_{MIX}	=	porosity of the mixture (cm^3 voids/cm^3 mixture)

3.2.2 Mixed Zone PCB Concentrations

Given the chemical isolation layer material is considered to contain no PCBs, the bulk PCB concentration (on a dry weight basis) of the mixture (C_{MIX}) is given by bulk PCB concentration of the sediment prior to mixing multiplied by its mass fraction in the mixture:

Equation 22

$$C_{MIX} = C_{SED} \times fm_{SED} = 40.4 \frac{\mu gPCB}{g\ dry\ sediment} \times 0.500 \frac{g\ \text{dry}\ sediment}{g\ dry\ mixture} = 20.2 \frac{\mu g\ PCB}{g\ dry\ mixture}$$

where:

C_{MIX} = dry weight bulk sediment concentration of the mixture (µg/g or mg/kg)

C_{SED} = dry weight bulk mixture concentration (µg/g or mg/kg)

The freely dissolved porewater PCB concentration of the mixture ($C_{MIX\text{-}pw}$) is then calculated using this bulk PCB concentration and equilibrium partitioning coefficients to describe the distribution among phases as follows:[2]

Equation 23

$$C_{MIX-pw} = \frac{C_{MIX} \times \frac{1000\ \mu g}{1\ mg}(unit\ conversion)}{\frac{\phi_{MIX}}{\rho_{MIX}} + K_{OC,SED} \times F_{OC,SED} \times fm_{SED} + K_{OC,SAND} \times F_{OC,SAND} \times fm_{SAND} + K_{PAC} \times fm_{PAC}}$$

Equation 24

$$C_{MIX-pw} = \frac{20.2\ \frac{mg\ PCBs}{kg\ dry\ mixture} \times \frac{1000\ \mu g}{1\ mg}}{\frac{0.403\ \frac{cm^3\ porewater}{cm^3\ mixture}}{1.55 \frac{g\ mixture}{cm^3\ mixture}} \times \frac{1\ L}{1000\ cm^3} \times \frac{1000\ g}{1\ kg} + 10^{6.4\ \frac{L\ porewater}{kg\ OC}} \times 0.011\ \frac{kg\ OC}{kg\ sediment} \times 0.500 \frac{kg\ sediment}{kg\ dry\ mixture} + 10^{6.4\ \frac{L\ porewater}{kg\ OC}} \times 0.001\ \frac{kg\ OC}{kg\ sand} \times 0.495\ \frac{kg\ sand}{kg\ dry\ mixture} + 10^{8.97\ \frac{L\ porewater}{kg\ PAC}} \times 0.005\ \frac{kg\ PAC}{kg\ dry\ mixture}}$$

Equation 25

$$C_{MIX-pw} = 4.27E-03 \frac{\mu g\ PCBs}{L\ porewater}$$

where:

$C_{MIX\text{-}pw}$ = freely dissolved porewater concentration of the mixture (µg/L)

As mentioned previously, the log K_{PAC} representing the sorption of PCBs to PAC (i.e., PCB concentration on the sorbent [PAC] divided by the porewater freely dissolved phase PCB concentration in the mixture) was determined iteratively. As discussed in Section 3.2.2.2 of Appendix H, sorption of PCBs onto PAC is described by a Freundlich isotherm, which is non-linear and is dependent on the porewater concentration. Thus, the K_{PAC} used in the previous equation to calculate porewater concentration is a function of porewater concentration, thereby requiring an iterative solution.

To solve for K_{AC}, an initial (best guess) $K_{AC,i}$ value was specified to begin the iterative calculation ($K_{AC,i}$). The resulting iterative mixed porewater concentration ($C_{mix\text{-}pw,i}$) was then calculated as per the

[2] The DOC-bound fraction of PCBs is implicitly accounted for by the use of bulk sediment concentrations in the calculation. This is so because the partition coefficients (i.e., K_{OC}, K_{AC}) were calculated based on relationships between freely dissolved phase PCB concentrations and bulk sediment PCB concentrations or PAC-sorbed concentrations that included the presence of DOC. Therefore, the DOC bound fraction does not need to be explicitly computed for this calculation.

above equation using the $K_{AC,i,}$ value and was then passed to the Freundlich isotherm equation to produce the PAC-sorbed phase concentration for the iteration, q_i, as follows:

Equation 26

$$q_i = (K_f * C_{mix-pw,i}{}^{1/n})$$

where:

q_i	=	Iterative concentration sorbed to PAC (µg/kg)
K_f	=	Freundlich isotherm equation constant related to adsorption capacity (µg/kg*L/µg$^{(1/n)}$; set to $10^{8.5}$ for PAC; see Appendix H)
1/n	=	Freundlich isotherm equation exponent (non-linearity parameter; set to 0.8 for PAC; see Appendix H)

A new log K_{AC} ($logK_{AC,i+1}$) is calculated using the values for $C_{mix-pw,i}$ and resulting q_i, as follows:

Equation 27

$$K_{AC,i+1} = \frac{q_i}{C_{mix-pw,i}}$$

The K_{AC} is then updated in an iterative manner until differences between a new $logKAC_{,i+1}$ and the previous $K_{AC,i}$, rounded to 3 decimal places, is zero. Once this condition is met, the resulting porewater concentrations (C_{mix-pw}) is final as well.

Following the example for hexa PCB homolog in the upper portion of Reach 5A subarea, the log K_{AC} for was found to be 8.97 log L/kg.

This procedure was repeated for each PCB homolog and each Reach 5A cap subarea, as presented in the next section.

4 Resulting Mixed Zone Concentrations

As discussed in Section 1, the calculations described in the preceding section were conducted for each subarea, PCB homolog, and scenario (base case and two K_{OC} sensitivity analysis scenarios). The results are summarized in the following tables:

Table 3: Base Case Modeling

Table 4: Sensitivity Analysis—Log KOC +2SE

Table 5: Sensitivity Analysis—Log KOC -2SE

Table 3
Freely Dissolved Porewater Concentrations in the Mixed Zone (1% PAC in Chemical Isolation Layer Material Mixed with Sediment)

Chemical Name	Freely Dissolved Porewater Concentration (µg/L)				
	Main Channel Reach 5A-1[a]	BW5A-1	BW5A-2[b]	Main Channel Reach 5A-2[c]	BW5A-5
PCB-mono	7.49E-07	1.33E-06	1.33E-06	7.09E-07	6.25E-07
PCB-di	4.08E-05	7.27E-05	7.24E-05	3.86E-05	3.40E-05
PCB-tri	1.63E-04	2.91E-04	2.89E-04	1.55E-04	1.36E-04
PCB-tetra	1.07E-03	1.89E-03	1.89E-03	1.01E-03	8.87E-04
PCB-penta	2.02E-03	3.55E-03	3.58E-03	1.92E-03	1.68E-03
PCB-hexa	4.27E-03	7.40E-03	7.56E-03	4.05E-03	3.52E-03
PCB-hepta	3.09E-03	5.25E-03	5.46E-03	2.94E-03	2.52E-03
PCB-octa	6.83E-04	1.14E-03	1.20E-03	6.47E-04	5.54E-04
PCB-nona	3.04E-05	5.13E-05	5.36E-05	2.88E-05	2.48E-05
PCB-deca	6.97E-07	1.19E-06	1.23E-06	6.60E-07	5.69E-07
Total PCB[d]	1.14E-02	1.97E-02	2.01E-02	1.08E-02	9.36E-03

Notes:

a. Concentrations in the Main Channel Reach 5A-1 were used for the cap modeling that represents the main channel (Stations 00+00 to 128+00).
b. Concentrations in BW5A-2 were used for the cap modeling that represents both BW5A-2 and BW5A-4.
c. Concentrations in the Main Channel Reach 5A-2 were used for the cap modeling that represents the main channel (between Stations 128+00 to 245+00) and Sykes Brook.
d. Total PCBs are included for reference only; total PCBs were not simulated with the model. PCBs were simulated by homolog group, and homolog values were summed to calculate total PCB.

Table 4
Sensitivity Analysis—Log K_{OC} +2SE: Freely Dissolved Porewater Concentrations in the Mixed Zone (1% PAC in Chemical Isolation Layer Material Mixed with Sediment)

Chemical Name	Freely Dissolved Porewater Concentration (µg/L)				
	Main Channel Reach 5A-1[a]	BW5A-1	BW5A-2[b]	Main Channel Reach 5A-2[c]	BW5A-5
PCB-mono	7.49E-07	1.33E-06	1.33E-06	7.09E-07	6.25E-07
PCB-di	4.08E-05	7.26E-05	7.23E-05	3.86E-05	3.40E-05
PCB-tri	1.63E-04	2.90E-04	2.89E-04	1.55E-04	1.36E-04
PCB-tetra	1.07E-03	1.88E-03	1.88E-03	1.01E-03	8.84E-04
PCB-penta	2.02E-03	3.51E-03	3.57E-03	1.91E-03	1.67E-03
PCB-hexa	4.26E-03	7.27E-03	7.52E-03	4.04E-03	3.49E-03
PCB-hepta	3.08E-03	5.09E-03	5.43E-03	2.92E-03	2.48E-03
PCB-octa	6.77E-04	1.08E-03	1.19E-03	6.42E-04	5.37E-04
PCB-nona	3.02E-05	4.88E-05	5.30E-05	2.86E-05	2.40E-05
PCB-deca	6.91E-07	1.11E-06	1.21E-06	6.54E-07	5.50E-07
Total PCB[d]	1.13E-02	1.92E-02	2.00E-02	1.07E-02	9.26E-02

Notes:

a. Concentrations in the Main Channel Reach 5A-1 were used for the cap modeling that represents the main channel (Stations 00+00 to 128+00).
b. Concentrations in BW5A-2 were used for the cap modeling that represents both BW5A-2 and BW5A-4.
c. Concentrations in the Main Channel Reach 5A-2 were used for the cap modeling that represents the main channel (between Stations 128+00 to 245+00) and Sykes Brook.
d. Total PCBs are included for reference only; total PCBs were not simulated with the model. PCBs were simulated by homolog group, and homolog values were summed to calculate total PCB.

Table 5
Sensitivity Analysis—Log K_{OC} -2SE: Freely Dissolved Porewater Concentrations in the Mixed Zone (1% PAC in Chemical Isolation Layer Material Mixed with Sediment)

Chemical Name	Freely Dissolved Porewater Concentration (µg/L)				
	Main Channel Reach 5A-1[a]	BW5A-1	BW5A-2[b]	Main Channel Reach 5A-2[c]	BW5A-5
PCB-mono	7.49E-07	1.34E-06	1.33E-06	7.09E-07	6.25E-07
PCB-di	4.08E-05	7.27E-05	7.24E-05	3.86E-05	3.40E-05
PCB-tri	1.63E-04	2.91E-04	2.89E-04	1.55E-04	1.36E-04
PCB-tetra	1.07E-03	1.89E-03	1.89E-03	1.01E-03	8.89E-04
PCB-penta	2.02E-03	3.57E-03	3.58E-03	1.92E-03	1.68E-03
PCB-hexa	4.28E-03	7.49E-03	7.58E-03	4.06E-03	3.54E-03
PCB-hepta	3.10E-03	5.37E-03	5.49E-03	2.94E-03	2.55E-03

Chemical Name	Freely Dissolved Porewater Concentration (µg/L)				
	Main Channel Reach 5A-1[a]	BW5A-1	BW5A-2[b]	Main Channel Reach 5A-2[c]	BW5A-5
PCB-octa	6.85E-04	1.18E-03	1.21E-03	6.49E-04	5.63E-04
PCB-nona	3.05E-05	5.29E-05	5.39E-05	2.89E-05	2.51E-05
PCB-deca	6.99E-07	1.22E-06	1.24E-06	6.62E-07	5.77E-07
Total PCB[d]	1.14E-02	1.99E-02	2.02E-02	1.08E-02	9.42E-03

Notes:

a. Concentrations in the Main Channel Reach 5A-1 were used for the cap modeling that represents the main channel (Stations 00+00 to 128+00).
b. Concentrations in BW5A-2 were used for the cap modeling that represents both BW5A-2 and BW5A-4.
c. Concentrations in the Main Channel Reach 5A-2 were used for the cap modeling that represents the main channel (between Stations 128+00 to 245+00) and Sykes Brook.
d. Total PCBs are included for reference only; total PCBs were not simulated with the model. PCBs were simulated by homolog group, and homolog values were summed to calculate total PCB.

Appendix I
Revised PCB Evaluations for Residential Properties

Appendix I
Revised PCB Evaluations for Residential Properties

Background

On September 28, 2023, the General Electric Company (GE) submitted a *Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A* (Conceptual RD/RA Work Plan; Anchor QEA et al. 2023) to the U.S. Environmental Protection Agency (EPA). As described in Section 4.4.1 of that Conceptual RD/RA Work Plan, a total of 27 residential floodplain properties were characterized and evaluated as part of the pre-design investigation of floodplain residential properties in Reach 5A. Of those 27 residential properties, it was determined that 12 properties did not meet the Residential Performance Standards in the Revised Final Resource Conservation and Recovery Act Permit Modification (Revised Final Permit) for the Rest of River (ROR; EPA 2020) under existing conditions and would require soil removal and replacement. As described in Section 3.4.2 of the *Final Remedial Design/Remedial Action Work Plan for Reach 5A* (Final RD/RA Work Plan), the applicable Residential Performance Standards are an average polychlorinated biphenyl (PCB) concentration of 2 milligrams per kilogram (mg/kg) in the top foot of soil and in the 1- to X-foot depth increment (where X equals the depth to which PCBs are detected at concentrations of 2 mg/kg or greater, up to a maximum depth of 15 feet), with no discrete PCB concentration in the top foot of soil exceeding 10 mg/kg (the not-to-exceed [NTE] level) for parcels exceeding 0.25 acre in size. The floodplain residential properties that were identified as not meeting those standards were Parcels I6-3-13, J6-2-3, J3-1-11, J3-1-12, J3-1-13, J3-2-2, J3-2-3, J3-2-4, J3-2-5, J3-2-6, K3-1-2, and K2-1-10. In addition, the Conceptual RD/RA Work Plan provided for remediation of one additional residential property (Parcel J6-3-1) that had been evaluated previously in a separate Removal Action associated with the Actual/Potential Lawns (A/P Lawn Properties) and for which remediation was proposed but deferred by the property owner. Detailed evaluations of current conditions and the extent of remediation required to achieve the Residential Performance Standards on these 13 properties were provided in Appendix E to the Conceptual RD/RA Work Plan and summarized in Section 4.4.1 of that work plan.

EPA conditionally approved the Conceptual RD/RA Work Plan in a letter dated December 3, 2024. That letter contained six conditions relating to the residential floodplain property evaluations. Those conditions, quoted in full, are as follows:

- **Condition 115:** "Parcel J6-2-3, Figure 2-1: Characterization to the depth 'X' on this property is incomplete due to difficult sampling conditions along the riverbank. EPA acknowledges that it is unlikely that additional sampling at depth would yield a property-wide spatially weighted concentration above 2 ppm[1] in the 1-X foot interval. However, there are two polygons at 1-2 feet

[1] EPA's comments sometimes use the metric of parts per million (ppm), which is equivalent in soil to mg/kg.

below grade with concentrations greater than 50 mg/kg. The 0–1-foot NTE removal above will provide access to these soils at 1-2 feet below grade. While removal of these >50 mg/kg soils is not necessary to achieve the residential Performance Standards, GE shall, in developing the Final RD/RA Work Plan, consider removing them due to the potentially incomplete characterization of this residential property and the proximity of these soils to the in-river sediment cap."

- **Condition 116:** "Parcel J6-3-1: There are other removal scenarios that will allow GE to achieve the 1-X foot depth spatial average of 2 mg/kg on this property and make more sense from a risk mitigation perspective. On this residential property, it makes more sense to remove higher concentrations from shallower depths to prevent potential future exposures. There are a number of polygons between 1 to 3 feet below ground with concentrations >50 mg/kg that GE proposes to leave behind. Instead, GE proposes to remove deeper soils in one specific area, presumably for construction convenience. A large percentage of the area of these polygons being left behind also fall beneath surficial NTE removals, meaning they will mostly be exposed during remediation already. These polygons range from 73 to 120 mg/kg. The proximity of these >50 mg/kg soils to the riverbank and riverbed cap isolation layer also make their removal more beneficial than soils at greater depths. EPA notes that this parcel was originally evaluated as part of the 2016 RD/RA Work Plan for Actual/Potential (A/P) Lawns before remediation for the parcel was deferred to the Rest of River Remedial Action. At that time, GE proposed excavation of 730 cubic yards of soil ranging from 1 to 4 feet below existing grade – an approach that removed more contaminated soils closer to the surface. In the Final RD/RA Work Plan, GE shall re-evaluate this property and propose a remediation approach consistent with this condition and the proposal from the 2016 RD/RA Work Plan for A/P Lawns."
- **Condition 117:** "Parcels J3-1-11 through J3-1-13: The existing data for the top 0-1 foot indicate that projecting data from outside the 1 ppm isopleth into polygons inside the 1 ppm isopleth does not make sense based on the topography leading down into the floodplain at the boundary between Parcels J3-1-13 and J3-1-12. The concentrations in these areas may be similar to those in the adjacent polygons from samples down in the wetland as opposed to the current assigned concentration from up on the sewer ROW outside the 1 ppm isopleth. In developing the Final RD/RA Work Plan, GE shall consider conducting an elevation-based 0-1 foot not-to-exceed (NTE) removal along this bank on these residential parcels."
- **Condition 118:** "Parcels J3-2-2 through J3-2-5: The existing data set for 0-1 foot below grade shows that projecting data from outside the 1 ppm isopleth down into polygons inside the 1 ppm isopleth does not make sense on Parcels J3-2-4 and J3-2-5. This approach results in leaving behind lower bank soils that may be above 10 mg/kg. In developing the Final RD/RA

Work Plan, GE shall consider conducting an elevation-based NTE removal on these residential parcels."

- **Condition 119:** "Parcel K3-1-2: The lack of removal to water's edge due to the one sample in polygon 8 (0-0.5 feet) and polygon 6 (0.5-1.0 feet) at 8.3 mg/kg, and one sample in polygon 5 (0-0.5 feet and 0.5-1.0 feet) at 7.5 mg/kg may not represent real-world conditions of NTE concentrations in soil along the river. In developing the Final RD/RA Work Plan, GE shall consider removing a continuous band of soil along the water's edge across these polygons."
- **Condition 120:** "Parcel K2-1-10: As described in the comments above, the sampling results for polygon 0 in the 0–1-foot interval may not be representative of actual field conditions. In developing the Final RD/RA Work Plan, GE shall consider conducting additional removal in the 0–1-foot interval for this polygon so that a continuous band of soil is removed along the water's edge."

In addition to the conditions listed above, EPA and GE conducted discussions during the fall of 2024 related to expansion of the evaluation areas associated with residential Parcels J6-3-1 and J6-2-3. Specifically, the evaluation areas for both of these properties were expanded to include adjacent properties whose ownership is uncertain but which property owners maintain as part of their own.[2] As a result, additional floodplain soil sampling was performed on these properties. The scope of that supplemental sampling was proposed by GE in an email dated October 16, 2024, and was approved by EPA in an email dated October 28, 2024. Those supplemental floodplain soil samples were collected in December 2024 and were summarized in GE's *Supplemental Data Collection Summary Report for Reach 5A* (Anchor QEA et al. 2026).

The various EPA conditions and modifications discussed above required a re-evaluation of 12 of the 13 residential parcels listed above. No revision was required for Parcel J3-2-6; however, for completeness, the original evaluation from the Conceptual RD/RA Work Plan has been included in this appendix. Updated evaluations, figures, and data tables for the 12 parcels requiring re-evaluation are provided in attachments to this appendix. Specifically, Attachments 1 and 2 provide Thiessen polygon maps and evaluation tables, respectively. The maps provided in Attachment 1 also show the specific polygons requiring remediation (i.e., soil removal and backfill) to meet the numeric Residential Performance Standards, and additional polygons required to comply with the various EPA conditions. Attachment 3 provides summaries of the relevant data for each property.

[2] This revision of evaluation areas for these two residential parcels is described more fully in Section 10.1.1 of the Final RD/RA Work Plan.

For each property subject to re-evaluation, the remainder of this appendix provides the following:[3]

- A brief description of the reason for the re-evaluation on a property-by-property basis (e.g., EPA condition; change in evaluation area);
- A description of the property, including identification of the associated "X" value (in feet below ground surface [bgs]);[4]
- An evaluation of existing PCB concentrations and discussion of the need for and extent of remediation to achieve the Residential Performance Standards; and
- An evaluation of post-remediation PCB concentrations.

Property-Specific Revised PCB Evaluations

Parcel I6-3-13

Reason for Re-Evaluation

As described in Section 10.1.3 of the Final RD/RA Work Plan, GE has elected to advance the remediation of vernal pool 5A-VP-13 because it is located partially within this floodplain residential parcel.[5] Accordingly, the evaluation of this floodplain residential parcel was revised to account for the additional Removal Action required to meet the applicable Performance Standard in this vernal pool (Figures 1-1 and 1-2 in Attachment 1).

Property Description

As shown on Figures 1-1 through 1-7 (Attachment 1), Parcel I6-3-13 is approximately 1.8 acres and is bordered by non-residential floodplain to the east and west, the Housatonic River to the south, and another residential property to the north. Because this parcel exceeds 0.25 acre in size, the NTE criterion of 10 mg/kg for the top foot of soil in unpaved areas applies. In accordance with the 2021 EPA-approved *Pre-Design Investigation Summary Report for Reach 5A Floodplain Residential Properties* (PDI Summary Report for Floodplain Residential Properties; Anchor QEA 2021), the soils at

[3] In this appendix, the two expanded evaluation areas associated with residential Parcels J6-3-1 and J6-2-3, as mentioned above, are referred to as "properties" for consistency with the other parcels evaluated.

[4] The property descriptions include the size of each property in acres. These acreages differ from those presented in the Conceptual RD/RA Work Plan, because those previously presented areas included only the portion of each property that was subject to the PCB evaluations (i.e., excluding the footprints of houses, driveways, etc., that were excluded from the PCB evaluations), whereas the property acreages presented herein represent the full area of each property.

[5] Later in 2026, as required by the Revised Final Permit, GE will initiate a pilot study of 10 vernal pools located within Reach 5A. Vernal pool 5A-VP-13 is not one of the pilot study pools. Although remediation of the non-pilot-study pools in Reach 5A has generally been deferred until after completion of the pilot study, it was decided that performing the remediation in this one non-pilot vernal pool concurrently with the residential property would increase efficiency and minimize the need for future disruption to the residential property owner.

this residential property were evaluated to a depth of six feet. PCB analytical results used in the updated evaluation of Parcel I6-3-13 are summarized in Attachment 3 in Tables 1a through 1c.

As described in the *Final Completion Report for Removal Action for Housatonic River Floodplain – Current Residential Properties Downstream of the Confluence* (Downstream Residential Removal Action Completion Report; Anchor QEA 2019), the northern portion of this parcel was evaluated and previously remediated during the A/P Lawn Properties Remedial Action. The revised evaluation summarized herein was performed across the entire parcel, including the portion of the parcel that was previously remediated.[6]

As described above, Vernal Pool 5A-VP-13 partially overlaps with this residential parcel (i.e., portions of this vernal pool extend outside the boundaries of this residential parcel). A separate evaluation of the vernal pool was conducted to determine the extent of remediation required to meet the applicable vernal pool Performance Standard. As a result, one additional 0- to 1-foot removal polygon was added within this residential parcel (shown as "'Vernal Pool Removal"' on Figures 1-1 and 1-2 in Attachment 1).

PCB Evaluation – Existing Conditions

The first step in the evaluation process for Parcel I6-3-13 involved the identification of all soil sample locations in the top foot of unpaved portions with PCB concentrations greater than 10 mg/kg (i.e., the NTE level). This step resulted in the identification of 19 such soil sample locations (i.e., I6-3-13_AH/AI-3, I6-3-13_AI-7, I6-3-13_AJ/AK-4, I6-3-13_AK-2, FL000910, I6-3-13_AI-5, I6-3-13_AE-6, I6-3-13_AD-6, I6-3-13_AE-7, I6-3-13_AG-8, FL000911, FL0001466, I6-3-13_AG-6, I6-3-13_N-8, I6-3-13_N-9, I6-3-13_AF-9, I6-3-13_N-10, FL000909, and FL001831). As a result, soil removal is necessary to address the PCB concentrations at these locations.

The next step in the PCB evaluation process for Parcel I6-3-13 involved calculating average PCB concentrations for the 0-to 1-foot depth interval. As indicated in the Conceptual RD/RA Work Plan, an X value of six feet was used for this evaluation area. The table below presents the existing average PCB concentrations calculated for this area, with references to the corresponding figures and tables in Attachments 1 and 2, and the applicable Performance Standard.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Existing Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	1-1, 1-2	E-1B-1	11.73	2
1–X	1-3 through 1-7	E-1B-2	15.85	2

[6] Replaced soils in the previously remediated portion of the parcel were assumed to have a PCB concentration equal to 0.021 mg/kg (the assumed background concentration of PCBs in soil in this area).

Consistent with the prior evaluation, the existing average PCB concentration in the 0- to 1-foot and the 1- to X-foot depth increments exceed the applicable Performance Standard. As a result, remediation is required to achieve that standard.

Proposed Remediation

Based on the evaluations presented above, GE is proposing to conduct soil removal/replacement activities at Parcel I6-3-13, as shown on Figures 1-1 through 1-7 in Attachment 1. This remediation will involve excavating approximately 836 cubic yards (cy) of soil from the top foot and approximately 2,237 cy of removal deeper than one foot, to a maximum depth of X feet bgs, for a total excavation volume of approximately 3,073 cy.

PCB Evaluation – Post-Remediation Conditions

The proposed remediation will result in the removal of surface soil with exceedances of the NTE level and in achievement of the Performance Standards for the relevant depth increments, as summarized in the following table.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Post-Remediation Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	1-1, 1-2	E-1B-3	1.13[a]	2
1–X	1-3 through 1-7	E-1B-4	1.96	2

Note:

a. This post-remediation average PCB concentration also includes 0.004 acre of vernal pool remediation that occurs within this residential property (see Section 10.1.3 of the Final RD/RA Work Plan).

Parcel J6-2-3

Reason for Re-Evaluation

As described above, the evaluation of this parcel has been revised to account for an expansion of the evaluation area to include an adjacent area maintained by the property owner. In addition, the re-evaluation includes incorporation of additional floodplain soil PCB data collected as a result of expanding the evaluation area and additional removal of soils with PCBs greater than 50 mg/kg below a depth of one foot, as suggested by EPA Condition 115.

Property Description

As shown in Attachment 1 on Figures 2-1 through 2-4, Parcel J6-2-3 is bordered by residential properties to the north and west, the riverbank of the Housatonic River to the southwest, and Holmes Road to the east. The expanded area of this property is approximately 1.3 acres. Because this area exceeds 0.25 acre in size, the NTE criterion of 10 mg/kg for the top foot of soil in unpaved areas applies. The X-depth for this property is three feet. The PCB analytical results used in the evaluation for expanded Parcel J6-2-3 are summarized in Attachment 3 in Tables 10a through 10d.

As described in the 2019 Downstream Residential Removal Action Completion Report, the western portion of this property, adjacent to the Housatonic River, was evaluated and remediated during the A/P Lawn Properties Remedial Action. The revised evaluation summarized herein was performed across the entire residential property, including the portion that was previously remediated.

PCB Evaluation – Existing Conditions

The first step in the evaluation process for Parcel J6-2-3 involved the identification of all soil sample locations in the top foot of unpaved portions with PCB concentrations greater than 10 mg/kg. This step resulted in the identification of 10 such soil sample locations (i.e., J6-2-3_L/M-5, J6-2-3_L-4, J6-2-3_L/M-6, BS000100, J6-2-3_M/N-7, J6-2-2_J/K-23/24, J6-2-3_K/L-3, J6-2-3_N-8, J6-2-3_O-10, and J6-2-3_N/O-9). As a result, soil removal is necessary to address the PCB concentrations at those locations.

The next step in the PCB evaluation process for expanded Parcel J6-2-3 involved calculating average PCB concentrations for the relevant depth increments. As indicated above, an X value of three feet was used for this property. The following table presents the existing average PCB concentrations calculated for this area, with references to the corresponding figures and tables in Attachments 1 and 2 and the applicable Performance Standard.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Existing Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	2-1, 2-2	E-1B-5	1.21	2
1–X	2-3, 2-4	E-1B-6	1.74	2

As shown in the preceding table, the existing average PCB concentrations in the 0- to 1-foot and the 1- to X-foot depth increments do not exceed the applicable Performance Standard. As a result, remediation is only required to achieve the NTE Performance Standard and to address EPA Condition 115.

Proposed Remediation

Based on the evaluations presented above and in accordance with EPA Condition 115, GE is proposing to conduct soil removal/replacement activities at expanded Parcel J6-2-3 as shown in Attachment 1 on Figures 2-1 through 2-4. This remediation will involve excavation of approximately 104 cy of soil from the 0- to 1-foot depth interval, approximately 67 cy of soil from the 1- to 2-foot depth interval, and approximately 14 cy of soil from the 2- to 3-foot depth interval, for a total excavation volume of approximately 185 cy.

PCB Evaluation – Post-Remediation Conditions

The proposed remediation will result in the removal of surface soil with exceedances of the NTE level and satisfy EPA Condition 115. The following table summarizes the post-remediation average PCB concentration for the relevant depth increments.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Post-Remediation Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	2-1, 2-2	E-1B-7	0.24	2
1–X	2-3, 2-4	E-1B-8	0.42	2

Parcel J6-3-1

Reason for Re-Evaluation

As described above, the evaluation of this parcel has been revised to account for an expansion of the evaluation area to include an adjacent area maintained by the property owner. In addition, the re-evaluation includes incorporation of additional floodplain soil PCB data collected as a result of expanding the evaluation area and additional removal of soils with PCBs greater than 50 mg/kg below a depth of one foot to a maximum depth of four feet, as suggested by EPA Condition 116.

Property Description

As shown in Attachment 1 on Figures 3-1 through 3-11, Parcel J6-3-1 is generally bordered by Pomeroy Avenue and Holmes Road to the west and south, non-residential floodplain to the east, and the Housatonic River to the north. The expanded area of this property is approximately 4.9 acres. Because this area exceeds 0.25 acre in size, the NTE criterion of 10 mg/kg for the top foot of soil in unpaved areas applies. In accordance with the *Revised Removal Design/Removal Action Work Plan for Floodplain Residential Properties Downstream of the Confluence* (Anchor QEA 2016), the soils at this residential property were evaluated to a depth of 10 feet. PCB analytical results used in the evaluation of expanded Parcel J6-3-1 are summarized in Attachment 3 in Tables 11a through 11d.

PCB Evaluation – Existing Conditions

The first step in the evaluation process for Parcel J6-3-1 involved the identification of all soil sample locations in the top foot of unpaved portions with PCB concentrations greater than 10 mg/kg. This step resulted in the identification of 15 such soil sample locations (i.e., BS000147, EA08-F/G-2, F0489606, F0489607, FL001281, FL001834, FL001835, FL001836, FL001837, J6-3-1_B-9, J6-3-1_C/D-10, J6-3-1-SB-13, J6-3-1-SB-14, J6-3-1-SB-15, and J6-3-1-SB-6). As a result, soil removal is necessary to address the PCB concentrations at those locations.

The next step in the PCB evaluation process for expanded Parcel J6-3-1 involved calculating average PCB concentrations for the relevant depth increments. As indicated above, an X value of 10 feet was

used for this property. The following table presents the existing average PCB concentrations calculated for this area, with references to the corresponding figures and tables in Attachments 1 and 2 and the applicable Performance Standard.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Existing Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	3-1, 3-2	E-1B-8	2.37	2
1–X	3-3 through 3-11	E-1B-9	2.57	2

Consistent with the prior evaluation, the existing average PCB concentration in the 0- to 1-foot and the 1- to X-foot depth increments exceed the applicable Performance Standards. As a result, remediation is required to achieve those standards.

Proposed Remediation

Based on the evaluations presented above and in accordance with EPA Condition 116, GE is proposing to conduct soil removal/replacement activities at expanded Parcel J6-3-1 to a maximum depth of four feet bgs. This remediation will involve excavation of approximately 519 cy of soil from the 0- to 1-foot depth interval and 661 cy of removal from one to four feet bgs, for a total excavation volume of 1,180 cy, as shown in Attachment 1 on Figures 3-1 through 3-5.

PCB Evaluation – Post-Remediation Conditions

The proposed remediation will result in the removal of surface soil with exceedances of the NTE level, satisfaction of EPA Condition 116, and achievement of the Performance Standard for the relevant depth increments, as shown in the following table.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Post-Remediation Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	3-1, 3-2	E-1B-10	0.74	2
1–X	3-3 through 3-5	E-1B-11	1.91	2

Parcel J3-1-13

Reason for Re-Evaluation

In response to EPA Condition 117, the evaluation for Parcel J3-1-13 was revised to include additional removal of soils located between the 1 part per million (ppm) isopleth and the parcel boundary nearest the river. This constitutes supplemental removal that is not required to meet the numeric Residential Performance Standards for this property.

Property Description

As shown in Attachment 1 on Figures 4-1 through 4-2, Parcel J3-1-13 is approximately 0.59 acre and is bordered by residential properties to the north, south, and west and non-residential floodplain to the east. The property also overlaps with backwater BW5A-3 to the east, which will also be remediated as part of this Final RD/RA Work Plan. Because this area exceeds 0.25 acre in size, the NTE criterion of 10 mg/kg for the top foot of soil in unpaved areas applies. In accordance with the 2021 EPA-approved residential pre-design investigation, the soils at this residential property were evaluated to a depth of one foot. PCB analytical results used in the evaluation of Parcel J3-1-13 are summarized in Attachment 3 Tables 4a through 4c.

PCB Evaluation – Existing Conditions

The first step in the evaluation process for Parcel J3-1-13 involved the identification of all soil sample locations in the top foot of unpaved portions with PCB concentrations greater than 10 mg/kg. This step resulted in the identification of one such soil sample location (FL001686). As a result, soil removal is necessary to address the PCB concentrations at this location.

The next step in the PCB evaluation process for Parcel J3-1-13 involved calculating average PCB concentrations for the relevant depth increments. The following table presents the existing average PCB concentration calculated for this area, with reference to the corresponding figures and table in Attachments 1 and 2 and the applicable PCB Performance Standard.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Existing Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	4-1, 4-2	E-1B-12	0.4	2

As shown in the preceding table, the existing average PCB concentrations in the 0- to 1-foot depth increment does not exceed the applicable Performance Standard. As a result, remediation is only required to achieve the NTE Performance Standard and to address EPA Condition 117.

Proposed Remediation

Based on the evaluation presented above and in response to EPA Condition 117, GE is proposing to conduct soil removal/replacement activities at Parcel J3-1-13, as shown on Figures 4-1 and 4-2 (separate from the remediation of the overlapping backwater BW5A-3). The purple "EPA CAL Removal" polygons on Figures 4-1 and 4-2 represent the additional soil removal suggested by EPA Condition 117.

With the additional removal to satisfy Condition 117, this remediation will involve excavation of approximately 21 cy[7] of soil within the top foot.

PCB Evaluation – Post-Remediation Conditions

The proposed remediation will result in the removal of surface soil exceeding the NTE level and satisfaction of EPA Condition 117. The following table summarizes the post-remediation average PCB concentration for the 0- to 1- foot depth interval.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Post-Remediation Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	4-1, 4-2	E-1B-13	0.17	2

Parcel J3-1-12

Reason for Re-Evaluation

In response to EPA Condition 117, the evaluation for Parcel J3-1-12 was revised to include additional removal of soils located between the 1 ppm isopleth and the parcel boundary nearest the river. This constitutes supplemental removal that is not required to meet the numeric Residential Performance Standards for this property.

Property Description

As shown in Attachment 1 on Figures 4-1 through 4-2, Parcel J3-1-12 is approximately 0.70 acre and is bordered by residential property to the north and south, Palomino Drive to the west, and non-residential floodplain to the east. The property also overlaps with backwater BW5A-3 to the east, which will also be remediated as part of this Final RD/RA Work Plan. Because this area exceeds 0.25 acre in size, the NTE criterion of 10 mg/kg for the top foot of soil in unpaved areas applies. In accordance with the 2021 PDI Summary Report for Floodplain Residential Properties, the soils at this residential property were evaluated to a depth of one foot. PCB analytical results used in the evaluation of Parcel J3-1-12 are summarized in Attachment 3 in Tables 3a and 3b.

PCB Evaluation – Existing Conditions

The first step in the evaluation process for Parcel J3-1-12 involved the identification of all soil sample locations in the top foot of unpaved portions with PCB concentrations greater than 10 mg/kg. This step resulted in the identification of three such soil sample locations (BS000090, FL001684, and BS000089). As a result, soil removal is necessary to address the PCB concentrations at those locations.

[7] This excludes an additional 1 cy of removal that is required to meet the residential performance standard on this property; however, that additional removal is included as part of the removal being performed in a backwater (BW5A-3) that overlaps with this residential parcel (as described in Section 8.1.2.2.2 of the Final RD/RA Work Plan).

The next step in the PCB evaluation process for Parcel J3-1-12 involved calculating average PCB concentrations for the relevant depth increments. The following table presents the existing average PCB concentration calculated for this area, with reference to the corresponding figures and table in Attachments 1 and 2 and the applicable PCB Performance Standard.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Existing Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	4-1, 4-2	E-1B-14	1.12	2

As shown in the preceding table, the existing average PCB concentration in the 0- to 1-foot depth does not exceed the PCB Performance Standards. As a result, remediation is only required to achieve the NTE Performance Standard and to address EPA Condition 117.

Proposed Remediation

Based on the evaluations presented above and in response to EPA Condition 117, GE is proposing to conduct soil removal/replacement activities at Parcel J3-1-12 as shown in Attachment 1 on Figures 4-1 and 4-2 (separate from the remediation of the overlapping backwater BW5A-3). The purple "EPA CAL Removal" polygons on Figures 4-1 and 4-2 represent the additional soil removal suggested by EPA Condition 117. With that additional removal, the remediation on this property will involve excavation of approximately 44 cy[8] of soil to one foot below existing grade.

PCB Evaluation – Post-Remediation Conditions

The proposed remediation will result in the removal of surface soil with exceedances of the NTE level and satisfaction of EPA Condition 117. The following table summarizes the post-remediation average PCB concentration for the 0- to 1-foot depth interval.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Post-Remediation Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	4-1, 4-2	E-1B-15	0.23	2

Parcel J3-1-11

Reason for Re-Evaluation

In response to EPA Condition 117, the evaluation for Parcel J3-1-11 was revised to include removal of additional soils located between the 1 ppm isopleth and the parcel boundary nearest the river. This

[8] This excludes an additional 36 cy of removal that is required to meet the residential performance standard on this property; however, that additional removal is included as part of the removal being performed in a backwater (BW5A-3) that overlaps with this residential parcel (as described in Section 8.1.2.2.2 of the Final RD/RA Work Plan).

constitutes supplemental removal that is not required to meet the numeric Residential Performance Standards for this property.

Property Description

As shown in Attachment 1 on Figures 4-1 through 4-2, Parcel J3-1-11 is approximately 0.80 acre and is bordered by residential properties to the north and south, Palomino Drive to the west, and non-residential floodplain to the east. Because this area exceeds 0.25 acre in size, the NTE criterion of 10 mg/kg for the top foot of soil in unpaved areas applies. In accordance with the 2021 PDI Summary Report for Floodplain Residential Properties, the soils at this residential property were evaluated to a depth of one foot. PCB analytical results used in the evaluation of Parcel J3-1-11 are summarized in Attachment 3 in Tables 2a and 2b.

PCB Evaluation – Existing Conditions

The first step in the evaluation process for Parcel J3-1-11 involved the identification of all soil sample locations in the top foot of unpaved portions with PCB concentrations greater than 10 mg/kg. This step resulted in the identification of two such soil sample locations (FL001682 and BS000089). As a result, soil removal is necessary to address the PCB concentrations at those locations.

The next step in the PCB evaluation process for Parcel J3-1-11 involved calculating average PCB concentrations for the relevant depth increments. The following table presents the existing average PCB concentration calculated for this area, with reference to the corresponding figures and table in Attachments 1 and 2 and the applicable PCB Performance Standard.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Existing Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	4-1, 4-2	E-1B-16	0.99	2

As shown in the preceding table, the existing average PCB concentration in the 0- to 1-foot depth does not exceed the PCB Performance Standards. As a result, remediation is only required to achieve the NTE Performance Standard and to address EPA Condition 117.

Proposed Remediation

Based on the evaluations presented above and in response to EPA Condition 117, GE is proposing to conduct soil removal/replacement activities at Parcel J3-1-11, as shown in Attachment 1 on Figures 4-1 and 4-2. The purple "EPA CAL Removal" polygons on Figures 4-1 and 4-2 represent the additional soil removal suggested by EPA Condition 117. With that additional removal, the remediation on this property will involve excavation of approximately 29 cy of soil to one foot below existing grade.

PCB Evaluation – Post-Remediation Conditions

The proposed remediation will result in the removal of surface soil with exceedances of the NTE level and satisfaction of EPA Condition 117. The following table summarizes the post-remediation average PCB concentration for the 0- to 1-foot depth interval.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Post-Remediation Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	4-1, 4-2	E-1B-17	0.72	2

Parcel J3-2-2

Reason for Re-Evaluation

In response to EPA Condition 118, the evaluation for Parcel J3-2-2 was revised to include removal of additional soils located between the 1 ppm isopleth and the parcel boundary nearest the river. This constitutes supplemental removal that is not required to meet the numeric Residential Performance Standards for this property.

Property Description

As shown in Attachment 1 on Figures 5-1 to 5-3, Parcel J3-2-2 is approximately 0.76 acre and is bordered by Joseph Drive to the north, residential properties to the east, the Housatonic River to the south, and non-residential floodplain to the west. Because this area exceeds 0.25 acre in size, the NTE criterion of 10 mg/kg for the top foot of soil in unpaved areas applies. In accordance with the 2021 PDI Summary Report for Floodplain Residential Properties, the soils at this residential property were evaluated to a depth of two feet. PCB analytical results used in the evaluation of Parcel J3-2-2 are summarized in Attachment 3 in Tables 5a through 5c.

PCB Evaluation – Existing Conditions

The first step in the evaluation process for Parcel J3-2-2 involved the identification of all soil sample locations in the top foot of unpaved portions with PCB concentrations greater than 10 mg/kg. This step resulted in the identification of seven such soil sample locations (i.e., J3-2-2_J/K-2/3, FL001323, FL001849, FL000914, J3-2-2-SB-1, FL001324, and BS000059). As a result, soil removal is necessary to address the PCB concentrations at those locations.

The next step in the PCB evaluation process for Parcel J3-2-2 involved calculating average PCB concentrations for the relevant depth increments. As indicated above, an X value of two feet was used for this evaluation area. The following table presents the existing average PCB concentrations calculated for this area, with a reference to the corresponding figures and tables in Attachments 1 and 2 and the applicable PCB Performance Standard.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Existing Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	5-1 to 5-2	E-1B-18	5.71	2
1–X	5-3	E-1B-19	2.52	2

As shown in the preceding table, the existing average PCB concentrations in the 0- to 1-foot and the 1- to X-foot depth increments exceed the PCB Performance Standards. As a result, remediation is required to achieve those standards.

Proposed Remediation

Based on the evaluations presented above and in response to EPA Condition 118, GE is proposing to conduct soil removal/replacement activities at Parcel J3-2-2, as shown in Attachment 1 on Figures 5-1 through 5-3. The purple "EPA CAL Removal" polygons on Figures 5-1 and 5-2 represent the additional soil removal suggested by EPA Condition 118. With that additional removal in the top foot, this remediation will involve excavation of approximately 203 cy of soil from the 0- to 1-foot depth interval and approximately 49 cy of soil from the 1- to 2-foot depth interval for a total excavation volume of 252 cy, as shown in Attachment 1 on Figures 5-1 through 5-3.

PCB Evaluation – Post-Remediation Conditions

The proposed remediation will result in the removal of surface soil with exceedances of the NTE level, satisfaction of EPA Condition 118, and achievement of the applicable Performance Standard for the relevant depth increments, as shown in the following table.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Post-Remediation Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	5-1, 5-2	E-1B-20	0.32	2
1–X	5-3	E-1B-21	0.51	2

Parcel J3-2-3

Reason for Re-Evaluation

In response to EPA Condition 118, the evaluation for Parcel J3-2-3 was revised to include removal of additional soils located between the 1 ppm isopleth and the parcel boundary nearest the river. This constitutes supplemental removal that is not required to meet the numeric Residential Performance Standards for this property.

Property Description

As shown in Attachment 1 on Figures 5-1 through 5-4, Parcel J3-2-3 is approximately 0.85 acre and is bordered by Joseph Drive to the north, residential properties to the east and west, and the Housatonic River to the south. Because this area exceeds 0.25 acre in size, the NTE criterion of

10 mg/kg for the top foot of soil in unpaved areas applies. In accordance with the 2021 PDI Summary Report for Floodplain Residential Properties, the soils at this residential property were evaluated to a depth of three feet. PCB analytical results used in the evaluation of Parcel J3-2-3 are summarized in Attachment 3 in Tables 6a and 6b.

PCB Evaluation – Existing Conditions

The first step in the evaluation process for Parcel J3-2-3 involved the identification of all soil sample locations in the top foot of unpaved portions with PCB concentrations greater than 10 mg/kg. This step resulted in the identification of 14 such soil sample locations (J3-2-2_J/K-2/3, FL000914, FL001323, BS000059, BS000058, J3-2-3-SB-3, J3-2-3_H/I-3/4, FL000700, J3-2-2-SB-1, J3-2-3-SB-1, J3-2-3-SB-4, FL001324, J3-2-3-SS-3, and FL000699). As a result, soil removal is necessary to address the PCB concentrations at those locations.

The next step in the PCB evaluation process for Parcel J3-2-3 involved calculating average PCB concentrations for the relevant depth increments. As indicated above, an X value of three feet was used for this evaluation area. The following table presents the existing average PCB concentrations calculated for this area, with a reference to the corresponding figures and tables in Attachments 1 and 2 and the applicable PCB Performance Standard.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Existing Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	5-1, 5-2	E-1B-22	2.86	2
1–X	5-3, 5-4	E-1B-23	0.66	2

As shown in the preceding table, the existing average PCB concentrations in the 0- to 1-foot depth increment exceed the PCB Performance Standard. As a result, remediation is required to achieve that standard.

Proposed Remediation

Based on the evaluations presented above and in response to EPA Condition 118, GE is proposing to conduct soil removal/replacement activities at Parcel J3-2-3, as shown in Attachment 1 on Figures 5-1 and 5-2. The purple "EPA CAL Removal" polygons on Figures 5-1 and 5-2 represent the additional soil removal suggested by EPA Condition 118. With that additional removal in the top foot, this remediation will involve excavation of approximately 262 cy of soil to one foot below existing grade.

PCB Evaluation – Post-Remediation Conditions

The proposed remediation will result in the removal of surface soil with exceedances of the NTE level, satisfaction of EPA Condition 118, and achievement of the PCB Performance Standard for the 0- to 1-foot depth increment, as shown in the following table.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Post-Remediation Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	5-1, 5-2	E-1B-24	0.39	2
1-X[a]	5-3, 5-4	E-1B-23	0.66	2

Note:

a. No remediation is required at this residential parcel in the 1- to X-foot depth interval because the Performance Standard is already achieved.

Parcel J3-2-4

Reason for Re-Evaluation

In response to EPA Condition 118, the evaluation for Parcel J3-2-4 was revised to include removal of additional soils located between the 1 ppm isopleth and the parcel boundary nearest the river. This constitutes supplemental removal that is not required to meet the numeric Residential Performance Standards for this property.

Property Description

As shown in Attachment 1 on Figures 5-1 through 5-4, Parcel J3-2-4 is approximately 0.55 acre and is bordered by Joseph Drive to the north, residential properties to the east and west, and the Housatonic River to the south. Because this area exceeds 0.25 acre in size, the NTE criterion of 10 mg/kg for the top foot of soil in unpaved areas applies. In accordance with the 2021 PDI Summary Report for Floodplain Residential Properties, the soils at this residential property were evaluated to a depth of three feet. PCB analytical results used in the evaluation of Parcel J3-2-4 are summarized in Attachment 3 Tables 7a and 7b.

PCB Evaluation – Existing Conditions

The first step in the evaluation process for Parcel J3-2-4 involved the identification of all soil sample locations in the top foot of unpaved portions with PCB concentrations greater than 10 mg/kg. This step resulted in the identification of eight such soil sample locations (BS000060, J3-2-4_F-5/6, J3-2-4_F/G-5/6, BS000057, FL000701, J3-2-4_E/F-6/7, J3-2-3-SB-4, and FL000699). As a result, soil removal is necessary to address the PCB concentrations at those locations.

The next step in the PCB evaluation process for Parcel J3-2-4 involved calculating average PCB concentrations for the relevant depth increments. As indicated above, an X value of three feet was used for this evaluation area. The following table presents the existing average PCB concentrations calculated for this area, with reference to the corresponding figures and tables in Attachments 1 and 2 and the applicable PCB Performance Standard.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Existing Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	5-1, 5-2	E-1B-25	1.29	2
1–X	5-3, 5-4	E-1B-26	1.40	2

As shown in the preceding table, the existing average PCB concentrations in the 0- to 1-foot and the 1- to X-foot depth increments do not exceed the PCB Performance Standards. As a result, remediation is only required to achieve the NTE Performance Standard and to address EPA Condition 118.

Proposed Remediation

Based on the evaluations presented above and in response to EPA Condition 118, GE is proposing to conduct soil removal/replacement activities at Parcel J3-2-4, as shown in Attachment 1 on Figures 5-1 and 5-2. The purple "EPA CAL Removal" polygons on Figures 5-1 and 5-2 represent the additional soil removal suggested by EPA Condition 118. With that additional removal, this remediation will involve excavation of approximately 76 cy of soil to one foot below existing grade.

PCB Evaluation – Post-Remediation Conditions

The proposed remediation will result in the removal of surface soil with exceedances of the NTE level, satisfaction of EPA Condition 118. and achievement of the PCB Performance Standard for the 0- to 1-foot depth increment, as shown in the following table.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Post-Remediation Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	5-1, 5-2	E-1B-27	0.12	2
1–X[a]	5-3, 5-4	E-1B-26	1.40	2

Note:

a. No remediation is required at this residential parcel in the 1- to X-foot depth interval because the Performance Standard is already achieved.

Parcel J3-2-5

Reason for Re-Evaluation

In response to EPA Condition 118, the evaluation for Parcel J3-2-5 was revised to include removal of additional soils located between the 1 ppm isopleth and the parcel boundary nearest the river. This constitutes supplemental removal that is not required to meet the numeric Residential Performance Standards for this property.

Property Description

As shown in Attachment 1 on Figures 5-1 and 5-2, Parcel J3-2-5 is approximately 0.45 acre and is bordered by Joseph Drive to the north, residential properties to the east and west, and the Housatonic River to the south. Because this area exceeds 0.25 acre in size, the NTE criterion of

10 mg/kg for the top foot of soil in unpaved areas applies. In accordance with the 2021 PDI Summary Report for Floodplain Residential Properties, the soils at this residential property were evaluated to a depth of one foot. PCB analytical results used in the evaluation of Parcel J3-2-5 are summarized in Attachment 3 in Tables 8a and 8b.

PCB Evaluation – Existing Conditions

The first step in the evaluation process for Parcel J3-2-5 involved the identification of all soil sample locations in the top foot of unpaved portions with PCB concentrations greater than 10 mg/kg. This step resulted in the identification of three such soil sample locations (i.e., BS000060, FL000702, and BS000061). As a result, soil removal activities are necessary to address PCB concentrations observed at those locations.

The next step in the PCB evaluation process for Parcel J3-2-5 involved calculating average PCB concentrations for the relevant depth increments. The following table presents the existing average PCB concentration calculated for this area, with a reference to the corresponding figures and table in Attachments 1 and 2 and the applicable PCB Performance Standard.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Existing Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	5-1, 5-2	E-1B-28	1.1	2

As shown in the preceding table, the existing average PCB concentration in the 0- to 1-foot depth does not exceed the PCB Performance Standards. As a result, remediation is only required to achieve the NTE Performance Standard and to address EPA Condition 118.

Proposed Remediation

Based on the evaluations presented above and in response to EPA Condition 118, GE is proposing to conduct soil removal/replacement activities at Parcel J3-2-5, as shown in Attachment 1 on Figures 5-1 and 5-2. The purple "EPA CAL Removal" polygons on Figures 5-1 and 5-2 represent the additional soil removal suggested by EPA Condition 118. With that additional removal, this remediation will involve excavation of approximately 38 cy of soil to one foot below existing grade.

PCB Evaluation – Post-Remediation Conditions

The proposed remediation will result in the removal of surface soil with exceedances of the NTE level and satisfaction of EPA Condition 118. The following table summarizes the post-remediation average PCB concentration for the 0- to 1-foot depth interval.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Post-Remediation Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	5-1, 5-2	E-1B-29	0.13	2

Parcel J3-2-6

Reason for Re-Evaluation

No re-evaluation of Parcel J3-2-6 was required. Therefore, for completeness, the evaluation presented below is the same as that presented in the Conceptual RD/RA Work Plan.

Property Description

As shown in Attachment 1 on Figures 5-1 through 5-2, Parcel J3-2-6 is approximately 0.54 acre and is bordered by Joseph Drive to the north, residential property to the west, a residential property and other non-residential floodplain area to the east, and the Housatonic River to the south. Because this area exceeds 0.25 acre in size, the NTE criterion of 10 mg/kg for the top foot of soil in unpaved areas applies. In accordance with the 2021 PDI Summary Report for Floodplain Residential Properties, the soils at this residential property were evaluated to a depth of one foot. PCB analytical results used in the evaluation of Parcel J3-2-6 are summarized in Attachment 3 in Tables 9a and 9b.

PCB Evaluation – Existing Conditions

The first step in the evaluation process for Parcel J3-2-6 involved the identification of all soil sample locations in the top foot of unpaved portions with PCB concentrations greater than 10 mg/kg. This step resulted in the identification of one such soil sample location (i.e., BS000062). As a result, soil removal is necessary to address the PCB concentrations at this location.

The next step in the PCB evaluation process for Parcel J3-2-6 involved calculating average PCB concentrations for the relevant depth increments. The following table presents the existing average PCB concentration calculated for this area, with a reference to the corresponding figures and table in Attachments 1 and 2 and the applicable PCB Performance Standard.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Existing Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	5-1, 5-2	E-1B-30	0.20	2

Proposed Remediation

Based on the evaluations presented above, GE is proposing to conduct soil removal/replacement activities at Parcel J3-2-6, as shown in Attachment 1 on Figures 5-1 and 5-2. This remediation will involve excavation of approximately 0.12 cy of soil to one foot below existing grade.

PCB Evaluation – Post-Remediation Conditions

The proposed remediation will result in the removal of the surface soil with exceedances of the NTE level. The following table summarizes the post-remediation average PCB concentration for the 0- to 1-foot depth interval.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Post-Remediation Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	5-1, 5-2	E-1B-31	0.19	2

Parcel K3-1-2

Reason for Re-Evaluation

In response to EPA Condition 119, the evaluation for Parcel K3-1-2 was revised to include additional soil removal adjacent to the river to form a continuous band of removal along the water's edge. This constitutes supplemental removal that is not required to meet the numeric Residential Performance Standards for this property.

Property Description

As shown in Attachment 1 on Figures 6-1 through 6-3, Parcel K3-1-2 is approximately 0.76 acre and is bordered by non-residential floodplain and a residential property to the north, East New Lenox Road to the east, non-residential floodplain to the south, and the Housatonic River to the west. Because this area exceeds 0.25 acre in size, the NTE criterion of 10 mg/kg for the top foot of soil in unpaved areas applies. In accordance with the 2021 PDI Summary Report for Floodplain Residential Properties, the soils at this residential property were evaluated to a depth of two feet. PCB analytical results used in the evaluation of Parcel K3-1-2 are summarized in Attachment 3 in Tables 13a through 13c.

PCB Evaluation – Existing Conditions

The first step in the evaluation process for Parcel K3-1-2 involved the identification of all soil sample locations in the top foot of unpaved portions with PCB concentrations greater than 10 mg/kg. This step resulted in the identification of five such soil sample locations (i.e., FL001301, K3-1-2_D/E-4, BS000065, FL001300, and K3-1-2_C-3). As a result, soil removal is necessary to address the PCB concentrations at those locations.

The next step in the PCB evaluation process for Parcel K3-1-2 involved calculating average PCB concentrations for the relevant depth increments. As indicated above, an X value of two feet was used for this evaluation area. The following table presents the existing average PCB concentrations calculated for this area, with a reference to the corresponding figures and tables in Attachments 1 and 2 and the applicable PCB Performance Standard.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Existing Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	6-1, 6-2	E-1B-32	2.06	2
1–X	6-3	E-1B-33	0.94	2

As shown in the preceding table, the existing average PCB concentration in the 0- to 1-foot increment exceeds the PCB Performance Standard. As a result, remediation is required to achieve that standard.

Proposed Remediation

Based on the evaluations presented above and in response to EPA Condition 119, GE is proposing to conduct soil removal/replacement activities at Parcel K3-1-2, as shown in Attachment 1 on Figures 6-1 and 6-2. The purple "EPA CAL Removal" polygons on Figures 6-1 and 6-2 represent the additional soil removal suggested by EPA Condition 119. With that additional removal, this remediation will involve excavation of approximately 85 cy of soil to a depth of one foot bgs.

PCB Evaluation – Post-Remediation Conditions

The proposed remediation will result in the removal of surface soil with exceedances of the NTE level, satisfaction of EPA Condition 119, and achievement of the PCB Performance Standard for the 0- to 1-foot depth increment, as shown in the following table.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Post-Remediation Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	6-1, 6-2	E-1B-34	0.58	2
1–X[a]	6-3	E-1B-33	0.94	2

Note:

a. No remediation is required at this residential parcel in the 1- to X-foot depth interval because the Performance Standard is already achieved.

Parcel K2-1-10

Reason for Re-Evaluation

In response to EPA Condition 119, the evaluation for Parcel K3-1-10 was revised to include additional soil removal adjacent to the river to form a continuous band of soil removal along the water's edge. This constitutes supplemental removal that is not required to meet the numeric Residential Performance Standards for this property.

Property Description

As shown in Attachment 1 on Figures 7-1 through 7-5, Parcel K2-1-10 is approximately 1.6 acres and is bordered by non-residential floodplain to the north, New Lenox Road to the east, a residential property and non-residential floodplain to the south, and the Housatonic River to the west. Because this area exceeds 0.25 acre in size, the NTE criterion of 10 mg/kg for the top foot of soil in unpaved areas applies. In accordance with the 2021 PDI Summary Report for Floodplain Residential Properties, the soils at this residential property were evaluated to a depth of four feet. PCB analytical results used in the evaluation of Parcel K2-1-10 are summarized in Attachment 3 in Tables 12a through 12c.

PCB Evaluation – Existing Conditions

The first step in the evaluation process for Parcel K2-1-10 involved the identification of all soil sample locations in the top foot of unpaved portions with PCB concentrations greater than 10 mg/kg. This step resulted in the identification of six such soil sample locations (i.e., K2-1-10_E-2, K2-1-10_D-2/3, FL0001569, FL001859, K2-1-10_C-2/3, and K2-1-10_B-2/3). As a result, soil removal is necessary to address the PCB concentrations at those locations.

The next step in the PCB evaluation process for Parcel K2-1-10 involved calculating average PCB concentrations for the relevant depth increments. As indicated above, an X value of four feet was used for this evaluation area. The following table presents the existing average PCB concentrations calculated for this area, with a reference to the corresponding figures and tables in Attachments 1 and 2 and the applicable PCB Performance Standard.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Existing Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	7-1, 7-2	E-1B-35	2.13	2
1–X	7-3 through 7-5	E-1B-36	1.15	2

As shown in the preceding table, the existing average PCB concentration in the 0- to 1-foot depth increment exceeds the PCB Performance Standard. As a result, remediation is required to achieve that standard.

Proposed Remediation

Based on the evaluations presented above and in response to EPA Condition 119, GE is proposing to conduct soil removal/replacement activities at Parcel K2-1-10, as shown in Attachment 1 on Figures 7-1 and 7-2. The purple "EPA CAL Removal" polygons on Figures 7-1 and 7-2 represent the additional soil removal suggested by EPA Condition 119. With that additional removal, this remediation will involve excavation of approximately 152 cy of soil to one foot below existing grade.

PCB Evaluation – Post-Remediation Conditions

The proposed remediation will result in the removal of surface soil with exceedances of the NTE level, satisfaction of EPA Condition 119, and achievement of the PCB Performance Standard for the 0- to 1-foot depth increment, as shown in the following table.

Depth Increment (feet bgs)	Attachment 1 Figure References	Attachment 2 Table Reference	Post-Remediation Average PCB Aroclor Concentration (mg/kg)	Performance Standard (mg/kg)
0–1	7-1, 7-2	E-1B-37	0.21	2
1–X[a]	7-3 through 7-5	E-1B-36	1.15	2

Note:

a. No remediation is required at this residential parcel in the 1- to X-foot depth interval because the Performance Standard is already achieved.

Floodplain Disposal Evaluations

As described in Sections II.B.5 and II.B.6 of the Revised Final Permit, the ROR Remedial Action will use a hybrid disposal approach that includes a combination of disposal at an Upland Disposal Facility (UDF) and off-site disposal. Attachment E to the Revised Final Permit describes the criteria and methods for determining whether material excavated during the ROR Remedial Action may be disposed of in the UDF. In accordance with that document, floodplain soil to be disposed of in the UDF must have a volume-weighted average PCB concentration of less than 50 mg/kg for each Exposure Area (EA). If the volume-weighted average PCB concentration in the soil to be removed from a given EA equals or exceeds 50 mg/kg, the soils with the highest PCB concentrations in the EA will be segregated for off-site disposal until the average concentration of the remainder of the soil to be removed in the EA decreases to less than 50 mg/kg for subsequent disposal at the UDF. Because the residential properties generally overlap with non-residential EAs,[9] the entire volume within the boundary of an individual EA (both non-residential and residential soil) was combined to determine the disposal requirements. The disposal evaluation for each EA (including the associated residential parcels) is presented in Appendix J to the Final RD/RA Work Plan (*Revised Non-Residential Exposure Area PCB Evaluations*).

References

Anchor QEA, 2016. *Revised Removal Design/Removal Action Work Plan for Floodplain Residential Properties Downstream of the Confluence*. Prepared for General Electric Company, Pittsfield, Massachusetts. September 2016.

Anchor QEA, 2019. *Final Completion Report for Removal Action for Housatonic River Floodplain – Current Residential Properties Downstream of the Confluence*. GE-Pittsfield/Housatonic River Site. Prepared for General Electric Company. February 2019.

Anchor QEA, 2021. *Pre-Design Investigation Summary Report for Reach 5A Floodplain Residential Properties*. Housatonic River – Rest of River. Prepared for General Electric Company, Pittsfield, Massachusetts. December 2021.

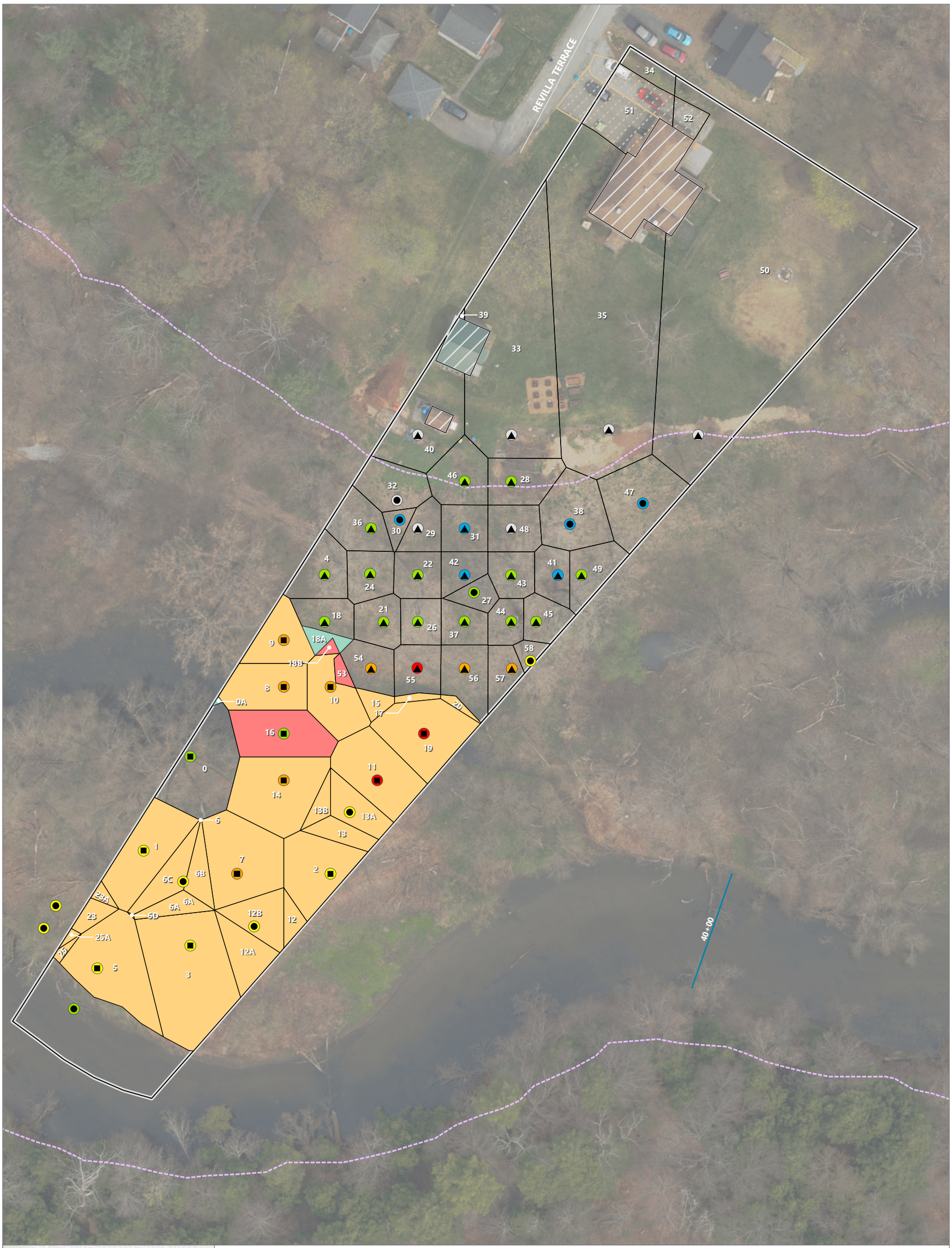
Anchor QEA, AECOM, and Arcadis, 2023. *Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A*. Housatonic River – Rest of River. Prepared for General Electric Company, Pittsfield, Massachusetts. September 28, 2023.

[9] Residential Parcel J6-3-1 is the only residential parcel that does not overlap with a non-residential EA; therefore, the disposal evaluation for Parcel J6-3-1 was conducted individually as described in Appendix J to the Final RD/RA Work Plan.

Anchor QEA, AECOM, and Arcadis, 2026. *Supplemental Data Collection Summary Report for Reach 5A*. Housatonic River – Rest of River. Prepared for General Electric Company, Pittsfield, Massachusetts. February 4, 2026.

EPA (U.S. Environmental Protection Agency), 2020. *Revised Final Permit Modification to the 2016 Reissued RCRA Permit and Selection of CERCLA Remedial Action and Operation & Maintenance for Rest of River*. December 2020.

Attachment 1
Evaluation Figures



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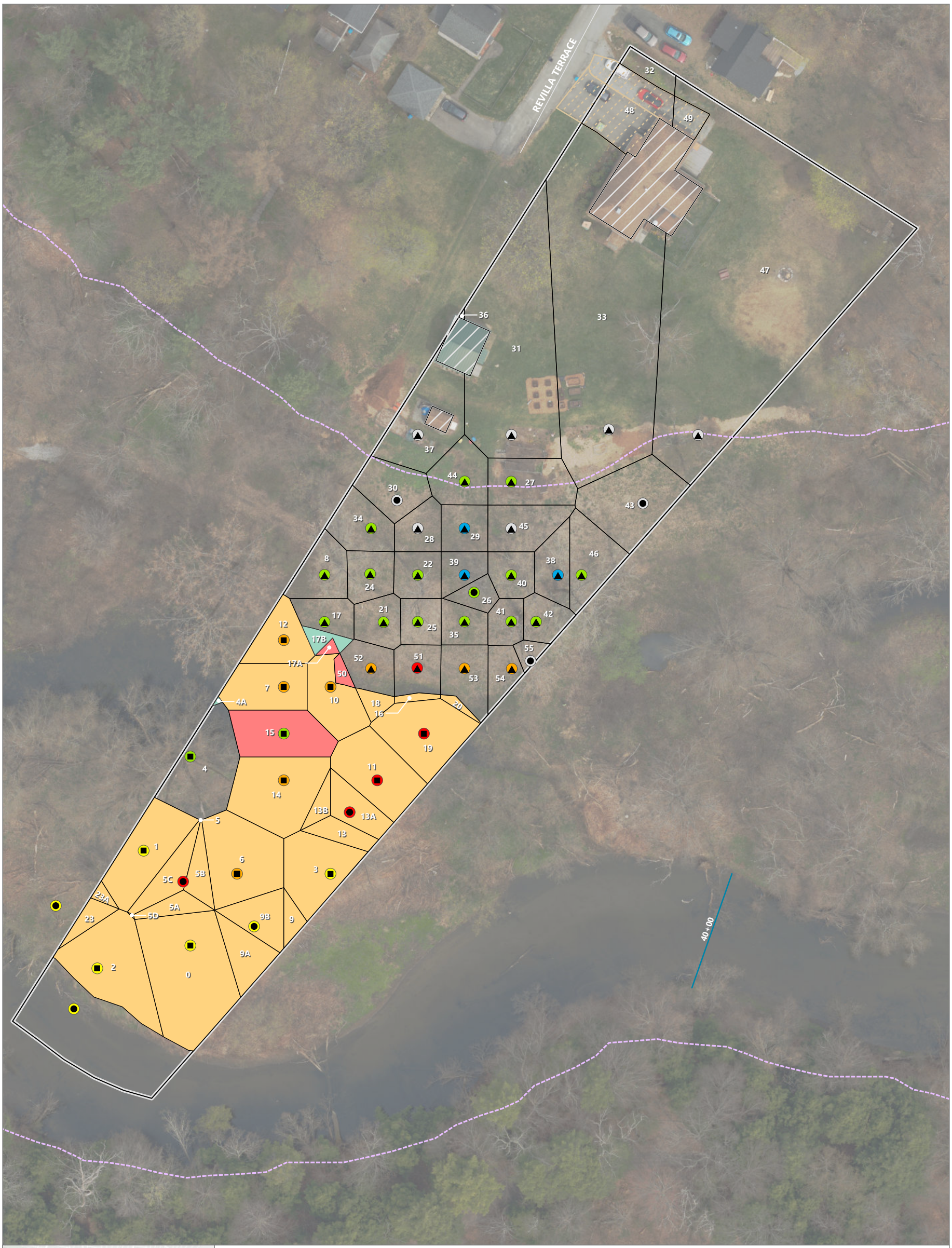
ANCHOR QEA

Figure 1-1
Parcel I6-3-13 – 0 to 0.5 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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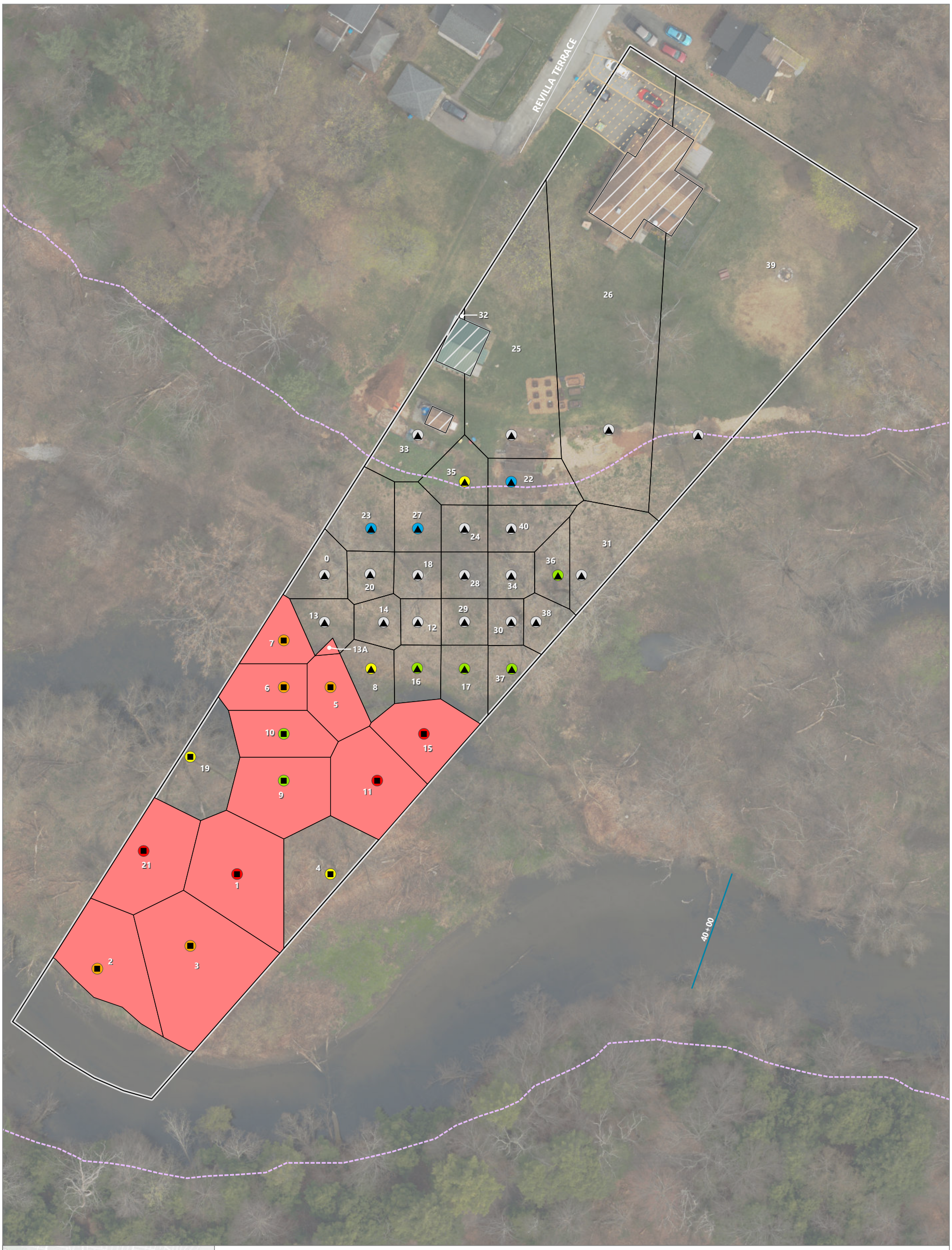
ANCHOR QEA

Figure 1-2
Parcel I6-3-13 – 0.5 to 1 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



LEGEND:

- Property Boundary
- Roads
- River Stationing
- 1 mg/kg PCB Isopleth
- Buildings
- Paved Driveways

Floodplain Soil PCB Sampling Location

- Historical EPA/GE Sample Location
- Actual Potential Lawn (GE Historical) Sample Location
- 2020-2022 PDI Sample Location
- 2024 Residential Floodplain Sample Location

- No Removal
- SA[4] Removal

PCB Aroclor Concentration (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTE:

1. Aerial imagery collected by Bluesky Geospatial, June 2025.
2. NTE: Not to exceed.
3. SA: Spatial average.
4. Additional removal areas to achieve average PCB concentration criteria in the top foot of soil and in the 1- to X-foot depth increment.

0 50
Feet

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ANCHOR QEA

Figure 1-3
Parcel I6-3-13 – 1 to 2 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River

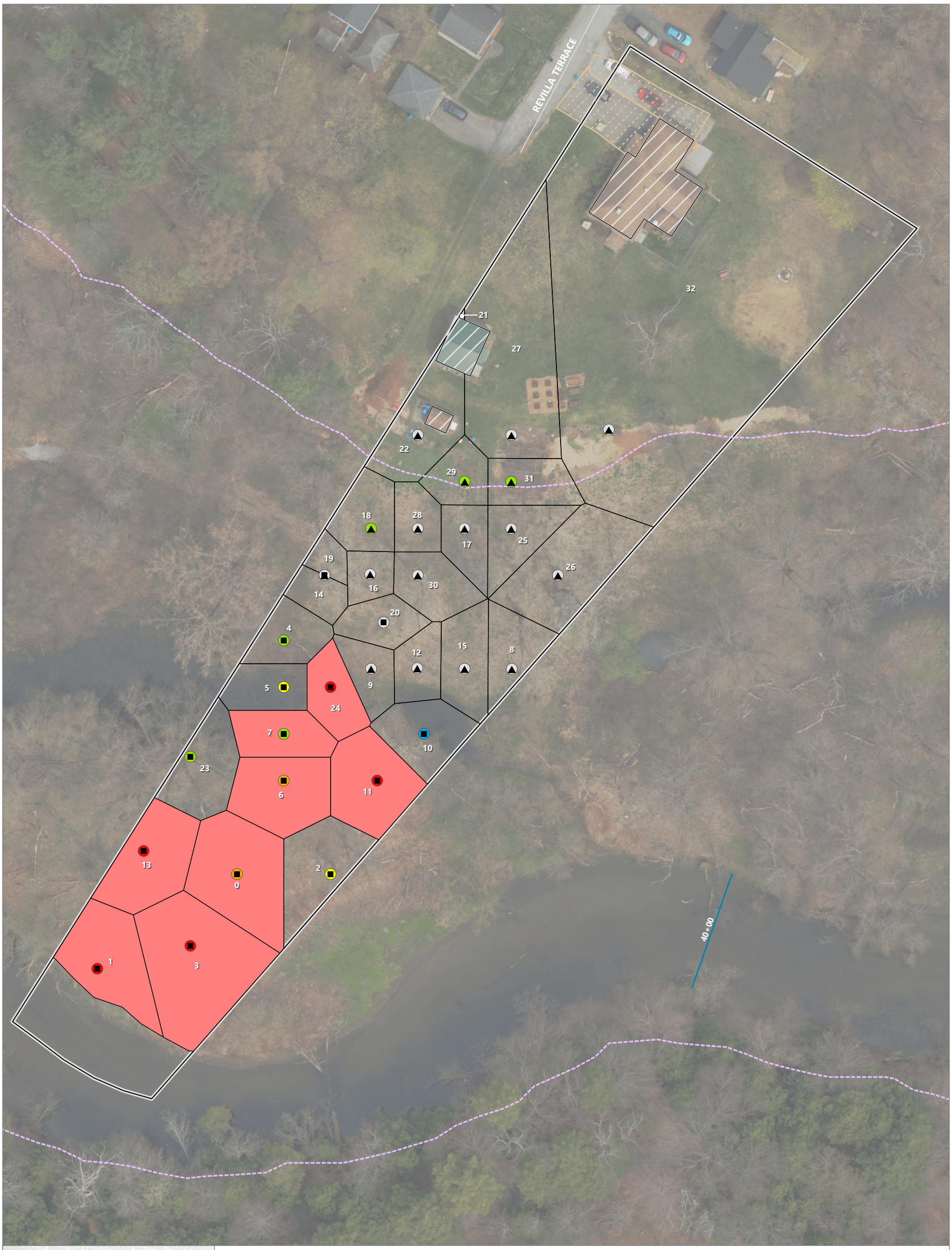

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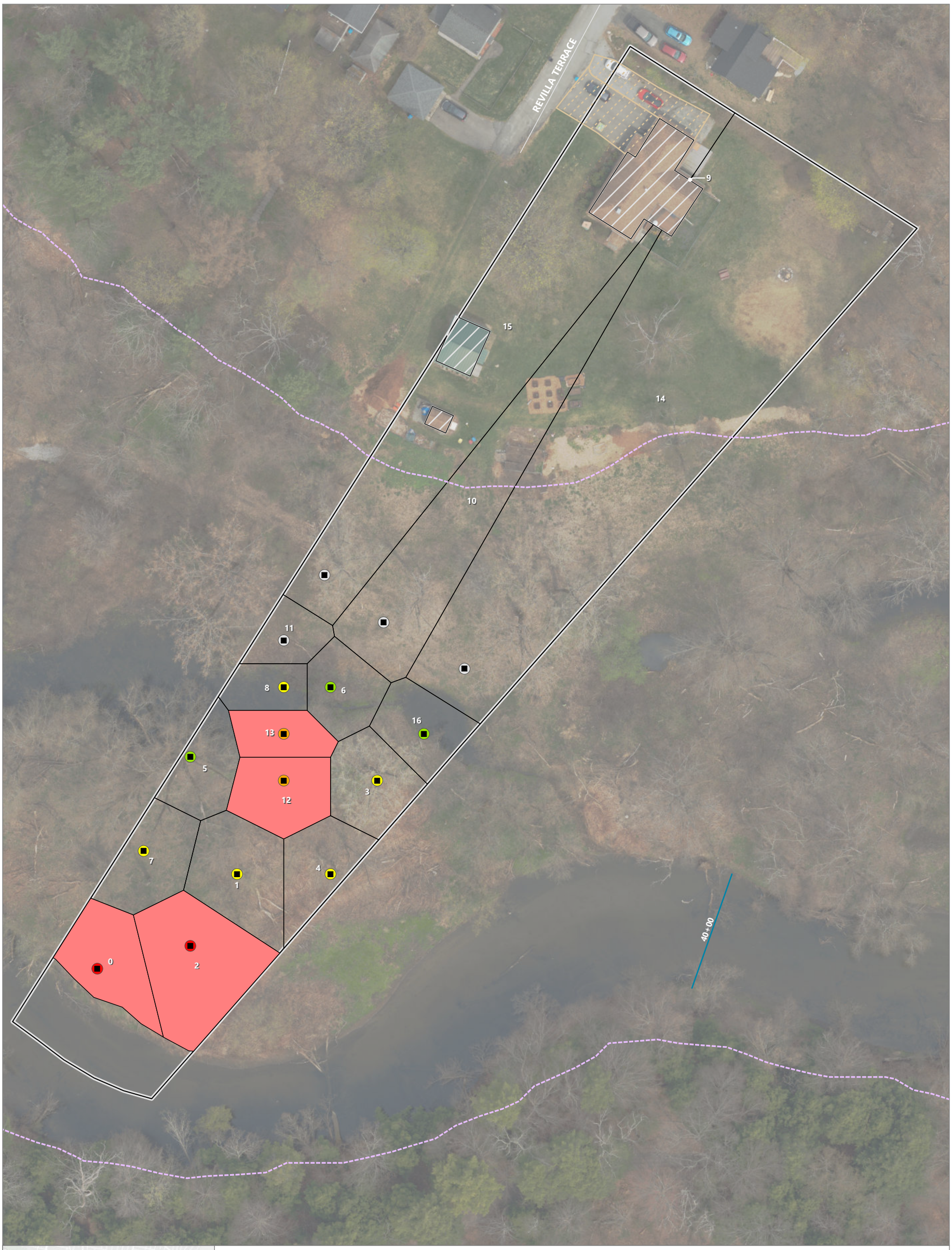
Figure 1-4
Parcel I6-3-13 – 2 to 3 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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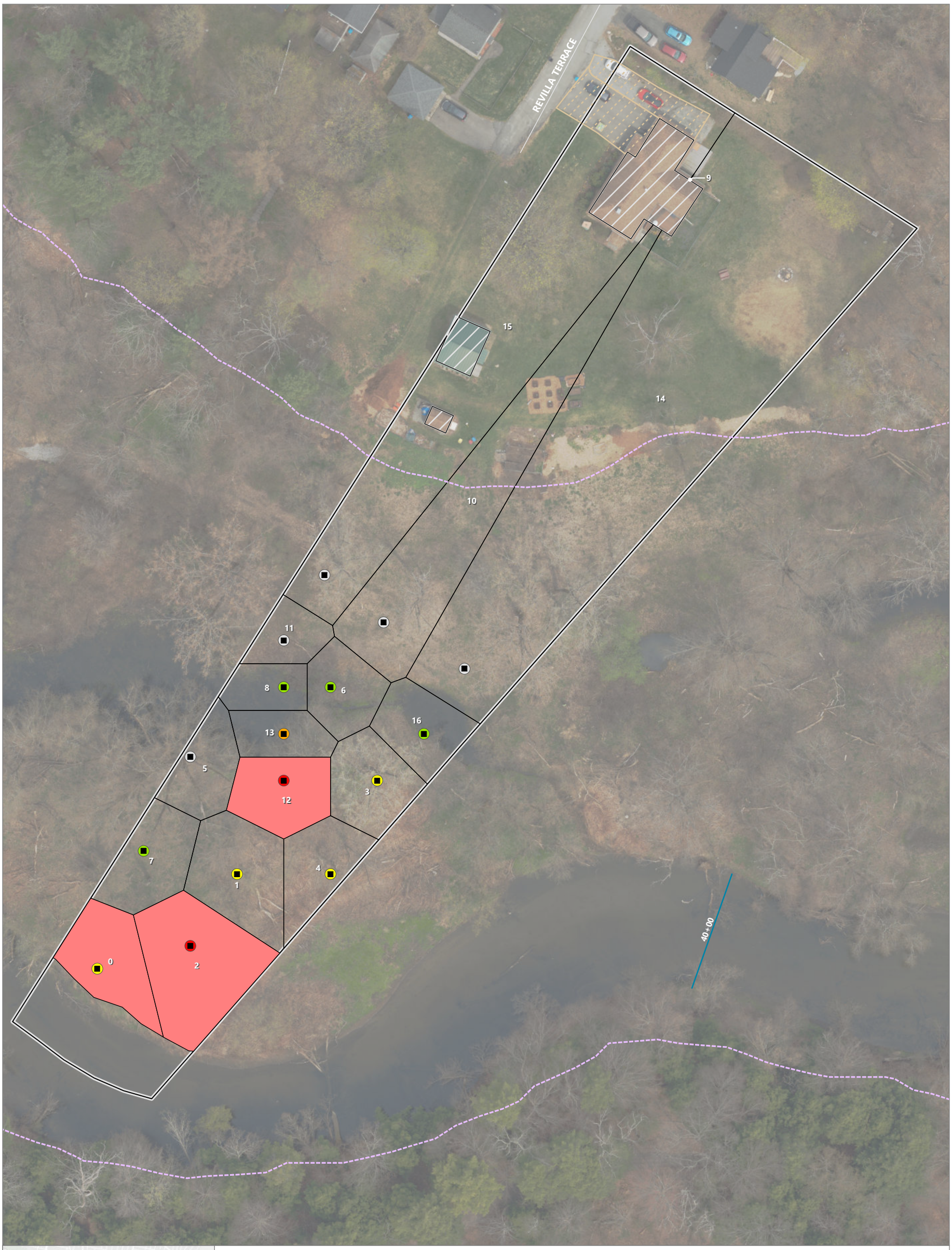
ANCHOR QEA

Figure 1-5
Parcel I6-3-13 – 3 to 4 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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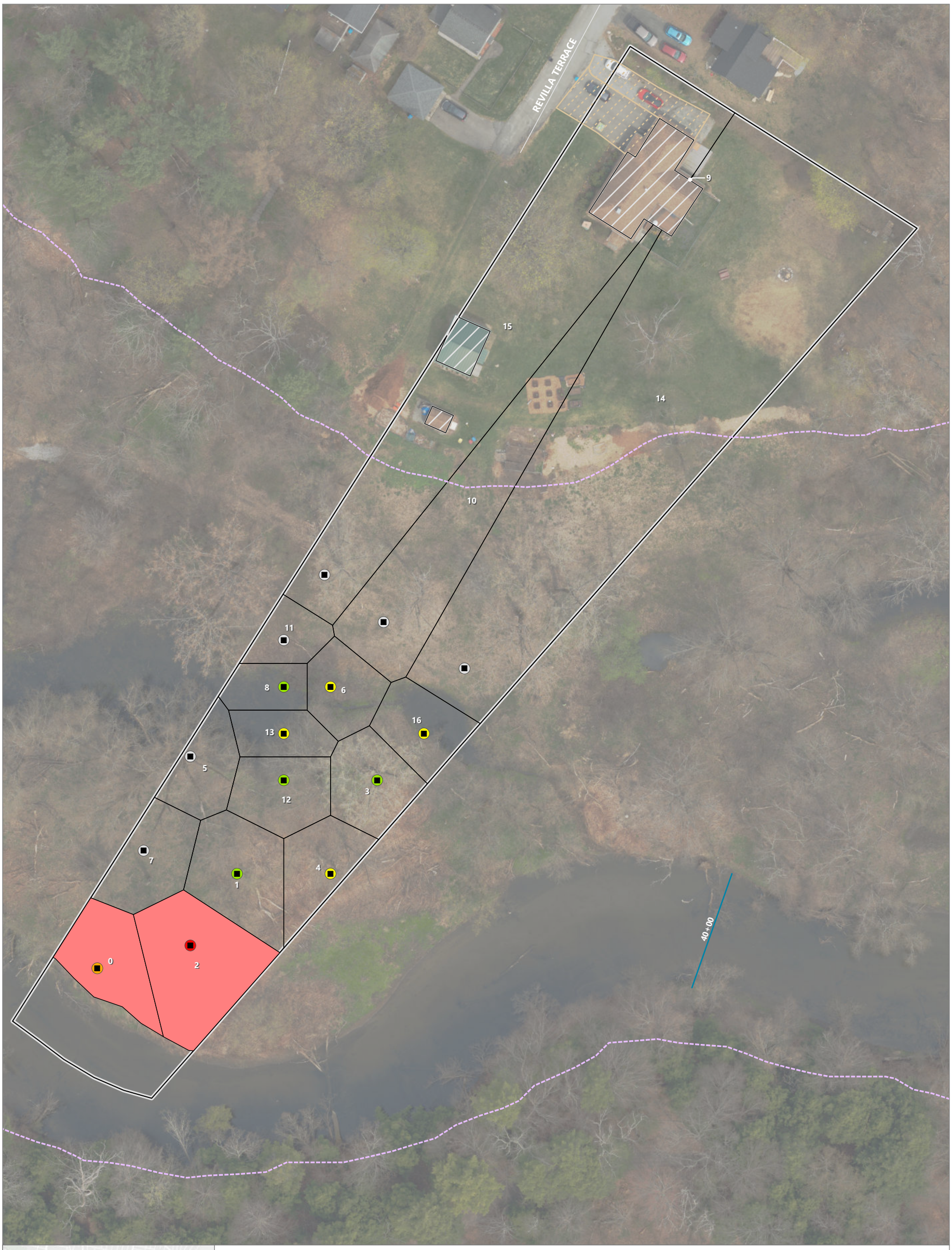
ANCHOR QEA

Figure 1-6
Parcel I6-3-13 – 4 to 5 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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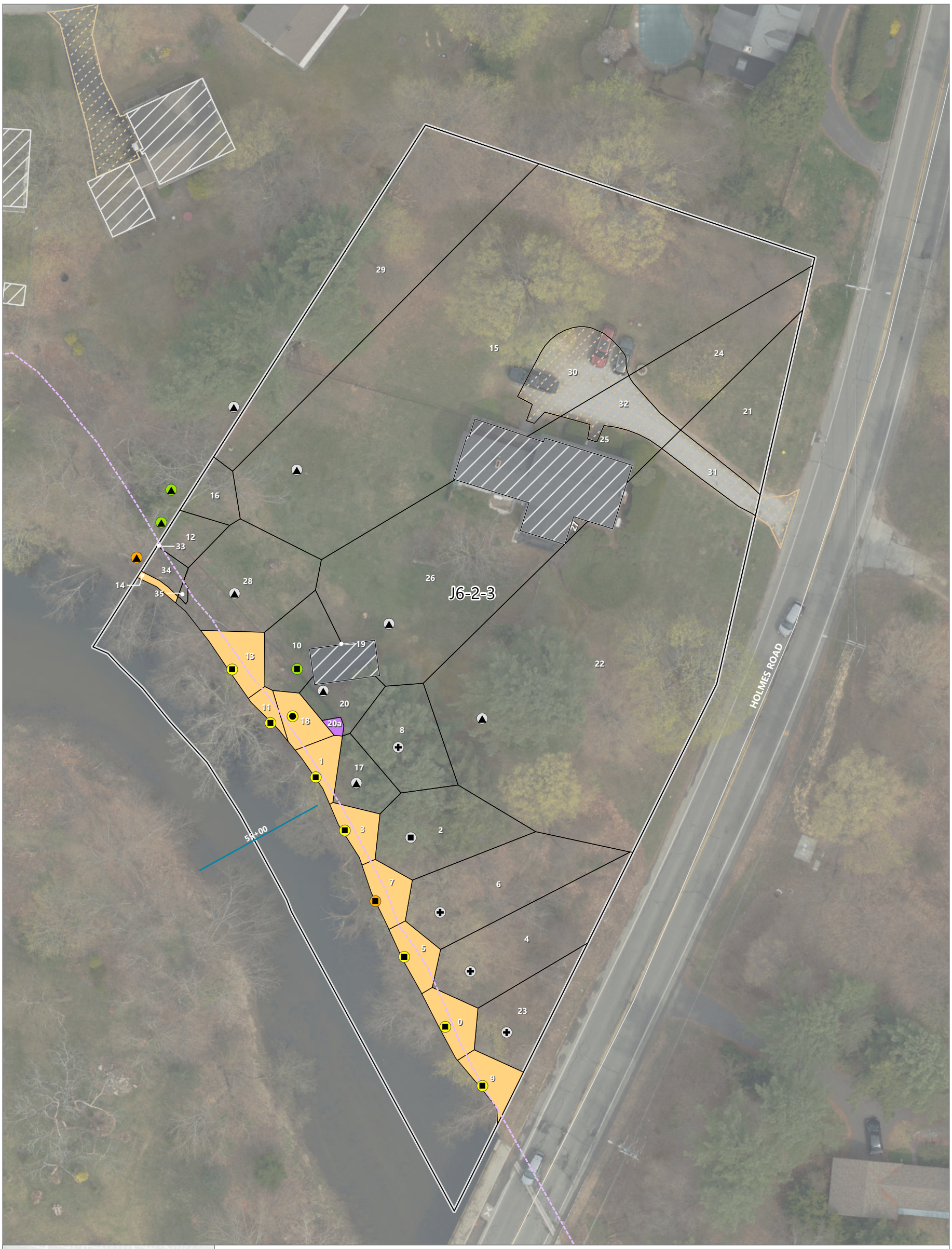
ANCHOR QEA

Figure 1-7
Parcel I6-3-13 – 5 to 6 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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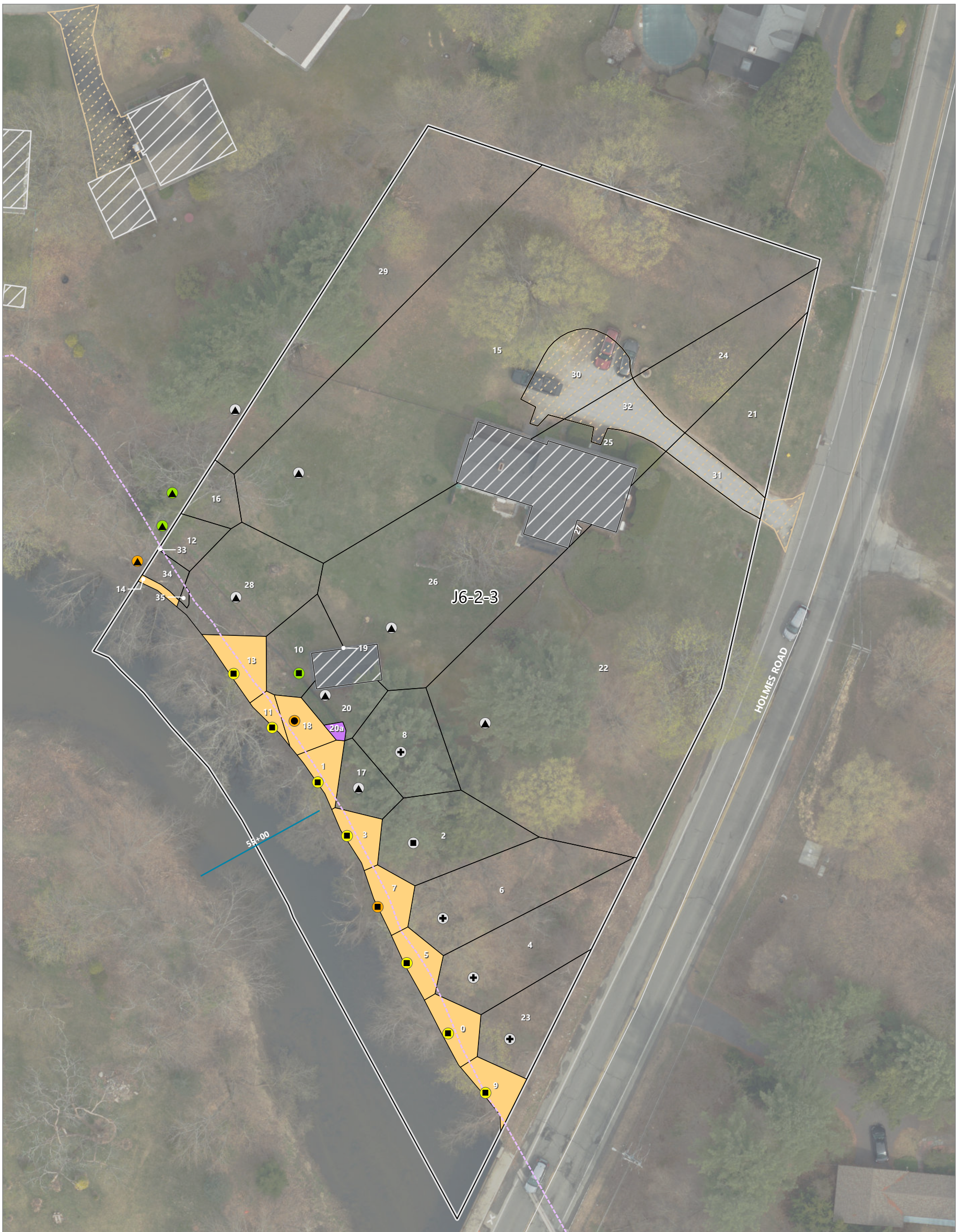
ANCHOR QEA

Figure 2-1
Parcel J6-2-3 – 0 to 0.5 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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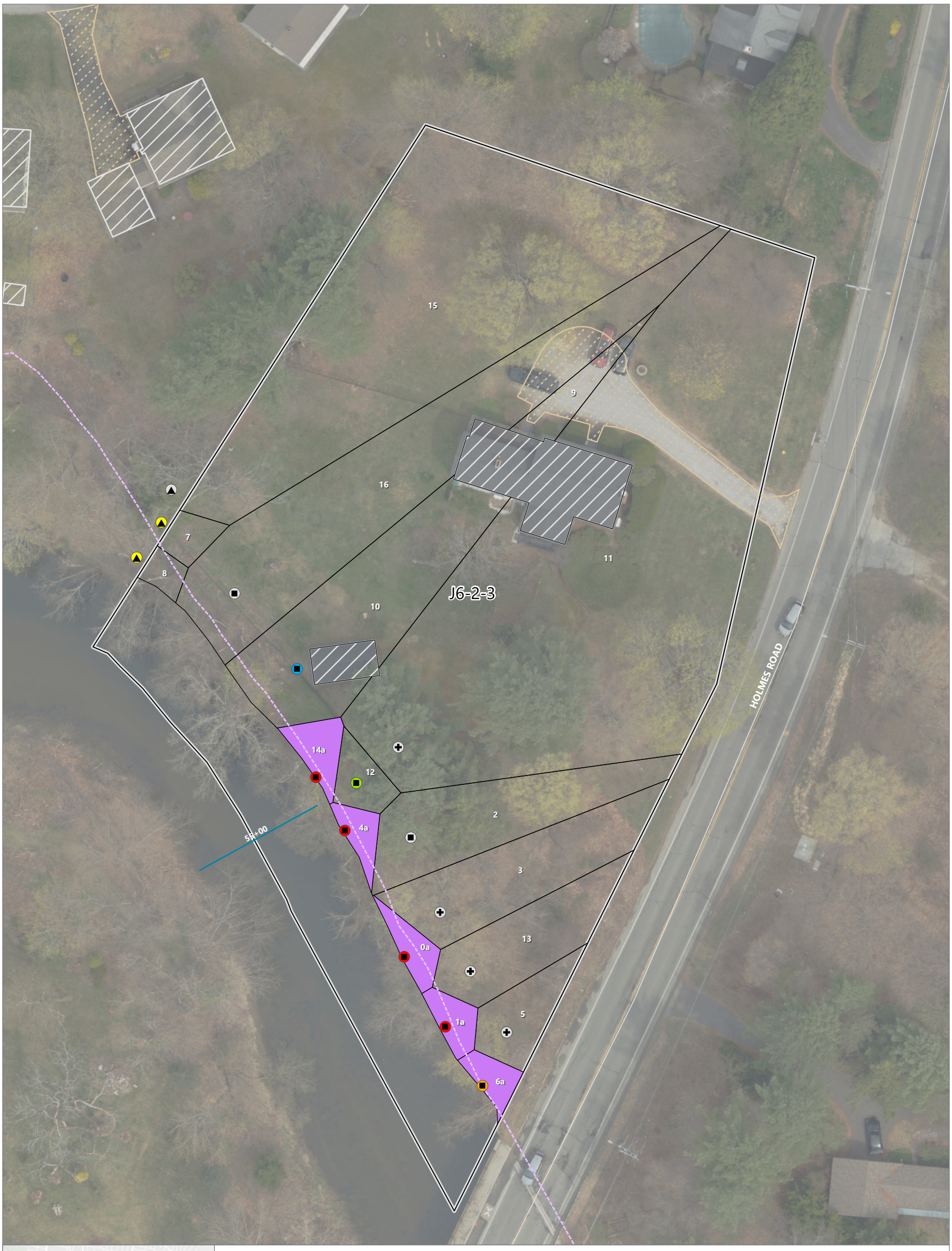
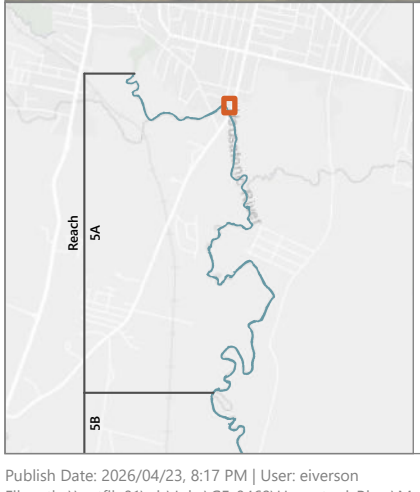
ANCHOR QEA

Figure 2-2
Parcel J6-2-3 – 0.5 to 1 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River





LEGEND:

- Property Boundary
- Roads
- River Stationing
- 1 mg/kg PCB Isopleth
- Buildings
- Paved Driveways

Floodplain Soil PCB Sampling Location

- Historical EPA/GE Sample Location
- Actual Potential Lawn (GE Historical) Sample Location
- 2020-2022 PDI Sample Location
- 2024 Residential Floodplain Sample Location

- No Removal
- EPA CAL Removal

PCB Aroclor Concentration (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTE:
1. Aerial imagery collected by Bluesky Geospatial, June 2025.
2. NTE: Not to exceed.

0 20
Feet

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ANCHOR QEA

Figure 2-3
Parcel J6-2-3 – 1 to 2 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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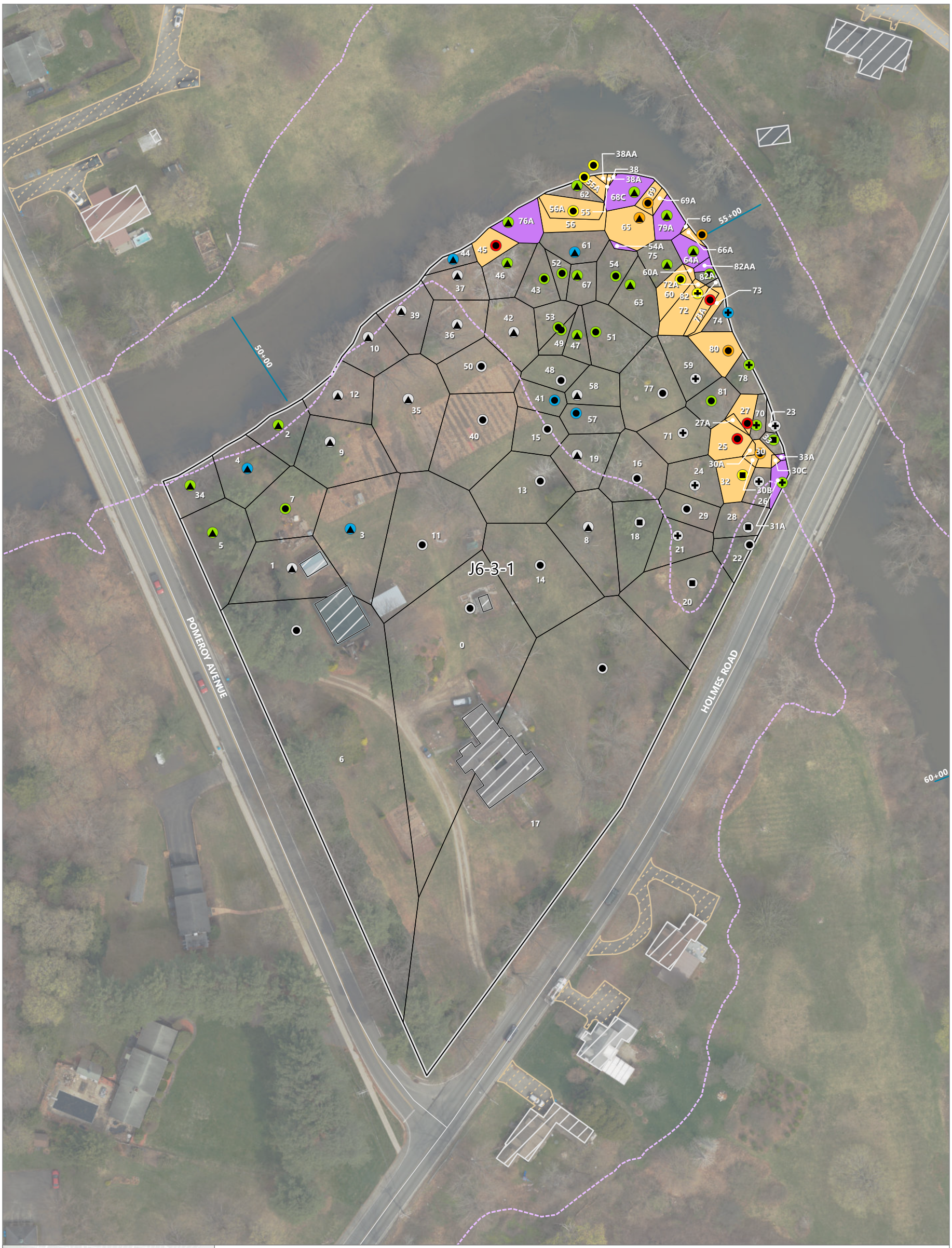
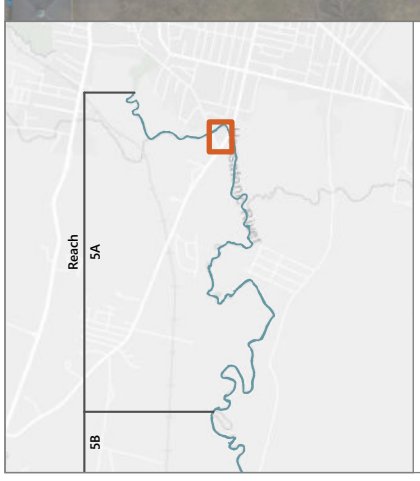
ANCHOR QEA

Figure 2-4
Parcel J6-2-3 – 2 to 3 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River





LEGEND:

- Property Boundary
- Roads
- River Stationing
- 1 mg/kg PCB Isopleth
- Buildings
- Paved Driveways

Floodplain Soil PCB Sampling Location

- Historical EPA/GE Sample Location
- Actual Potential Lawn (GE Historical) Sample Location
- 2020-2022 PDI Sample Location
- 2024 Residential Floodplain Sample Location

- No Removal
- NTE Removal
- EPA CAL Removal

PCB Aroclor Concentration (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTE:
1. Aerial imagery collected by Bluesky Geospatial, June 2025.
2. NTE: Not to exceed.

0 80
Feet

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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 3 J6-3-1 Removal CAL Approved

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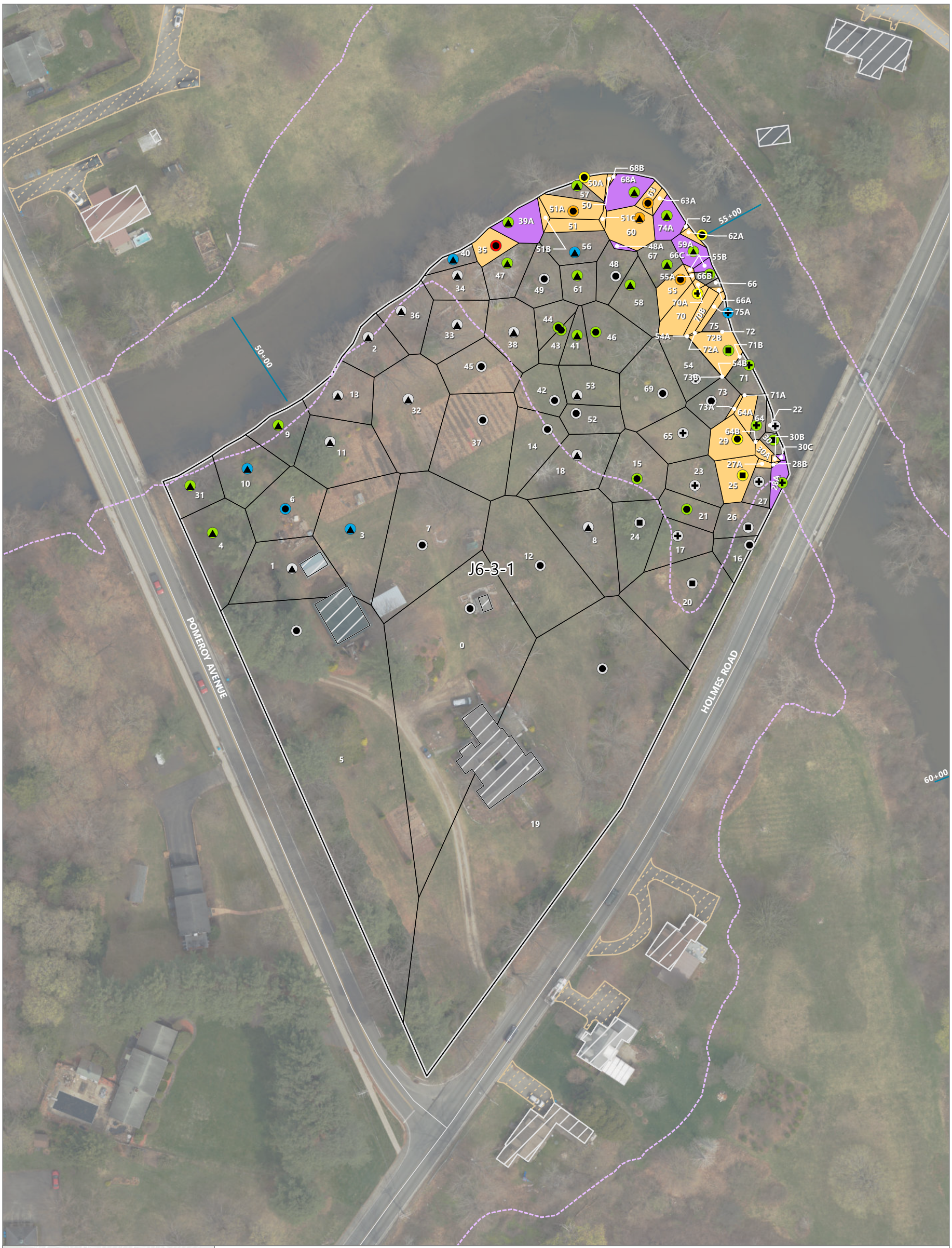
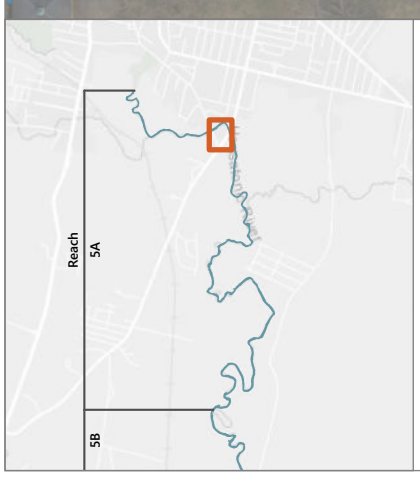
Figure 3- 1
Parcel J6-3-1 – 0 to 0.5 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River





LEGEND:

- Property Boundary
- Roads
- River Stationing
- 1 mg/kg PCB Isopleth
- Buildings
- Paved Driveways

Floodplain Soil PCB Sampling Location

- Historical EPA/GE Sample Location
- Actual Potential Lawn (GE Historical) Sample Location
- 2020-2022 PDI Sample Location
- 2024 Residential Floodplain Sample Location

- No Removal
- NTE Removal
- EPA CAL Removal

PCB Aroclor Concentration (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTE:
1. Aerial imagery collected by Bluesky Geospatial, June 2025.
2. NTE: Not to exceed.

0 80
Feet

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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 3 J6-3-1 Removal CAL Approved

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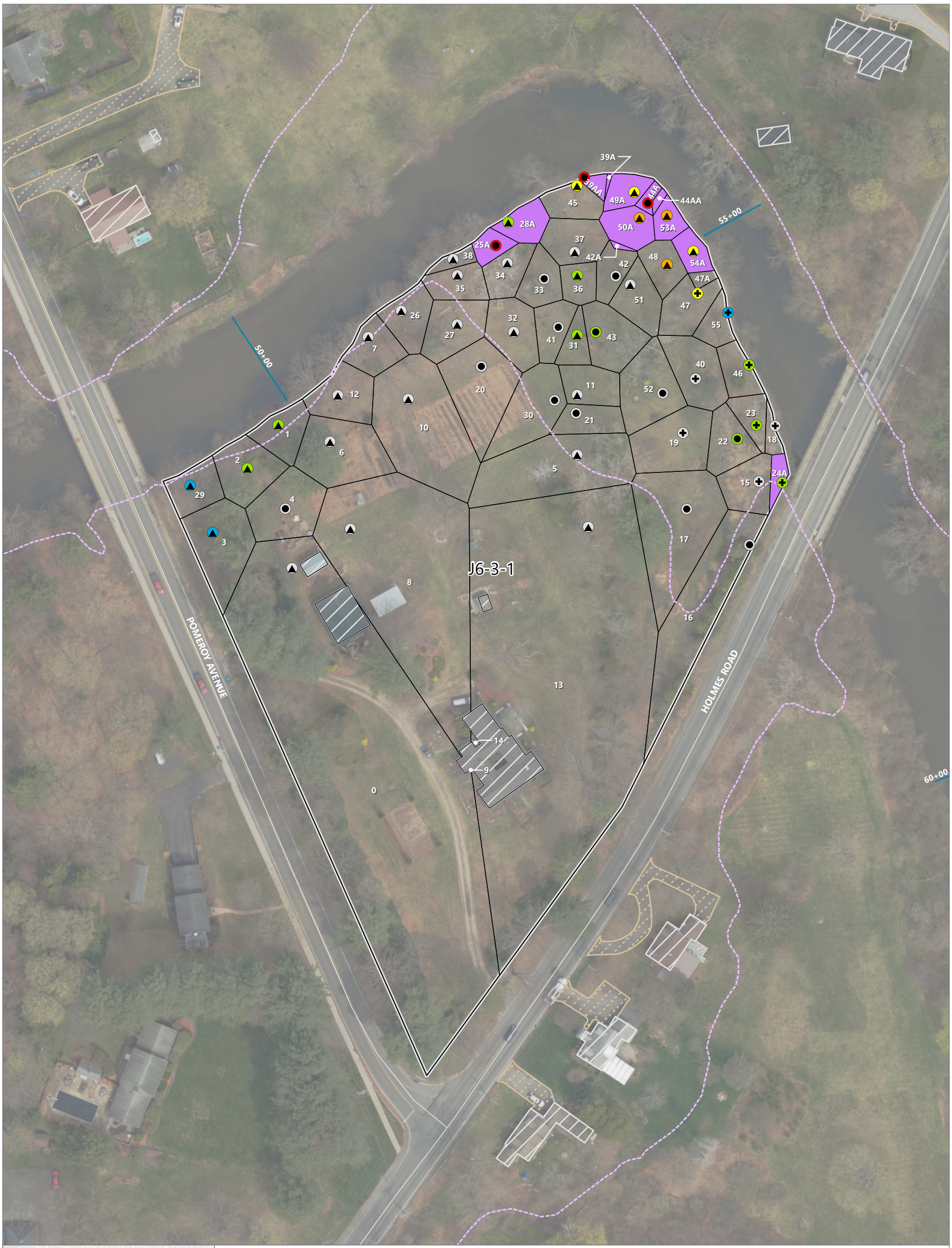
Figure 3- 2
Parcel J6-3-1 – 0.5 to 1 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



LEGEND:

- Property Boundary
- Roads
- River Stationing
- 1 mg/kg PCB Isopleth
- Buildings
- Paved Driveways

Floodplain Soil PCB Sampling Location

- Historical EPA/GE Sample Location
- Actual Potential Lawn (GE Historical) Sample Location
- 2020-2022 PDI Sample Location
- 2024 Residential Floodplain Sample Location

- No Removal
- EPA CAL Removal

PCB Aroclor Concentration (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTE:
1. Aerial imagery collected by Bluesky Geospatial, June 2025.
2. NTE: Not to exceed.

0 80
Feet

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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 3 J6-3-1 Removal CAL Approved

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Figure 3- 3
Parcel J6-3-1 – 1 to 2 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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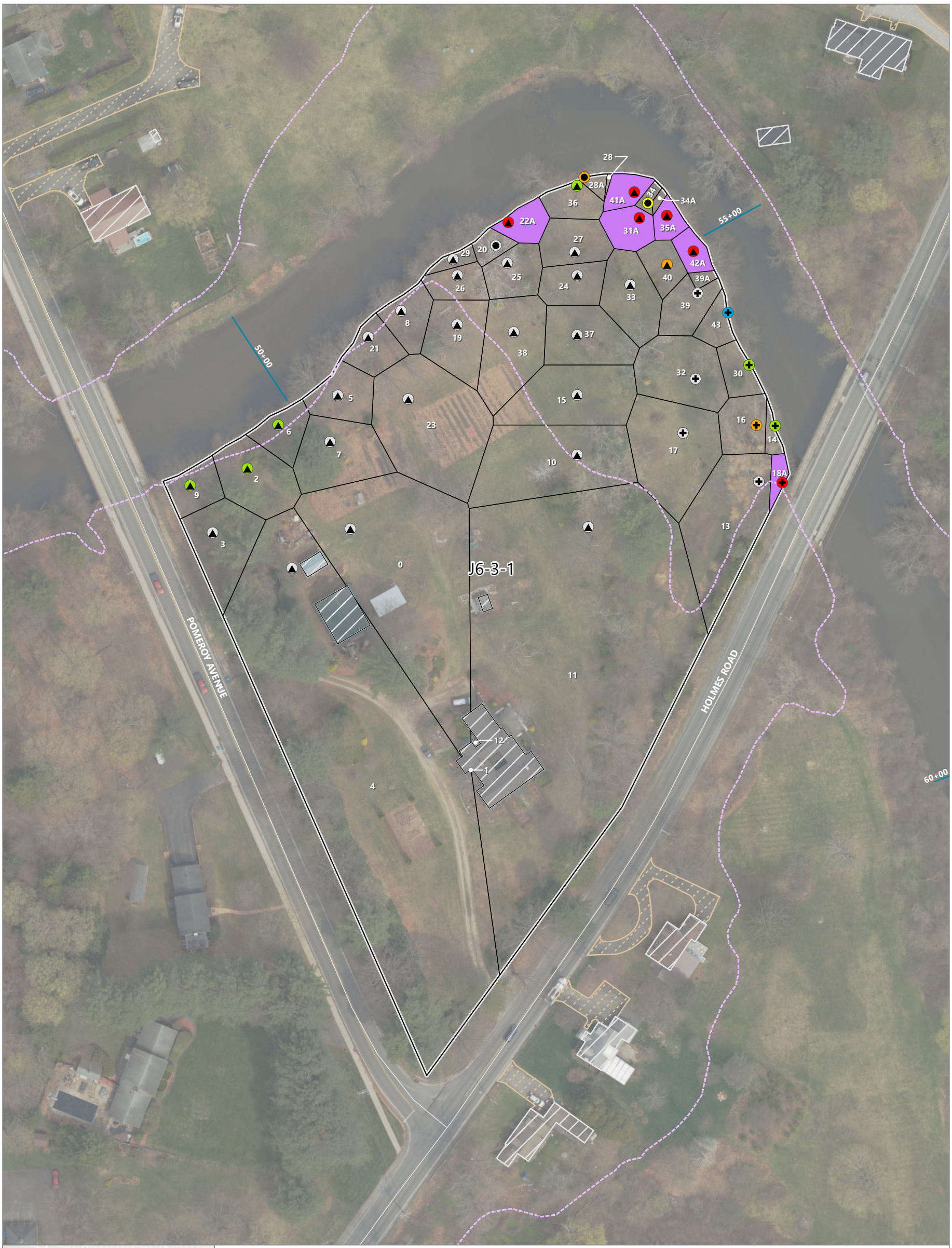
Figure 3- 4
Parcel J6-3-1 – 2 to 3 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 3 J6-3-1 Removal CAL Approved

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Figure 3- 5
Parcel J6-3-1 – 3 to 4 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 3 J6-3-1 Removal CAL Approved

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Figure 3- 6
Parcel J6-3-1 – 4 to 5 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Figure 3- 7
Parcel J6-3-1 – 5 to 6 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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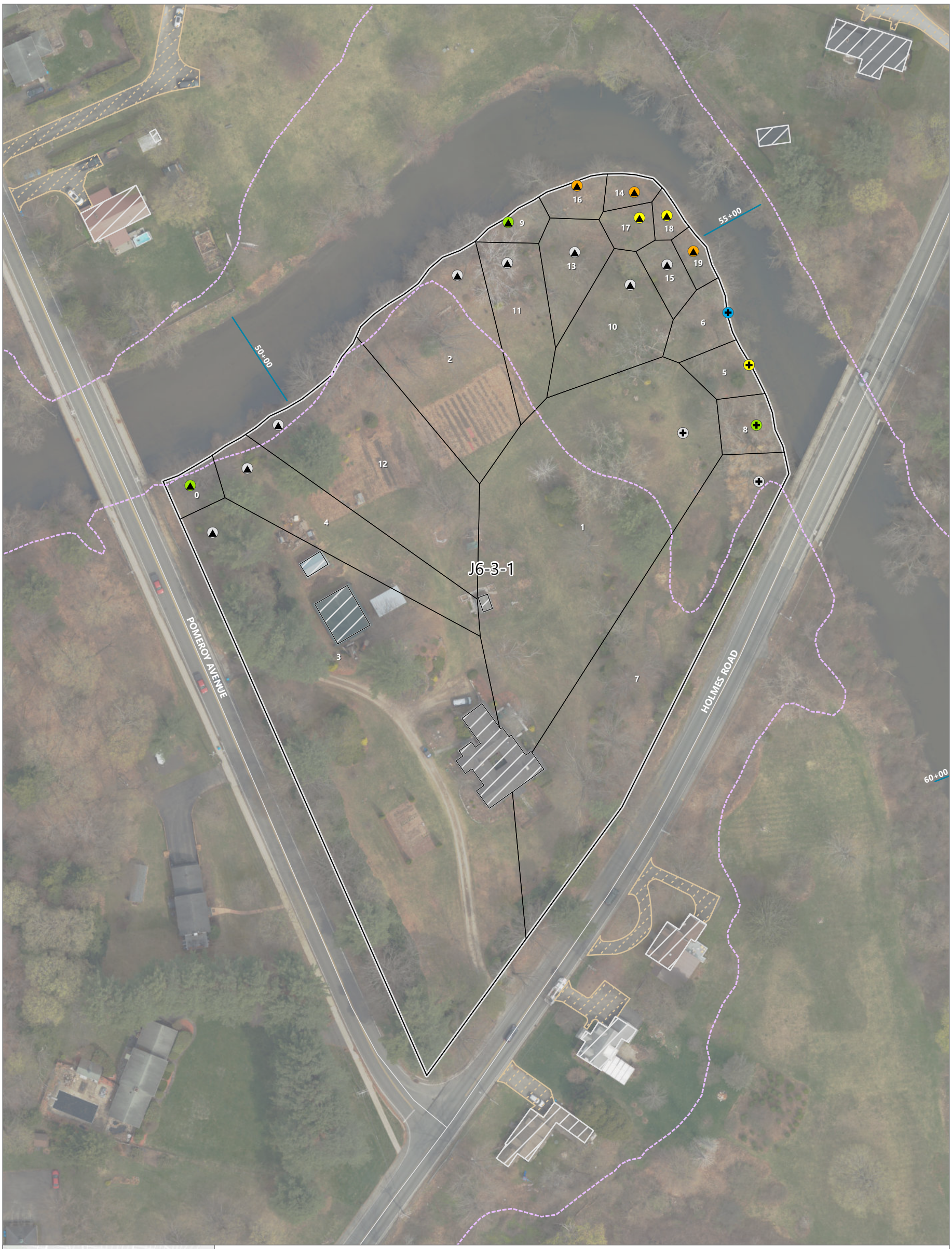
Figure 3- 8
Parcel J6-3-1 – 6 to 7 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 3 J6-3-1 Removal CAL Approved

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Figure 3- 9
Parcel J6-3-1 – 7 to 8 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Figure 3- 10
Parcel J6-3-1 – 8 to 9 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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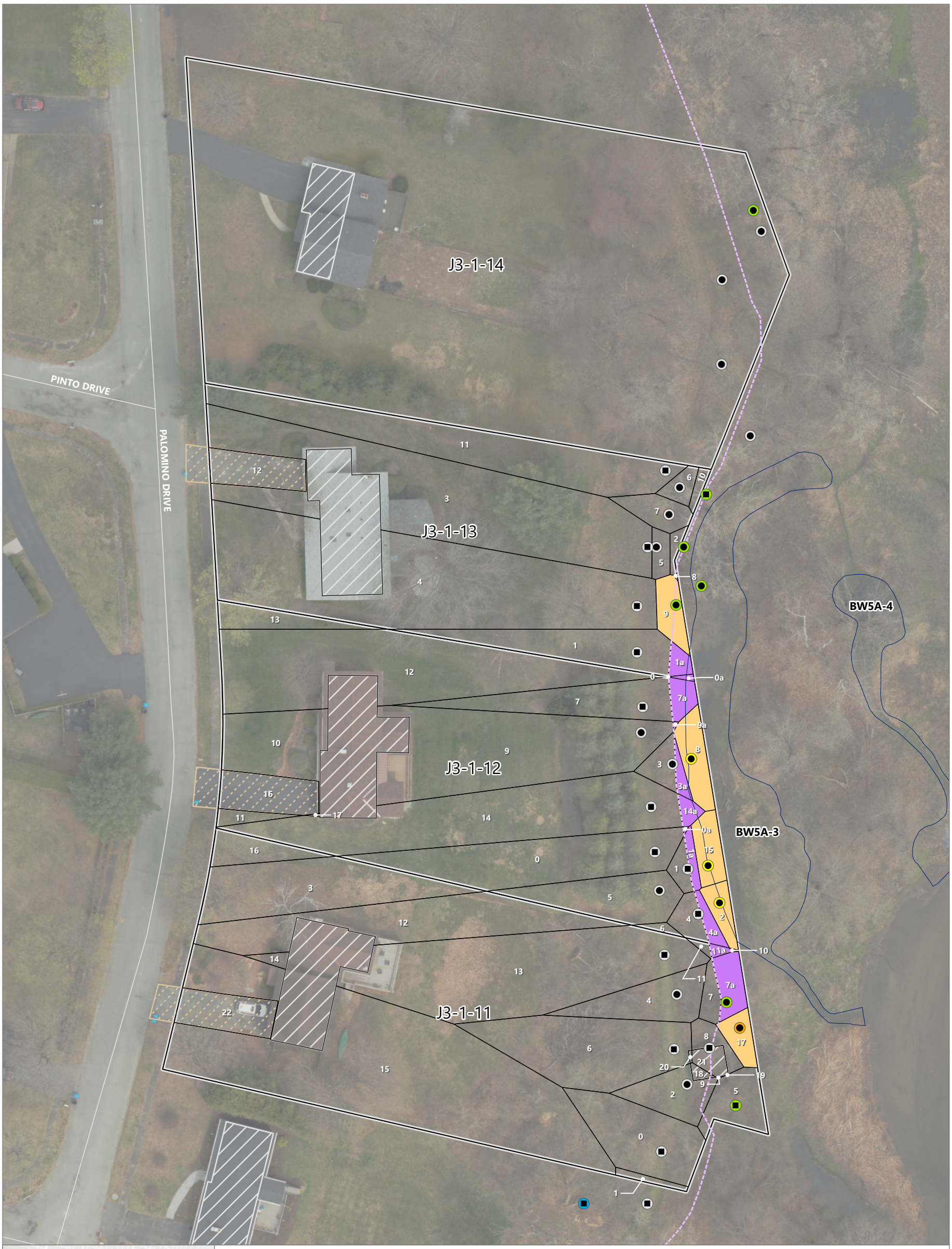
Figure 3- 11
Parcel J6-3-1 – 9 to 10 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 4 J3-1-X Removal CAL Approved

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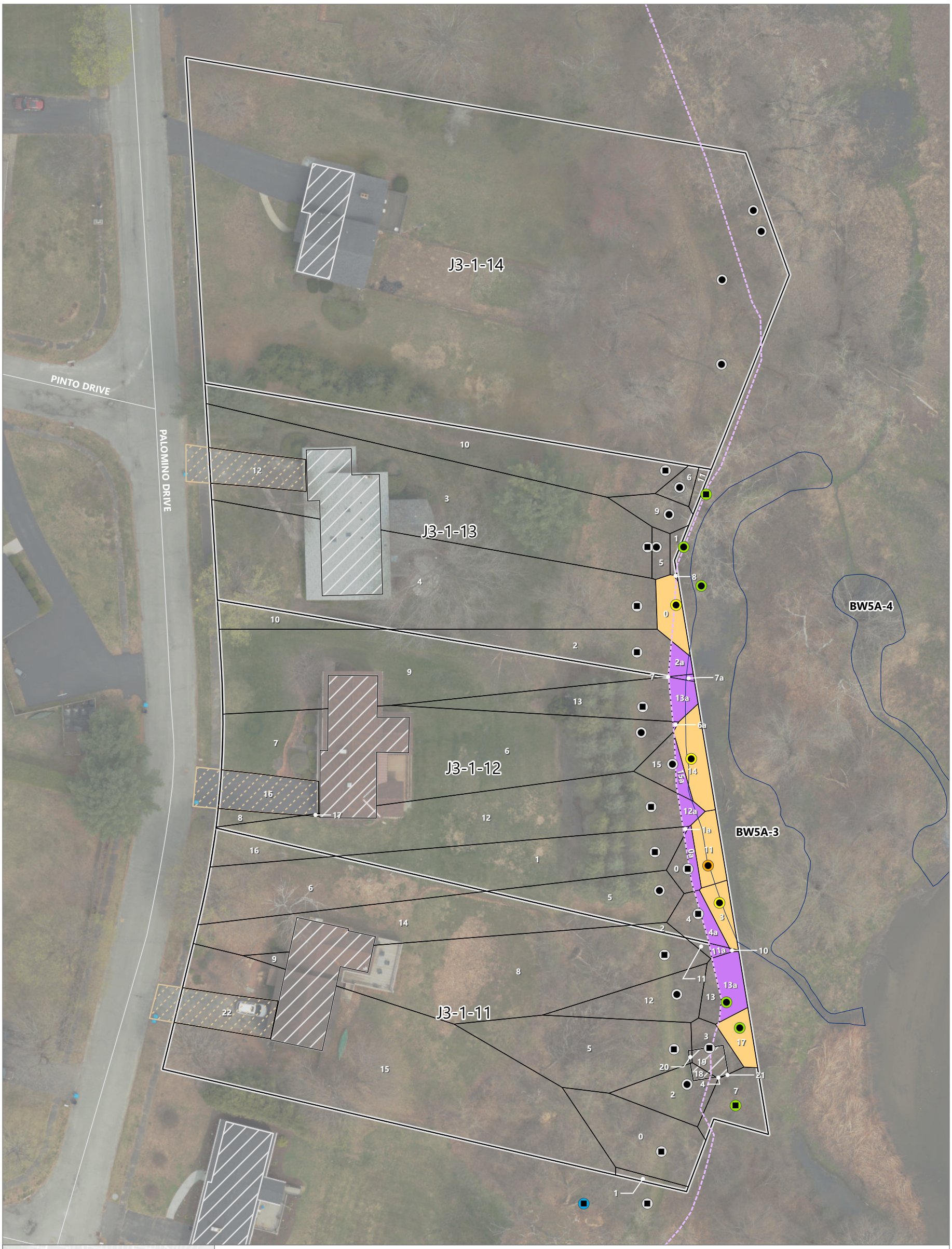
Figure 4- 1
Parcel J3-1-11 through J3-1-13 – 0 to 0.5 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 4 J3-1-X Removal CAL Approved

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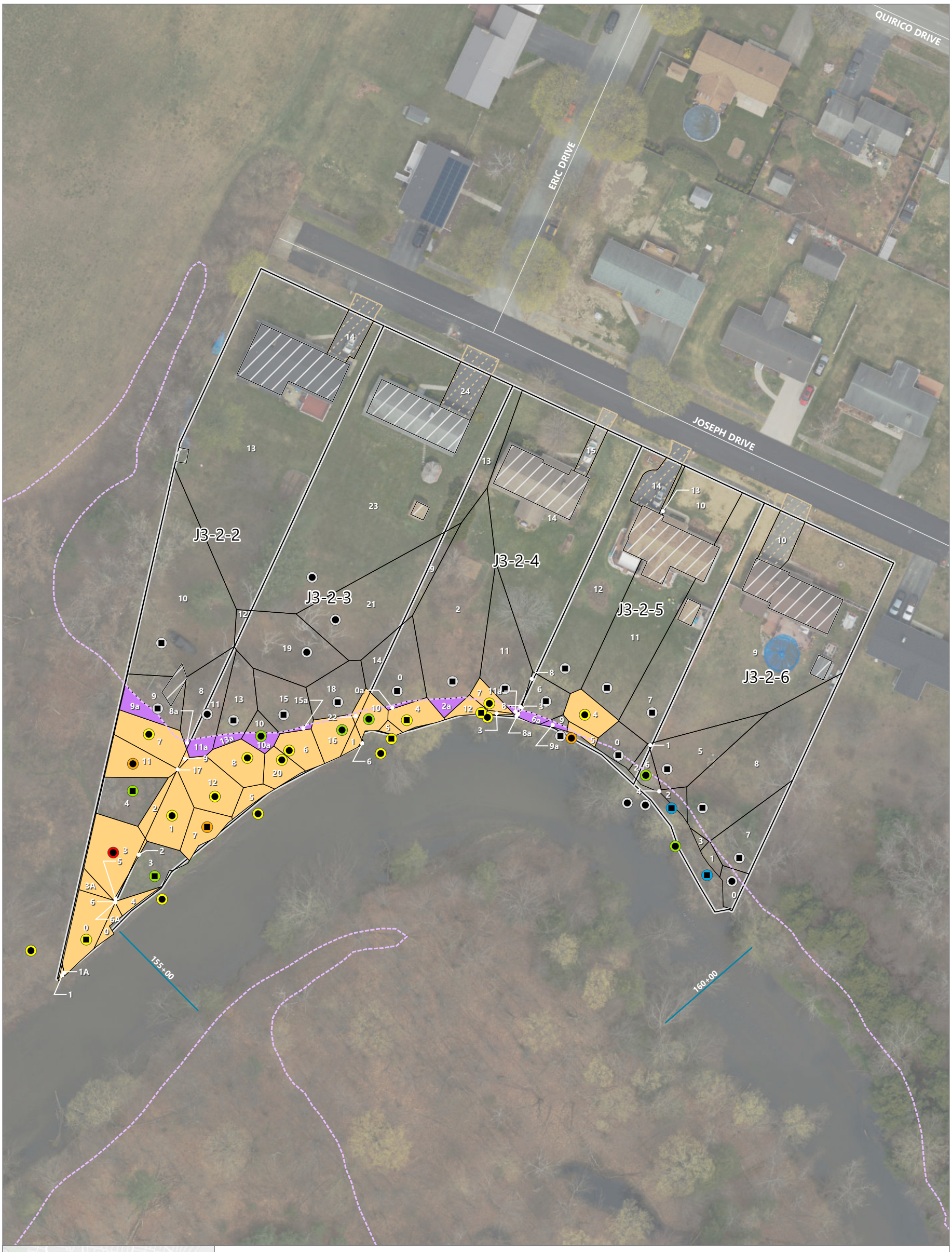
Figure 4- 2
Parcel J3-1-11 through J3-1-13 – 0.5 to 1 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 5 J3-2-X Removal CAL Approved

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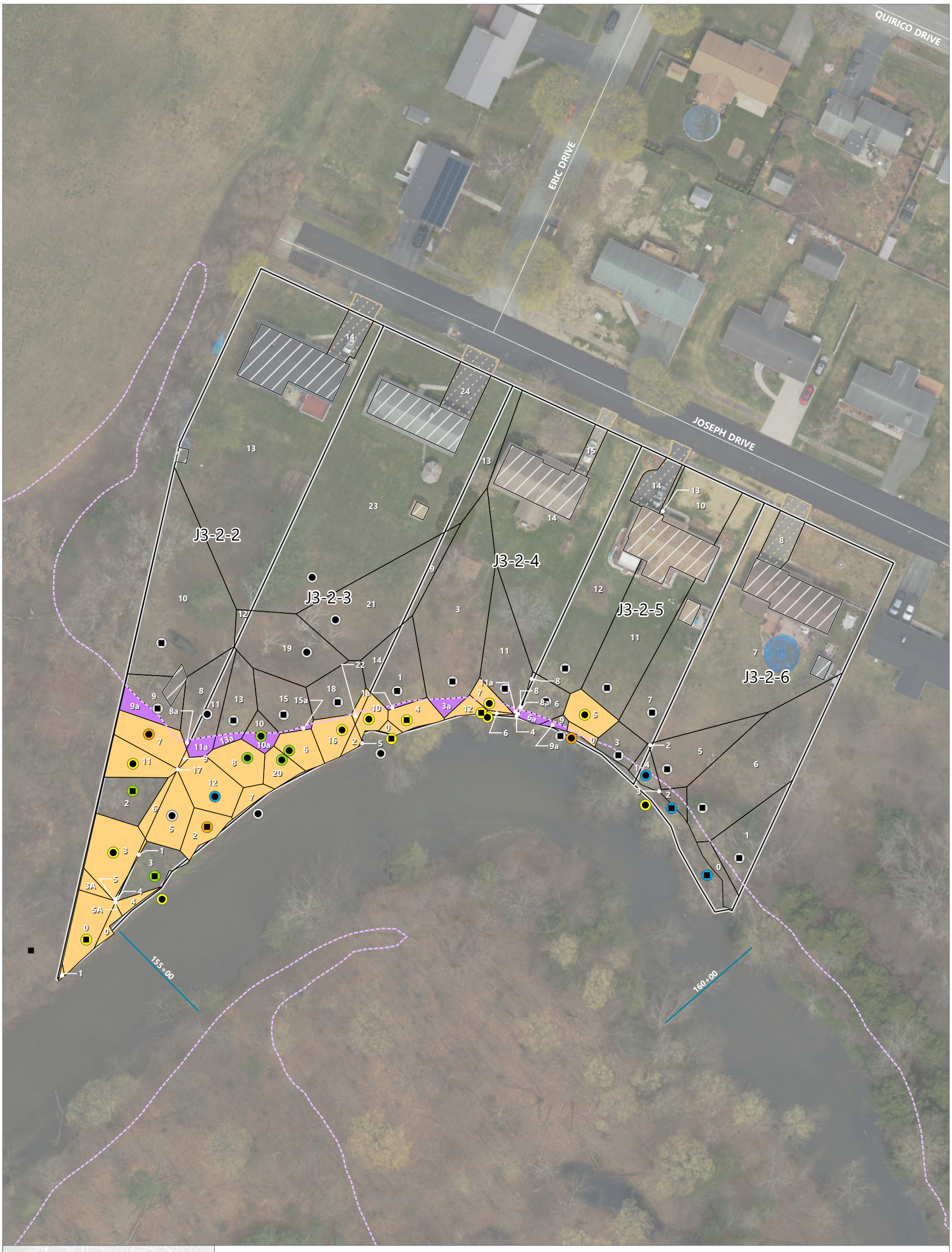
Figure 5-1
Parcel J3-2-2 through J3-2-6 – 0 to 0.5 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 5 J3-2-X Removal CAL Approved

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Figure 5-2
Parcel J3-2-2 through J3-2-6 – 0.5 to 1 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 5 J3-2-X Removal CAL Approved

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Figure 5-3
Parcel J3-2-2 through J3-2-6 – 1 to 2 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 5 J3-2-X Removal CAL Approved

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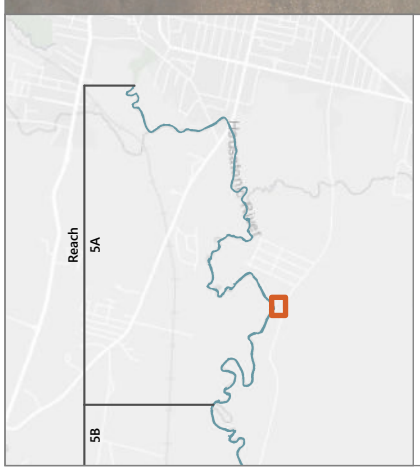
Figure 5-4
Parcel J3-2-2 through J3-2-6 – 2 to 3 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River





LEGEND:

- Property Boundary
- Roads
- River Stationing
- 1 mg/kg PCB Isopleth
- Buildings
- Paved Driveways

Floodplain Soil PCB Sampling Location

- Historical EPA/GE Sample Location
- Actual Potential Lawn (GE Historical) Sample Location
- 2020-2022 PDI Sample Location
- 2024 Residential Floodplain Sample Location

- No Removal
- NTE Removal
- EPA CAL Removal

PCB Aroclor Concentration (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTE:
1. Aerial imagery collected by Bluesky Geospatial, June 2025.
2. NTE: Not to exceed.

0 40
Feet

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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 6 K3-1-2 Removal CAL Approved

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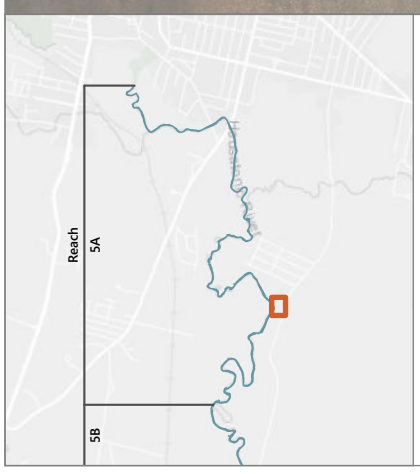
Figure 6-1
Parcel K3-1-2 – 0 to 0.5 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River





LEGEND:

- Property Boundary
- Roads
- River Stationing
- 1 mg/kg PCB Isopleth
- Buildings
- Paved Driveways

Floodplain Soil PCB Sampling Location

- Historical EPA/GE Sample Location
- Actual Potential Lawn (GE Historical) Sample Location
- 2020-2022 PDI Sample Location
- 2024 Residential Floodplain Sample Location

- No Removal
- NTE Removal
- EPA CAL Removal

PCB Aroclor Concentration (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTE:
1. Aerial imagery collected by Bluesky Geospatial, June 2025.
2. NTE: Not to exceed.

0 40
Feet

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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 6 K3-1-2 Removal CAL Approved

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Figure 6-2
Parcel K3-1-2 – 0.5 to 1 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River





LEGEND:

- Property Boundary
- Roads
- River Stationing
- 1 mg/kg PCB Isopleth
- Buildings
- Paved Driveways

Floodplain Soil PCB Sampling Location

- Historical EPA/GE Sample Location
- Actual Potential Lawn (GE Historical) Sample Location
- 2020-2022 PDI Sample Location
- 2024 Residential Floodplain Sample Location
- No Removal

PCB Aroclor Concentration (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTE:
1. Aerial imagery collected by Bluesky Geospatial, June 2025.
2. NTE: Not to exceed.

0 40
Feet

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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 6 K3-1-2 Removal CAL Approved

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Figure 6-3
Parcel K3-1-2 – 1 to 2 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 7 K2-1-10 Removal CAL Approved

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Figure 7-1
Parcel K2-1-10 – 0 to 0.5 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 7 K2-1-10 Removal CAL Approved

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Figure 7-2
Parcel K2-1-10 – 0.5 to 1 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Figure 7-3
Parcel K2-1-10 – 1 to 2 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 7 K2-1-10 Removal CAL Approved

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Figure 7-4
Parcel K2-1-10 – 2 to 3 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River



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Filepath: \\gstfile01\gis\Jobs\GE_0469\HousatonicRiver\Maps\Reports\R5ARDWorkPlanFinal\AppendixI\AppendixI.aprx | Fig 7 K2-1-10 Removal CAL Approved

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Figure 7-5
Parcel K2-1-10 – 3 to 4 Feet
Revised PCB Evaluations for Residential Properties
Housatonic River – Rest of River

Attachment 2
Evaluation Tables

Table E-1B-1

Parcel I6-3-13
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AF/AG-4	0	1,625	30.08	9.8	9.8	294.82
I6-3-13_AF/AG-4	0A	10	0.2	9.8	9.8	1.90
I6-3-13_AH/AI-3	1	1,401	25.9	16.0	16.0	415.16
I6-3-13_AI-7	2	1,249	23.1	21.0	21.0	485.64
I6-3-13_AJ/AK-4	3	2,821	52.2	15.0	15.0	783.59
I6-3-13_L-7	4	816	15.1	6.5	6.5	98.18
I6-3-13_AK-2	5	1,837	34.0	16.0/10.0	13.0	442.23
FL000910	6	0.1	0.003	17.0	17.0	0.04
FL000910	6A	314	5.808	17.0	17.0	98.74
FL000910	6B	377	6.979	17.0	17.0	118.64
FL000910	6C	564	10.441	17.0	17.0	177.50
FL000910	6D	4	0.07	17.0	17.0	1.20
I6-3-13_AI-5	7	1,690	31.30	32.0/26.5	29.3	915.59
I6-3-13_AE-6	8	1,069	19.80	43.0	43.0	851.24
I6-3-13_AD-6	9	816	15.12	42.0	42.0	634.88
I6-3-13_AE-7	10	956	17.71	27	27	478.21
I6-3-13_AG-8	11	1,398	25.89	140.0	140.0	3,624.61
FL000911	12	202	3.74	11.7	11.7	43.71
FL000911	12A	656	12.14	11.7	11.7	142.05
FL000911	12B	666	12.34	11.7	11.7	144.35
FL001466	13	361	6.69	23.5	23.5	157.22
FL001466	13A	600	11.11	23.5	23.5	261.15
FL001466	13B	207	3.83	23.5	23.5	89.89
I6-3-13_AG-6	14	1,735	32.13	29.0	29.0	931.69
I6-3-13_N-8	15	197	3.65	50	50	182.63
I6-3-13_AF-6	16	1,236	22.88	10.0	10.0	228.81
I6-3-13_N-9	17	90	1.66	61	61	101.21
I6-3-13_M-7	18	554	10.25	6.8	6.8	69.70
I6-3-13_M-7	18A	184	3.41	6.8	6.8	23.18
I6-3-13_M-7	18B	57	1.05	6.8	6.8	7.14
I6-3-13_AF-9	19	1,483	27.46	61.0	61.0	1,675.25
I6-3-13_N-10	20	83	1.54	41.0 [34.0]	37.5	57.79
I6-3-13_M-8	21	619	11.47	6.2	6.2	71.10
I6-3-13_L-9	22	626	11.60	2.9 [2.7]	2.8	32.47
FL000909	23	219	4.06	10.4	10.4	42.18
FL000909	23A	85	1.57	10.4	10.4	16.33
I6-3-13_L-8	24	642	11.88	5.0	5.0	59.42

Table E-1B-1

Parcel I6-3-13
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
FL001831	25	60	1.11	19.0	19.0	21.00
FL001831	25A	39	0.7	19.0	19.0	13.88
I6-3-13_M-9	26	539	10.0	4.7	4.7	46.87
FL000815	27	321	5.9	6.53	6.53	38.81
I6-3-13_J-11	28	895	16.6	5.2	5.2	86.23
I6-3-13_K-9	29	487	9.0	0.23	0.23	2.08
I6-3-13B	30	217	4.0	1.8	1.8	7.24
I6-3-13_K-10	31	626	11.6	1.08	1.08	12.53
FL001254	32	836	15.5	0.428	0.428	6.63
I6-3-13_I-11	33	5,306	98.3	0.93	0.93	91.38
I6-3-13_I-13	34	329	6.1	0.27	0.27	1.64
I6-3-13_I-13	35	8,601	159.3	0.27	0.27	43.01
I6-3-13_K-8	36	785	14.5	2.8	2.8	40.68
I6-3-13_M-10	37	529	9.8	6.3	6.3	61.74
I6-3-13A	38	1,270	23.5	1.4	1.4	32.93
I6-3-13_I-9	39	10	0.2	0.92	0.92	0.17
I6-3-13_I-9	40	1,692	31.3	0.92	0.92	28.83
I6-3-13_L-12	41	534	9.9	1.9	1.9	18.78
I6-3-13_L-10	42	464	8.6	2.0	2.0	17.19
I6-3-13_L-11	43	572	10.6	4.5 [4.1]	4.3	45.57
I6-3-13_M-11	44	448	8.3	6.0	6.0	49.72
I6-3-13_M-11/12	45	521	9.7	5.0/4.5	4.8	45.84
I6-3-13_J-10	46	906	16.8	3.1	3.1	51.99
FL001255	47	1,460	27.0	1.01	1.01	27.31
I6-3-13_K-11	48	700	13.0	0.22	0.22	2.85
I6-3-13_L-12/13	49	707	13.1	3.2	3.2	41.88
I6-3-13_I-15	50	15,222	281.9	0.54	0.54	152.22
I6-3-13_I-13	51	1,369	25.4	0.27	0.27	6.85
I6-3-13_I-15	52	272	5.0	0.54	0.54	2.72
I6-3-13_AE-7	53	107	2.0	0.021	0.021	0.04
I6-3-13_N-8	54	641	11.9	0.021	0.021	0.25
I6-3-13_N-9	55	655	12.1	0.021	0.021	0.25
I6-3-13_N-10	56	830	15.4	0.021	0.021	0.32
I6-3-13_N-11	57	463	8.6	0.021	0.021	0.18
FL001465	58	180	3.3	0.021	0.021	0.07

Table E-1B-1

Parcel I6-3-13
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
Total	--	**76,043**	**1,408**	--	--	**14,759**
				Volume-Weighted Average (mg/kg)		**10.48**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AJ/AK-4	0	2,821	52.2	15.0	15.0	783.59
I6-3-13_AH/AI-3	1	1,401	25.9	16.0	16.0	415.16
I6-3-13_AK-2	2	1,897	35.1	16.0/10.0	13.0	456.59
I6-3-13_AI-7	3	1,249	23.1	21.0	21.0	485.64
I6-3-13_AF/AG-4	4	1,625	30.1	9.8	9.8	294.82
I6-3-13_AF/AG-4	4A	10	0.2	9.8	9.8	1.90
FL000910	5	0.1	0.003	119.0	119.0	0.31
FL000910	5A	314	5.808	119.0	119.0	691.17
FL000910	5B	377	6.979	119.0	119.0	830.51
FL000910	5C	564	10.441	119.0	119.0	1,242.53
FL000910	5D	4	0.07	119.0	119.0	8.42
I6-3-13_AI-5	6	1,690	31.30	32.0/26.5	29.3	915.59
I6-3-13_AE-6	7	1,069	19.80	43.0	43.0	851.24
I6-3-13_L-7	8	816	15.10	6.5	6.5	98.18
FL000911	9	202	3.74	11.9	11.9	44.46
FL000911	9A	656	12.14	11.9	11.9	144.48
FL000911	9B	666	12.34	11.9	11.9	146.82
I6-3-13_AE-7	10	956	17.71	27.0	27.0	478.21
I6-3-13_AG-8	11	1,398	25.89	140.0	140.0	3,624.61
I6-3-13_AD-6	12	816	15.12	42.0	42.0	634.88
FL001466	13	361	6.69	74.4	74.4	497.75
FL001466	13A	600	11.11	74.4	74.4	826.79
FL001466	13B	207	3.83	74.4	74.4	284.58
I6-3-13_AG-6	14	1,735	32.13	29.0	29.0	931.69
I6-3-13_AF-6	15	1,236	22.88	10.0	10.0	228.81
I6-3-13_N-9	16	90	1.66	61.0	61.0	101.21
I6-3-13_M-7	17	553	10.25	6.8	6.8	69.70
I6-3-13_M-7	17A	57	1.05	6.8	6.8	7.14
I6-3-13_M-7	17B	184	3.41	6.8	6.8	23.19

Table E-1B-1

Parcel I6-3-13
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_N-8	18	197	3.65	50.0	50.0	182.63
I6-3-13_AF-9	19	1,483	27.46	61.0	61.0	1,675.25
I6-3-13_N-10	20	83	1.54	41.0 [34.0]	37.5	57.79
I6-3-13_M-8	21	619	11.47	6.2	6.2	71.10
I6-3-13_L-9	22	626	11.60	2.9 [2.7]	2.8	32.48
FL000909	23	258	4.79	20.0	20.0	95.73
FL000909	23A	85	1.57	20.0	20.0	31.40
I6-3-13_L-8	24	642	11.89	5.0	5.0	59.43
I6-3-13_M-9	25	539	9.97	4.7	4.7	46.87
FL000815	26	321	5.94	4.89	4.89	29.06
I6-3-13_J-11	27	1,125	20.83	5.2	5.2	108.29
I6-3-13_K-9	28	584	10.81	0.23	0.23	2.49
I6-3-13_K-10	29	626	11.60	1.08	1.08	12.53
FL001254	30	902	16.70	ND (0.501)	0.501	8.37
I6-3-13_I-11	31	5,306	98.26	0.93	0.93	91.38
I6-3-13_I-13	32	329	6.08	0.27	0.27	1.64
I6-3-13_I-13	33	8,673	160.62	0.27	0.27	43.37
I6-3-13_K-8	34	839	15.54	2.8	2.8	43.50
I6-3-13_M-10	35	529	9.80	6.3	6.3	61.74
I6-3-13_I-9	36	10	0.2	0.92	0.92	0.17
I6-3-13_I-9	37	1,692	31.3	0.92	0.92	28.83
I6-3-13_L-12	38	671	12.4	1.9	1.9	23.60
I6-3-13_L-10	39	464	8.6	2.0	2.0	17.19
I6-3-13_L-11	40	572	10.6	4.5 [4.1]	4.3	45.57
I6-3-13_M-11	41	448	8.3	6.0	6.0	49.72
I6-3-13_M-11/12	42	521	9.7	5.0/4.5	4.8	45.84
FL001255	43	1,767	32.7	ND (0.502)	0.502	16.43
I6-3-13_J-10	44	906	16.8	3.1	3.1	51.99
I6-3-13_K-11	45	930	17.2	0.22	0.22	3.79
I6-3-13_L-12/13	46	1,001	18.5	3.2	3.2	59.32
I6-3-13_I-15	47	15,222	281.9	0.54	0.54	152.22
I6-3-13_I-13	48	1,369	25.4	0.27	0.27	6.85
I6-3-13_I-15	49	272	5.0	0.54	0.54	2.72
I6-3-13_AE-7	50	107	2.0	0.021	0.021	0.04
I6-3-13_N-9	51	655	12.1	0.021	0.021	0.25
I6-3-13_N-8	52	641	11.9	0.021	0.021	0.25
I6-3-13_N-10	53	830	15.4	0.021	0.021	0.32

Table E-1B-1
Parcel I6-3-13
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_N-11	54	463	8.6	0.021	0.021	0.18
FL001465	55	180	3.3	0.021	0.021	0.07
Total	**--**	**76,043**	**1,408**	**--**	**--**	**18,280**
				Volume-Weighted Average (mg/kg)		**12.98**

I6-3-13 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	76,043	2,816	33,040	11.73

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-2

Parcel I6-3-13
Existing Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_L-7	0	816	30.2	0.57	0.57	17.22
I6-3-13_AI-5	1	2,733	101.2	190.0 [280.0]	235.0	23,790.99
I6-3-13_AK-2	2	2,159	80.0	37.0	37.0	2,958.51
I6-3-13_AJ/AK-4	3	3,790	140.4	49.0/40.0	44.5	6,246.75
I6-3-13_AI-7	4	1,812	67.1	16.0	16.0	1,073.65
I6-3-13_AE-7	5	1,063	39.4	40.0	40.0	1,575.42
I6-3-13_AE-6	6	1,069	39.6	19.0 [51.0]	35.0	1,385.74
I6-3-13_AD-6	7	816	30.2	50.0	50.0	1,511.61
I6-3-13_N-8	8	838	31.0	15.5	15.5	481.24
I6-3-13_AG-6	9	1,941	71.9	7.2	7.2	517.71
I6-3-13_AF-6	10	1,236	45.8	10.0	10.0	457.62
I6-3-13_AG-8	11	1,998	74.0	260.0	260.0	19,241.48
I6-3-13_M-9	12	539	19.9	0.26	0.26	5.19
I6-3-13_M-7	13	738	27.3	0.57	0.57	15.57
I6-3-13_M-7	13A	57	2.1	0.57	0.57	1.20
I6-3-13_M-8	14	619	22.9	0.19	0.19	4.36
I6-3-13_AF-9	15	1,483	54.9	65.0	65.0	3,570.21
I6-3-13_N-9	16	745	27.6	6.4	6.4	176.56
I6-3-13_N-10	17	914	33.8	7.9	7.9	267.34
I6-3-13_L-9	18	626	23.2	ND (0.031)	0.031	0.72
I6-3-13_AF/AG-4	19	1,635	60.6	17.0	17.0	1,029.51
I6-3-13_L-8	20	642	23.8	0.1	0.1	2.38
I6-3-13_AH/AI-3	21	2,050	75.9	80.0	80.0	6,073.43
I6-3-13_J-11	22	1,145	42.4	1.4	1.4	59.38
I6-3-13_K-8	23	1,200	44.5	1.68	1.68	74.68
I6-3-13_K-10	24	626	23.2	0.45	0.45	10.44
I6-3-13_I-11	25	5,306	196.5	0.44	0.44	86.47
I6-3-13_I-13	26	11,066	409.8	ND (0.026)	0.026	10.66
I6-3-13_K-9	27	861	31.9	1.07	1.07	34.11
I6-3-13_L-10	28	624	23.1	0.34	0.34	7.85
I6-3-13_M-10	29	625	23.1	0.39	0.39	9.03
I6-3-13_M-11	30	479	17.8	0.5	0.5	8.88
I6-3-13_L-12/13	31	1,625	60.2	0.63	0.63	37.91
I6-3-13_I-9	32	10	0.4	ND (0.027)	0.027	0.01
I6-3-13_I-9	33	1,923	71.2	ND (0.027)	0.027	1.92
I6-3-13_L-11	34	614	22.7	0.17	0.17	3.86
I6-3-13_J-10	35	938	34.8	10.7	10.7	371.90

Table E-1B-2

Parcel I6-3-13
Existing Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_L-12	36	671	24.8	2.4	2.4	59.63
I6-3-13_N-11	37	577	21.4	4.8	4.8	102.63
I6-3-13_M-11/12	38	580	21.5	0.036	0.036	0.77
I6-3-13_I-15	39	15,922	589.7	0.97	0.97	572.02
I6-3-13_K-11	40	931	34.5	0.18	0.18	6.21
Total	--	**76,043**	**2,816**	--	--	**71,863**
				Volume-Weighted Average (mg/kg)		**25.52**

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AI-5	0	2,733	101.2	27.0	27.0	2,733.43
I6-3-13_AK-2	1	2,159	80.0	64.0	64.0	5,117.43
I6-3-13_AI-7	2	1,812	67.1	16.0	16.0	1,073.65
I6-3-13_AJ/AK-4	3	3,790	140.4	78.0	78.0	10,949.37
I6-3-13_AD-6	4	1,105	40.9	4.4	4.4	180.07
I6-3-13_AE-6	5	1,069	39.6	18.0	18.0	712.67
I6-3-13_AG-6	6	1,941	71.9	29.0	29.0	2,085.22
I6-3-13_AF-6	7	1,236	45.8	7.9	7.9	361.52
I6-3-13_N-11	8	1,180	43.7	ND (0.026)	0.026	1.14
I6-3-13_N-8	9	897	33.2	0.131	0.131	4.35
I6-3-13_AF-9	10	1,483	54.9	1.1	1.1	60.42
I6-3-13_AG-8	11	1,998	74.0	58.0	58.0	4,292.33
I6-3-13_N-9	12	910	33.7	ND (0.027)	0.027	0.91
I6-3-13_AH/AI-3	13	2,050	75.9	100.0	100.0	7,591.79
I6-3-13_AC-7	14	647	23.9	ND (0.011)	0.011	0.26
I6-3-13_N-10	15	1,386	51.4	ND (0.027)	0.027	1.39
I6-3-13_L-8	16	649	24.0	ND (0.03)	0.03	0.72
I6-3-13_K-10	17	936	34.7	ND (0.029)	0.029	1.01
I6-3-13_K-8	18	1,200	44.5	5.2	5.2	231.16
I6-3-13_L-7	19	410	15.2	0.196	0.196	2.98
I6-3-13_AD-8	20	971	36.0	0.062	0.062	2.23
I6-3-13_I-9	21	10	0.4	ND (0.029)	0.029	0.01
I6-3-13_I-9	22	1,923	71.2	ND (0.029)	0.029	2.07
I6-3-13_AF/AG-4	23	1,635	60.6	5.5	5.5	333.08

Table E-1B-2
Parcel I6-3-13
Existing Conditions

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AE-7	24	1,120	41.5	57.0	57.0	2,364.68
I6-3-13_K-11	25	1,252	46.4	0.49	0.49	22.73
I6-3-13_L-12	26	2,873	106.4	ND (0.028)	0.028	2.98
I6-3-13_I-11	27	5,306	196.5	ND (0.029)	0.029	5.70
I6-3-13_K-9	28	861	31.9	0.6	0.6	19.12
I6-3-13_J-10	29	938	34.8	2.3	2.3	79.94
I6-3-13_L-9	30	1,259	46.6	ND (0.031)	0.031	1.45
I6-3-13_J-11	31	1,150	42.6	3.0	3.0	127.78
I6-3-13_I-13	32	27,151	1005.6	0.33	0.33	331.85
Total	--	**76,043**	**2,816**	--	--	**38,695**
				Volume-Weighted Average (mg/kg)		**13.74**

3- to 4-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AK-2	0	2,159	80.0	87.0	87.0	6,956.50
I6-3-13_AI-5	1	2,733	101.2	18.0	18.0	1,822.29
I6-3-13_AJ/AK-4	2	3,790	140.4	100.0	100.0	14,037.65
I6-3-13_AG-8	3	1,998	74.0	16.0	16.0	1,184.09
I6-3-13_AI-7	4	1,812	67.1	17.0	17.0	1,140.76
I6-3-13_AF/AG-4	5	1,635	60.6	5.4	5.4	327.02
I6-3-13_AE-7	6	1,609	59.6	6.4	6.4	381.41
I6-3-13_AH/AI-3	7	2,050	75.9	13.0	13.0	986.93
I6-3-13_AE-6	8	1,069	39.6	13.0	13.0	514.70
I6-3-13_AD-8	9	1	0.05	ND (0.011)	0.011	0.00
I6-3-13_AD-8	10	7,562	280.06	ND (0.011)	0.011	3.08
I6-3-13_AD-6	11	1,106	40.95	0.32	0.32	13.10
I6-3-13_AG-6	12	1,941	71.90	33.0	33.0	2,372.84
I6-3-13_AF-6	13	1,236	45.76	46.0	46.0	2,105.06
I6-3-13_AE-10	14	28,550	1057.41	ND (0.012)	0.012	12.69
I6-3-13_AC-7	15	15,016	556.16	ND (0.01)	0.01	5.56
I6-3-13_AF-9	16	1,775	65.75	4.3 [5.8]	5.1	332.06
Total	--	**76,043**	**2,816**	--	--	**32,196**
				Volume-Weighted Average (mg/kg)		**11.43**

Table E-1B-2

Parcel I6-3-13
Existing Conditions

4- to 5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AK-2	0	2,159	79.96	21	21	1,679.16
I6-3-13_AI-5	1	2,733	101.24	16	16	1,619.81
I6-3-13_AJ/AK-4	2	3,790	140.38	250	250	35,094.13
I6-3-13_AG-8	3	1,998	74.01	12	12	888.07
I6-3-13_AI-7	4	1,812	67.10	12	12	805.24
I6-3-13_AF/AG-4	5	1,635	60.56	1	1	60.56
I6-3-13_AE-7	6	1,609	59.59	6.5	6.5	387.37
I6-3-13_AH/AI-3	7	2,050	75.92	9.9	9.9	751.58
I6-3-13_AE-6	8	1,069	39.59	5.5	5.5	217.76
I6-3-13_AD-8	9	1	0.05	ND (0.011)	0.011	0.00
I6-3-13_AD-8	10	7,562	280.06	ND (0.011)	0.011	3.08
I6-3-13_AD-6	11	1,106	40.95	ND (0.013)	0.013	0.53
I6-3-13_AG-6	12	1,941	71.90	63	63	4,529.96
I6-3-13_AF-6	13	1,236	45.76	30	30	1,372.86
I6-3-13_AE-10	14	28,550	1057.41	ND (0.011)	0.011	11.63
I6-3-13_AC-7	15	15,016	556.16	ND (0.01)	0.01	5.56
I6-3-13_AF-9	16	1,775	65.75	9.3	9.3	611.51
Total	--	**76,043**	**2,816**	--	--	**48,039**
				Volume-Weighted Average (mg/kg)		**17.06**

5- to 6-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AK-2	0	2,159	79.96	44.0	44.0	3,518.23
I6-3-13_AI-5	1	2,733	101.24	8.0	8.0	809.91
I6-3-13_AJ/AK-4	2	3,790	140.38	160.0	160.0	22,460.24
I6-3-13_AG-8	3	1,998	74.01	4.8	4.8	355.23
I6-3-13_AI-7	4	1,812	67.10	24.0	24.0	1,610.48
I6-3-13_AF/AG-4	5	1,635	60.56	0.020 [ND (0.011)]	0.016	0.94
I6-3-13_AE-7	6	1,609	59.59	20.0	20.0	1,191.89
I6-3-13_AH/AI-3	7	2,050	75.92	0.071	0.071	5.39
I6-3-13_AE-6	8	1,069	39.59	6.3	6.3	249.43
I6-3-13_AD-8	9	1	0.05	ND (0.011)	0.011	0.00
I6-3-13_AD-8	10	7,562	280.06	ND (0.011)	0.011	3.08
I6-3-13_AD-6	11	1,106	40.95	ND (0.013)	0.013	0.53

Table E-1B-2

Parcel I6-3-13
Existing Conditions

5- to 6-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AG-6	12	1,941	71.90	7.6	7.6	546.47
I6-3-13_AF-6	13	1,236	45.76	12.0	12.0	549.14
I6-3-13_AE-10	14	28,550	1057.41	ND (0.011)	0.011	11.63
I6-3-13_AC-7	15	15,016	556.16	ND (0.01)	0.01	5.56
I6-3-13_AF-9	16	1,775	65.75	16.0	16.0	1,052.06
Total	**--**	**76,043**	**2,816**	**--**	**--**	**32,370**
				Volume-Weighted Average (mg/kg)		**11.49**

Table E-1B-2
Parcel I6-3-13
Existing Conditions

I6-3-13 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 6-Foot Depth Increment	76,043	14,082	223,163	15.85

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-3

Parcel I6-3-13
Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AF/AG-4	0	1,625	30.08	9.8	9.8	294.82
I6-3-13_AF/AG-4	0A	10	0.2	9.8	***0.021***	0.00
I6-3-13_AH/AI-3	1	1,401	25.9	16.0	***0.021***	0.54
I6-3-13_AI-7	2	1,249	23.1	21.0	***0.021***	0.49
I6-3-13_AJ/AK-4	3	2,821	52.2	15.0	***0.021***	1.10
I6-3-13_L-7	4	816	15.1	6.5	6.5	98.18
I6-3-13_AK-2	5	1,837	34.0	16.0/10.0	***0.021***	0.71
FL000910	6	0.1	0.003	17.0	***0.021***	0.00
FL000910	6A	314	5.808	17.0	***0.021***	0.12
FL000910	6B	377	6.979	17.0	***0.021***	0.15
FL000910	6C	564	10.441	17.0	***0.021***	0.22
FL000910	6D	4	0.07	17.0	***0.021***	0.00
I6-3-13_AI-5	7	1,690	31.30	32.0/26.5	***0.021***	0.66
I6-3-13_AE-6	8	1,069	19.80	43.0	***0.021***	0.42
I6-3-13_AD-6	9	816	15.12	42.0	***0.021***	0.32
I6-3-13_AE-7	10	956	17.71	27	***0.021***	0.37
I6-3-13_AG-8	11	1,398	25.89	140.0	***0.021***	0.54
FL000911	12	202	3.74	11.7	***0.021***	0.08
FL000911	12A	656	12.14	11.7	***0.021***	0.25
FL000911	12B	666	12.34	11.7	***0.021***	0.26
FL001466	13	361	6.69	23.5	***0.021***	0.14
FL001466	13A	600	11.11	23.5	***0.021***	0.23
FL001466	13B	207	3.83	23.5	***0.021***	0.08
I6-3-13_AG-6	14	1,735	32.13	29.0	***0.021***	0.67
I6-3-13_N-8	15	197	3.65	50	***0.021***	0.08
I6-3-13_AF-6	16	1,236	22.88	10.0	***0.021***	0.48
I6-3-13_N-9	17	90	1.66	61	***0.021***	0.03
I6-3-13_M-7	18	554	10.25	6.8	6.8	69.70
I6-3-13_M-7	18A	184	3.41	6.8	***0.021***	0.07
I6-3-13_M-7	18B	57	1.05	6.8	***0.021***	0.02
I6-3-13_AF-9	19	1,483	27.46	61.0	***0.021***	0.58
I6-3-13_N-10	20	83	1.54	41.0 [34.0]	***0.021***	0.03
I6-3-13_M-8	21	619	11.47	6.2	6.2	71.10
I6-3-13_L-9	22	626	11.60	2.9 [2.7]	2.8	32.47
FL000909	23	219	4.06	10.4	***0.021***	0.09
FL000909	23A	85	1.57	10.4	***0.021***	0.03
I6-3-13_L-8	24	642	11.88	5.0	5.0	59.42

Table E-1B-3

Parcel I6-3-13
Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
FL001831	25	60	1.11	19.0	***0.021***	0.02
FL001831	25A	39	0.7	19.0	***0.021***	0.02
I6-3-13_M-9	26	539	10.0	4.7	4.7	46.87
FL000815	27	321	5.9	6.53	6.53	38.81
I6-3-13_J-11	28	895	16.6	5.2	5.2	86.23
I6-3-13_K-9	29	487	9.0	0.23	0.23	2.08
I6-3-13B	30	217	4.0	1.8	1.8	7.24
I6-3-13_K-10	31	626	11.6	1.08	1.08	12.53
FL001254	32	836	15.5	0.428	0.428	6.63
I6-3-13_I-11	33	5,306	98.3	0.93	0.93	91.38
I6-3-13_I-13	34	329	6.1	0.27	0.27	1.64
I6-3-13_I-13	35	8,601	159.3	0.27	0.27	43.01
I6-3-13_K-8	36	785	14.5	2.8	2.8	40.68
I6-3-13_M-10	37	529	9.8	6.3	6.3	61.74
I6-3-13A	38	1,270	23.5	1.4	1.4	32.93
I6-3-13_I-9	39	10	0.2	0.92	0.92	0.17
I6-3-13_I-9	40	1,692	31.3	0.92	0.92	28.83
I6-3-13_L-12	41	534	9.9	1.9	1.9	18.78
I6-3-13_L-10	42	464	8.6	2.0	2.0	17.19
I6-3-13_L-11	43	572	10.6	4.5 [4.1]	4.3	45.57
I6-3-13_M-11	44	448	8.3	6.0	6.0	49.72
I6-3-13_M-11/12	45	521	9.7	5.0/4.5	4.8	45.84
I6-3-13_J-10	46	906	16.8	3.1	3.1	51.99
FL001255	47	1,460	27.0	1.01	1.01	27.31
I6-3-13_K-11	48	700	13.0	0.22	0.22	2.85
I6-3-13_L-12/13	49	707	13.1	3.2	3.2	41.88
I6-3-13_I-15	50	15,222	281.9	0.54	0.54	152.22
I6-3-13_I-13	51	1,369	25.4	0.27	0.27	6.85
I6-3-13_I-15	52	272	5.0	0.54	0.54	2.72
I6-3-13_AE-7	53	107	2.0	0.021	***0.021***	0.04
I6-3-13_N-8	54	641	11.9	0.021	0.021	0.25
I6-3-13_N-9	55	655	12.1	0.021	0.021	0.25
I6-3-13_N-10	56	830	15.4	0.021	0.021	0.32
I6-3-13_N-11	57	463	8.6	0.021	0.021	0.18
FL001465	58	180	3.3	0.021	0.021	0.07

Table E-1B-3
Parcel I6-3-13
Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
Total	--	**76,043**	**1,408**	--	--	**1,599**
				Volume-Weighted Average (mg/kg)		**1.14**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AJ/AK-4	0	2,821	52.2	15.0	***0.021***	1.10
I6-3-13_AH/AI-3	1	1,401	25.9	16.0	***0.021***	0.54
I6-3-13_AK-2	2	1,897	35.1	16.0/10.0	***0.021***	0.74
I6-3-13_AI-7	3	1,249	23.1	21.0	***0.021***	0.49
I6-3-13_AF/AG-4	4	1,625	30.1	9.8	9.8	294.82
I6-3-13_AF/AG-4	4A	10	0.2	9.8	***0.021***	0.00
FL000910	5	0.1	0.003	119.0	***0.021***	0.00
FL000910	5A	314	5.808	119.0	***0.021***	0.12
FL000910	5B	377	6.979	119.0	***0.021***	0.15
FL000910	5C	564	10.441	119.0	***0.021***	0.22
FL000910	5D	4	0.07	119.0	***0.021***	0.00
I6-3-13_AI-5	6	1,690	31.30	32.0/26.5	***0.021***	0.66
I6-3-13_AE-6	7	1,069	19.80	43.0	***0.021***	0.42
I6-3-13_L-7	8	816	15.10	6.5	6.5	98.18
FL000911	9	202	3.74	11.9	***0.021***	0.08
FL000911	9A	656	12.14	11.9	***0.021***	0.25
FL000911	9B	666	12.34	11.9	***0.021***	0.26
I6-3-13_AE-7	10	956	17.71	27.0	***0.021***	0.37
I6-3-13_AG-8	11	1,398	25.89	140.0	***0.021***	0.54
I6-3-13_AD-6	12	816	15.12	42.0	***0.021***	0.32
FL001466	13	361	6.69	74.4	***0.021***	0.14
FL001466	13A	600	11.11	74.4	***0.021***	0.23
FL001466	13B	207	3.83	74.4	***0.021***	0.08
I6-3-13_AG-6	14	1,735	32.13	29.0	***0.021***	0.67
I6-3-13_AF-6	15	1,236	22.88	10.0	***0.021***	0.48
I6-3-13_N-9	16	90	1.66	61.0	***0.021***	0.03
I6-3-13_M-7	17	553	10.25	6.8	6.8	69.70
I6-3-13_M-7	17A	57	1.05	6.8	***0.021***	0.02
I6-3-13_M-7	17B	184	3.41	6.8	***0.021***	0.07

Table E-1B-3

Parcel I6-3-13
Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_N-8	18	197	3.65	50.0	***0.021***	0.08
I6-3-13_AF-9	19	1,483	27.46	61.0	***0.021***	0.58
I6-3-13_N-10	20	83	1.54	41.0 [34.0]	***0.021***	0.03
I6-3-13_M-8	21	619	11.47	6.2	6.2	71.10
I6-3-13_L-9	22	626	11.60	2.9 [2.7]	2.8	32.48
FL000909	23	258	4.79	20.0	***0.021***	0.10
FL000909	23A	85	1.57	20.0	***0.021***	0.03
I6-3-13_L-8	24	642	11.89	5.0	5.0	59.43
I6-3-13_M-9	25	539	9.97	4.7	4.7	46.87
FL000815	26	321	5.94	4.89	4.89	29.06
I6-3-13_J-11	27	1,125	20.83	5.2	5.2	108.29
I6-3-13_K-9	28	584	10.81	0.23	0.23	2.49
I6-3-13_K-10	29	626	11.60	1.08	1.08	12.53
FL001254	30	902	16.70	ND (0.501)	0.501	8.37
I6-3-13_I-11	31	5,306	98.26	0.93	0.93	91.38
I6-3-13_I-13	32	329	6.08	0.27	0.27	1.64
I6-3-13_I-13	33	8,673	160.62	0.27	0.27	43.37
I6-3-13_K-8	34	839	15.54	2.8	2.8	43.50
I6-3-13_M-10	35	529	9.80	6.3	6.3	61.74
I6-3-13_I-9	36	10	0.2	0.92	0.92	0.17
I6-3-13_I-9	37	1,692	31.3	0.92	0.92	28.83
I6-3-13_L-12	38	671	12.4	1.9	1.9	23.60
I6-3-13_L-10	39	464	8.6	2.0	2.0	17.19
I6-3-13_L-11	40	572	10.6	4.5 [4.1]	4.3	45.57
I6-3-13_M-11	41	448	8.3	6.0	6.0	49.72
I6-3-13_M-11/12	42	521	9.7	5.0/4.5	4.8	45.84
FL001255	43	1,767	32.7	ND (0.502)	0.502	16.43
I6-3-13_J-10	44	906	16.8	3.1	3.1	51.99
I6-3-13_K-11	45	930	17.2	0.22	0.22	3.79
I6-3-13_L-12/13	46	1,001	18.5	3.2	3.2	59.32
I6-3-13_I-15	47	15,222	281.9	0.54	0.54	152.22
I6-3-13_I-13	48	1,369	25.4	0.27	0.27	6.85
I6-3-13_I-15	49	272	5.0	0.54	0.54	2.72
I6-3-13_AE-7	50	107	2.0	0.021	***0.021***	0.04
I6-3-13_N-9	51	655	12.1	0.021	0.021	0.25
I6-3-13_N-8	52	641	11.9	0.021	0.021	0.25
I6-3-13_N-10	53	830	15.4	0.021	0.021	0.32

Table E-1B-3
Parcel I6-3-13
Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_N-11	54	463	8.6	0.021	0.021	0.18
FL001465	55	180	3.3	0.021	0.021	0.07
Total	**--**	**76,043**	**1,408**	**--**	**--**	**1,589**
				Volume-Weighted Average (mg/kg)		**1.13**

I6-3-13 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	76,043	2,816	3,188	1.13

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-4

Parcel I6-3-13
Post-Remediation Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_L-7	0	816	30.2	0.57	0.57	17.22
I6-3-13_AI-5	1	2,733	101.2	190.0 [280.0]	***0.021***	2.13
I6-3-13_AK-2	2	2,159	80.0	37.0	***0.021***	1.68
I6-3-13_AJ/AK-4	3	3,790	140.4	49.0/40.0	***0.021***	2.95
I6-3-13_AI-7	4	1,812	67.1	16.0	16.0	1,073.65
I6-3-13_AE-7	5	1,063	39.4	40.0	***0.021***	0.83
I6-3-13_AE-6	6	1,069	39.6	19.0 [51.0]	***0.021***	0.83
I6-3-13_AD-6	7	816	30.2	50.0	***0.021***	0.63
I6-3-13_N-8	8	838	31.0	15.5	15.5	481.24
I6-3-13_AG-6	9	1,941	71.9	7.2	***0.021***	1.51
I6-3-13_AF-6	10	1,236	45.8	10.0	***0.021***	0.96
I6-3-13_AG-8	11	1,998	74.0	260.0	***0.021***	1.55
I6-3-13_M-9	12	539	19.9	0.26	0.26	5.19
I6-3-13_M-7	13	738	27.3	0.57	0.57	15.57
I6-3-13_M-7	13A	57	2.1	0.57	***0.021***	0.04
I6-3-13_M-8	14	619	22.9	0.19	0.19	4.36
I6-3-13_AF-9	15	1,483	54.9	65.0	***0.021***	1.15
I6-3-13_N-9	16	745	27.6	6.4	6.4	176.56
I6-3-13_N-10	17	914	33.8	7.9	7.9	267.34
I6-3-13_L-9	18	626	23.2	ND (0.031)	0.031	0.72
I6-3-13_AF/AG-4	19	1,635	60.6	17.0	17.0	1,029.51
I6-3-13_L-8	20	642	23.8	0.1	0.1	2.38
I6-3-13_AH/AI-3	21	2,050	75.9	80.0	***0.021***	1.59
I6-3-13_J-11	22	1,145	42.4	1.4	1.4	59.38
I6-3-13_K-8	23	1,200	44.5	1.68	1.68	74.68
I6-3-13_K-10	24	626	23.2	0.45	0.45	10.44
I6-3-13_I-11	25	5,306	196.5	0.44	0.44	86.47
I6-3-13_I-13	26	11,066	409.8	ND (0.026)	0.026	10.66
I6-3-13_K-9	27	861	31.9	1.07	1.07	34.11
I6-3-13_L-10	28	624	23.1	0.34	0.34	7.85
I6-3-13_M-10	29	625	23.1	0.39	0.39	9.03
I6-3-13_M-11	30	479	17.8	0.5	0.5	8.88
I6-3-13_L-12/13	31	1,625	60.2	0.63	0.63	37.91
I6-3-13_I-9	32	10	0.4	ND (0.027)	0.027	0.01
I6-3-13_I-9	33	1,923	71.2	ND (0.027)	0.027	1.92
I6-3-13_L-11	34	614	22.7	0.17	0.17	3.86
I6-3-13_J-10	35	938	34.8	10.7	10.7	371.90

Table E-1B-4

Parcel I6-3-13
Post-Remediation Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_L-12	36	671	24.8	2.4	2.4	59.63
I6-3-13_N-11	37	577	21.4	4.8	4.8	102.63
I6-3-13_M-11/12	38	580	21.5	0.036	0.036	0.77
I6-3-13_I-15	39	15,922	589.7	0.97	0.97	572.02
I6-3-13_K-11	40	931	34.5	0.18	0.18	6.21
Total	--	**76,043**	**2,816**	--	--	**4,548**
				Volume-Weighted Average (mg/kg)		**1.61**

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AI-5	0	2,733	101.2	27.0	***0.021***	2.13
I6-3-13_AK-2	1	2,159	80.0	64.0	***0.021***	1.68
I6-3-13_AI-7	2	1,812	67.1	16.0	16.0	1,073.65
I6-3-13_AJ/AK-4	3	3,790	140.4	78.0	***0.021***	2.95
I6-3-13_AD-6	4	1,105	40.9	4.4	4.4	180.07
I6-3-13_AE-6	5	1,069	39.6	18.0	18.0	712.67
I6-3-13_AG-6	6	1,941	71.9	29.0	***0.021***	1.51
I6-3-13_AF-6	7	1,236	45.8	7.9	***0.021***	0.96
I6-3-13_N-11	8	1,180	43.7	ND (0.026)	0.026	1.14
I6-3-13_N-8	9	897	33.2	0.131	0.131	4.35
I6-3-13_AF-9	10	1,483	54.9	1.1	1.1	60.42
I6-3-13_AG-8	11	1,998	74.0	58.0	***0.021***	1.55
I6-3-13_N-9	12	910	33.7	ND (0.027)	0.027	0.91
I6-3-13_AH/AI-3	13	2,050	75.9	100.0	***0.021***	1.59
I6-3-13_AC-7	14	647	23.9	ND (0.011)	0.011	0.26
I6-3-13_N-10	15	1,386	51.4	ND (0.027)	0.027	1.39
I6-3-13_L-8	16	649	24.0	ND (0.03)	0.03	0.72
I6-3-13_K-10	17	936	34.7	ND (0.029)	0.029	1.01
I6-3-13_K-8	18	1,200	44.5	5.2	5.2	231.16
I6-3-13_L-7	19	410	15.2	0.196	0.196	2.98
I6-3-13_AD-8	20	971	36.0	0.062	0.062	2.23
I6-3-13_I-9	21	10	0.4	ND (0.029)	0.029	0.01
I6-3-13_I-9	22	1,923	71.2	ND (0.029)	0.029	2.07
I6-3-13_AF/AG-4	23	1,635	60.6	5.5	5.5	333.08

Table E-1B-4

Parcel I6-3-13
Post-Remediation Conditions

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AE-7	24	1,120	41.5	57.0	***0.021***	0.87
I6-3-13_K-11	25	1,252	46.4	0.49	0.49	22.73
I6-3-13_L-12	26	2,873	106.4	ND (0.028)	0.028	2.98
I6-3-13_I-11	27	5,306	196.5	ND (0.029)	0.029	5.70
I6-3-13_K-9	28	861	31.9	0.6	0.6	19.12
I6-3-13_J-10	29	938	34.8	2.3	2.3	79.94
I6-3-13_L-9	30	1,259	46.6	ND (0.031)	0.031	1.45
I6-3-13_J-11	31	1,150	42.6	3.0	3.0	127.78
I6-3-13_I-13	32	27,151	1005.6	0.33	0.33	331.85
Total	--	**76,043**	**2,816**	--	--	**3,213**
				Volume-Weighted Average (mg/kg)		**1.14**

3- to 4-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AK-2	0	2,159	80.0	87.0	***0.021***	1.68
I6-3-13_AI-5	1	2,733	101.2	18.0	18.0	1,822.29
I6-3-13_AJ/AK-4	2	3,790	140.4	100.0	***0.021***	2.95
I6-3-13_AG-8	3	1,998	74.0	16.0	16.0	1,184.09
I6-3-13_AI-7	4	1,812	67.1	17.0	17.0	1,140.76
I6-3-13_AF/AG-4	5	1,635	60.6	5.4	5.4	327.02
I6-3-13_AE-7	6	1,609	59.6	6.4	6.4	381.41
I6-3-13_AH/AI-3	7	2,050	75.9	13.0	13.0	986.93
I6-3-13_AE-6	8	1,069	39.6	13.0	13.0	514.70
I6-3-13_AD-8	9	1	0.05	ND (0.011)	0.011	0.00
I6-3-13_AD-8	10	7,562	280.06	ND (0.011)	0.011	3.08
I6-3-13_AD-6	11	1,106	40.95	0.32	0.32	13.10
I6-3-13_AG-6	12	1,941	71.90	33.0	***0.021***	1.51
I6-3-13_AF-6	13	1,236	45.76	46.0	***0.021***	0.96
I6-3-13_AE-10	14	28,550	1057.41	ND (0.012)	0.012	12.69
I6-3-13_AC-7	15	15,016	556.16	ND (0.01)	0.01	5.56
I6-3-13_AF-9	16	1,775	65.75	4.3 [5.8]	5.1	332.06
Total	--	**76,043**	**2,816**	--	--	**6,731**
				Volume-Weighted Average (mg/kg)		**2.39**

Table E-1B-4

Parcel I6-3-13
Post-Remediation Conditions

4- to 5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AK-2	0	2,159	79.96	21	***0.021***	1.68
I6-3-13_AI-5	1	2,733	101.24	16	16	1,619.81
I6-3-13_AJ/AK-4	2	3,790	140.38	250	***0.021***	2.95
I6-3-13_AG-8	3	1,998	74.01	12	12	888.07
I6-3-13_AI-7	4	1,812	67.10	12	12	805.24
I6-3-13_AF/AG-4	5	1,635	60.56	1	1	60.56
I6-3-13_AE-7	6	1,609	59.59	6.5	6.5	387.37
I6-3-13_AH/AI-3	7	2,050	75.92	9.9	9.9	751.58
I6-3-13_AE-6	8	1,069	39.59	5.5	5.5	217.76
I6-3-13_AD-8	9	1	0.05	ND (0.011)	0.011	0.00
I6-3-13_AD-8	10	7,562	280.06	ND (0.011)	0.011	3.08
I6-3-13_AD-6	11	1,106	40.95	ND (0.013)	0.013	0.53
I6-3-13_AG-6	12	1,941	71.90	63	***0.021***	1.51
I6-3-13_AF-6	13	1,236	45.76	30	30	1,372.86
I6-3-13_AE-10	14	28,550	1057.41	ND (0.011)	0.011	11.63
I6-3-13_AC-7	15	15,016	556.16	ND (0.01)	0.01	5.56
I6-3-13_AF-9	16	1,775	65.75	9.3	9.3	611.51
Total	--	**76,043**	**2,816**	--	--	**6,742**
				Volume-Weighted Average (mg/kg)		**2.39**

5- to 6-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AK-2	0	2,159	79.96	44.0	***0.021***	1.68
I6-3-13_AI-5	1	2,733	101.24	8.0	8.0	809.91
I6-3-13_AJ/AK-4	2	3,790	140.38	160.0	***0.021***	2.95
I6-3-13_AG-8	3	1,998	74.01	4.8	4.8	355.23
I6-3-13_AI-7	4	1,812	67.10	24.0	24.0	1,610.48
I6-3-13_AF/AG-4	5	1,635	60.56	0.020 [ND (0.011)]	0.016	0.94
I6-3-13_AE-7	6	1,609	59.59	20.0	20.0	1,191.89
I6-3-13_AH/AI-3	7	2,050	75.92	0.071	0.071	5.39
I6-3-13_AE-6	8	1,069	39.59	6.3	6.3	249.43
I6-3-13_AD-8	9	1	0.05	ND (0.011)	0.011	0.00
I6-3-13_AD-8	10	7,562	280.06	ND (0.011)	0.011	3.08
I6-3-13_AD-6	11	1,106	40.95	ND (0.013)	0.013	0.53

Table E-1B-4

Parcel I6-3-13
Post-Remediation Conditions

5- to 6-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
I6-3-13_AG-6	12	1,941	71.90	7.6	7.6	546.47
I6-3-13_AF-6	13	1,236	45.76	12.0	12.0	549.14
I6-3-13_AE-10	14	28,550	1057.41	ND (0.011)	0.011	11.63
I6-3-13_AC-7	15	15,016	556.16	ND (0.01)	0.01	5.56
I6-3-13_AF-9	16	1,775	65.75	16.0	16.0	1,052.06
Total	--	**76,043**	**2,816**	--	--	**6,396**
				Volume-Weighted Average (mg/kg)		**2.27**

Table E-1B-4
Parcel I6-3-13
Post-Remediation Conditions

I6-3-13 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 6-Foot Depth Increment	76,043	14,082	27,630	1.96

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-5

Parcel J6-2-3
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-2-3_N/O-9	0	358	6.6	22	22	146.01
J6-2-3_L/M-5	1	257	4.8	11.0	11.0	52.27
J6-2-3_L/M-7	2	1,487	27.5	0.064	0.064	1.76
J6-2-3_L/M-6	3	281	5.2	13.0	13.0	67.65
J6-2-3_M/N-9	4	1,946	36.0	0.0725	0.0725	2.61
J6-2-3_N-8	5	311	5.8	13	13	74.88
J6-2-3_M-8	6	1,983	36.7	ND (0.0021) [ND (0.002)]	0.002	0.08
J6-2-3_M/N-7	7	328	6.1	40.0	40.0	243.21
J6-2-3_K-6	8	1,181	21.9	0.157	0.157	3.43
J6-2-3_O-10	9	320	5.9	19	19	112.67
J6-2-3_K-4	10	741	13.7	2.4	2.4	32.93
J6-2-3_L-4	11	120	2.2	12.5	12.5	27.85
J6-2-2_J-24	12	347	6.4	6.3	6.3	40.50
J6-2-3_K/L-3	13	411	7.6	14.0/10.0	12.0	91.37
J6-2-2_J/K-23/24	14	51	0.9	29.0/27.0	28.0	26.41
J6-2-3_I-26	15	14,034	259.9	0.063	0.063	16.37
J6-2-2_I/J-24	16	386	7.1	3.9	3.9	27.86
J6-2-3_N-27	17	505	9.3	0.35	0.35	3.27
BS000100	18	316	5.8	16.7	16.7	97.64
J6-2-3_L/M-26/27	19	0.5	0.010	ND (0.63)	0.63	0.01
J6-2-3_L/M-26/27	20	445	8.245	ND (0.63)	0.63	5.19
J6-2-3_L/M-26/27	20a	41	0.8	ND (0.63)	0.63	0.48
J6-2-3_M-29	21	1,400	25.9	0.074 [0.074]	0.074	1.92
J6-2-3_M-29	22	12,383	229.3	0.074 [0.074]	0.074	16.97
J6-2-3_N-10	23	976	18.1	0.124	0.124	2.24
J6-2-3_K/L-27/28	24	1,628	30.1	ND (0.57)	0.57	17.18
J6-2-3_K/L-27/28	25	504	9.3	ND (0.57)	0.57	5.32
J6-2-3_K/L-27/28	26	4,629	85.7	ND (0.57)	0.57	48.87
J6-2-3_K/L-27/28	27	35	0.6	ND (0.57)	0.57	0.36
J6-2-3_K-25	28	1,744	32.3	0.21	0.21	6.78
J6-2-10_H-25	29	4,506	83.4	0.089	0.089	7.43
J6-2-3_I-26	30	1,035	19.2	0.063	0.063	1.21
J6-2-3_M-29	31	433	8.0	0.074 [0.074]	0.074	0.59
J6-2-3_K/L-27/28	32	613	11.4	ND (0.57)	0.57	6.47
J6-2-2_J-24	33	2	0.04	0.021	0.021	0.00
J6-2-2_J/K-23/24	34	187	3.46	0.021	0.021	0.07
J6-2-3_K-25	35	22	0.4	0.021	0.021	0.01

Table E-1B-5

Parcel J6-2-3

Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
Total	--	**55,949**	**1,036**	--	--	**1,190**
				Volume-Weighted Average (mg/kg)		**1.15**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-2-3_N/O-9	0	358	6.6	22	22	146.01
J6-2-3_L/M-5	1	257	4.8	11.0	11.0	52.27
J6-2-3_L/M-7	2	1,487	27.5	0.064	0.064	1.76
J6-2-3_L/M-6	3	281	5.2	13.0	13.0	67.65
J6-2-3_M/N-9	4	1,946	36.0	0.0725	0.0725	2.61
J6-2-3_N-8	5	311	5.8	13	13	74.88
J6-2-3_M-8	6	1,983	36.7	ND (0.0021) [ND (0.002)]	0.002	0.08
J6-2-3_M/N-7	7	328	6.1	40.0	40.0	243.21
J6-2-3_K-6	8	1,181	21.9	0.157	0.157	3.43
J6-2-3_O-10	9	320	5.9	19	19	112.67
J6-2-3_K-4	10	741	13.7	2.4	2.4	32.93
J6-2-3_L-4	11	120	2.2	12.5	12.5	27.85
J6-2-2_J-24	12	347	6.4	6.3	6.3	40.50
J6-2-3_K/L-3	13	411	7.6	14.0	12.0	91.37
J6-2-2_J/K-23/24	14	51	0.9	28.0	28.0	26.41
J6-2-3_I-26	15	14,034	259.9	0.063	0.063	16.37
J6-2-2_I/J-24	16	386	7.1	3.9	3.9	27.86
J6-2-3_N-27	17	505	9.3	0.35	0.35	3.27
BS000100	18	316	5.8	38.9 [37.5]	38.2	223.35
J6-2-3_L/M-26/27	19	0.5	0.010	ND (0.63)	0.63	0.01
J6-2-3_L/M-26/27	20	445	8.245	ND (0.63)	0.63	5.19
J6-2-3_L/M-26/27	20a	41	0.8	ND (0.63)	0.63	0.48
J6-2-3_M-29	21	1,400	25.9	0.074 [0.074]	0.074	1.92
J6-2-3_M-29	22	12,383	229.3	0.074 [0.074]	0.074	16.97
J6-2-3_N-10	23	976	18.1	0.120 [0.128]	0.124	2.24
J6-2-3_K/L-27/28	24	1,628	30.1	ND (0.57)	0.57	17.18
J6-2-3_K/L-27/28	25	504	9.3	ND (0.57)	0.57	5.32
J6-2-3_K/L-27/28	26	4,629	85.7	ND (0.57)	0.57	48.87
J6-2-3_K/L-27/28	27	35	0.6	ND (0.57)	0.57	0.36

Table E-1B-5

Parcel J6-2-3
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-2-3_K-25	28	1,744	32.3	0.21	0.21	6.78
J6-2-10_H-25	29	4,506	83.4	0.089	0.089	7.43
J6-2-3_I-26	30	1,035	19.2	0.063	0.063	1.21
J6-2-3_M-29	31	433	8.0	0.074 [0.074]	0.074	0.59
J6-2-3_K/L-27/28	32	613	11.4	ND (0.57)	0.57	6.47
J6-2-2_J-24	33	2	0.04	0.021	0.021	0.00
J6-2-2_J/K-23/24	34	187	3.46	0.021	0.021	0.07
J6-2-3_K-25	35	22	0.4	0.021	0.021	0.01
Total	--	**55,949**	**1,036**	--	--	**1,316**
				Volume-Weighted Average (mg/kg)		**1.27**

Table E-1B-5
Parcel J6-2-3
Existing Conditions

J6-2-3 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	55,949	2,072	2,505	1.21

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-6
Parcel J6-2-3
Existing Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-2-3_N-8	0a	369	13.7	58	58	792.65
J6-2-3_N/O-9	1a	358	13.3	65	65	862.81
J6-2-3_L/M-7	2	2,857	105.8	ND (0.0086)	0.0086	0.91
J6-2-3_M-8	3	2,736	101.3	0.0145	0.0145	1.47
J6-2-3_L/M-6	4a	315	11.7	73.0	73.0	852.79
J6-2-3_N-10	5	976	36.2	0.0408	0.0408	1.48
J6-2-3_O-10	6a	320	11.9	50	50	592.98
J6-2-2_J-24	7	350	12.9	10.4	10.4	134.64
J6-2-2_J/K-23/24	8	238	8.8	16.0	16.0	140.87
J6-2-3_K-4	9	606	22.5	1.3	1.3	29.19
J6-2-3_K-4	10	4,040	149.6	1.3	1.3	194.50
J6-2-3_K-6	11	19,978	739.9	ND (0.002)	0.002	1.48
J6-2-3_L-5/6	12	510	18.9	2.6	2.6	49.16
J6-2-3_M/N-9	13	1,947	72.1	ND (0.0018) [ND (0.0018)]	0.0018	0.13
J6-2-3_L/M-5	14a	450	16.7	80.0	80.0	1,332.12
J6-2-2_I/J-24	15	12,930	478.9	0.036	0.036	17.24
J6-2-3_J/K-2/3	16	6,969	258.1	ND (0.0079)	0.0079	2.04
Total	--	**55,949**	**2,072**	--	--	**5,006**
				Volume-Weighted Average (mg/kg)		**2.42**

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-2-3_O-10	0a	365	13.5	78	78	1,055.41
J6-2-3_L/M-7	1	15,171	561.9	0.017	0.017	9.55
J6-2-3_N-10	2	3,499	129.6	0.397	0.397	51.45
J6-2-3_J/K-2/3	3	12,752	472.3	ND (0.0081)	0.0081	3.83
J6-2-2_J/K-23/24	4	238	8.8	5.3	5.3	46.66
J6-2-3_K-4	5	16,313	604.2	1.7	1.7	1,027.10
J6-2-2_J-24	6	7,610	281.9	ND (0.049)	0.049	13.81
Total	--	**55,949**	**2,072**	--	--	**2,208**
				Volume-Weighted Average (mg/kg)		**1.07**

Table E-1B-6
Parcel J6-2-3
Existing Conditions

J6-2-3 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 3-Foot Depth Increment	55,949	4,144	7,214	1.74

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-7

Parcel J6-2-3
Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-2-3_N/O-9	0	358	6.6	22	***0.021***	0.14
J6-2-3_L/M-5	1	257	4.8	11.0	***0.021***	0.10
J6-2-3_L/M-7	2	1,487	27.5	0.064	0.064	1.76
J6-2-3_L/M-6	3	281	5.2	13.0	***0.021***	0.11
J6-2-3_M/N-9	4	1,946	36.0	0.0725	0.0725	2.61
J6-2-3_N-8	5	311	5.8	13	***0.021***	0.12
J6-2-3_M-8	6	1,983	36.7	ND (0.0021) [ND (0.002)]	0.002	0.08
J6-2-3_M/N-7	7	328	6.1	40.0	***0.021***	0.13
J6-2-3_K-6	8	1,181	21.9	0.157	0.157	3.43
J6-2-3_O-10	9	320	5.9	19	***0.021***	0.12
J6-2-3_K-4	10	741	13.7	2.4	2.4	32.93
J6-2-3_L-4	11	120	2.2	12.5	***0.021***	0.05
J6-2-2_J-24	12	347	6.4	6.3	6.3	40.50
J6-2-3_K/L-3	13	411	7.6	14.0/10.0	***0.021***	0.16
J6-2-2_J/K-23/24	14	51	0.9	29.0/27.0	***0.021***	0.02
J6-2-3_I-26	15	14,034	259.9	0.063	0.063	16.37
J6-2-2_I/J-24	16	386	7.1	3.9	3.9	27.86
J6-2-3_N-27	17	505	9.3	0.35	0.35	3.27
BS000100	18	316	5.8	16.7	***0.021***	0.12
J6-2-3_L/M-26/27	19	0.5	0.010	ND (0.63)	0.63	0.01
J6-2-3_L/M-26/27	20	445	8.245	ND (0.63)	0.63	5.19
J6-2-3_L/M-26/27	20a	41	0.8	ND (0.63)	***0.021***	0.02
J6-2-3_M-29	21	1,400	25.9	0.074 [0.074]	0.074	1.92
J6-2-3_M-29	22	12,383	229.3	0.074 [0.074]	0.074	16.97
J6-2-3_N-10	23	976	18.1	0.124	0.124	2.24
J6-2-3_K/L-27/28	24	1,628	30.1	ND (0.57)	0.57	17.18
J6-2-3_K/L-27/28	25	504	9.3	ND (0.57)	0.57	5.32
J6-2-3_K/L-27/28	26	4,629	85.7	ND (0.57)	0.57	48.87
J6-2-3_K/L-27/28	27	35	0.6	ND (0.57)	0.57	0.36
J6-2-3_K-25	28	1,744	32.3	0.21	0.21	6.78
J6-2-10_H-25	29	4,506	83.4	0.089	0.089	7.43
J6-2-3_I-26	30	1,035	19.2	0.063	0.063	1.21
J6-2-3_M-29	31	433	8.0	0.074 [0.074]	0.074	0.59
J6-2-3_K/L-27/28	32	613	11.4	ND (0.57)	0.57	6.47
J6-2-2_J-24	33	2	0.04	0.021	0.021	0.00
J6-2-2_J/K-23/24	34	187	3.46	0.021	0.021	0.07
J6-2-3_K-25	35	22	0.4	0.021	0.021	0.01

Table E-1B-7

Parcel J6-2-3

Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
Total	--	**55,949**	**1,036**	--	--	**251**
				Volume-Weighted Average (mg/kg)		**0.24**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-2-3_N/O-9	0	358	6.6	22	***0.021***	0.14
J6-2-3_L/M-5	1	257	4.8	11.0	***0.021***	0.10
J6-2-3_L/M-7	2	1,487	27.5	0.064	0.064	1.76
J6-2-3_L/M-6	3	281	5.2	13.0	***0.021***	0.11
J6-2-3_M/N-9	4	1,946	36.0	0.0725	0.0725	2.61
J6-2-3_N-8	5	311	5.8	13	***0.021***	0.12
J6-2-3_M-8	6	1,983	36.7	ND (0.0021) [ND (0.002)]	0.002	0.08
J6-2-3_M/N-7	7	328	6.1	40.0	***0.021***	0.13
J6-2-3_K-6	8	1,181	21.9	0.157	0.157	3.43
J6-2-3_O-10	9	320	5.9	19	***0.021***	0.12
J6-2-3_K-4	10	741	13.7	2.4	2.4	32.93
J6-2-3_L-4	11	120	2.2	12.5	***0.021***	0.05
J6-2-2_J-24	12	347	6.4	6.3	6.3	40.50
J6-2-3_K/L-3	13	411	7.6	14.0	***0.021***	0.16
J6-2-2_J/K-23/24	14	51	0.9	28.0	***0.021***	0.02
J6-2-3_I-26	15	14,034	259.9	0.063	0.063	16.37
J6-2-2_I/J-24	16	386	7.1	3.9	3.9	27.86
J6-2-3_N-27	17	505	9.3	0.35	0.35	3.27
BS000100	18	316	5.8	38.9 [37.5]	***0.021***	0.12
J6-2-3_L/M-26/27	19	0.5	0.010	ND (0.63)	0.63	0.01
J6-2-3_L/M-26/27	20	445	8.245	ND (0.63)	0.63	5.19
J6-2-3_L/M-26/27	20a	41	0.8	ND (0.63)	***0.021***	0.02
J6-2-3_M-29	21	1,400	25.9	0.074 [0.074]	0.074	1.92
J6-2-3_M-29	22	12,383	229.3	0.074 [0.074]	0.074	16.97
J6-2-3_N-10	23	976	18.1	0.120 [0.128]	0.124	2.24
J6-2-3_K/L-27/28	24	1,628	30.1	ND (0.57)	0.57	17.18
J6-2-3_K/L-27/28	25	504	9.3	ND (0.57)	0.57	5.32
J6-2-3_K/L-27/28	26	4,629	85.7	ND (0.57)	0.57	48.87
J6-2-3_K/L-27/28	27	35	0.6	ND (0.57)	0.57	0.36

Table E-1B-7

Parcel J6-2-3
Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-2-3_K-25	28	1,744	32.3	0.21	0.21	6.78
J6-2-10_H-25	29	4,506	83.4	0.089	0.089	7.43
J6-2-3_I-26	30	1,035	19.2	0.063	0.063	1.21
J6-2-3_M-29	31	433	8.0	0.074 [0.074]	0.074	0.59
J6-2-3_K/L-27/28	32	613	11.4	ND (0.57)	0.57	6.47
J6-2-2_J-24	33	2	0.04	0.021	0.021	0.00
J6-2-2_J/K-23/24	34	187	3.46	0.021	0.021	0.07
J6-2-3_K-25	35	22	0.4	0.021	0.021	0.01
Total	--	**55,949**	**1,036**	--	--	**251**
				Volume-Weighted Average (mg/kg)		**0.24**

Table E-1B-7
Parcel J6-2-3
Post-Remediation Conditions

J6-2-3 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	55,949	2,072	501	0.24

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-8

Parcel J6-2-3

Post-Remediation Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-2-3_N-8	0a	369	13.7	58	***0.021***	0.29
J6-2-3_N/O-9	1a	358	13.3	65	***0.021***	0.28
J6-2-3_L/M-7	2	2,857	105.8	ND (0.0086)	0.0086	0.91
J6-2-3_M-8	3	2,736	101.3	0.0145	0.0145	1.47
J6-2-3_L/M-6	4a	315	11.7	73.0	***0.021***	0.25
J6-2-3_N-10	5	976	36.2	0.0408	0.0408	1.48
J6-2-3_O-10	6a	320	11.9	50	***0.021***	0.25
J6-2-2_J-24	7	350	12.9	10.4	10.4	134.64
J6-2-2_J/K-23/24	8	238	8.8	16.0	16.0	140.87
J6-2-3_K-4	9	606	22.5	1.3	1.3	29.19
J6-2-3_K-4	10	4,040	149.6	1.3	1.3	194.50
J6-2-3_K-6	11	19,978	739.9	ND (0.002)	0.002	1.48
J6-2-3_L-5/6	12	510	18.9	2.6	2.6	49.16
J6-2-3_M/N-9	13	1,947	72.1	ND (0.0018) [ND (0.0018)]	0.0018	0.13
J6-2-3_L/M-5	14a	450	16.7	80.0	***0.021***	0.35
J6-2-2_I/J-24	15	12,930	478.9	0.036	0.036	17.24
J6-2-3_J/K-2/3	16	6,969	258.1	ND (0.0079)	0.0079	2.04
Total	--	**55,949**	**2,072**	--	--	**575**
				Volume-Weighted Average (mg/kg)		**0.28**

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-2-3_O-10	0a	365	13.5	78	***0.021***	0.28
J6-2-3_L/M-7	1	15,171	561.9	0.017	0.017	9.55
J6-2-3_N-10	2	3,499	129.6	0.397	0.397	51.45
J6-2-3_J/K-2/3	3	12,752	472.3	ND (0.0081)	0.0081	3.83
J6-2-2_J/K-23/24	4	238	8.8	5.3	5.3	46.66
J6-2-3_K-4	5	16,313	604.2	1.7	1.7	1,027.10
J6-2-2_J-24	6	7,610	281.9	ND (0.049)	0.049	13.81
Total	--	**55,949**	**2,072**	--	--	**1,153**
				Volume-Weighted Average (mg/kg)		**0.56**

Table E-1B-8
Parcel J6-2-3
Post-Remediation Conditions

J6-2-3 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 3-Foot Depth Increment	55,949	4,144	1,727	0.42

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-8

Parcel J6-3-1
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1-SS-4	0	17,839	330.3	ND (0.133)	0.133	43.94
J6-3-1_H-3	1	3,532	65.4	0.032	0.032	2.09
J6-3-1_E/F-3	2	1,538	28.5	2.2	2.2	62.65
J6-3-1_G/H-4/5	3	4,829	89.4	1.24	1.24	110.88
J6-3-1_F-2/3	4	2,277	42.2	1.23	1.23	51.87
J6-3-1_G-2	5	3,331	61.7	3.5	3.5	215.89
J6-3-1-SS-8	6	26,390	488.7	ND (0.128) [ND (0.136)]	0.132	64.51
J6-3-1-SS-9	7	2,877	53.3	4.51	4.51	240.31
J6-3-1_G-8	8	3,267	60.5	0.186	0.186	11.25
J6-3-1_F-4	9	3,551	65.8	0.27	0.27	17.76
J6-3-1_D-4/5	10	1,596	29.5	0.14	0.14	4.14
J6-3-1-SS-7	11	7,289	135.0	0.941	0.941	127.01
J6-3-1_E-4	12	2,090	38.7	0.063	0.063	2.44
F0489601	13	3,802	70.4	0.485	0.485	34.15
J6-3-1-SS-6	14	5,607	103.8	ND (0.153)	0.153	15.89
F0489602	15	1,405	26.0	0.504	0.504	13.11
FL001282	16	2,436	45.1	ND (0.501)	0.501	22.60
J6-3-1-SS-5	17	38,390	710.9	ND (0.135)	0.135	95.97
EA08-G-1	18	2,184	40.4	0.132	0.132	5.34
J6-3-1_F-8	19	1,883	34.9	0.78 [0.79]	0.79	27.38
EA08-G/H-1/2	20	5,132	95.0	0.168	0.168	15.97
J6-3-1_G/H-10	21	1,529	28.3	0.0647	0.0647	1.83
J6-3-1-SB-8	22	830	15.4	0.263	0.263	4.04
J6-3-1_E/F-11/12	23	143	2.6	0.799	0.799	2.11
J6-3-1_F/G-10	24	1,423	26.4	0.923	0.923	24.33
J6-3-1-SB-6	25	866	16.0	52.5	52.5	842.14
J6-3-1_F/G-11	26	591	11.0	0.612	0.612	6.70
FL001836	27	462	8.6	55.0	55.0	470.93
FL001836	27A	104	1.9	55.0	55.0	106.27
EA08-G-2	28	1,110	20.6	0.131	0.131	2.69
J6-3-1-SB-7	29	1,092	20.2	0.792	0.792	16.02
FL001837	30	265	4.9	46.0	46.0	225.95
FL001837	30A	80	1.5	46.0	46.0	67.73
FL001837	30B	74	1.4	46.0	46.0	62.63
FL001837	30C	50	0.9	46.0	46.0	42.26
J6-3-1_F/G-11/12	31a	372	6.9	7.48	7.48	51.48
EA08-F/G-2	32	910	16.9	15.0	15.0	252.76

Table E-1B-8

Parcel J6-3-1
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
EA08-F-2	33	236	4.4	3.99 [3.94]	3.97	17.36
EA08-F-2	33a	34	0.6	3.99 [3.94]	3.97	2.49
J6-3-1_F/G-1/2	34	1,526	28.3	4.1	4.1	115.88
J6-3-1_E-5	35	4,772	88.4	0.16	0.16	14.14
J6-3-1_D-6	36	2,172	40.2	0.17	0.17	6.84
J6-3-1_C-6	37	1,335	24.7	0.99	0.99	24.48
F0489607	38	20	0.4	16.7	16.7	6.16
F0489607	38A	33	0.6	16.7	16.7	10.13
F0489607	38AA	49	0.9	16.7	16.7	15.02
J6-3-1_C/D-5	39	1,625	30.1	0.17	0.17	5.11
J6-3-1-SS-1	40	4,328	80.1	0.45 [0.449]	0.45	36.02
J6-3-1-SS-2	41	917	17.0	1.46	1.46	24.80
J6-3-1_D-7	42	1,994	36.9	0.61/0.62	0.62	22.71
J6-3-1-SB-1	43	1,155	21.4	5.96	5.96	127.45
J6-3-1_B/C-6	44	454	8.4	1.44	1.44	12.12
J6-3-1-SB-13	45	667	12.4	70.0	70.0	865.01
J6-3-1_C-7	46	1,304	24.1	7.4	7.4	178.71
J6-3-1_D-8	47	659	12.2	8.0	8.0	97.70
F0489603	48	1,139	21.1	0.502	0.502	10.59
F0489604	49	410	7.6	5.42	5.42	41.18
J6-3-1-SB-3	50	2,251	41.7	ND (0.135)	0.135	5.63
J6-3-1-SS-3	51	2,157	39.9	8.1	8.1	323.56
F0489605	52	458	8.5	9.89	9.89	83.93
J6-3-1-SB-9	53	830	15.4	2.85	2.85	43.83
J6-3-1-SB-2	54	1,075	19.9	3.57	3.57	71.04
J6-3-1-SB-2	54a	74	1.4	3.57	3.57	4.89
J6-3-1-SB-14	55	17	0.3	18.2	18.2	5.74
J6-3-1-SB-14	55A	235	4.4	18.2	18.2	79.29
F0489606	56	681	12.6	10.9	10.9	137.46
F0489606	56A	846	15.7	10.9	10.9	170.86
J6-3-1-SB-4	57	1,178	21.8	1.28	1.28	27.91
J6-3-1_E-8	58	1,208	22.4	0.24	0.24	5.37
J6-3-1_D/E-10	59	1,525	28.2	0.597	0.597	16.86
FL001281	60	696	12.9	16.6	16.6	214.04
FL001281	60A	65	1.2	16.6	16.6	19.98
J6-3-1_B/C-8	61	1,211	22.4	1.6	1.6	35.90
J6-3-1_A/B-8	62	408	7.6	3.6	3.6	27.23

Table E-1B-8

Parcel J6-3-1
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_C-9	63	1,584	29.3	5.0/2.5	3.8	109.98
J6-3-1_B/C-10	64a	523	9.7	4.5	4.5	43.61
J6-3-1_B-9	65	1,196	22.1	38.0	38.0	841.45
BS000147	66	21	0.4	30.7	30.7	12.19
BS000147	66A	108	2.0	30.7	30.7	61.31
J6-3-1_C-8	67	785	14.5	8.7 [5.9]	7.3	106.08
J6-3-1_A/B-9	68a	854	15.8	9.3	9.3	147.13
J6-3-1-SB-15	69	272	5.0	38.2	38.2	192.23
J6-3-1-SB-15	69A	128	2.4	38.2	38.2	90.21
J6-3-1_E/F-11	70	381	7.1	2.28	2.28	16.10
J6-3-1_E/F-10	71	1,827	33.8	0.672	0.672	22.74
J6-3-1_C/D-10	72	900	16.7	18.3	18.3	304.94
J6-3-1_C/D-10	72A	50	0.9	18.3	18.3	16.96
FL001834	73	263	4.9	120.0	120.0	585.08
FL001834	73A	352	6.5	120.0	120.0	783.22
J6-3-1_C/D-10/11	74	355	6.6	1.59	1.59	10.45
J6-3-1_C-9/10	75	917	17.0	6.4	6.4	108.74
J6-3-1_B-7	76a	961	17.8	2.7 [3.5]	3.1	55.18
J6-3-1-SB-5	77	2,820	52.2	0.127	0.127	6.63
J6-3-1_D/E-11	78	623	11.5	2.31	2.31	26.63
J6-3-1_B-9/10	79a	675	12.5	5.0	5.0	62.54
FL001835	80	999	18.5	26.0	26.0	481.21
FL001280	81	1,096	20.3	4.4	4.4	89.28
EA08-E-2	82	61	1.1	8.96	8.96	10.06
EA08-E-2	82A	157	2.9	8.96	8.96	26.13
EA08-E-2	82Aa	120	2.2	8.96	8.96	19.94
Total	**--**	**208,920**	**3,869**	**--**	**--**	**10,502**
				Volume-Weighted Average (mg/kg)		**2.71**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1-SS-4	0	17,839	330.3	ND (0.126)	0.126	41.62
J6-3-1_H-3	1	3,532	65.4	0.032	0.032	2.09
J6-3-1_D-4/5	2	1,596	29.5	0.14	0.14	4.14

Table E-1B-8

Parcel J6-3-1
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_G/H-4/5	3	4,829	89.4	1.24	1.24	110.88
J6-3-1_G-2	4	3,331	61.7	3.5	3.5	215.89
J6-3-1-SS-8	5	26,390	488.7	ND (0.12)	0.12	58.64
J6-3-1-SS-9	6	2,877	53.3	1.15	1.15	61.28
J6-3-1-SS-7	7	7,470	138.3	ND (0.127)	0.127	17.57
J6-3-1_G-8	8	3,722	68.9	0.186	0.186	12.82
J6-3-1_E/F-3	9	1,538	28.5	2.2	2.2	62.65
J6-3-1_F-2/3	10	2,277	42.2	1.23	1.23	51.87
J6-3-1_F-4	11	3,551	65.8	0.27	0.27	17.76
J6-3-1-SS-6	12	6,457	119.6	ND (0.135)	0.135	16.14
J6-3-1_E-4	13	2,090	38.7	0.063	0.063	2.44
F0489602	14	2,181	40.4	0.85	0.85	34.33
FL001282	15	2,436	45.1	2.03	2.03	91.56
J6-3-1-SB-8	16	830	15.4	ND (0.12)	0.12	1.84
J6-3-1_G/H-10	17	1,529	28.3	0.0647	0.0647	1.83
J6-3-1_F-8	18	2,762	51.1	0.78 [0.79]	0.79	40.15
J6-3-1-SS-5	19	38,390	710.9	ND (0.136)	0.136	96.69
EA08-G/H-1/2	20	5,132	95.0	0.0671	0.0671	6.38
J6-3-1-SB-7	21	1,092	20.2	3.35 [2.79]	3.07	62.08
J6-3-1_E/F-11/12	22	143	2.6	0.799	0.799	2.11
J6-3-1_F/G-10	23	1,423	26.4	0.923	0.923	24.33
EA08-G-1	24	2,184	40.4	0.125	0.125	5.05
EA08-F/G-2	25	983	18.2	16.4	16.4	298.68
EA08-G-2	26	1,110	20.6	0.24	0.24	4.93
J6-3-1_F/G-11	27	591	11.0	0.612	0.612	6.70
J6-3-1_F/G-11	27A	77	1.4	0.612	0.612	0.87
J6-3-1_F/G-11/12	28A	372	6.9	7.48	7.48	51.48
J6-3-1_F/G-11/12	28B	18	0.3	7.48	7.48	2.46
J6-3-1-SB-6	29	1,050	19.4	22.1	22.1	429.74
EA08-F-2	30	236	4.4	8.45	8.45	37.00
EA08-F-2	30A	178	3.3	8.45	8.45	27.90
EA08-F-2	30B	32	0.6	8.45	8.45	4.99
EA08-F-2	30C	34	0.6	8.45	8.45	5.30
J6-3-1_F/G-1/2	31	1,526	28.3	4.1	4.1	115.88
J6-3-1_E-5	32	4,772	88.4	0.16	0.16	14.14
J6-3-1_D-6	33	2,172	40.2	0.17	0.17	6.84
J6-3-1_C-6	34	1,335	24.7	0.99	0.99	24.48

Table E-1B-8

Parcel J6-3-1
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1-SB-13	35	667	12.4	90.5	90.5	1,118.34
J6-3-1_C/D-5	36	1,625	30.1	0.17	0.17	5.11
J6-3-1-SS-1	37	4,989	92.4	0.15	0.15	13.86
J6-3-1_D-7	38	2,057	38.1	0.61/0.62	0.62	23.42
J6-3-1_B-7	39A	961	17.8	2.7 [3.5]	3.1	55.18
J6-3-1_B/C-6	40	454	8.4	1.44	1.44	12.12
J6-3-1_D-8	41	765	14.2	8.0	8.0	113.37
J6-3-1-SS-2	42	1,443	26.7	0.254	0.254	6.79
F0489604	43	549	10.2	8.75	8.75	88.96
J6-3-1-SB-9	44	832	15.4	2.68 [2.78]	2.73	42.06
J6-3-1-SB-3	45	2,254	41.7	ND (0.124)	0.124	5.18
J6-3-1-SS-3	46	2,157	39.9	7.25	7.25	289.60
J6-3-1_C-7	47	1,304	24.1	7.4	7.4	178.71
J6-3-1-SB-2	48	1,075	19.9	0.181	0.181	3.60
J6-3-1-SB-2	48A	74	1.4	0.181	0.181	0.25
J6-3-1-SB-1	49	1,358	25.1	0.136	0.136	3.42
J6-3-1-SB-14	50	50	0.9	13.2	13.2	12.17
J6-3-1-SB-14	50A	284	5.3	13.2	13.2	69.38
F0489606	51	489	9.1	26.8	26.8	242.81
F0489606	51A	846	15.7	26.8	26.8	420.10
F0489606	51B	125	2.3	26.8	26.8	62.16
F0489606	51C	67	1.2	26.8	26.8	33.05
J6-3-1-SB-4	52	1,178	21.8	ND (0.118) [ND (0.122)]	0.120	2.62
J6-3-1_E-8	53	1,510	28.0	0.24	0.24	6.71
J6-3-1_D/E-10	54	1,525	28.2	0.597	0.597	16.86
J6-3-1_D/E-10	54A	1	0.02	0.597	0.597	0.01
J6-3-1_D/E-10	54B	5	0.09	0.597	0.597	0.05
FL001281	55	696	12.89	30.9	30.9	398.43
FL001281	55A	29	0.5	30.9	30.9	16.46
FL001281	55B	36	0.7	30.9	30.9	20.73
J6-3-1_B/C-8	56	1,287	23.8	1.6	1.6	38.13
J6-3-1_A/B-8	57	408	7.6	3.6	3.6	27.23
J6-3-1_C-9	58	1,584	29.3	5.0/2.5	3.8	109.98
J6-3-1_B/C-10	59A	523	9.7	4.5	4.5	43.61
J6-3-1_B-9	60	1,196	22.1	38.0	38.0	841.45
J6-3-1_C-8	61	963	17.8	8.7 [5.9]	7.3	130.18
BS000147	62	21	0.4	16.6	16.6	6.59

Table E-1B-8

Parcel J6-3-1
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
BS000147	62A	108	2.0	16.6	16.6	33.15
J6-3-1-SB-15	63	272	5.0	35.5	35.5	178.64
J6-3-1-SB-15	63A	128	2.4	35.5	35.5	83.83
J6-3-1_E/F-11	64	381	7.1	2.28	2.28	16.10
J6-3-1_E/F-11	64A	381	7.1	2.28	2.28	16.08
J6-3-1_E/F-11	64B	10	0.2	2.28	2.28	0.43
J6-3-1_E/F-10	65	1,827	33.8	0.672	0.672	22.74
EA08-E-2	66	61	1.1	6.58	6.58	7.38
EA08-E-2	66A	38	0.7	6.58	6.58	4.58
EA08-E-2	66B	157	2.9	6.58	6.58	19.19
EA08-E-2	66C	120	2.2	6.58	6.58	14.64
J6-3-1_C-9/10	67	917	17.0	6.4	6.4	108.74
J6-3-1_A/B-9	68A	854	15.8	9.3	9.3	147.13
J6-3-1_A/B-9	68B	20	0.4	9.3	9.3	3.43
J6-3-1-SB-5	69	2,820	52.2	ND (0.114)	0.114	5.95
J6-3-1_C/D-10	70	900	16.7	18.3	18.3	304.95
J6-3-1_C/D-10	70A	50	0.9	18.3	18.3	16.96
J6-3-1_C/D-10	70B	352	6.5	18.3	18.3	119.44
J6-3-1_D/E-11	71	622	11.5	2.31	2.31	26.63
J6-3-1_D/E-11	71A	14	0.3	2.31	2.31	0.60
J6-3-1_D/E-11	71B	3	0.06	2.31	2.31	0.13
EA08-E/F-2	72	2	0.04	2.9	2.9	0.12
EA08-E/F-2	72A	13	0.2	2.9	2.9	0.72
EA08-E/F-2	72B	991	18.4	2.9	2.9	53.24
FL001280	73	1,096	20.3	ND (0.501)	0.501	10.17
FL001280	73A	67	1.2	ND (0.501)	0.501	0.63
FL001280	73B	0.3	0.006	ND (0.501)	0.501	0.00
J6-3-1_B-9/10	74A	675	12.507	5.0	5.0	62.54
J6-3-1_C/D-10/11	75	353	6.536	1.59	1.59	10.39
J6-3-1_C/D-10/11	75A	211	3.912	1.59	1.59	6.22
Total	**--**	**208,920**	**3,869**	**--**	**--**	**7,807**
				Volume-Weighted Average (mg/kg)		**2.02**

Table E-1B-8
Parcel J6-3-1
Existing Conditions

J6-3-1 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	208,920	7,738	18,309	2.37

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-9

Parcel J6-3-1
Existing Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_H-3	0	46,717	1730.263	0.056	0.056	96.89
J6-3-1_E/F-3	1	1,538	56.958	2.8	2.8	159.48
J6-3-1_F-2/3	2	2,277	84.337	3.9	3.9	328.92
J6-3-1_G-2	3	3,350	124.087	1.47	1.47	182.41
J6-3-1-SB-12	4	2,877	106.567	0.3125	0.3125	33.30
J6-3-1_F-8	5	5,994	222.018	0.29	0.29	64.39
J6-3-1_F-4	6	3,551	131.530	0.089	0.089	11.71
J6-3-1_D-4/5	7	1,596	59.100	ND (0.031)	0.031	1.83
J6-3-1_G/H-4/5	8	18,075	669.438	0.069	0.069	46.19
J6-3-1_G/H-4/5	9	0.5	0.02	0.069	0.069	0.00
J6-3-1_E-5	10	7,177	265.83	0.031	0.031	8.24
J6-3-1_E-8	11	1,510	55.93	0.055	0.055	3.08
J6-3-1_E-4	12	2,090	77.42	ND (0.026)	0.026	2.01
J6-3-1_G-8	13	43,873	1624.91	ND (0.024)	0.024	39.00
J6-3-1_G-8	14	52	1.92	ND (0.024)	0.024	0.05
J6-3-1_F/G-11	15	1,717	63.59	0.994	0.994	63.21
J6-3-1-SB-8	16	6,329	234.42	0.522	0.522	122.37
J6-3-1-SB-7	17	6,250	231.46	ND (0.136)	0.136	31.36
J6-3-1_E/F-11/12	18	384	14.24	0.781	0.781	11.12
J6-3-1_E/F-10	19	2,995	110.94	0.0252	0.0252	2.80
J6-3-1-SB-3	20	3,822	141.57	ND (0.126)	0.126	17.77
J6-3-1-SB-4	21	1,312	48.60	ND (0.119)	0.119	5.76
J6-3-1-SB-6	22	1,626	60.22	5.628	5.628	338.89
J6-3-1_E/F-11	23	957	35.44	6.81	6.81	241.32
J6-3-1_F/G-11/12	24a	458	16.97	7.01	7.01	118.95
J6-3-1-SB-13	25a	667	24.71	76.45	76.45	1,889.43
J6-3-1_C/D-5	26	1,625	60.18	0.15	0.15	9.03
J6-3-1_D-6	27	2,172	80.44	ND (0.028)	0.028	2.25
J6-3-1_B-7	28a	1,086	40.24	6.0	6.0	241.43
J6-3-1_F/G-1/2	29	1,526	56.53	1.56	1.56	88.18
J6-3-1-SB-10	30	2,975	110.18	ND (0.117)	0.117	12.89
J6-3-1_D-8	31	861	31.88	3.3	3.3	105.21
J6-3-1_D-7	32	2,060	76.29	0.24	0.24	18.31
J6-3-1-SB-1	33	1,358	50.29	0.1975	0.1975	9.93
J6-3-1_C-7	34	1,304	48.30	0.85	0.85	41.05
J6-3-1_C-6	35	1,335	49.46	ND (0.027)	0.027	1.34
J6-3-1_C-8	36	963	35.66	5.7	5.7	203.29

Table E-1B-9

Parcel J6-3-1
Existing Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_B/C-8	37	1,776	65.78	0.2	0.2	13.16
J6-3-1_B/C-6	38	454	16.83	0.44	0.44	7.40
J6-3-1-SB-14	39a	50	1.84	107.2	107.2	197.53
J6-3-1-SB-14	39Aa	284	10.51	107.2	107.2	1,126.29
J6-3-1_D/E-10	40	2,381	88.17	0.0249	0.0249	2.20
J6-3-1-SB-9	41	1,272	47.11	0.475	0.475	22.37
J6-3-1-SB-2	42	1,075	39.80	ND (0.119)	0.119	4.74
J6-3-1-SB-2	42a	74	2.74	ND (0.119)	0.119	0.33
J6-3-1-SB-11	43	2,157	79.89	4.004	4.004	319.84
J6-3-1-SB-15	44a	272	10.06	115.8	115.8	1,164.95
J6-3-1-SB-15	44Aa	128	4.72	115.8	115.8	546.66
J6-3-1_A/B-8	45	1,255	46.48	21.0	21.0	975.99
J6-3-1_D/E-11	46	1,129	41.81	2.51	2.51	104.94
J6-3-1_C/D-10	47	1,688	62.52	16.9	16.9	1,056.63
J6-3-1_C/D-10	47A	236	8.75	16.9	16.9	147.89
J6-3-1_C-9/10	48	1,216	45.03	44.0	44.0	1,981.25
J6-3-1_A/B-9	49a	885	32.79	13.3	13.3	436.16
J6-3-1_B-9	50a	1,251	46.34	47.0	47.0	2,177.91
J6-3-1_C-9	51	1,645	60.93	0.26	0.26	15.84
J6-3-1-SB-5	52	2,850	105.55	ND (0.124)	0.124	13.04
J6-3-1_B-9/10	53a	697	25.81	46.0	46.0	1,187.22
J6-3-1_B/C-10	54a	788	29.17	22.0	22.0	641.70
J6-3-1_C/D-10/11	55	898	33.24	1.1	1.1	36.57
Total	--	**208,920**	**7,738**	--	--	**16,734**
				Volume-Weighted Average (mg/kg)		**2.16**

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_H-3	0	46,717	1730.26	ND (0.024)	0.024	41.53
J6-3-1_F/G-1/2	1	1,526	56.53	5.3	5.3	299.59
J6-3-1_G/H-4/5	2	18,075	669.44	ND (0.025) [ND (0.024)]	0.025	16.74
J6-3-1_G/H-4/5	3	0.5	0.02	ND (0.025) [ND (0.024)]	0.025	0.00
J6-3-1-SB-12	4	2,877	106.57	ND (0.144) [0.197]	0.171	18.17
J6-3-1_G-2	5	3,350	124.09	0.037	0.037	4.59

Table E-1B-9

Parcel J6-3-1
Existing Conditions

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_F-4	6	3,551	131.53	ND (0.025) [ND (0.024)]	0.025	3.29
J6-3-1_F-2/3	7	2,277	84.34	3.2	3.2	269.88
J6-3-1_E-4	8	2,090	77.42	ND (0.024)	0.024	1.86
J6-3-1-SB-10	9	4,123	152.69	ND (0.119)	0.119	18.17
J6-3-1_E/F-3	10	1,538	56.96	6.8	6.8	387.32
J6-3-1_F-8	11	6,421	237.83	0.64	0.64	152.21
J6-3-1_G-8	12	50,315	1863.51	ND (0.023)	0.023	42.86
J6-3-1_G-8	13	52	1.92	ND (0.023)	0.023	0.04
J6-3-1_F/G-11	14	6,681	247.45	0.942	0.942	233.09
J6-3-1_E/F-11/12	15	384	14.24	1.06	1.06	15.09
J6-3-1_E-8	16	2,667	98.79	0.088	0.088	8.69
J6-3-1_E/F-11	17	1,812	67.12	31.5	31.5	2,114.33
J6-3-1_C/D-5	18	1,625	60.18	ND (0.026)	0.026	1.56
J6-3-1_E/F-10	19	5,739	212.57	0.039	0.039	8.29
J6-3-1_F/G-11/12	20a	458	16.97	25.7	25.7	436.09
J6-3-1_D-6	21	3,008	111.42	ND (0.026)	0.026	2.90
J6-3-1-SB-13	22	667	24.71	11.1	11.1	274.21
J6-3-1_D-4/5	23	1,596	59.10	ND (0.026)	0.026	1.54
J6-3-1_B-7	24a	1,087	40.26	88.0	88.0	3,542.65
J6-3-1_C-6	25	1,335	49.46	ND (0.026)	0.026	1.29
J6-3-1_E-5	26	8,269	306.25	ND (0.025)	0.025	7.66
J6-3-1_C-8	27	1,755	64.98	0.026	0.026	1.69
J6-3-1_B/C-8	28	2,051	75.95	ND (0.026)	0.026	1.97
J6-3-1_B/C-6	29	454	16.83	ND (0.024)	0.024	0.40
J6-3-1_C-7	30	1,823	67.53	ND (0.027)	0.027	1.82
J6-3-1_D-7	31	3,515	130.17	0.026	0.026	3.38
J6-3-1-SB-14	32a	50	1.84	74.3	74.3	136.97
J6-3-1-SB-14	32Aa	284	10.51	74.3	74.3	780.99
J6-3-1_D/E-11	33	1,129	41.81	2.05	2.05	85.71
J6-3-1_D-8	34	1,705	63.14	0.53	0.53	33.46
J6-3-1-SB-11	35	2,443	90.47	5.7	5.7	515.70
J6-3-1-SB-15	36a	272	10.06	92.65	92.65	932.46
J6-3-1-SB-15	36Aa	128	4.72	92.65	92.65	437.57
J6-3-1_B-9	37a	1,325	49.08	120.0	120.0	5,889.34
J6-3-1_A/B-8	38	1,255	46.48	8.7	8.7	404.34
J6-3-1_C-9	39	2,392	88.59	0.05	0.05	4.43
J6-3-1_B-9/10	40a	697	25.81	83.0 [109.0]	96.0	2,477.68

Table E-1B-9

Parcel J6-3-1
Existing Conditions

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_C/D-10	41	1,688	62.52	14.7	14.7	919.08
J6-3-1_C/D-10	41A	236	8.75	14.7	14.7	128.64
J6-3-1_C-9/10	42	1,218	45.11	26.0	26.0	1,172.82
J6-3-1_A/B-9	43a	885	32.79	75.0 [71.0]	73.0	2,393.97
J6-3-1_B/C-10	44a	788	29.17	69.0	69.0	2,012.61
J6-3-1_D/E-10	45	3,689	136.62	ND (0.0017)	0.0017	0.23
J6-3-1_C/D-10/11	46	898	33.24	0.97	0.97	32.24
Total	--	**208,920**	**7,738**	--	--	**26,271**
				Volume-Weighted Average (mg/kg)		**3.40**

3- to 4-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_G/H-4/5	0	18,638	690.31	ND (0.025) [ND (0.024)]	0.025	16.91
J6-3-1_G/H-4/5	1	0.5	0.02	ND (0.025) [ND (0.024)]	0.025	0.00
J6-3-1_F-2/3	2	3,331	123.36	3.2	3.2	394.74
J6-3-1_G-2	3	3,550	131.49	0.037	0.037	4.87
J6-3-1_H-3	4	47,486	1758.75	ND (0.024)	0.024	42.21
J6-3-1_E-4	5	2,090	77.42	ND (0.024)	0.024	1.86
J6-3-1_E/F-3	6	1,541	57.06	6.8	6.8	388.01
J6-3-1_F-4	7	3,840	142.22	ND (0.025) [ND (0.024)]	0.025	3.48
J6-3-1_C/D-5	8	1,625	60.18	ND (0.026)	0.026	1.56
J6-3-1_F/G-1/2	9	1,526	56.53	5.3	5.3	299.59
J6-3-1_F-8	10	7,463	276.41	0.64	0.64	176.90
J6-3-1_G-8	11	50,315	1863.51	ND (0.023)	0.023	42.86
J6-3-1_G-8	12	52	1.92	ND (0.023)	0.023	0.04
J6-3-1_F/G-11	13	6,681	247.45	0.016	0.016	3.96
J6-3-1_E/F-11/12	14	384	14.24	2.99	2.99	42.56
J6-3-1_E-8	15	4,962	183.76	0.088	0.088	16.17
J6-3-1_E/F-11	16	1,812	67.12	42.6	42.6	2,859.38
J6-3-1_E/F-10	17	5,739	212.57	0.0407	0.0407	8.65
J6-3-1_F/G-11/12	18A	458	16.97	55.8	55.8	946.84
J6-3-1_D-6	19	3,008	111.42	ND (0.026)	0.026	2.90
J6-3-1-SB-13	20	667	24.71	0.794	0.794	19.62
J6-3-1_D-4/5	21	1,596	59.10	ND (0.026)	0.026	1.54

Table E-1B-9

Parcel J6-3-1
Existing Conditions

3- to 4-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_B-7	22A	1,087	40.26	88.0	88.0	3,542.65
J6-3-1_E-5	23	8,579	317.72	ND (0.025)	0.025	7.94
J6-3-1_C-8	24	1,792	66.37	0.026	0.026	1.73
J6-3-1_C-7	25	1,823	67.53	ND (0.027)	0.027	1.82
J6-3-1_C-6	26	1,335	49.46	ND (0.026)	0.026	1.29
J6-3-1_B/C-8	27	2,051	75.95	ND (0.026)	0.026	1.97
J6-3-1-SB-14	28	50	1.84	47.05	47.05	86.74
J6-3-1-SB-14	28A	284	10.51	47.05	47.05	494.56
J6-3-1_B/C-6	29	454	16.83	ND (0.024)	0.024	0.40
J6-3-1_D/E-11	30	1,129	41.81	5.47	5.47	228.69
J6-3-1_B-9	31A	1,325	49.08	120.0	120.0	5,889.34
J6-3-1_D/E-10	32	3,859	142.92	0.0433	0.0433	6.19
J6-3-1_C-9	33	2,868	106.23	0.05	0.05	5.31
J6-3-1-SB-15	34	272	10.06	20.0	20.0	201.29
J6-3-1-SB-15	34A	128	4.72	20.0	20.0	94.46
J6-3-1_B-9/10	35A	697	25.81	83.0 [109.0]	96.0	2,477.68
J6-3-1_A/B-8	36	1,255	46.48	8.7	8.7	404.34
J6-3-1_D-8	37	3,300	122.23	0.53	0.53	64.78
J6-3-1_D-7	38	4,155	153.88	0.026	0.026	4.00
J6-3-1_C/D-10	39	1,688	62.52	0.153	0.153	9.57
J6-3-1_C/D-10	39A	236	8.75	0.153	0.153	1.34
J6-3-1_C-9/10	40	1,218	45.11	26.0	26.0	1,172.82
J6-3-1_A/B-9	41A	885	32.79	75.0 [71.0]	73.0	2,393.97
J6-3-1_B/C-10	42A	788	29.17	69.0	69.0	2,012.61
J6-3-1_C/D-10/11	43	898	33.24	1.64	1.64	54.52
Total	--	**208,920**	**7,738**	--	--	**24,435**
				Volume-Weighted Average (mg/kg)		**3.16**

4- to 5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_D-4/5	0	1,596	59.10	ND (0.025)	0.025	1.48
J6-3-1_G/H-4/5	1	18,638	690.31	ND (0.023)	0.023	15.88
J6-3-1_G/H-4/5	2	0.5	0.02	ND (0.023)	0.023	0.00
J6-3-1_G-2	3	3,550	131.49	ND (0.027)	0.027	3.55

Table E-1B-9

Parcel J6-3-1
Existing Conditions

4- to 5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_F-4	4	3,840	142.22	ND (0.13)	0.13	18.49
J6-3-1_E/F-3	5	1,541	57.06	0.27	0.27	15.41
J6-3-1_F-2/3	6	3,331	123.36	0.28	0.28	34.54
J6-3-1_H-3	7	47,486	1758.75	0.033	0.033	58.04
J6-3-1_E-4	8	2,090	77.42	ND (0.024)	0.024	1.86
J6-3-1_F-8	9	7,463	276.41	ND (0.026)	0.026	7.19
J6-3-1_G-8	10	50,315	1863.51	ND (0.024)	0.024	44.72
J6-3-1_G-8	11	52	1.92	ND (0.024)	0.024	0.05
J6-3-1_F/G-11	12	6,681	247.45	ND (0.0017)	0.0017	0.42
J6-3-1_E/F-11/12	13	384	14.24	1.11	1.11	15.80
J6-3-1_E/F-10	14	5,739	212.57	ND (0.0019)	0.0019	0.40
J6-3-1_D/E-10	15	3,973	147.16	ND (0.0019)	0.0019	0.28
J6-3-1_F/G-11/12	16	458	16.97	31.9	31.9	541.29
J6-3-1_E/F-11	17	1,812	67.12	111	111	7,450.49
J6-3-1_F/G-1/2	18	1,526	56.53	7.2	7.2	406.99
J6-3-1_D-6	19	3,008	111.42	ND (0.026)	0.026	2.90
J6-3-1_C-6	20	1,342	49.71	ND (0.026)	0.026	1.29
J6-3-1_B-7	21	1,309	48.47	96.0	96.0	4,652.98
J6-3-1_C/D-5	22	1,625	60.18	ND (0.026)	0.026	1.56
J6-3-1_E-5	23	8,579	317.72	ND (0.025)	0.025	7.94
J6-3-1_D-8	24	3,300	122.23	0.59	0.59	72.12
J6-3-1_B/C-6	25	551	20.41	ND (0.024)	0.024	0.49
J6-3-1_C-7	26	2,165	80.20	ND (0.024)	0.024	1.92
J6-3-1_C-8	27	1,792	66.37	ND (0.025)	0.025	1.66
J6-3-1_A/B-8	28	1,539	56.99	150.0	150.0	8,548.07
J6-3-1_B/C-8	29	2,051	75.95	0.026	0.026	1.97
J6-3-1_C-9	30	3,054	113.11	ND (0.024)	0.024	2.71
J6-3-1_B-9/10	31	824	30.53	150.0	150.0	4,579.79
J6-3-1_D-7	32	4,155	153.88	ND (0.024)	0.024	3.69
J6-3-1_D/E-11	33	1,129	41.81	1.84	1.84	76.93
J6-3-1_E-8	34	4,962	183.76	0.52	0.52	95.56
J6-3-1_B-9	35	1,409	52.19	43.0	43.0	2,244.15
J6-3-1_C/D-10/11	36	1,784	66.09	1.34	1.34	88.56
J6-3-1_C-9/10	37	1,719	63.67	ND (0.034)	0.034	2.16
J6-3-1_A/B-9	38	1,123	41.59	25.0	25.0	1,039.75
J6-3-1_B/C-10	39	1,024	37.92	150.0	150.0	5,687.84

Table E-1B-9

Parcel J6-3-1
Existing Conditions

4- to 5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
Total	--	**208,920**	**7,738**	--	--	**35,731**
				Volume-Weighted Average (mg/kg)		**4.62**

5- to 6-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_D-4/5	0	1,596	59.10	ND (0.025)	0.025	1.48
J6-3-1_G/H-4/5	1	18,638	690.31	ND (0.023)	0.023	15.88
J6-3-1_G/H-4/5	2	0.5	0.02	ND (0.023)	0.023	0.00
J6-3-1_G-2	3	3,550	131.49	ND (0.027)	0.027	3.55
J6-3-1_F-4	4	3,840	142.22	ND (0.13)	0.13	18.49
J6-3-1_E/F-3	5	1,541	57.06	0.27	0.27	15.41
J6-3-1_F-2/3	6	3,331	123.36	0.28	0.28	34.54
J6-3-1_H-3	7	47,486	1758.75	0.033	0.033	58.04
J6-3-1_E-4	8	2,090	77.42	ND (0.024)	0.024	1.86
J6-3-1_F/G-11	9	7,113	263.45	ND (0.0019)	0.0019	0.50
J6-3-1_F-8	10	7,463	276.41	ND (0.026)	0.026	7.19
J6-3-1_G-8	11	50,315	1863.51	ND (0.024)	0.024	44.72
J6-3-1_G-8	12	52	1.92	ND (0.024)	0.024	0.05
J6-3-1_E/F-11/12	13	410	15.20	1.58	1.58	24.02
J6-3-1_E/F-10	14	5,739	212.57	ND (0.0019)	0.0019	0.40
J6-3-1_D/E-10	15	3,973	147.16	ND (0.0019)	0.0019	0.28
J6-3-1_E/F-11	16	1,812	67.12	ND (0.0022)	0.0022	0.15
J6-3-1_F/G-1/2	17	1,526	56.53	7.2	7.2	406.99
J6-3-1_D-6	18	3,008	111.42	ND (0.026)	0.026	2.90
J6-3-1_C-6	19	1,342	49.71	ND (0.026)	0.026	1.29
J6-3-1_B-7	20	1,309	48.47	96.0	96.0	4,652.98
J6-3-1_C/D-5	21	1,625	60.18	ND (0.026)	0.026	1.56
J6-3-1_E-5	22	8,579	317.72	ND (0.025)	0.025	7.94
J6-3-1_D-8	23	3,300	122.23	0.59	0.59	72.12
J6-3-1_B/C-6	24	551	20.41	ND (0.024)	0.024	0.49
J6-3-1_C-7	25	2,165	80.20	ND (0.024)	0.024	1.92
J6-3-1_C-8	26	1,792	66.37	ND (0.025)	0.025	1.66
J6-3-1_A/B-8	27	1,539	56.99	150.0	150.0	8,548.07
J6-3-1_B/C-8	28	2,051	75.95	0.026	0.026	1.97

Table E-1B-9

Parcel J6-3-1
Existing Conditions

5- to 6-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_C-9	29	3,054	113.11	ND (0.024)	0.024	2.71
J6-3-1_B-9/10	30	824	30.53	150.0	150.0	4,579.79
J6-3-1_D-7	31	4,155	153.88	ND (0.024)	0.024	3.69
J6-3-1_D/E-11	32	1,129	41.81	3.34	3.34	139.64
J6-3-1_E-8	33	4,962	183.76	0.52	0.52	95.56
J6-3-1_B-9	34	1,409	52.19	43.0	43.0	2,244.15
J6-3-1_C/D-10/11	35	1,784	66.09	1.42	1.42	93.85
J6-3-1_C-9/10	36	1,719	63.67	ND (0.034)	0.034	2.16
J6-3-1_A/B-9	37	1,123	41.59	25.0	25.0	1,039.75
J6-3-1_B/C-10	38	1,024	37.92	150.0	150.0	5,687.84
Total	--	**208,920**	**7,738**	--	--	**27,816**
				Volume-Weighted Average (mg/kg)		**3.59**

6- to 7-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_F/G-1/2	0	1,526	56.53	7.1	7.1	401.34
J6-3-1_E/F-10	1	39,688	1469.94	ND (0.0019)	0.0019	2.79
J6-3-1_C-6	2	14,311	530.02	0.065	0.065	34.45
J6-3-1_G-2	3	62,374	2310.16	ND (0.028)	0.028	64.68
J6-3-1_F-2/3	4	10,082	373.40	ND (0.028)	0.028	10.46
J6-3-1_D/E-11	5	2,030	75.19	3.66	3.66	275.21
J6-3-1_C/D-10/11	6	2,498	92.51	5.06	5.06	468.09
J6-3-1_F/G-11	7	29,221	1082.26	ND (0.0019)	0.0019	2.06
J6-3-1_E/F-11	8	2,232	82.68	5.07	5.07	419.16
J6-3-1_B-7	9	1,318	48.82	5.2 [1.1]	3.2	153.77
J6-3-1_C-9	10	7,301	270.42	0.044	0.044	11.90
J6-3-1_C-7	11	6,112	226.36	ND (0.025)	0.025	5.66
J6-3-1_E/F-3	12	18,680	691.87	ND (0.023)	0.023	15.91
J6-3-1_B/C-8	13	3,908	144.75	ND (0.028)	0.028	4.05
J6-3-1_A/B-9	14	1,123	41.59	42.0	42.0	1,746.79
J6-3-1_C-9/10	15	1,719	63.67	ND (0.027)	0.027	1.72
J6-3-1_A/B-8	16	1,539	56.99	26.0	26.0	1,481.67
J6-3-1_B-9	17	1,409	52.19	11.0	11.0	574.09
J6-3-1_B-9/10	18	824	30.53	24.8	24.8	757.19

Table E-1B-9
Parcel J6-3-1
Existing Conditions

6- to 7-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_B/C-10	19	1,024	37.92	29.0	29.0	1,099.66
Total	--	**208,920**	**7,738**	--	--	**7,531**
				Volume-Weighted Average (mg/kg)		**0.97**

7- to 8-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_F/G-1/2	0	1,526	56.53	7.1	7.1	401.34
J6-3-1_E/F-10	1	39,688	1469.94	0.0186	0.0186	27.34
J6-3-1_C-6	2	14,311	530.02	0.065	0.065	34.45
J6-3-1_G-2	3	62,374	2310.16	ND (0.028)	0.028	64.68
J6-3-1_F-2/3	4	10,082	373.40	ND (0.028)	0.028	10.46
J6-3-1_D/E-11	5	2,030	75.19	24.2	24.2	1,819.69
J6-3-1_C/D-10/11	6	2,498	92.51	1.06	1.06	98.06
J6-3-1_F/G-11	7	29,221	1082.26	0.0149	0.0149	16.13
J6-3-1_E/F-11	8	2,232	82.68	2.46	2.46	203.38
J6-3-1_B-7	9	1,318	48.82	5.2 [1.1]	3.2	153.77
J6-3-1_C-9	10	7,301	270.42	0.044	0.044	11.90
J6-3-1_C-7	11	6,112	226.36	ND (0.025)	0.025	5.66
J6-3-1_E/F-3	12	18,680	691.87	ND (0.023)	0.023	15.91
J6-3-1_B/C-8	13	3,908	144.75	ND (0.028)	0.028	4.05
J6-3-1_A/B-9	14	1,123	41.59	42.0	42.0	1,746.79
J6-3-1_C-9/10	15	1,719	63.67	ND (0.027)	0.027	1.72
J6-3-1_A/B-8	16	1,539	56.99	26.0	26.0	1,481.67
J6-3-1_B-9	17	1,409	52.19	11.0	11.0	574.09
J6-3-1_B-9/10	18	824	30.53	24.8	24.8	757.19
J6-3-1_B/C-10	19	1,024	37.92	29.0	29.0	1,099.66
Total	--	**208,920**	**7,738**	--	--	**8,528**
				Volume-Weighted Average (mg/kg)		**1.10**

Table E-1B-9
Parcel J6-3-1
Existing Conditions

8- to 9-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_F/G-1/2	0	107,433	3978.98	0.7	0.7	2,785.29
J6-3-1_B/C-10	1	2,855	105.74	68.0	68.0	7,190.33
J6-3-1_B-7	2	15,627	578.77	ND (0.035)	0.035	20.26
J6-3-1_A/B-9	3	1,123	41.59	56.0	56.0	2,329.05
J6-3-1_B-9/10	4	824	30.53	16.0	16.0	488.51
J6-3-1_C-9/10	5	47,673	1765.67	ND (0.025)	0.025	44.14
J6-3-1_B/C-8	6	30,354	1124.21	ND (0.024)	0.024	26.98
J6-3-1_B-9	7	1,493	55.31	0.3	0.3	16.59
J6-3-1_A/B-8	8	1,539	56.99	53.0	53.0	3,020.32
Total	--	**208,920**	**7,738**	--	--	**15,921**
				Volume-Weighted Average (mg/kg)		**2.06**

9- to 10-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_F/G-1/2	0	107,433	3978.98	0.7	0.7	2,785.29
J6-3-1_B/C-10	1	2,855	105.74	68.0	68.0	7,190.33
J6-3-1_B-7	2	15,627	578.77	ND (0.035)	0.035	20.26
J6-3-1_A/B-9	3	1,123	41.59	56.0	56.0	2,329.05
J6-3-1_B-9/10	4	824	30.53	16.0	16.0	488.51
J6-3-1_C-9/10	5	47,673	1765.67	ND (0.025)	0.025	44.14
J6-3-1_B/C-8	6	30,354	1124.21	ND (0.024)	0.024	26.98
J6-3-1_B-9	7	1,493	55.31	0.3	0.3	16.59
J6-3-1_A/B-8	8	1,539	56.99	53.0	53.0	3,020.32
Total	--	**208,920**	**7,738**	--	--	**15,921**
				Volume-Weighted Average (mg/kg)		**2.06**

Table E-1B-9
Parcel J6-3-1
Existing Conditions

J6-3-1 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 10-Foot Depth Increment	208,920	69,640	178,888	2.57

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-10

Parcel J6-3-1

Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1-SS-4	0	17,839	330.34	ND (0.133)	0.133	43.94
J6-3-1_H-3	1	3,532	65.41	0.032	0.032	2.09
J6-3-1_E/F-3	2	1,538	28.48	2.2	2.2	62.65
J6-3-1_G/H-4/5	3	4,829	89.42	1.24	1.24	110.88
J6-3-1_F-2/3	4	2,277	42.17	1.23	1.23	51.87
J6-3-1_G-2	5	3,331	61.68	3.5	3.5	215.89
J6-3-1-SS-8	6	26,390	488.70	ND (0.128) [ND (0.136)]	0.132	64.51
J6-3-1-SS-9	7	2,877	53.28	4.51	4.51	240.31
J6-3-1_G-8	8	3,267	60.50	0.186	0.186	11.25
J6-3-1_F-4	9	3,551	65.76	0.27	0.27	17.76
J6-3-1_D-4/5	10	1,596	29.55	0.14	0.14	4.14
J6-3-1-SS-7	11	7,289	134.97	0.941	0.941	127.01
J6-3-1_E-4	12	2,090	38.71	0.063	0.063	2.44
F0489601	13	3,802	70.41	0.485	0.485	34.15
J6-3-1-SS-6	14	5,607	103.84	ND (0.153)	0.153	15.89
F0489602	15	1,405	26.02	0.504	0.504	13.11
FL001282	16	2,436	45.11	ND (0.501)	0.501	22.60
J6-3-1-SS-5	17	38,390	710.92	ND (0.135)	0.135	95.97
EA08-G-1	18	2,184	40.44	0.132	0.132	5.34
J6-3-1_F-8	19	1,883	34.87	0.78 [0.79]	0.79	27.38
EA08-G/H-1/2	20	5,132	95.04	0.168	0.168	15.97
J6-3-1_G/H-10	21	1,529	28.32	0.0647	0.0647	1.83
J6-3-1-SB-8	22	830	15.36	0.263	0.263	4.04
J6-3-1_E/F-11/12	23	143	2.64	0.799	0.799	2.11
J6-3-1_F/G-10	24	1,423	26.36	0.923	0.923	24.33
J6-3-1-SB-6	25	866	16.04	52.5	***0.021***	0.34
J6-3-1_F/G-11	26	591	10.95	0.612	0.612	6.70
FL001836	27	462	8.56	55.0	***0.021***	0.18
FL001836	27A	104	1.93	55.0	***0.021***	0.04
EA08-G-2	28	1,110	20.56	0.131	0.131	2.69
J6-3-1-SB-7	29	1,092	20.22	0.792	0.792	16.02
FL001837	30	265	4.91	46.0	***0.021***	0.10
FL001837	30A	80	1.47	46.0	***0.021***	0.03
FL001837	30B	74	1.36	46.0	***0.021***	0.03
FL001837	30C	50	0.9	46.0	***0.021***	0.02
J6-3-1_F/G-11/12	31a	372	6.9	7.48	***0.021***	0.14
EA08-F/G-2	32	910	16.9	15.0	***0.021***	0.35

Table E-1B-10

Parcel J6-3-1

Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
EA08-F-2	33	236	4.4	3.99 [3.94]	3.97	17.36
EA08-F-2	33a	34	0.6	3.99 [3.94]	***0.021***	0.01
J6-3-1_F/G-1/2	34	1,526	28.3	4.1	4.1	115.88
J6-3-1_E-5	35	4,772	88.4	0.16	0.16	14.14
J6-3-1_D-6	36	2,172	40.2	0.17	0.17	6.84
J6-3-1_C-6	37	1,335	24.7	0.99	0.99	24.48
F0489607	38	20	0.4	16.7	***0.021***	0.01
F0489607	38A	33	0.6	16.7	***0.021***	0.01
F0489607	38AA	49	0.9	16.7	***0.021***	0.02
J6-3-1_C/D-5	39	1,625	30.1	0.17	0.17	5.11
J6-3-1-SS-1	40	4,328	80.1	0.45 [0.449]	0.45	36.02
J6-3-1-SS-2	41	917	17.0	1.46	1.46	24.80
J6-3-1_D-7	42	1,994	36.9	0.61/0.62	0.62	22.71
J6-3-1-SB-1	43	1,155	21.4	5.96	5.96	127.45
J6-3-1_B/C-6	44	454	8.4	1.44	1.44	12.12
J6-3-1-SB-13	45	667	12.4	70.0	***0.021***	0.26
J6-3-1_C-7	46	1,304	24.1	7.4	7.4	178.71
J6-3-1_D-8	47	659	12.2	8.0	8.0	97.70
F0489603	48	1,139	21.1	0.502	0.502	10.59
F0489604	49	410	7.6	5.42	5.42	41.18
J6-3-1-SB-3	50	2,251	41.7	ND (0.135)	0.135	5.63
J6-3-1-SS-3	51	2,157	39.9	8.1	8.1	323.56
F0489605	52	458	8.5	9.89	9.89	83.93
J6-3-1-SB-9	53	830	15.4	2.85	2.85	43.83
J6-3-1-SB-2	54	1,075	19.9	3.57	3.57	71.04
J6-3-1-SB-2	54a	74	1.4	3.57	***0.021***	0.03
J6-3-1-SB-14	55	17	0.3	18.2	***0.021***	0.01
J6-3-1-SB-14	55A	235	4.4	18.2	***0.021***	0.09
F0489606	56	681	12.6	10.9	***0.021***	0.26
F0489606	56A	846	15.7	10.9	***0.021***	0.33
J6-3-1-SB-4	57	1,178	21.8	1.28	1.28	27.91
J6-3-1_E-8	58	1,208	22.4	0.24	0.24	5.37
J6-3-1_D/E-10	59	1,525	28.2	0.597	0.597	16.86
FL001281	60	696	12.9	16.6	***0.021***	0.27
FL001281	60A	65	1.2	16.6	***0.021***	0.03
J6-3-1_B/C-8	61	1,211	22.4	1.6	1.6	35.90
J6-3-1_A/B-8	62	408	7.6	3.6	3.6	27.23

Table E-1B-10

Parcel J6-3-1

Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_C-9	63	1,584	29.3	5.0/2.5	3.8	109.98
J6-3-1_B/C-10	64a	523	9.7	4.5	***0.021***	0.20
J6-3-1_B-9	65	1,196	22.1	38.0	***0.021***	0.47
BS000147	66	21	0.4	30.7	***0.021***	0.01
BS000147	66A	108	2.0	30.7	***0.021***	0.04
J6-3-1_C-8	67	785	14.5	8.7 [5.9]	7.3	106.08
J6-3-1_A/B-9	68a	854	15.8	9.3	***0.021***	0.33
J6-3-1-SB-15	69	272	5.0	38.2	***0.021***	0.11
J6-3-1-SB-15	69A	128	2.4	38.2	***0.021***	0.05
J6-3-1_E/F-11	70	381	7.1	2.28	2.28	16.10
J6-3-1_E/F-10	71	1,827	33.8	0.672	0.672	22.74
J6-3-1_C/D-10	72	900	16.7	18.3	***0.021***	0.35
J6-3-1_C/D-10	72A	50	0.9	18.3	***0.021***	0.02
FL001834	73	263	4.9	120.0	***0.021***	0.10
FL001834	73A	352	6.5	120.0	***0.021***	0.14
J6-3-1_C/D-10/11	74	355	6.6	1.59	1.59	10.45
J6-3-1_C-9/10	75	917	17.0	6.4	6.4	108.74
J6-3-1_B-7	76a	961	17.8	2.7 [3.5]	***0.021***	0.37
J6-3-1-SB-5	77	2,820	52.2	0.127	0.127	6.63
J6-3-1_D/E-11	78	623	11.5	2.31	2.31	26.63
J6-3-1_B-9/10	79a	675	12.5	5.0	***0.021***	0.26
FL001835	80	999	18.5	26.0	***0.021***	0.39
FL001280	81	1,096	20.3	4.4	4.4	89.28
EA08-E-2	82	61	1.1	8.96	8.96	10.06
EA08-E-2	82A	157	2.9	8.96	8.96	26.13
EA08-E-2	82Aa	120	2.2	8.96	***0.021***	0.05
Total	**--**	**208,920**	**3,869**	**--**	**--**	**3,157**
				Volume-Weighted Average (mg/kg)		**0.82**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1-SS-4	0	17,839	330.3	ND (0.126)	0.126	41.62
J6-3-1_H-3	1	3,532	65.4	0.032	0.032	2.09
J6-3-1_D-4/5	2	1,596	29.5	0.14	0.14	4.14

Table E-1B-10

Parcel J6-3-1

Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_G/H-4/5	3	4,829	89.4	1.24	1.24	110.88
J6-3-1_G-2	4	3,331	61.7	3.5	3.5	215.89
J6-3-1-SS-8	5	26,390	488.7	ND (0.12)	0.12	58.64
J6-3-1-SS-9	6	2,877	53.3	1.15	1.15	61.28
J6-3-1-SS-7	7	7,470	138.3	ND (0.127)	0.127	17.57
J6-3-1_G-8	8	3,722	68.9	0.186	0.186	12.82
J6-3-1_E/F-3	9	1,538	28.5	2.2	2.2	62.65
J6-3-1_F-2/3	10	2,277	42.2	1.23	1.23	51.87
J6-3-1_F-4	11	3,551	65.8	0.27	0.27	17.76
J6-3-1-SS-6	12	6,457	119.6	ND (0.135)	0.135	16.14
J6-3-1_E-4	13	2,090	38.7	0.063	0.063	2.44
F0489602	14	2,181	40.4	0.85	0.85	34.33
FL001282	15	2,436	45.1	2.03	2.03	91.56
J6-3-1-SB-8	16	830	15.4	ND (0.12)	0.12	1.84
J6-3-1_G/H-10	17	1,529	28.3	0.0647	0.0647	1.83
J6-3-1_F-8	18	2,762	51.1	0.78 [0.79]	0.79	40.15
J6-3-1-SS-5	19	38,390	710.9	ND (0.136)	0.136	96.69
EA08-G/H-1/2	20	5,132	95.0	0.0671	0.0671	6.38
J6-3-1-SB-7	21	1,092	20.2	3.35 [2.79]	3.07	62.08
J6-3-1_E/F-11/12	22	143	2.6	0.799	0.799	2.11
J6-3-1_F/G-10	23	1,423	26.4	0.923	0.923	24.33
EA08-G-1	24	2,184	40.4	0.125	0.125	5.05
EA08-F/G-2	25	983	18.2	16.4	***0.021***	0.38
EA08-G-2	26	1,110	20.6	0.24	0.24	4.93
J6-3-1_F/G-11	27	591	11.0	0.612	0.612	6.70
J6-3-1_F/G-11	27A	77	1.4	0.612	***0.021***	0.03
J6-3-1_F/G-11/12	28A	372	6.9	7.48	***0.021***	0.14
J6-3-1_F/G-11/12	28B	18	0.3	7.48	***0.021***	0.01
J6-3-1-SB-6	29	1,050	19.4	22.1	***0.021***	0.41
EA08-F-2	30	236	4.4	8.45	8.45	37.00
EA08-F-2	30A	178	3.3	8.45	***0.021***	0.07
EA08-F-2	30B	32	0.6	8.45	***0.021***	0.01
EA08-F-2	30C	34	0.6	8.45	***0.021***	0.01
J6-3-1_F/G-1/2	31	1,526	28.3	4.1	4.1	115.88
J6-3-1_E-5	32	4,772	88.4	0.16	0.16	14.14
J6-3-1_D-6	33	2,172	40.2	0.17	0.17	6.84
J6-3-1_C-6	34	1,335	24.7	0.99	0.99	24.48

Table E-1B-10

Parcel J6-3-1

Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1-SB-13	35	667	12.4	90.5	***0.021***	0.26
J6-3-1_C/D-5	36	1,625	30.1	0.17	0.17	5.11
J6-3-1-SS-1	37	4,989	92.4	0.15	0.15	13.86
J6-3-1_D-7	38	2,057	38.1	0.61/0.62	0.62	23.42
J6-3-1_B-7	39A	961	17.8	2.7 [3.5]	***0.021***	0.37
J6-3-1_B/C-6	40	454	8.4	1.44	1.44	12.12
J6-3-1_D-8	41	765	14.2	8.0	8.0	113.37
J6-3-1-SS-2	42	1,443	26.7	0.254	0.254	6.79
F0489604	43	549	10.2	8.75	8.75	88.96
J6-3-1-SB-9	44	832	15.4	2.68 [2.78]	2.73	42.06
J6-3-1-SB-3	45	2,254	41.7	ND (0.124)	0.124	5.18
J6-3-1-SS-3	46	2,157	39.9	7.25	7.25	289.60
J6-3-1_C-7	47	1,304	24.1	7.4	7.4	178.71
J6-3-1-SB-2	48	1,075	19.9	0.181	0.181	3.60
J6-3-1-SB-2	48A	74	1.4	0.181	***0.021***	0.03
J6-3-1-SB-1	49	1,358	25.1	0.136	0.136	3.42
J6-3-1-SB-14	50	50	0.9	13.2	***0.021***	0.02
J6-3-1-SB-14	50A	284	5.3	13.2	***0.021***	0.11
F0489606	51	489	9.1	26.8	***0.021***	0.19
F0489606	51A	846	15.7	26.8	***0.021***	0.33
F0489606	51B	125	2.3	26.8	***0.021***	0.05
F0489606	51C	67	1.2	26.8	***0.021***	0.03
J6-3-1-SB-4	52	1,178	21.8	ND (0.118) [ND (0.122)]	0.120	2.62
J6-3-1_E-8	53	1,510	28.0	0.24	0.24	6.71
J6-3-1_D/E-10	54	1,525	28.2	0.597	0.597	16.86
J6-3-1_D/E-10	54A	1	0.02	0.597	***0.021***	0.00
J6-3-1_D/E-10	54B	5	0.09	0.597	0.597	0.05
FL001281	55	696	12.89	30.9	***0.021***	0.27
FL001281	55A	29	0.5	30.9	***0.021***	0.01
FL001281	55B	36	0.7	30.9	***0.021***	0.01
J6-3-1_B/C-8	56	1,287	23.8	1.6	1.6	38.13
J6-3-1_A/B-8	57	408	7.6	3.6	3.6	27.23
J6-3-1_C-9	58	1,584	29.3	5.0/2.5	3.8	109.98
J6-3-1_B/C-10	59A	523	9.7	4.5	***0.021***	0.20
J6-3-1_B-9	60	1,196	22.1	38.0	***0.021***	0.47
J6-3-1_C-8	61	963	17.8	8.7 [5.9]	7.3	130.18
BS000147	62	21	0.4	16.6	***0.021***	0.01

Table E-1B-10

Parcel J6-3-1

Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
BS000147	62A	108	2.0	16.6	***0.021***	0.04
J6-3-1-SB-15	63	272	5.0	35.5	***0.021***	0.11
J6-3-1-SB-15	63A	128	2.4	35.5	***0.021***	0.05
J6-3-1_E/F-11	64	381	7.1	2.28	2.28	16.10
J6-3-1_E/F-11	64A	381	7.1	2.28	***0.021***	0.15
J6-3-1_E/F-11	64B	10	0.2	2.28	***0.021***	0.00
J6-3-1_E/F-10	65	1,827	33.8	0.672	0.672	22.74
EA08-E-2	66	61	1.1	6.58	6.58	7.38
EA08-E-2	66A	38	0.7	6.58	***0.021***	0.01
EA08-E-2	66B	157	2.9	6.58	6.58	19.19
EA08-E-2	66C	120	2.2	6.58	***0.021***	0.05
J6-3-1_C-9/10	67	917	17.0	6.4	6.4	108.74
J6-3-1_A/B-9	68A	854	15.8	9.3	***0.021***	0.33
J6-3-1_A/B-9	68B	20	0.4	9.3	***0.021***	0.01
J6-3-1-SB-5	69	2,820	52.2	ND (0.114)	0.114	5.95
J6-3-1_C/D-10	70	900	16.7	18.3	***0.021***	0.35
J6-3-1_C/D-10	70A	50	0.9	18.3	***0.021***	0.02
J6-3-1_C/D-10	70B	352	6.5	18.3	***0.021***	0.14
J6-3-1_D/E-11	71	622	11.5	2.31	2.31	26.63
J6-3-1_D/E-11	71A	14	0.3	2.31	***0.021***	0.01
J6-3-1_D/E-11	71B	3	0.06	2.31	2.31	0.13
EA08-E/F-2	72	2	0.04	2.9	2.9	0.12
EA08-E/F-2	72A	13	0.2	2.9	***0.021***	0.01
EA08-E/F-2	72B	991	18.4	2.9	***0.021***	0.39
FL001280	73	1,096	20.3	ND (0.501)	0.501	10.17
FL001280	73A	67	1.2	ND (0.501)	***0.021***	0.03
FL001280	73B	0.3	0.006	ND (0.501)	0.501	0.00
J6-3-1_B-9/10	74A	675	12.507	5.0	***0.021***	0.26
J6-3-1_C/D-10/11	75	353	6.536	1.59	1.59	10.39
J6-3-1_C/D-10/11	75A	211	3.912	1.59	***0.021***	0.08
Total	**--**	**208,920**	**3,869**	**--**	**--**	**2,603**
				Volume-Weighted Average (mg/kg)		**0.67**

Table E-1B-10
Parcel J6-3-1
Post-Remediation Conditions

J6-3-1 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	208,920	7,738	5,761	0.74

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-11

Parcel J6-3-1
Post-Remediation Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_H-3	0	46,717	1730.263	0.056	0.056	96.89
J6-3-1_E/F-3	1	1,538	56.958	2.8	2.8	159.48
J6-3-1_F-2/3	2	2,277	84.337	3.9	3.9	328.92
J6-3-1_G-2	3	3,350	124.087	1.47	1.47	182.41
J6-3-1-SB-12	4	2,877	106.567	0.3125	0.3125	33.30
J6-3-1_F-8	5	5,994	222.018	0.29	0.29	64.39
J6-3-1_F-4	6	3,551	131.530	0.089	0.089	11.71
J6-3-1_D-4/5	7	1,596	59.100	ND (0.031)	0.031	1.83
J6-3-1_G/H-4/5	8	18,075	669.438	0.069	0.069	46.19
J6-3-1_G/H-4/5	9	0.5	0.02	0.069	0.069	0.00
J6-3-1_E-5	10	7,177	265.83	0.031	0.031	8.24
J6-3-1_E-8	11	1,510	55.93	0.055	0.055	3.08
J6-3-1_E-4	12	2,090	77.42	ND (0.026)	0.026	2.01
J6-3-1_G-8	13	43,873	1624.91	ND (0.024)	0.024	39.00
J6-3-1_G-8	14	52	1.92	ND (0.024)	0.024	0.05
J6-3-1_F/G-11	15	1,717	63.59	0.994	0.994	63.21
J6-3-1-SB-8	16	6,329	234.42	0.522	0.522	122.37
J6-3-1-SB-7	17	6,250	231.46	ND (0.136)	0.136	31.36
J6-3-1_E/F-11/12	18	384	14.24	0.781	0.781	11.12
J6-3-1_E/F-10	19	2,995	110.94	0.0252	0.0252	2.80
J6-3-1-SB-3	20	3,822	141.57	ND (0.126)	0.126	17.77
J6-3-1-SB-4	21	1,312	48.60	ND (0.119)	0.119	5.76
J6-3-1-SB-6	22	1,626	60.22	5.628	5.628	338.89
J6-3-1_E/F-11	23	957	35.44	6.81	6.81	241.32
J6-3-1_F/G-11/12	24a	458	16.97	7.01	***0.021***	0.36
J6-3-1-SB-13	25a	667	24.71	76.45	***0.021***	0.52
J6-3-1_C/D-5	26	1,625	60.18	0.15	0.15	9.03
J6-3-1_D-6	27	2,172	80.44	ND (0.028)	0.028	2.25
J6-3-1_B-7	28a	1,086	40.24	6.0	***0.021***	0.85
J6-3-1_F/G-1/2	29	1,526	56.53	1.56	1.56	88.18
J6-3-1-SB-10	30	2,975	110.18	ND (0.117)	0.117	12.89
J6-3-1_D-8	31	861	31.88	3.3	3.3	105.21
J6-3-1_D-7	32	2,060	76.29	0.24	0.24	18.31
J6-3-1-SB-1	33	1,358	50.29	0.1975	0.1975	9.93
J6-3-1_C-7	34	1,304	48.30	0.85	0.85	41.05
J6-3-1_C-6	35	1,335	49.46	ND (0.027)	0.027	1.34
J6-3-1_C-8	36	963	35.66	5.7	5.7	203.29

Table E-1B-11

Parcel J6-3-1

Post-Remediation Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_B/C-8	37	1,776	65.78	0.2	0.2	13.16
J6-3-1_B/C-6	38	454	16.83	0.44	0.44	7.40
J6-3-1-SB-14	39a	50	1.84	107.2	***0.021***	0.04
J6-3-1-SB-14	39Aa	284	10.51	107.2	***0.021***	0.22
J6-3-1_D/E-10	40	2,381	88.17	0.0249	0.0249	2.20
J6-3-1-SB-9	41	1,272	47.11	0.475	0.475	22.37
J6-3-1-SB-2	42	1,075	39.80	ND (0.119)	0.119	4.72
J6-3-1-SB-2	42a	74	2.74	ND (0.119)	***0.021***	0.06
J6-3-1-SB-11	43	2,157	79.89	4.004	4.004	319.84
J6-3-1-SB-15	44a	272	10.06	115.8	***0.021***	0.21
J6-3-1-SB-15	44Aa	128	4.72	115.8	***0.021***	0.10
J6-3-1_A/B-8	45	1,255	46.48	21.0	21.0	975.99
J6-3-1_D/E-11	46	1,129	41.81	2.51	2.51	104.94
J6-3-1_C/D-10	47	1,688	62.52	16.9	16.9	1,056.63
J6-3-1_C/D-10	47A	236	8.75	16.9	16.9	147.89
J6-3-1_C-9/10	48	1,216	45.03	44.0	44.0	1,981.25
J6-3-1_A/B-9	49a	885	32.79	13.3	***0.021***	0.69
J6-3-1_B-9	50a	1,251	46.34	47.0	***0.021***	0.97
J6-3-1_C-9	51	1,645	60.93	0.26	0.26	15.84
J6-3-1-SB-5	52	2,850	105.55	ND (0.124)	0.124	13.04
J6-3-1_B-9/10	53a	697	25.81	46.0	***0.021***	0.54
J6-3-1_B/C-10	54a	788	29.17	22.0	***0.021***	0.61
J6-3-1_C/D-10/11	55	898	33.24	1.1	1.1	36.57
Total	--	**208,920**	**7,738**	--	--	**7,011**
				Volume-Weighted Average (mg/kg)		**0.91**

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_H-3	0	46,717	1730.26	ND (0.024)	0.024	41.53
J6-3-1_F/G-1/2	1	1,526	56.53	5.3	5.3	299.59
J6-3-1_G/H-4/5	2	18,075	669.44	ND (0.025) [ND (0.024)]	0.025	16.74
J6-3-1_G/H-4/5	3	0.5	0.02	ND (0.025) [ND (0.024)]	0.025	0.00
J6-3-1-SB-12	4	2,877	106.57	ND (0.144) [0.197]	0.171	18.17
J6-3-1_G-2	5	3,350	124.09	0.037	0.037	4.59

Table E-1B-11

Parcel J6-3-1

Post-Remediation Conditions

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_F-4	6	3,551	131.53	ND (0.025) [ND (0.024)]	0.025	3.29
J6-3-1_F-2/3	7	2,277	84.34	3.2	3.2	269.88
J6-3-1_E-4	8	2,090	77.42	ND (0.024)	0.024	1.86
J6-3-1-SB-10	9	4,123	152.69	ND (0.119)	0.119	18.17
J6-3-1_E/F-3	10	1,538	56.96	6.8	6.8	387.32
J6-3-1_F-8	11	6,421	237.83	0.64	0.64	152.21
J6-3-1_G-8	12	50,315	1863.51	ND (0.023)	0.023	42.86
J6-3-1_G-8	13	52	1.92	ND (0.023)	0.023	0.04
J6-3-1_F/G-11	14	6,681	247.45	0.942	0.942	233.09
J6-3-1_E/F-11/12	15	384	14.24	1.06	1.06	15.09
J6-3-1_E-8	16	2,667	98.79	0.088	0.088	8.69
J6-3-1_E/F-11	17	1,812	67.12	31.5	31.5	2,114.33
J6-3-1_C/D-5	18	1,625	60.18	ND (0.026)	0.026	1.56
J6-3-1_E/F-10	19	5,739	212.57	0.039	0.039	8.29
J6-3-1_F/G-11/12	20a	458	16.97	25.7	***0.021***	0.36
J6-3-1_D-6	21	3,008	111.42	ND (0.026)	0.026	2.90
J6-3-1-SB-13	22	667	24.71	11.1	11.1	274.21
J6-3-1_D-4/5	23	1,596	59.10	ND (0.026)	0.026	1.54
J6-3-1_B-7	24a	1,087	40.26	88.0	***0.021***	0.85
J6-3-1_C-6	25	1,335	49.46	ND (0.026)	0.026	1.29
J6-3-1_E-5	26	8,269	306.25	ND (0.025)	0.025	7.66
J6-3-1_C-8	27	1,755	64.98	0.026	0.026	1.69
J6-3-1_B/C-8	28	2,051	75.95	ND (0.026)	0.026	1.97
J6-3-1_B/C-6	29	454	16.83	ND (0.024)	0.024	0.40
J6-3-1_C-7	30	1,823	67.53	ND (0.027)	0.027	1.82
J6-3-1_D-7	31	3,515	130.17	0.026	0.026	3.38
J6-3-1-SB-14	32a	50	1.84	74.3	***0.021***	0.04
J6-3-1-SB-14	32Aa	284	10.51	74.3	***0.021***	0.22
J6-3-1_D/E-11	33	1,129	41.81	2.05	2.05	85.71
J6-3-1_D-8	34	1,705	63.14	0.53	0.53	33.46
J6-3-1-SB-11	35	2,443	90.47	5.7	5.7	515.70
J6-3-1-SB-15	36a	272	10.06	92.65	***0.021***	0.21
J6-3-1-SB-15	36Aa	128	4.72	92.65	***0.021***	0.10
J6-3-1_B-9	37a	1,325	49.08	120.0	***0.021***	1.03
J6-3-1_A/B-8	38	1,255	46.48	8.7	8.7	404.34
J6-3-1_C-9	39	2,392	88.59	0.05	0.05	4.43
J6-3-1_B-9/10	40a	697	25.81	83.0 [109.0]	***0.021***	0.54

Table E-1B-11

Parcel J6-3-1

Post-Remediation Conditions

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_C/D-10	41	1,688	62.52	14.7	14.7	919.08
J6-3-1_C/D-10	41A	236	8.75	14.7	14.7	128.64
J6-3-1_C-9/10	42	1,218	45.11	26.0	26.0	1,172.82
J6-3-1_A/B-9	43a	885	32.79	75.0 [71.0]	***0.021***	0.69
J6-3-1_B/C-10	44a	788	29.17	69.0	***0.021***	0.61
J6-3-1_D/E-10	45	3,689	136.62	ND (0.0017)	0.0017	0.23
J6-3-1_C/D-10/11	46	898	33.24	0.97	0.97	32.24
Total	--	**208,920**	**7,738**	--	--	**7,235**
				Volume-Weighted Average (mg/kg)		**0.94**

3- to 4-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_G/H-4/5	0	18,638	690.31	ND (0.025) [ND (0.024)]	0.025	16.91
J6-3-1_G/H-4/5	1	0.5	0.02	ND (0.025) [ND (0.024)]	0.025	0.00
J6-3-1_F-2/3	2	3,331	123.36	3.2	3.2	394.74
J6-3-1_G-2	3	3,550	131.49	0.037	0.037	4.87
J6-3-1_H-3	4	47,486	1758.75	ND (0.024)	0.024	42.21
J6-3-1_E-4	5	2,090	77.42	ND (0.024)	0.024	1.86
J6-3-1_E/F-3	6	1,541	57.06	6.8	6.8	388.01
J6-3-1_F-4	7	3,840	142.22	ND (0.025) [ND (0.024)]	0.025	3.48
J6-3-1_C/D-5	8	1,625	60.18	ND (0.026)	0.026	1.56
J6-3-1_F/G-1/2	9	1,526	56.53	5.3	5.3	299.59
J6-3-1_F-8	10	7,463	276.41	0.64	0.64	176.90
J6-3-1_G-8	11	50,315	1863.51	ND (0.023)	0.023	42.86
J6-3-1_G-8	12	52	1.92	ND (0.023)	0.023	0.04
J6-3-1_F/G-11	13	6,681	247.45	0.016	0.016	3.96
J6-3-1_E/F-11/12	14	384	14.24	2.99	2.99	42.56
J6-3-1_E-8	15	4,962	183.76	0.088	0.088	16.17
J6-3-1_E/F-11	16	1,812	67.12	42.6	42.6	2,859.38
J6-3-1_E/F-10	17	5,739	212.57	0.0407	0.0407	8.65
J6-3-1_F/G-11/12	18A	458	16.97	55.8	***0.021***	0.36
J6-3-1_D-6	19	3,008	111.42	ND (0.026)	0.026	2.90
J6-3-1-SB-13	20	667	24.71	0.794	0.794	19.62
J6-3-1_D-4/5	21	1,596	59.10	ND (0.026)	0.026	1.54

Table E-1B-11

Parcel J6-3-1

Post-Remediation Conditions

3- to 4-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_B-7	22A	1,087	40.26	88.0	***0.021***	0.85
J6-3-1_E-5	23	8,579	317.72	ND (0.025)	0.025	7.94
J6-3-1_C-8	24	1,792	66.37	0.026	0.026	1.73
J6-3-1_C-7	25	1,823	67.53	ND (0.027)	0.027	1.82
J6-3-1_C-6	26	1,335	49.46	ND (0.026)	0.026	1.29
J6-3-1_B/C-8	27	2,051	75.95	ND (0.026)	0.026	1.97
J6-3-1-SB-14	28	50	1.84	47.05	47.05	86.74
J6-3-1-SB-14	28A	284	10.51	47.05	47.05	494.56
J6-3-1_B/C-6	29	454	16.83	ND (0.024)	0.024	0.40
J6-3-1_D/E-11	30	1,129	41.81	5.47	5.47	228.69
J6-3-1_B-9	31A	1,325	49.08	120.0	***0.021***	1.03
J6-3-1_D/E-10	32	3,859	142.92	0.0433	0.0433	6.19
J6-3-1_C-9	33	2,868	106.23	0.05	0.05	5.31
J6-3-1-SB-15	34	272	10.06	20.0	20.0	201.29
J6-3-1-SB-15	34A	128	4.72	20.0	20.0	94.46
J6-3-1_B-9/10	35A	697	25.81	83.0 [109.0]	***0.021***	0.54
J6-3-1_A/B-8	36	1,255	46.48	8.7	8.7	404.34
J6-3-1_D-8	37	3,300	122.23	0.53	0.53	64.78
J6-3-1_D-7	38	4,155	153.88	0.026	0.026	4.00
J6-3-1_C/D-10	39	1,688	62.52	0.153	0.153	9.57
J6-3-1_C/D-10	39A	236	8.75	0.153	0.153	1.34
J6-3-1_C-9/10	40	1,218	45.11	26.0	26.0	1,172.82
J6-3-1_A/B-9	41A	885	32.79	75.0 [71.0]	***0.021***	0.69
J6-3-1_B/C-10	42A	788	29.17	69.0	***0.021***	0.61
J6-3-1_C/D-10/11	43	898	33.24	1.64	1.64	54.52
Total	--	**208,920**	**7,738**	--	--	**7,176**
				Volume-Weighted Average (mg/kg)		**0.93**

4- to 5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_D-4/5	0	1,596	59.10	ND (0.025)	0.025	1.48
J6-3-1_G/H-4/5	1	18,638	690.31	ND (0.023)	0.023	15.88
J6-3-1_G/H-4/5	2	0.5	0.02	ND (0.023)	0.023	0.00
J6-3-1_G-2	3	3,550	131.49	ND (0.027)	0.027	3.55

Table E-1B-11

Parcel J6-3-1

Post-Remediation Conditions

4- to 5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_F-4	4	3,840	142.22	ND (0.13)	0.13	18.49
J6-3-1_E/F-3	5	1,541	57.06	0.27	0.27	15.41
J6-3-1_F-2/3	6	3,331	123.36	0.28	0.28	34.54
J6-3-1_H-3	7	47,486	1758.75	0.033	0.033	58.04
J6-3-1_E-4	8	2,090	77.42	ND (0.024)	0.024	1.86
J6-3-1_F-8	9	7,463	276.41	ND (0.026)	0.026	7.19
J6-3-1_G-8	10	50,315	1863.51	ND (0.024)	0.024	44.72
J6-3-1_G-8	11	52	1.92	ND (0.024)	0.024	0.05
J6-3-1_F/G-11	12	6,681	247.45	ND (0.0017)	0.0017	0.42
J6-3-1_E/F-11/12	13	384	14.24	1.11	1.11	15.80
J6-3-1_E/F-10	14	5,739	212.57	ND (0.0019)	0.0019	0.40
J6-3-1_D/E-10	15	3,973	147.16	ND (0.0019)	0.0019	0.28
J6-3-1_F/G-11/12	16	458	16.97	31.9	31.9	541.29
J6-3-1_E/F-11	17	1,812	67.12	111	111	7,450.49
J6-3-1_F/G-1/2	18	1,526	56.53	7.2	7.2	406.99
J6-3-1_D-6	19	3,008	111.42	ND (0.026)	0.026	2.90
J6-3-1_C-6	20	1,342	49.71	ND (0.026)	0.026	1.29
J6-3-1_B-7	21	1,309	48.47	96.0	96.0	4,652.98
J6-3-1_C/D-5	22	1,625	60.18	ND (0.026)	0.026	1.56
J6-3-1_E-5	23	8,579	317.72	ND (0.025)	0.025	7.94
J6-3-1_D-8	24	3,300	122.23	0.59	0.59	72.12
J6-3-1_B/C-6	25	551	20.41	ND (0.024)	0.024	0.49
J6-3-1_C-7	26	2,165	80.20	ND (0.024)	0.024	1.92
J6-3-1_C-8	27	1,792	66.37	ND (0.025)	0.025	1.66
J6-3-1_A/B-8	28	1,539	56.99	150.0	150.0	8,548.07
J6-3-1_B/C-8	29	2,051	75.95	0.026	0.026	1.97
J6-3-1_C-9	30	3,054	113.11	ND (0.024)	0.024	2.71
J6-3-1_B-9/10	31	824	30.53	150.0	150.0	4,579.79
J6-3-1_D-7	32	4,155	153.88	ND (0.024)	0.024	3.69
J6-3-1_D/E-11	33	1,129	41.81	1.84	1.84	76.93
J6-3-1_E-8	34	4,962	183.76	0.52	0.52	95.56
J6-3-1_B-9	35	1,409	52.19	43.0	43.0	2,244.15
J6-3-1_C/D-10/11	36	1,784	66.09	1.34	1.34	88.56
J6-3-1_C-9/10	37	1,719	63.67	ND (0.034)	0.034	2.16
J6-3-1_A/B-9	38	1,123	41.59	25.0	25.0	1,039.75
J6-3-1_B/C-10	39	1,024	37.92	150.0	150.0	5,687.84

Table E-1B-11

Parcel J6-3-1

Post-Remediation Conditions

4- to 5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
Total	--	**208,920**	**7,738**	--	--	**35,731**
				Volume-Weighted Average (mg/kg)		**4.62**

5- to 6-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_D-4/5	0	1,596	59.10	ND (0.025)	0.025	1.48
J6-3-1_G/H-4/5	1	18,638	690.31	ND (0.023)	0.023	15.88
J6-3-1_G/H-4/5	2	0.5	0.02	ND (0.023)	0.023	0.00
J6-3-1_G-2	3	3,550	131.49	ND (0.027)	0.027	3.55
J6-3-1_F-4	4	3,840	142.22	ND (0.13)	0.13	18.49
J6-3-1_E/F-3	5	1,541	57.06	0.27	0.27	15.41
J6-3-1_F-2/3	6	3,331	123.36	0.28	0.28	34.54
J6-3-1_H-3	7	47,486	1758.75	0.033	0.033	58.04
J6-3-1_E-4	8	2,090	77.42	ND (0.024)	0.024	1.86
J6-3-1_F/G-11	9	7,113	263.45	ND (0.0019)	0.0019	0.50
J6-3-1_F-8	10	7,463	276.41	ND (0.026)	0.026	7.19
J6-3-1_G-8	11	50,315	1863.51	ND (0.024)	0.024	44.72
J6-3-1_G-8	12	52	1.92	ND (0.024)	0.024	0.05
J6-3-1_E/F-11/12	13	410	15.20	1.58	1.58	24.02
J6-3-1_E/F-10	14	5,739	212.57	ND (0.0019)	0.0019	0.40
J6-3-1_D/E-10	15	3,973	147.16	ND (0.0019)	0.0019	0.28
J6-3-1_E/F-11	16	1,812	67.12	ND (0.0022)	0.0022	0.15
J6-3-1_F/G-1/2	17	1,526	56.53	7.2	7.2	406.99
J6-3-1_D-6	18	3,008	111.42	ND (0.026)	0.026	2.90
J6-3-1_C-6	19	1,342	49.71	ND (0.026)	0.026	1.29
J6-3-1_B-7	20	1,309	48.47	96.0	96.0	4,652.98
J6-3-1_C/D-5	21	1,625	60.18	ND (0.026)	0.026	1.56
J6-3-1_E-5	22	8,579	317.72	ND (0.025)	0.025	7.94
J6-3-1_D-8	23	3,300	122.23	0.59	0.59	72.12
J6-3-1_B/C-6	24	551	20.41	ND (0.024)	0.024	0.49
J6-3-1_C-7	25	2,165	80.20	ND (0.024)	0.024	1.92
J6-3-1_C-8	26	1,792	66.37	ND (0.025)	0.025	1.66
J6-3-1_A/B-8	27	1,539	56.99	150.0	150.0	8,548.07
J6-3-1_B/C-8	28	2,051	75.95	0.026	0.026	1.97

Table E-1B-11

Parcel J6-3-1

Post-Remediation Conditions

5- to 6-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_C-9	29	3,054	113.11	ND (0.024)	0.024	2.71
J6-3-1_B-9/10	30	824	30.53	150.0	150.0	4,579.79
J6-3-1_D-7	31	4,155	153.88	ND (0.024)	0.024	3.69
J6-3-1_D/E-11	32	1,129	41.81	3.34	3.34	139.64
J6-3-1_E-8	33	4,962	183.76	0.52	0.52	95.56
J6-3-1_B-9	34	1,409	52.19	43.0	43.0	2,244.15
J6-3-1_C/D-10/11	35	1,784	66.09	1.42	1.42	93.85
J6-3-1_C-9/10	36	1,719	63.67	ND (0.034)	0.034	2.16
J6-3-1_A/B-9	37	1,123	41.59	25.0	25.0	1,039.75
J6-3-1_B/C-10	38	1,024	37.92	150.0	150.0	5,687.84
Total	--	**208,920**	**7,738**	--	--	**27,816**
				Volume-Weighted Average (mg/kg)		**3.59**

6- to 7-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_F/G-1/2	0	1,526	56.53	7.1	7.1	401.34
J6-3-1_E/F-10	1	39,688	1469.94	ND (0.0019)	0.0019	2.79
J6-3-1_C-6	2	14,311	530.02	0.065	0.065	34.45
J6-3-1_G-2	3	62,374	2310.16	ND (0.028)	0.028	64.68
J6-3-1_F-2/3	4	10,082	373.40	ND (0.028)	0.028	10.46
J6-3-1_D/E-11	5	2,030	75.19	3.66	3.66	275.21
J6-3-1_C/D-10/11	6	2,498	92.51	5.06	5.06	468.09
J6-3-1_F/G-11	7	29,221	1082.26	ND (0.0019)	0.0019	2.06
J6-3-1_E/F-11	8	2,232	82.68	5.07	5.07	419.16
J6-3-1_B-7	9	1,318	48.82	5.2 [1.1]	3.2	153.77
J6-3-1_C-9	10	7,301	270.42	0.044	0.044	11.90
J6-3-1_C-7	11	6,112	226.36	ND (0.025)	0.025	5.66
J6-3-1_E/F-3	12	18,680	691.87	ND (0.023)	0.023	15.91
J6-3-1_B/C-8	13	3,908	144.75	ND (0.028)	0.028	4.05
J6-3-1_A/B-9	14	1,123	41.59	42.0	42.0	1,746.79
J6-3-1_C-9/10	15	1,719	63.67	ND (0.027)	0.027	1.72
J6-3-1_A/B-8	16	1,539	56.99	26.0	26.0	1,481.67
J6-3-1_B-9	17	1,409	52.19	11.0	11.0	574.09
J6-3-1_B-9/10	18	824	30.53	24.8	24.8	757.19

Table E-1B-11

Parcel J6-3-1

Post-Remediation Conditions

6- to 7-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_B/C-10	19	1,024	37.92	29.0	29.0	1,099.66
Total	--	**208,920**	**7,738**	--	--	**7,531**
				Volume-Weighted Average (mg/kg)		**0.97**

7- to 8-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_F/G-1/2	0	1,526	56.53	7.1	7.1	401.34
J6-3-1_E/F-10	1	39,688	1469.94	0.0186	0.0186	27.34
J6-3-1_C-6	2	14,311	530.02	0.065	0.065	34.45
J6-3-1_G-2	3	62,374	2310.16	ND (0.028)	0.028	64.68
J6-3-1_F-2/3	4	10,082	373.40	ND (0.028)	0.028	10.46
J6-3-1_D/E-11	5	2,030	75.19	24.2	24.2	1,819.69
J6-3-1_C/D-10/11	6	2,498	92.51	1.06	1.06	98.06
J6-3-1_F/G-11	7	29,221	1082.26	0.0149	0.0149	16.13
J6-3-1_E/F-11	8	2,232	82.68	2.46	2.46	203.38
J6-3-1_B-7	9	1,318	48.82	5.2 [1.1]	3.2	153.77
J6-3-1_C-9	10	7,301	270.42	0.044	0.044	11.90
J6-3-1_C-7	11	6,112	226.36	ND (0.025)	0.025	5.66
J6-3-1_E/F-3	12	18,680	691.87	ND (0.023)	0.023	15.91
J6-3-1_B/C-8	13	3,908	144.75	ND (0.028)	0.028	4.05
J6-3-1_A/B-9	14	1,123	41.59	42.0	42.0	1,746.79
J6-3-1_C-9/10	15	1,719	63.67	ND (0.027)	0.027	1.72
J6-3-1_A/B-8	16	1,539	56.99	26.0	26.0	1,481.67
J6-3-1_B-9	17	1,409	52.19	11.0	11.0	574.09
J6-3-1_B-9/10	18	824	30.53	24.8	24.8	757.19
J6-3-1_B/C-10	19	1,024	37.92	29.0	29.0	1,099.66
Total	--	**208,920**	**7,738**	--	--	**8,528**
				Volume-Weighted Average (mg/kg)		**1.10**

Table E-1B-11
Parcel J6-3-1
Post-Remediation Conditions

8- to 9-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_F/G-1/2	0	107,433	3978.98	0.7	0.7	2,785.29
J6-3-1_B/C-10	1	2,855	105.74	68.0	68.0	7,190.33
J6-3-1_B-7	2	15,627	578.77	ND (0.035)	0.035	20.26
J6-3-1_A/B-9	3	1,123	41.59	56.0	56.0	2,329.05
J6-3-1_B-9/10	4	824	30.53	16.0	16.0	488.51
J6-3-1_C-9/10	5	47,673	1765.67	ND (0.025)	0.025	44.14
J6-3-1_B/C-8	6	30,354	1124.21	ND (0.024)	0.024	26.98
J6-3-1_B-9	7	1,493	55.31	0.3	0.3	16.59
J6-3-1_A/B-8	8	1,539	56.99	53.0	53.0	3,020.32
Total	--	**208,920**	**7,738**	--	--	**15,921**
				Volume-Weighted Average (mg/kg)		**2.06**

9- to 10-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J6-3-1_F/G-1/2	0	107,433	3978.98	0.7	0.7	2,785.29
J6-3-1_B/C-10	1	2,855	105.74	68.0	68.0	7,190.33
J6-3-1_B-7	2	15,627	578.77	ND (0.035)	0.035	20.26
J6-3-1_A/B-9	3	1,123	41.59	56.0	56.0	2,329.05
J6-3-1_B-9/10	4	824	30.53	16.0	16.0	488.51
J6-3-1_C-9/10	5	47,673	1765.67	ND (0.025)	0.025	44.14
J6-3-1_B/C-8	6	30,354	1124.21	ND (0.024)	0.024	26.98
J6-3-1_B-9	7	1,493	55.31	0.3	0.3	16.59
J6-3-1_A/B-8	8	1,539	56.99	53.0	53.0	3,020.32
Total	--	**208,920**	**7,738**	--	--	**15,921**
				Volume-Weighted Average (mg/kg)		**2.06**

Table E-1B-11
Parcel J6-3-1
Post-Remediation Conditions

J6-3-1 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 10-Foot Depth Increment	208,920	69,640	132,870	1.91

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-12

Parcel J3-1-13
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-12_H-7/8	0	0.1	0.002	ND (0.093)	0.093	0.00
J3-1-12_H-7/8	0a	25	0.5	ND (0.093)	0.093	0.04
J3-1-13_G/H-7/8	1	1,687	31.2	ND (0.09)	0.09	2.81
J3-1-13_G/H-7/8	1a	146	2.7	ND (0.09)	0.09	0.24
FL001687	2	104	1.9	2.53	2.53	4.89
J3-1-13_F/G-7/8	3	7,197	133.3	ND (0.12)	0.12	15.33
J3-1-13_G-7/8	4	8,242	152.6	ND (0.1)	0.1	15.26
FL000760	5	216	4.0	ND (0.502)	0.502	2.00
FL000761	6	227	4.2	ND (0.501)	0.501	2.11
FL000595	7	474	8.8	ND (0.018)	0.018	0.16
BS000091	8	4	0.07	6.07	6.07	0.43
FL001686	9	430	7.96	8.6	8.6	68.50
J3-1-13_F-8	10	105	1.95	3.0/2.0	2.5	4.87
J3-1-13_F-7/8	11	3,946	73.07	0.29	0.29	21.19
J3-1-13_F/G-7/8	12	807	14.94	ND (0.12)	0.12	1.72
Total	--	**23,611**	**437**	--	--	**140**
				Volume-Weighted Average (mg/kg)		**0.32**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
FL001686	0	430	7.96	16.8	16.8	133.81
FL001687	1	104	1.93	3.42	3.42	6.61
J3-1-13_G/H-7/8	2	1,687	31.23	ND (0.09)	0.09	2.81
J3-1-13_G/H-7/8	2a	146	2.70	ND (0.09)	0.09	0.24
J3-1-13_F/G-7/8	3	7,197	133.29	ND (0.12)	0.12	15.33
J3-1-13_G-7/8	4	8,242	152.64	ND (0.1)	0.1	15.26
FL000760	5	216	3.99	ND (0.501)	0.501	2.00
FL000761	6	227	4.21	ND (0.501)	0.501	2.11
J3-1-12_H-7/8	7	0.1	0.002	ND (0.093)	0.093	0.00
J3-1-12_H-7/8	7a	25	0.5	ND (0.093)	0.093	0.04
BS000091	8	4	0.07	8.3	8.3	0.58
FL000595	9	474	8.78	0.098	0.098	0.86
J3-1-13_F-7/8	10	3,946	73.07	0.29	0.29	21.19
J3-1-13_F-8	11	105	1.95	3.0/2.0	2.5	4.87

Table E-1B-12

Parcel J3-1-13
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-13_F/G-7/8	12	807	14.94	ND (0.12)	0.12	1.72
Total	**--**	**23,611**	**437**	**--**	**--**	**207**
				Volume-Weighted Average (mg/kg)		**0.47**

J3-1-13 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	23,611	874	347	0.40

Notes:

1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-13

Parcel J3-1-13

Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-12_H-7/8	0	0.1	0.002	ND (0.093)	0.093	0.00
J3-1-12_H-7/8	0a	25	0.5	ND (0.093)	***0.021***	0.01
J3-1-13_G/H-7/8	1	1,687	31.2	ND (0.09)	0.09	2.81
J3-1-13_G/H-7/8	1a	146	2.7	ND (0.09)	***0.021***	0.06
FL001687	2	104	1.9	2.53	2.53	4.89
J3-1-13_F/G-7/8	3	7,197	133.3	ND (0.12)	0.12	15.33
J3-1-13_G-7/8	4	8,242	152.6	ND (0.1)	0.1	15.26
FL000760	5	216	4.0	ND (0.502)	0.502	2.00
FL000761	6	227	4.2	ND (0.501)	0.501	2.11
FL000595	7	474	8.8	ND (0.018)	0.018	0.16
BS000091	8	4	0.07	6.07	6.07	0.43
FL001686	9	430	7.96	8.6	***0.021***	0.17
J3-1-13_F-8	10	105	1.95	3.0/2.0	2.5	4.87
J3-1-13_F-7/8	11	3,946	73.07	0.29	0.29	21.19
J3-1-13_F/G-7/8	12	807	14.94	ND (0.12)	0.12	1.72
Total	--	**23,611**	**437**	--	--	**71**
				Volume-Weighted Average (mg/kg)		**0.16**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
FL001686	0	430	7.96	16.8	***0.021***	0.17
FL001687	1	104	1.93	3.42	3.42	6.61
J3-1-13_G/H-7/8	2	1,687	31.23	ND (0.09)	0.09	2.81
J3-1-13_G/H-7/8	2a	146	2.70	ND (0.09)	***0.021***	0.06
J3-1-13_F/G-7/8	3	7,197	133.29	ND (0.12)	0.12	15.33
J3-1-13_G-7/8	4	8,242	152.64	ND (0.1)	0.1	15.26
FL000760	5	216	3.99	ND (0.501)	0.501	2.00
FL000761	6	227	4.21	ND (0.501)	0.501	2.11
J3-1-12_H-7/8	7	0.1	0.002	ND (0.093)	0.093	0.00
J3-1-12_H-7/8	7a	25	0.5	ND (0.093)	***0.021***	0.01
BS000091	8	4	0.07	8.3	8.3	0.58
FL000595	9	474	8.78	0.098	0.098	0.86
J3-1-13_F-7/8	10	3,946	73.07	0.29	0.29	21.19
J3-1-13_F-8	11	105	1.95	3.0/2.0	2.5	4.87

Table E-1B-13
Parcel J3-1-13
Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-13_F/G-7/8	12	807	14.94	ND (0.12)	0.12	1.72
Total	**--**	**23,611**	**437**	**--**	**--**	**74**
				Volume-Weighted Average (mg/kg)		**0.17**

J3-1-13 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	23,611	874	145	0.17

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

-

Table E-1B-14

Parcel J3-1-12
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-12_I/J-7/8	0	3,038	56.3	ND (0.12)	0.12	6.75
J3-1-12_I/J-7/8	0a	7	0.1	ND (0.12)	0.12	0.01
J3-1-12_I/J-8	1	197	3.7	ND (0.11)	0.11	0.40
J3-1-12_I/J-8	1a	130	2.4	ND (0.11)	0.11	0.26
BS000089	2	318	5.9	10.6	10.6	62.37
FL001685	3	328	6.1	0.122	0.122	0.74
FL001685	3a	117	2.2	0.122	0.122	0.26
J3-1-12_J-8	4	305	5.6	0.235	0.235	1.33
J3-1-12_J-8	4a	165	3.1	0.235	0.235	0.72
FL000758	5	1,497	27.7	ND (0.502)	0.502	13.91
J3-1-11_J/K-7/8	6	73	1.4	0.13	0.13	0.18
J3-1-12_H-7/8	7	1,582	29.3	ND (0.093)	0.093	2.72
J3-1-12_H-7/8	7a	235	4.4	ND (0.093)	0.093	0.40
BS000090	8	591	10.9	15.2	15.2	166.39
FL000759	9	4,981	92.2	ND (0.501)	0.501	46.21
FL000759	9a	7	0.1	ND (0.501)	0.501	0.06
FL000759	10	1,664	30.8	ND (0.501)	0.501	15.44
FL000759	11	198	3.7	ND (0.501)	0.501	1.84
J3-1-13_G/H-7/8	12	5,669	105.0	ND (0.09)	0.09	9.45
J3-1-13_G-7/8	13	620	11.5	ND (0.1)	0.1	1.15
J3-1-12_I-7/8	14	5,035	93.2	0.14	0.14	13.05
J3-1-12_I-7/8	14a	124	2.3	0.14	0.14	0.32
FL001684	15	466	8.6	19.6	19.6	169.25
FL000759	16	927	17.2	ND (0.501)	0.501	8.60
J3-1-12_I-7/8	17	6	0.1	0.14	0.14	0.01
Total	**--**	**28,278**	**524**	**--**	**--**	**522**
				Volume-Weighted Average (mg/kg)		**1.00**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-12_I/J-8	0	197	3.7	ND (0.11)	0.11	0.40
J3-1-12_I/J-8	0a	130	2.4	ND (0.11)	0.11	0.26
J3-1-12_I/J-7/8	1	3,038	56.3	ND (0.12)	0.12	6.75
J3-1-12_I/J-7/8	1a	7	0.1	ND (0.12)	0.12	0.01

Table E-1B-14

Parcel J3-1-12
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-11_J/K-7/8	2	73	1.4	0.13	0.13	0.18
BS000089	3	318	5.9	21.9	21.9	128.85
J3-1-12_J-8	4	305	5.6	0.235	0.235	1.33
J3-1-12_J-8	4a	165	3.1	0.235	0.235	0.72
FL000758	5	1,497	27.7	ND (0.502)	0.502	13.91
FL000759	6	4,981	92.2	ND (0.501)	0.501	46.21
FL000759	6a	7	0.1	ND (0.501)	0.501	0.06
FL000759	7	1,664	30.8	ND (0.501)	0.501	15.44
FL000759	8	198	3.7	ND (0.501)	0.501	1.84
J3-1-13_G/H-7/8	9	5,669	105.0	ND (0.09)	0.09	9.45
J3-1-13_G-7/8	10	620	11.5	ND (0.1)	0.1	1.15
FL001684	11	466	8.6	26.0	26.0	224.52
J3-1-12_I-7/8	12	5,035	93.2	0.14	0.14	13.05
J3-1-12_I-7/8	12a	124	2.3	0.14	0.14	0.32
J3-1-12_H-7/8	13	1,582	29.3	ND (0.093)	0.093	2.72
J3-1-12_H-7/8	13a	235	4.4	ND (0.093)	0.093	0.40
BS000090	14	591	10.9	16.3	16.3	178.43
FL001685	15	328	6.1	0.034	0.034	0.21
FL001685	15a	117	2.2	0.034	0.034	0.07
FL000759	16	927	17.2	ND (0.501)	0.501	8.60
J3-1-12_I-7/8	17	6	0.1	0.14	0.14	0.01
Total	--	**28,278**	**524**	--	--	**655**
				Volume-Weighted Average (mg/kg)		**1.25**

Table E-1B-14

Parcel J3-1-12
Existing Conditions

J3-1-12 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	28,278	1,047	1,177	1.12

Notes:

1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-15

Parcel J3-1-12
Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-12_I/J-7/8	0	3,038	56.3	ND (0.12)	0.12	6.75
J3-1-12_I/J-7/8	0a	7	0.1	ND (0.12)	***0.021***	0.00
J3-1-12_I/J-8	1	197	3.7	ND (0.11)	0.11	0.40
J3-1-12_I/J-8	1a	130	2.4	ND (0.11)	***0.021***	0.05
BS000089	2	318	5.9	10.6	***0.021***	0.12
FL001685	3	328	6.1	0.122	0.122	0.74
FL001685	3a	117	2.2	0.122	***0.021***	0.05
J3-1-12_J-8	4	305	5.6	0.235	0.235	1.33
J3-1-12_J-8	4a	165	3.1	0.235	***0.021***	0.06
FL000758	5	1,497	27.7	ND (0.502)	0.502	13.91
J3-1-11_J/K-7/8	6	73	1.4	0.13	0.13	0.18
J3-1-12_H-7/8	7	1,582	29.3	ND (0.093)	0.093	2.72
J3-1-12_H-7/8	7a	235	4.4	ND (0.093)	***0.021***	0.09
BS000090	8	591	10.9	15.2	***0.021***	0.23
FL000759	9	4,981	92.2	ND (0.501)	0.501	46.21
FL000759	9a	7	0.1	ND (0.501)	***0.021***	0.00
FL000759	10	1,664	30.8	ND (0.501)	0.501	15.44
FL000759	11	198	3.7	ND (0.501)	0.501	1.84
J3-1-13_G/H-7/8	12	5,669	105.0	ND (0.09)	0.09	9.45
J3-1-13_G-7/8	13	620	11.5	ND (0.1)	0.1	1.15
J3-1-12_I-7/8	14	5,035	93.2	0.14	0.14	13.05
J3-1-12_I-7/8	14a	124	2.3	0.14	***0.021***	0.05
FL001684	15	466	8.6	19.6	***0.021***	0.18
FL000759	16	927	17.2	ND (0.501)	0.501	8.60
J3-1-12_I-7/8	17	6	0.1	0.14	0.14	0.01
Total	**--**	**28,278**	**524**	**--**	**--**	**123**
				Volume-Weighted Average (mg/kg)		**0.23**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-12_I/J-8	0	197	3.7	ND (0.11)	0.11	0.40
J3-1-12_I/J-8	0a	130	2.4	ND (0.11)	***0.021***	0.05
J3-1-12_I/J-7/8	1	3,038	56.3	ND (0.12)	0.12	6.75
J3-1-12_I/J-7/8	1a	7	0.1	ND (0.12)	***0.021***	0.00

Table E-1B-15

Parcel J3-1-12

Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-11_J/K-7/8	2	73	1.4	0.13	0.13	0.18
BS000089	3	318	5.9	21.9	***0.021***	0.12
J3-1-12_J-8	4	305	5.6	0.235	0.235	1.33
J3-1-12_J-8	4a	165	3.1	0.235	***0.021***	0.06
FL000758	5	1,497	27.7	ND (0.502)	0.502	13.91
FL000759	6	4,981	92.2	ND (0.501)	0.501	46.21
FL000759	6a	7	0.1	ND (0.501)	***0.021***	0.00
FL000759	7	1,664	30.8	ND (0.501)	0.501	15.44
FL000759	8	198	3.7	ND (0.501)	0.501	1.84
J3-1-13_G/H-7/8	9	5,669	105.0	ND (0.09)	0.09	9.45
J3-1-13_G-7/8	10	620	11.5	ND (0.1)	0.1	1.15
FL001684	11	466	8.6	26.0	***0.021***	0.18
J3-1-12_I-7/8	12	5,035	93.2	0.14	0.14	13.05
J3-1-12_I-7/8	12a	124	2.3	0.14	***0.021***	0.05
J3-1-12_H-7/8	13	1,582	29.3	ND (0.093)	0.093	2.72
J3-1-12_H-7/8	13a	235	4.4	ND (0.093)	***0.021***	0.09
BS000090	14	591	10.9	16.3	***0.021***	0.23
FL001685	15	328	6.1	0.034	0.034	0.21
FL001685	15a	117	2.2	0.034	***0.021***	0.05
FL000759	16	927	17.2	ND (0.501)	0.501	8.60
J3-1-12_I-7/8	17	6	0.1	0.14	0.14	0.01
Total	--	**28,278**	**524**	--	--	**122**
				Volume-Weighted Average (mg/kg)		**0.23**

Table E-1B-15
Parcel J3-1-12
Post-Remediation Conditions

J3-1-12 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	28,278	1,047	245	0.23

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-16

Parcel J3-1-11
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-11_L/M-7/8	0	1,877	34.755	0.71 [0.38]	0.55	18.94
J3-1-10_M-7/8	1	121	2.242	0.18	0.18	0.40
FL000756	2	838	15.514	ND (0.501)	0.501	7.77
J3-1-12_I/J-7/8	3	2,808	52.006	ND (0.12)	0.12	6.24
FL000757	4	1,173	21.729	0.422	0.422	9.17
J3-1-11_L-8/9	5	766	14.177	3.1	3.1	43.95
J3-1-11_K/L-7/8	6	3,049	56.471	0.39	0.39	22.02
FL001683	7	235	4.348	4.6	4.6	20.00
FL001683	7a	405	7.507	4.6	4.6	34.53
J3-1-11_K/L-8	8	284	5.257	0.45	0.45	2.37
J3-1-11_K/L-8	9	2	0.04	0.45	0.45	0.02
BS000089	10	5	0.10	10.6	10.6	1.02
J3-1-12_J-8	11	48	0.9	0.22 [0.25]	0.24	0.21
J3-1-12_J-8	11a	49	0.9	0.22 [0.25]	0.24	0.21
FL000758	12	3,193	59.1	ND (0.502)	0.502	29.68
J3-1-11_J/K-7/8	13	5,858	108.5	0.13	0.13	14.10
J3-1-11_J/K-7/8	14	101	1.9	0.13	0.13	0.24
J3-1-10_M-6/7	15	10,000	185.2	1.3	1.3	240.75
J3-1-12_I-7/8	16	614	11.4	0.14	0.14	1.59
FL001682	17	336	6.2	31.0 [33.0]	32.0	199.03
FL000756	18	57	1.1	ND (0.501)	0.501	0.53
J3-1-11_L-8/9	19	0.5	0.009	3.1	3.1	0.03
J3-1-11_K/L-7/8	20	9	0.2	0.39	0.39	0.07
J3-1-11_K/L-8	21	206	3.8	0.45	0.45	1.71
J3-1-10_M-6/7	22	898	16.6	1.3	1.3	21.62
Total	--	**32,932**	**610**	--	--	**676**
				Volume-Weighted Average (mg/kg)		**1.11**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-11_L/M-7/8	0	1,877	34.8	0.71 [0.38]	0.55	18.94
J3-1-10_M-7/8	1	121	2.2	0.18	0.18	0.40
FL000756	2	838	15.5	ND (0.502)	0.502	7.79
J3-1-11_K/L-8	3	284	5.3	0.45	0.45	2.37

Table E-1B-16

Parcel J3-1-11
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-11_K/L-8	4	2	0.04	0.45	0.45	0.02
J3-1-11_K/L-7/8	5	3,049	56.47	0.39	0.39	22.02
J3-1-12_I/J-7/8	6	2,808	52.01	ND (0.12)	0.12	6.24
J3-1-11_L-8/9	7	766	14.18	3.1	3.1	43.95
J3-1-11_J/K-7/8	8	5,858	108.48	0.13	0.13	14.10
J3-1-11_J/K-7/8	9	101	1.88	0.13	0.13	0.24
BS000089	10	5	0.10	21.9	21.9	2.10
J3-1-12_J-8	11	48	0.9	0.22 [0.25]	0.24	0.21
J3-1-12_J-8	11a	49	0.9	0.22 [0.25]	0.24	0.21
FL000757	12	1,173	21.7	ND (0.5)	0.5	10.86
FL001683	13	235	4.3	3.71	3.71	16.13
FL001683	13a	405	7.5	3.71	3.71	27.85
FL000758	14	3,193	59.1	ND (0.502)	0.502	29.68
J3-1-10_M-6/7	15	10,000	185.2	1.3	1.3	240.75
J3-1-12_I-7/8	16	614	11.4	0.14	0.14	1.59
FL001682	17	336	6.2	9.5	9.5	59.09
FL000756	18	57	1.1	ND (0.502)	0.502	0.53
J3-1-11_K/L-8	19	206	3.8	0.45	0.45	1.71
J3-1-11_K/L-7/8	20	9	0.2	0.39	0.39	0.07
J3-1-11_L-8/9	21	0.5	0.009	3.1	3.1	0.03
J3-1-10_M-6/7	22	898	16.632	1.3	1.3	21.62
Total	--	**32,932**	**610**	--	--	**529**
				Volume-Weighted Average (mg/kg)		**0.87**

Table E-1B-16

Parcel J3-1-11
Existing Conditions

J3-1-11 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	32,932	1,220	1,205	0.99

Notes:

1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-17

Parcel J3-1-11
Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-11_L/M-7/8	0	1,877	34.755	0.71 [0.38]	0.55	18.94
J3-1-10_M-7/8	1	121	2.242	0.18	0.18	0.40
FL000756	2	838	15.514	ND (0.501)	0.501	7.77
J3-1-12_I/J-7/8	3	2,808	52.006	ND (0.12)	0.12	6.24
FL000757	4	1,173	21.729	0.422	0.422	9.17
J3-1-11_L-8/9	5	766	14.177	3.1	3.1	43.95
J3-1-11_K/L-7/8	6	3,049	56.471	0.39	0.39	22.02
FL001683	7	235	4.348	4.6	4.6	20.00
FL001683	7a	405	7.507	4.6	***0.021***	0.16
J3-1-11_K/L-8	8	284	5.257	0.45	0.45	2.37
J3-1-11_K/L-8	9	2	0.04	0.45	0.45	0.02
BS000089	10	5	0.10	10.6	***0.021***	0.00
J3-1-12_J-8	11	48	0.9	0.22 [0.25]	0.24	0.21
J3-1-12_J-8	11a	49	0.9	0.22 [0.25]	***0.021***	0.02
FL000758	12	3,193	59.1	ND (0.502)	0.502	29.68
J3-1-11_J/K-7/8	13	5,858	108.5	0.13	0.13	14.10
J3-1-11_J/K-7/8	14	101	1.9	0.13	0.13	0.24
J3-1-10_M-6/7	15	10,000	185.2	1.3	1.3	240.75
J3-1-12_I-7/8	16	614	11.4	0.14	0.14	1.59
FL001682	17	336	6.2	31.0 [33.0]	***0.021***	0.13
FL000756	18	57	1.1	ND (0.501)	0.501	0.53
J3-1-11_L-8/9	19	0.5	0.009	3.1	3.1	0.03
J3-1-11_K/L-7/8	20	9	0.2	0.39	0.39	0.07
J3-1-11_K/L-8	21	206	3.8	0.45	0.45	1.71
J3-1-10_M-6/7	22	898	16.6	1.3	1.3	21.62
Total	--	**32,932**	**610**	--	--	**442**
				Volume-Weighted Average (mg/kg)		**0.72**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-11_L/M-7/8	0	1,877	34.8	0.71 [0.38]	0.55	18.94
J3-1-10_M-7/8	1	121	2.2	0.18	0.18	0.40
FL000756	2	838	15.5	ND (0.502)	0.502	7.79
J3-1-11_K/L-8	3	284	5.3	0.45	0.45	2.37

Table E-1B-17

Parcel J3-1-11
Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-1-11_K/L-8	4	2	0.04	0.45	0.45	0.02
J3-1-11_K/L-7/8	5	3,049	56.47	0.39	0.39	22.02
J3-1-12_I/J-7/8	6	2,808	52.01	ND (0.12)	0.12	6.24
J3-1-11_L-8/9	7	766	14.18	3.1	3.1	43.95
J3-1-11_J/K-7/8	8	5,858	108.48	0.13	0.13	14.10
J3-1-11_J/K-7/8	9	101	1.88	0.13	0.13	0.24
BS000089	10	5	0.10	21.9	***0.021***	0.00
J3-1-12_J-8	11	48	0.9	0.22 [0.25]	0.24	0.21
J3-1-12_J-8	11a	49	0.9	0.22 [0.25]	***0.021***	0.02
FL000757	12	1,173	21.7	ND (0.5)	0.5	10.86
FL001683	13	235	4.3	3.71	3.71	16.13
FL001683	13a	405	7.5	3.71	***0.021***	0.16
FL000758	14	3,193	59.1	ND (0.502)	0.502	29.68
J3-1-10_M-6/7	15	10,000	185.2	1.3	1.3	240.75
J3-1-12_I-7/8	16	614	11.4	0.14	0.14	1.59
FL001682	17	336	6.2	9.5	***0.021***	0.13
FL000756	18	57	1.1	ND (0.502)	0.502	0.53
J3-1-11_K/L-8	19	206	3.8	0.45	0.45	1.71
J3-1-11_K/L-7/8	20	9	0.2	0.39	0.39	0.07
J3-1-11_L-8/9	21	0.5	0.009	3.1	3.1	0.03
J3-1-10_M-6/7	22	898	16.632	1.3	1.3	21.62
Total	--	**32,932**	**610**	--	--	**440**
				Volume-Weighted Average (mg/kg)		**0.72**

Table E-1B-17
Parcel J3-1-11
Post-Remediation Conditions

J3-1-11 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	32,932	1,220	881	0.72

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-18

Parcel J3-2-2
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	1,113	20.60	13.0	13.0	267.86
FL001849	1	21	0.4	19.0	19.0	7.50
FL001849	1A	0.5	0.008	19.0	19.0	0.16
FL000914	2	261	4.835	18.1	18.1	87.52
FL001323	3	1,568	29.041	93.7	93.7	2,721.16
FL001323	3A	195	3.615	93.7	93.7	338.71
J3-2-2_H/I-2/3	4	1,173	21.722	5.6	5.6	121.64
J3-2-3_I/J-3/4	5	20	0.4	8.5	8.5	3.19
BS000059	6	0.4	0.007	12.2	12.2	0.09
BS000059	6A	0.10	0.002	12.2	12.2	0.02
J3-2-2-SB-1	7	1,091	20.205	20.8	20.8	420.26
J3-2-3-SS-2	8	951	17.611	ND (0.122)	0.122	2.15
J3-2-3-SS-2	8a	18	0.3	ND (0.122)	0.122	0.04
J3-2-2_G/H-2/3	9	842	15.6	0.17	0.17	2.65
J3-2-2_G/H-2/3	9a	332	6.2	0.17	0.17	1.05
J3-2-2_F/G-2	10	6,207	114.9	ND (0.12)	0.12	13.79
FL001324	11	893	16.5	40.4	40.4	667.89
J3-2-3-SS-4	12	137	2.5	ND (0.172)	0.172	0.44
J3-2-3-SS-1	13	15,001	277.8	ND (0.128)	0.128	35.56
J3-2-3-SS-1	14	638	11.8	ND (0.128)	0.128	1.51
Total	--	**30,462**	**564**	--	--	**4,693**
				Volume-Weighted Average (mg/kg)		**8.32**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	1,113	20.6	13.0	13.0	267.97
EA22-R-12	1	21	0.4	0.977	0.977	0.39
J3-2-2_H/I-2/3	2	1,173	21.7	5.6	5.6	121.64
FL001323	3	1,568	29.0	8.72 [14.0]	11.4	329.91
FL001323	3A	195	3.6	8.72 [14.0]	11.4	41.06
J3-2-3_I/J-3/4	4	20	0.4	8.5	8.5	3.19
BS000059	5	0.4	0.007	17.7	17.7	0.12
BS000059	5A	0.10	0.002	17.7	17.7	0.03
FL000914	6	261	4.835	0.517	0.517	2.50

Table E-1B-18

Parcel J3-2-2
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2-SB-1	7	1,091	20.205	31.4	31.4	634.44
J3-2-3-SS-2	8	951	17.611	ND (0.113)	0.113	1.99
J3-2-3-SS-2	8a	18	0.3	ND (0.113)	0.113	0.04
J3-2-2_G/H-2/3	9	842	15.6	0.17	0.17	2.65
J3-2-2_G/H-2/3	9a	332	6.2	0.17	0.17	1.05
J3-2-2_F/G-2	10	6,207	114.9	ND (0.12)	0.12	13.79
FL001324	11	893	16.5	18.0	18.0	297.57
J3-2-3-SS-4	12	137	2.5	ND (0.146)	0.146	0.37
J3-2-3-SS-1	13	15,001	277.8	ND (0.122)	0.122	33.89
J3-2-3-SS-1	14	638	11.8	ND (0.122)	0.122	1.44
Total	--	**30,462**	**564**	--	--	**1,754**
				Volume-Weighted Average (mg/kg)		**3.11**

Table E-1B-18
Parcel J3-2-2
Existing Conditions

J3-2-2 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	30,462	1,128	6,447	5.71

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-19

Parcel J3-2-2
Existing Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	1,330	49.2	46.0	46.0	2,265.44
J3-2-2-SB-1	1	1,551	57.4	2.324	2.324	133.48
J3-2-3_I/J-3/4	2	1,100	40.8	0.16	0.16	6.52
J3-2-3-SB-1	3	0.5	0.02	2.317	2.317	0.04
J3-2-2_H/I-2/3	4	2,407	89.16	0.9/6.6	4	334.35
J3-2-2_G/H-2/3	5	1,549	57.39	ND (0.083)	0.083	4.76
J3-2-3_G-3/4	6	409	15.16	ND (0.12)	0.12	1.82
J3-2-4_E/F-6	7	241	8.94	ND (0.12)	0.12	1.07
J3-2-3_F-4/5	8	2	0.08	ND (0.1)	0.1	0.01
J3-2-4_E/F-5/6	9	950	35.17	ND (0.13)	0.13	4.57
J3-2-2_F/G-2	10	20,922	774.87	ND (0.12)	0.12	92.98
Total	--	**30,462**	**1,128**	--	--	**2,845**
				Volume-Weighted Average (mg/kg)		**2.52**

Table E-1B-19
Parcel J3-2-2
Existing Conditions

J3-2-2 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 2-Foot Depth Increment	30,462	1,128	2,845	2.52

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-20

Parcel J3-2-2

Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	1,113	20.60	13.0	***0.021***	0.43
FL001849	1	21	0.4	19.0	***0.021***	0.01
FL001849	1A	0.5	0.008	19.0	***0.021***	0.00
FL000914	2	261	4.835	18.1	***0.021***	0.10
FL001323	3	1,568	29.041	93.7	***0.021***	0.61
FL001323	3A	195	3.615	93.7	***0.021***	0.08
J3-2-2_H/I-2/3	4	1,173	21.722	5.6	5.6	121.64
J3-2-3_I/J-3/4	5	20	0.4	8.5	8.5	3.19
BS000059	6	0.4	0.007	12.2	***0.021***	0.00
BS000059	6A	0.10	0.002	12.2	***0.021***	0.00
J3-2-2-SB-1	7	1,091	20.205	20.8	***0.021***	0.42
J3-2-3-SS-2	8	951	17.611	ND (0.122)	0.122	2.15
J3-2-3-SS-2	8a	18	0.3	ND (0.122)	***0.021***	0.01
J3-2-2_G/H-2/3	9	842	15.6	0.17	0.17	2.65
J3-2-2_G/H-2/3	9a	332	6.2	0.17	***0.021***	0.13
J3-2-2_F/G-2	10	6,207	114.9	ND (0.12)	0.12	13.79
FL001324	11	893	16.5	40.4	***0.021***	0.35
J3-2-3-SS-4	12	137	2.5	ND (0.172)	0.172	0.44
J3-2-3-SS-1	13	15,001	277.8	ND (0.128)	0.128	35.56
J3-2-3-SS-1	14	638	11.8	ND (0.128)	0.128	1.51
Total	--	**30,462**	**564**	--	--	**183**
				Volume-Weighted Average (mg/kg)		**0.32**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	1,113	20.6	13.0	***0.021***	0.43
EA22-R-12	1	21	0.4	0.977	***0.021***	0.01
J3-2-2_H/I-2/3	2	1,173	21.7	5.6	5.6	121.64
FL001323	3	1,568	29.0	8.72 [14.0]	***0.021***	0.61
FL001323	3A	195	3.6	8.72 [14.0]	***0.021***	0.08
J3-2-3_I/J-3/4	4	20	0.4	8.5	8.5	3.19
BS000059	5	0.4	0.007	17.7	***0.021***	0.00
BS000059	5A	0.10	0.002	17.7	***0.021***	0.00
FL000914	6	261	4.835	0.517	***0.021***	0.10

Table E-1B-20

Parcel J3-2-2
Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2-SB-1	7	1,091	20.205	31.4	***0.021***	0.42
J3-2-3-SS-2	8	951	17.611	ND (0.113)	0.113	1.99
J3-2-3-SS-2	8a	18	0.3	ND (0.113)	***0.021***	0.01
J3-2-2_G/H-2/3	9	842	15.6	0.17	0.17	2.65
J3-2-2_G/H-2/3	9a	332	6.2	0.17	***0.021***	0.13
J3-2-2_F/G-2	10	6,207	114.9	ND (0.12)	0.12	13.79
FL001324	11	893	16.5	18.0	***0.021***	0.35
J3-2-3-SS-4	12	137	2.5	ND (0.146)	0.146	0.37
J3-2-3-SS-1	13	15,001	277.8	ND (0.122)	0.122	33.89
J3-2-3-SS-1	14	638	11.8	ND (0.122)	0.122	1.44
Total	--	**30,462**	**564**	--	--	**181**
				Volume-Weighted Average (mg/kg)		**0.32**

Table E-1B-20
Parcel J3-2-2
Post-Remediation Conditions

J3-2-2 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	30,462	1,128	364	0.32

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-21

Parcel J3-2-2
Post-Remediation Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	1,330	49.2	46.0	***0.021***	1.03
J3-2-2-SB-1	1	1,551	57.4	2.324	2.324	133.48
J3-2-3_I/J-3/4	2	1,100	40.8	0.16	0.16	6.52
J3-2-3-SB-1	3	0.5	0.02	2.317	2.317	0.04
J3-2-2_H/I-2/3	4	2,407	89.16	0.9/6.6	4	334.35
J3-2-2_G/H-2/3	5	1,549	57.39	ND (0.083)	0.083	4.76
J3-2-3_G-3/4	6	409	15.16	ND (0.12)	0.12	1.82
J3-2-4_E/F-6	7	241	8.94	ND (0.12)	0.12	1.07
J3-2-3_F-4/5	8	2	0.08	ND (0.1)	0.1	0.01
J3-2-4_E/F-5/6	9	950	35.17	ND (0.13)	0.13	4.57
J3-2-2_F/G-2	10	20,922	774.87	ND (0.12)	0.12	92.98
Total	**--**	**30,462**	**1,128**	**--**	**--**	**581**
				Volume-Weighted Average (mg/kg)		**0.51**

Table E-1B-21
Parcel J3-2-2
Post-Remediation Conditions

J3-2-2 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 2-Foot Depth Increment	30,462	1,128	581	0.51

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-22

Parcel J3-2-3
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	169	3.12	11.0 [15.0]	13.0	40.58
FL000914	1	1,017	18.84	18.1	18.1	341.02
FL001323	2	28	0.5	93.7	93.7	48.13
J3-2-3_I/J-3/4	3	1,004	18.6	8.5	8.5	158.02
BS000059	4	185	3.4	12.2	12.2	41.73
BS000058	5	282	5.2	20.6	20.6	107.59
J3-2-3-SB-3	6	642	11.9	19.0	19.0	225.87
J3-2-3_H/I-3/4	7	641	11.9	29.0	29.0	344.29
FL000700	8	883	16.3	18.7	18.7	305.69
J3-2-2-SB-1	9	34	0.6	20.8	20.8	13.27
J3-2-3-SB-2	10	196	3.6	9.26	9.26	33.55
J3-2-3-SB-2	10a	248	4.6	9.26	9.26	42.56
J3-2-3-SS-2	11	583	10.8	ND (0.122)	0.122	1.32
J3-2-3-SS-2	11a	220	4.1	ND (0.122)	0.122	0.50
J3-2-3-SB-1	12	1,239	22.9	20.6	20.6	472.75
J3-2-3_G-3/4	13	1,051	19.5	ND (0.12)	0.12	2.34
J3-2-3_G-3/4	13a	134	2.5	ND (0.12)	0.12	0.30
J3-2-4_E/F-5/6	14	427	7.9	ND (0.14)	0.14	1.11
J3-2-3_F/G-4	15	1,244	23.0	ND (0.12)	0.12	2.76
J3-2-3_F/G-4	15a	44	0.8	ND (0.12)	0.12	0.10
J3-2-3-SB-4	16	683	12.6	9.23	9.23	116.76
FL001324	17	1.0	0.02	40.4	40.4	0.74
J3-2-3_F-4/5	18	1,192	22.07	ND (0.12)	0.12	2.65
J3-2-3-SS-4	19	2,651	49.09	ND (0.172)	0.172	8.44
J3-2-3-SS-3	20	510	9.45	19.0	19.0	179.52
J3-2-3-SS-5	21	3,710	68.70	0.23 [ND (0.156)]	0.19	13.26
FL000699	22	113	2.10	6.1	6.1	12.80
J3-2-3-SS-1	23	15,062	278.92	ND (0.128)	0.128	35.70
J3-2-3-SS-1	24	815	15.10	ND (0.128)	0.128	1.93
Total	--	**35,008**	**648**	--	--	**2,555**
				Volume-Weighted Average (mg/kg)		**3.94**

Table E-1B-22

Parcel J3-2-3
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	169	3.12	11.0 [15.0]	13.0	40.58
FL001323	1	28	0.5	8.72 [14.0]	11.4	5.83
J3-2-3_H/I-3/4	2	641	11.9	29.0	29.0	344.29
J3-2-3_I/J-3/4	3	1,004	18.6	8.5	8.5	158.02
BS000059	4	185	3.4	17.7	17.7	60.54
FL000914	5	1,017	18.8	0.517	0.517	9.74
J3-2-3-SB-3	6	642	11.9	8.4	8.4	99.86
BS000058	7	282	5.2	ND (0.596)	0.596	3.11
FL000700	8	883	16.3	3.34	3.34	54.60
J3-2-2-SB-1	9	34	0.6	31.4	31.4	20.04
J3-2-3-SB-2	10	196	3.6	5.02	5.02	18.19
J3-2-3-SB-2	10a	248	4.6	5.02	5.02	23.07
J3-2-3-SS-2	11	583	10.8	ND (0.113)	0.113	1.22
J3-2-3-SS-2	11a	220	4.1	ND (0.113)	0.113	0.46
J3-2-3-SB-1	12	1,239	22.9	1.6	1.6	36.72
J3-2-3_G-3/4	13	1,051	19.5	ND (0.12)	0.12	2.34
J3-2-3_G-3/4	13a	134	2.5	ND (0.12)	0.12	0.30
J3-2-4_E/F-5/6	14	427	7.9	ND (0.14)	0.14	1.11
J3-2-3_F/G-4	15	1,244	23.0	ND (0.12)	0.12	2.76
J3-2-3_F/G-4	15a	44	0.8	ND (0.12)	0.12	0.10
J3-2-3-SB-4	16	683	12.6	10.8	10.8	136.62
FL001324	17	1.0	0.02	18.0	18.0	0.33
J3-2-3_F-4/5	18	1,192	22.07	ND (0.12)	0.12	2.65
J3-2-3-SS-4	19	2,651	49.09	ND (0.146)	0.146	7.17
J3-2-3-SS-3	20	510	9.45	5.84	5.84	55.18
J3-2-3-SS-5	21	3,710	68.70	ND (0.17)	0.17	11.68
FL000699	22	113	2.10	11.3	11.3	23.71
J3-2-3-SS-1	23	15,062	278.92	ND (0.122)	0.122	34.03
J3-2-3-SS-1	24	815	15.10	ND (0.122)	0.122	1.84
Total	--	**35,008**	**648**	--	--	**1,156**
				Volume-Weighted Average (mg/kg)		**1.78**

Table E-1B-22
Parcel J3-2-3
Existing Conditions

J3-2-3 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	35,008	1,297	3,711	2.86

Notes:

1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-23

Parcel J3-2-3
Existing Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	185	6.85	46.0	46.0	315.02
J3-2-2-SB-1	1	80	2.97	2.324	2.324	6.89
J3-2-3-SB-3	2	642	23.78	0.18725	0.18725	4.45
J3-2-3_I/J-3/4	3	1,357	50.27	0.16	0.16	8.04
J3-2-3_H/I-3/4	4	1,085	40.19	0.52	0.52	20.90
J3-2-3-SB-1	5	1,908	70.67	2.317	2.317	163.74
J3-2-3-SB-5	6	779	28.84	0.908	0.908	26.19
J3-2-3-SB-2	7	734	27.19	1.123	1.123	30.54
J3-2-2_H/I-2/3	8	232	8.59	0.9	0.9	7.73
J3-2-3_F/G-4	9	2,890	107.03	ND (0.12)	0.12	12.84
J3-2-3-SB-4	10	707	26.20	2.94	2.94	77.01
J3-2-3_G-3/4	11	2,204	81.64	ND (0.12)	0.12	9.80
J3-2-4_E/F-6	12	7,268	269.19	ND (0.12)	0.12	32.30
J3-2-3_F-4/5	13	6,130	227.02	ND (0.1)	0.1	22.70
J3-2-4_E/F-5/6	14	7,260	268.88	ND (0.13)	0.13	34.95
J3-2-5_D/E-7/8	15	762	28.23	ND (0.1)	0.1	2.82
J3-2-2_F/G-2	16	784	29.05	ND (0.12)	0.12	3.49
Total	--	**35,008**	**1,297**	--	--	**779**
				Volume-Weighted Average (mg/kg)		**0.60**

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	607	22.48	ND (0.15)	0.15	3.37
J3-2-3-SB-3	1	642	23.78	0.142	0.142	3.38
J3-2-3-SB-1	2	2,087	77.28	0.4215	0.4215	32.57
J3-2-2-SB-1	3	219	8.10	ND (0.167)	0.167	1.35
J3-2-3_H/I-3/4	4	2,181	80.79	0.35	0.35	28.28
J3-2-3-SB-2	5	2,056	76.14	0.7315	0.7315	55.69
J3-2-3-SB-4	6	2,694	99.79	6.208	6.208	619.47
J3-2-3-SB-5	7	779	28.84	ND (0.136)	0.136	3.92
J3-2-4_E/F-6/7	8	4,744	175.72	0.51	0.51	89.62
J3-2-3_F/G-4	9	10,586	392.06	ND (0.11)	0.11	43.13
J3-2-4_F-5/6	10	8,413	311.61	ND (0.14)	0.14	43.63

Table E-1B-23
Parcel J3-2-3
Existing Conditions

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
Total	--	**35,008**	**1,297**	--	--	**924**
				Volume-Weighted Average (mg/kg)		**0.71**

J3-2-3 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 3-Foot Depth Increment	35,008	2,593	1,704	0.66

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-24

Parcel J3-2-3

Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	169	3.12	11.0 [15.0]	***0.021***	0.07
FL000914	1	1,017	18.84	18.1	***0.021***	0.40
FL001323	2	28	0.5	93.7	***0.021***	0.01
J3-2-3_I/J-3/4	3	1,004	18.6	8.5	8.5	158.02
BS000059	4	185	3.4	12.2	***0.021***	0.07
BS000058	5	282	5.2	20.6	***0.021***	0.11
J3-2-3-SB-3	6	642	11.9	19.0	***0.021***	0.25
J3-2-3_H/I-3/4	7	641	11.9	29.0	***0.021***	0.25
FL000700	8	883	16.3	18.7	***0.021***	0.34
J3-2-2-SB-1	9	34	0.6	20.8	***0.021***	0.01
J3-2-3-SB-2	10	196	3.6	9.26	9.26	33.55
J3-2-3-SB-2	10a	248	4.6	9.26	***0.021***	0.10
J3-2-3-SS-2	11	583	10.8	ND (0.122)	0.122	1.32
J3-2-3-SS-2	11a	220	4.1	ND (0.122)	***0.021***	0.09
J3-2-3-SB-1	12	1,239	22.9	20.6	***0.021***	0.48
J3-2-3_G-3/4	13	1,051	19.5	ND (0.12)	0.12	2.34
J3-2-3_G-3/4	13a	134	2.5	ND (0.12)	***0.021***	0.05
J3-2-4_E/F-5/6	14	427	7.9	ND (0.14)	0.14	1.11
J3-2-3_F/G-4	15	1,244	23.0	ND (0.12)	0.12	2.76
J3-2-3_F/G-4	15a	44	0.8	ND (0.12)	***0.021***	0.02
J3-2-3-SB-4	16	683	12.6	9.23	***0.021***	0.27
FL001324	17	1.0	0.02	40.4	***0.021***	0.00
J3-2-3_F-4/5	18	1,192	22.07	ND (0.12)	0.12	2.65
J3-2-3-SS-4	19	2,651	49.09	ND (0.172)	0.172	8.44
J3-2-3-SS-3	20	510	9.45	19.0	***0.021***	0.20
J3-2-3-SS-5	21	3,710	68.70	0.23 [ND (0.156)]	0.19	13.26
FL000699	22	113	2.10	6.1	***0.021***	0.04
J3-2-3-SS-1	23	15,062	278.92	ND (0.128)	0.128	35.70
J3-2-3-SS-1	24	815	15.10	ND (0.128)	0.128	1.93
Total	--	**35,008**	**648**	--	--	**264**
				Volume-Weighted Average (mg/kg)		**0.41**

Table E-1B-24

Parcel J3-2-3

Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	169	3.12	11.0 [15.0]	***0.021***	0.07
FL001323	1	28	0.5	8.72 [14.0]	***0.021***	0.01
J3-2-3_H/I-3/4	2	641	11.9	29.0	***0.021***	0.25
J3-2-3_I/J-3/4	3	1,004	18.6	8.5	8.5	158.02
BS000059	4	185	3.4	17.7	***0.021***	0.07
FL000914	5	1,017	18.8	0.517	***0.021***	0.40
J3-2-3-SB-3	6	642	11.9	8.4	***0.021***	0.25
BS000058	7	282	5.2	ND (0.596)	***0.021***	0.11
FL000700	8	883	16.3	3.34	***0.021***	0.34
J3-2-2-SB-1	9	34	0.6	31.4	***0.021***	0.01
J3-2-3-SB-2	10	196	3.6	5.02	5.02	18.19
J3-2-3-SB-2	10a	248	4.6	5.02	***0.021***	0.10
J3-2-3-SS-2	11	583	10.8	ND (0.113)	0.113	1.22
J3-2-3-SS-2	11a	220	4.1	ND (0.113)	***0.021***	0.09
J3-2-3-SB-1	12	1,239	22.9	1.6	***0.021***	0.48
J3-2-3_G-3/4	13	1,051	19.5	ND (0.12)	0.12	2.34
J3-2-3_G-3/4	13a	134	2.5	ND (0.12)	***0.021***	0.05
J3-2-4_E/F-5/6	14	427	7.9	ND (0.14)	0.14	1.11
J3-2-3_F/G-4	15	1,244	23.0	ND (0.12)	0.12	2.76
J3-2-3_F/G-4	15a	44	0.8	ND (0.12)	***0.021***	0.02
J3-2-3-SB-4	16	683	12.6	10.8	***0.021***	0.27
FL001324	17	1.0	0.02	18.0	***0.021***	0.00
J3-2-3_F-4/5	18	1,192	22.07	ND (0.12)	0.12	2.65
J3-2-3-SS-4	19	2,651	49.09	ND (0.146)	0.146	7.17
J3-2-3-SS-3	20	510	9.45	5.84	***0.021***	0.20
J3-2-3-SS-5	21	3,710	68.70	ND (0.17)	0.17	11.68
FL000699	22	113	2.10	11.3	***0.021***	0.04
J3-2-3-SS-1	23	15,062	278.92	ND (0.122)	0.122	34.03
J3-2-3-SS-1	24	815	15.10	ND (0.122)	0.122	1.84
Total	**--**	**35,008**	**648**	**--**	**--**	**244**
				Volume-Weighted Average (mg/kg)		**0.38**

Table E-1B-24
Parcel J3-2-3
Post-Remediation Conditions

J3-2-3 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	35,008	1,297	508	0.39

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-25
Parcel J3-2-3
Post-Remediation Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	185	6.85	46.0	46.0	315.02
J3-2-2-SB-1	1	80	2.97	2.324	2.324	6.89
J3-2-3-SB-3	2	642	23.78	0.18725	0.18725	4.45
J3-2-3_I/J-3/4	3	1,357	50.27	0.16	0.16	8.04
J3-2-3_H/I-3/4	4	1,085	40.19	0.52	0.52	20.90
J3-2-3-SB-1	5	1,908	70.67	2.317	2.317	163.74
J3-2-3-SB-5	6	779	28.84	0.908	0.908	26.19
J3-2-3-SB-2	7	734	27.19	1.123	1.123	30.54
J3-2-2_H/I-2/3	8	232	8.59	0.9	0.9	7.73
J3-2-3_F/G-4	9	2,890	107.03	ND (0.12)	0.12	12.84
J3-2-3-SB-4	10	707	26.20	2.94	2.94	77.01
J3-2-3_G-3/4	11	2,204	81.64	ND (0.12)	0.12	9.80
J3-2-4_E/F-6	12	7,268	269.19	ND (0.12)	0.12	32.30
J3-2-3_F-4/5	13	6,130	227.02	ND (0.1)	0.1	22.70
J3-2-4_E/F-5/6	14	7,260	268.88	ND (0.13)	0.13	34.95
J3-2-5_D/E-7/8	15	762	28.23	ND (0.1)	0.1	2.82
J3-2-2_F/G-2	16	784	29.05	ND (0.12)	0.12	3.49
Total	--	**35,008**	**1,297**	--	--	**779**
				Volume-Weighted Average (mg/kg)		**0.60**

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-2_J/K-2/3	0	607	22.48	ND (0.15)	0.15	3.37
J3-2-3-SB-3	1	642	23.78	0.142	0.142	3.38
J3-2-3-SB-1	2	2,087	77.28	0.4215	0.4215	32.57
J3-2-2-SB-1	3	219	8.10	ND (0.167)	0.167	1.35
J3-2-3_H/I-3/4	4	2,181	80.79	0.35	0.35	28.28
J3-2-3-SB-2	5	2,056	76.14	0.7315	0.7315	55.69
J3-2-3-SB-4	6	2,694	99.79	6.208	6.208	619.47
J3-2-3-SB-5	7	779	28.84	ND (0.136)	0.136	3.92
J3-2-4_E/F-6/7	8	4,744	175.72	0.51	0.51	89.62
J3-2-3_F/G-4	9	10,586	392.06	ND (0.11)	0.11	43.13
J3-2-4_F-5/6	10	8,413	311.61	ND (0.14)	0.14	43.63

Table E-1B-25
Parcel J3-2-3
Post-Remediation Conditions

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
Total	--	**35,008**	**1,297**	--	--	**924**
				Volume-Weighted Average (mg/kg)		**0.71**

J3-2-3 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 3-Foot Depth Increment	35,008	2,593	1,704	0.66

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-25

Parcel J3-2-4
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-4_E/F-5/6	0	1,424	26.4	ND (0.14)	0.14	3.69
J3-2-4_E/F-5/6	0a	39	0.7	ND (0.14)	0.14	0.10
J3-2-3-SB-4	1	133	2.5	9.23	9.23	22.69
J3-2-4_E/F-6	2	5,329	98.7	ND (0.15)	0.15	14.80
J3-2-4_E/F-6	2a	183	3.4	ND (0.15)	0.15	0.51
BS000060	3	38	0.7	17.7	17.7	12.56
J3-2-4_F-5/6	4	577	10.7	15.0	15.0	160.17
J3-2-4_F/G-5/6	5	87	1.6	14.0	14.0	22.66
BS000057	6	7	0.1	16.2	16.2	2.00
FL000701	7	319	5.9	22.8	22.8	134.57
J3-2-5_E-7/8	8	25	0.5	ND (0.14)	0.14	0.07
J3-2-3-SS-5	9	419	7.8	0.23 [ND (0.156)]	0.19	1.50
FL000699	10	411	7.6	6.1	6.1	46.43
J3-2-4_E-6/7	11	2,029	37.6	ND (0.16)	0.16	6.01
J3-2-4_E-6/7	11a	26	0.5	ND (0.16)	0.16	0.08
J3-2-4_E/F-6/7	12	230	4.3	16.0	16.0	68.14
J3-2-3-SS-1	13	1,145	21.2	ND (0.128)	0.128	2.71
J3-2-5_D/E-7/8	14	9,400	174.1	ND (0.11)	0.11	19.15
J3-2-5_D/E-7/8	15	340	6.3	ND (0.11)	0.11	0.69
Total	--	**22,161**	**410**	--	--	**519**
				Volume-Weighted Average (mg/kg)		**1.26**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-4_F/G-5/6	0	87	1.6	14.0	14.0	22.66
J3-2-4_E/F-5/6	1	1,424	26.4	ND (0.14)	0.14	3.69
J3-2-4_E/F-5/6	1a	39	0.7	ND (0.14)	0.14	0.10
J3-2-3-SB-4	2	133	2.5	10.8	10.8	26.56
J3-2-4_E/F-6	3	5,329	98.7	ND (0.15)	0.15	14.80
J3-2-4_E/F-6	3a	183	3.4	ND (0.15)	0.15	0.51
J3-2-4_F-5/6	4	577	10.7	15.0	15.0	160.17
BS000057	5	7	0.1	ND (0.507)	0.507	0.06
BS000060	6	38	0.7	18.7	18.7	13.27
FL000701	7	319	5.9	19.2	19.2	113.32

Table E-1B-25

Parcel J3-2-4
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-5_E-7/8	8	25	0.5	ND (0.14)	0.14	0.07
J3-2-3-SS-5	9	419	7.8	ND (0.17)	0.17	1.32
FL000699	10	411	7.6	11.3	11.3	86.00
J3-2-4_E-6/7	11	2,029	37.6	ND (0.16)	0.16	6.01
J3-2-4_E-6/7	11a	26	0.5	ND (0.16)	0.16	0.08
J3-2-4_E/F-6/7	12	230	4.3	16.0	16.0	68.14
J3-2-3-SS-1	13	1,145	21.2	ND (0.122)	0.122	2.59
J3-2-5_D/E-7/8	14	9,400	174.1	ND (0.11)	0.11	19.15
J3-2-5_D/E-7/8	15	340	6.3	ND (0.11)	0.11	0.69
Total	--	**22,161**	**410**	--	--	**539**
				Volume-Weighted Average (mg/kg)		**1.31**

Table E-1B-25

Parcel J3-2-4
Existing Conditions

J3-2-4 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	22,161	821	1,058	1.29

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-26
Parcel J3-2-4
Existing Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-3-SB-4	0	261	9.7	2.94	2.94	28.38
J3-2-4_F-5/6	1	598	22.1	15.0	15.0	332.19
J3-2-4_E/F-6	2	6,444	238.7	ND (0.12)	0.12	28.64
J3-2-3_F-4/5	3	34	1.3	ND (0.1)	0.1	0.13
J3-2-4_E/F-5/6	4	1,603	59.4	ND (0.13)	0.13	7.72
J3-2-4_F/G-5/6	5	214	7.9	60.0	60.0	474.58
J3-2-4_E-6/7	6	2,196	81.3	ND (0.12)	0.12	9.76
J3-2-5_D/E-7/8	7	10,358	383.6	ND (0.1)	0.1	38.36
J3-2-4_E/F-6/7	8	428	15.9	24.0	24.0	380.68
J3-2-5_E-7/8	9	25	0.9	ND (0.11)	0.11	0.10
Total	--	**22,161**	**821**	--	--	**1,301**
				Volume-Weighted Average (mg/kg)		**1.58**

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-3-SB-4	0	312	11.5	6.208	6.208	71.62
J3-2-4_E/F-6/7	1	18,296	677.6	0.51	0.51	345.60
J3-2-4_F/G-5/6	2	225	8.3	67.0	67.0	557.95
J3-2-4_F-5/6	3	3,328	123.3	ND (0.14)	0.14	17.26
Total	--	**22,161**	**821**	--	--	**992**
				Volume-Weighted Average (mg/kg)		**1.21**

Table E-1B-26
Parcel J3-2-4
Existing Conditions

J3-2-4 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 3-Foot Depth Increment	22,161	1,642	2,293	1.40

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-27

Parcel J3-2-4

Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-4_E/F-5/6	0	1,424	26.4	ND (0.14)	0.14	3.69
J3-2-4_E/F-5/6	0a	39	0.7	ND (0.14)	***0.021***	0.02
J3-2-3-SB-4	1	133	2.5	9.23	***0.021***	0.05
J3-2-4_E/F-6	2	5,329	98.7	ND (0.15)	0.15	14.80
J3-2-4_E/F-6	2a	183	3.4	ND (0.15)	***0.021***	0.07
BS000060	3	38	0.7	17.7	***0.021***	0.01
J3-2-4_F-5/6	4	577	10.7	15.0	***0.021***	0.22
J3-2-4_F/G-5/6	5	87	1.6	14.0	***0.021***	0.03
BS000057	6	7	0.1	16.2	***0.021***	0.00
FL000701	7	319	5.9	22.8	***0.021***	0.12
J3-2-5_E-7/8	8	25	0.5	ND (0.14)	0.14	0.07
J3-2-3-SS-5	9	419	7.8	0.23 [ND (0.156)]	0.19	1.50
FL000699	10	411	7.6	6.1	***0.021***	0.16
J3-2-4_E-6/7	11	2,029	37.6	ND (0.16)	0.16	6.01
J3-2-4_E-6/7	11a	26	0.5	ND (0.16)	***0.021***	0.01
J3-2-4_E/F-6/7	12	230	4.3	16.0	***0.021***	0.09
J3-2-3-SS-1	13	1,145	21.2	ND (0.128)	0.128	2.71
J3-2-5_D/E-7/8	14	9,400	174.1	ND (0.11)	0.11	19.15
J3-2-5_D/E-7/8	15	340	6.3	ND (0.11)	0.11	0.69
Total	--	**22,161**	**410**	--	--	**49**
				Volume-Weighted Average (mg/kg)		**0.12**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-4_F/G-5/6	0	87	1.6	14.0	***0.021***	0.03
J3-2-4_E/F-5/6	1	1,424	26.4	ND (0.14)	0.14	3.69
J3-2-4_E/F-5/6	1a	39	0.7	ND (0.14)	***0.021***	0.02
J3-2-3-SB-4	2	133	2.5	10.8	***0.021***	0.05
J3-2-4_E/F-6	3	5,329	98.7	ND (0.15)	0.15	14.80
J3-2-4_E/F-6	3a	183	3.4	ND (0.15)	***0.021***	0.07
J3-2-4_F-5/6	4	577	10.7	15.0	***0.021***	0.22
BS000057	5	7	0.1	ND (0.507)	***0.021***	0.00
BS000060	6	38	0.7	18.7	***0.021***	0.01
FL000701	7	319	5.9	19.2	***0.021***	0.12

Table E-1B-27

Parcel J3-2-4
Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-5_E-7/8	8	25	0.5	ND (0.14)	0.14	0.07
J3-2-3-SS-5	9	419	7.8	ND (0.17)	0.17	1.32
FL000699	10	411	7.6	11.3	***0.021***	0.16
J3-2-4_E-6/7	11	2,029	37.6	ND (0.16)	0.16	6.01
J3-2-4_E-6/7	11a	26	0.5	ND (0.16)	***0.021***	0.01
J3-2-4_E/F-6/7	12	230	4.3	16.0	***0.021***	0.09
J3-2-3-SS-1	13	1,145	21.2	ND (0.122)	0.122	2.59
J3-2-5_D/E-7/8	14	9,400	174.1	ND (0.11)	0.11	19.15
J3-2-5_D/E-7/8	15	340	6.3	ND (0.11)	0.11	0.69
Total	--	**22,161**	**410**	--	--	**49**
				Volume-Weighted Average (mg/kg)		**0.12**

Table E-1B-27
Parcel J3-2-4
Post-Remediation Conditions

J3-2-4 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	22,161	821	99	0.12

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-28
Parcel J3-2-4
Post-Remediation Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-3-SB-4	0	261	9.7	2.94	2.94	28.38
J3-2-4_F-5/6	1	598	22.1	15.0	15.0	332.19
J3-2-4_E/F-6	2	6,444	238.7	ND (0.12)	0.12	28.64
J3-2-3_F-4/5	3	34	1.3	ND (0.1)	0.1	0.13
J3-2-4_E/F-5/6	4	1,603	59.4	ND (0.13)	0.13	7.72
J3-2-4_F/G-5/6	5	214	7.9	60.0	60.0	474.58
J3-2-4_E-6/7	6	2,196	81.3	ND (0.12)	0.12	9.76
J3-2-5_D/E-7/8	7	10,358	383.6	ND (0.1)	0.1	38.36
J3-2-4_E/F-6/7	8	428	15.9	24.0	24.0	380.68
J3-2-5_E-7/8	9	25	0.9	ND (0.11)	0.11	0.10
Total	--	**22,161**	**821**	--	--	**1,301**
				Volume-Weighted Average (mg/kg)		**1.58**

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-3-SB-4	0	312	11.5	6.208	6.208	71.62
J3-2-4_E/F-6/7	1	18,296	677.6	0.51	0.51	345.60
J3-2-4_F/G-5/6	2	225	8.3	67.0	67.0	557.95
J3-2-4_F-5/6	3	3,328	123.3	ND (0.14)	0.14	17.26
Total	--	**22,161**	**821**	--	--	**992**
				Volume-Weighted Average (mg/kg)		**1.21**

Table E-1B-28
Parcel J3-2-4
Post-Remediation Conditions

J3-2-4 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 3-Foot Depth Increment	22,161	1,642	2,293	1.40

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB – polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-28

Parcel J3-2-5
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-5_E/F-8/9	0	678	12.6	ND (0.14)	0.14	1.76
J3-2-6_E-9/10	1	6	0.1	ND (0.14)	0.14	0.02
FL000703	2	126	2.3	2.83 [2.78]	2.81	6.57
BS000060	3	0.9	0.02	17.7	17.7	0.31
FL000702	4	720	13.33	14.2	14.2	189.32
BS000061	5	137	2.54	33.0	33.0	83.79
J3-2-5_E-7/8	6	687	12.71	ND (0.14)	0.14	1.78
J3-2-5_E-7/8	6a	114	2.12	ND (0.14)	0.14	0.30
J3-2-5_D/E-8/9	7	3,932	72.82	ND (0.12) [ND (0.13)]	0.13	9.10
J3-2-4_E-6/7	8	5	0.10	ND (0.16)	0.16	0.02
J3-2-4_E-6/7	8a	7	0.1	ND (0.16)	0.16	0.02
J3-2-5_E/F-7/8	9	60	1.1	0.8	0.8	0.88
J3-2-5_E/F-7/8	9a	59	1.1	0.8	0.8	0.88
J3-2-5_D/E-8	10	1,802	33.4	ND (0.12)	0.12	4.00
J3-2-5_D/E-8	11	3,781	70.0	ND (0.12)	0.12	8.40
J3-2-5_D/E-7/8	12	4,588	85.0	ND (0.11)	0.11	9.35
J3-2-5_D/E-7/8	13	86	1.6	ND (0.11)	0.11	0.18
J3-2-5_D/E-7/8	14	726	13.4	ND (0.11)	0.11	1.48
Total	--	**17,517**	**324**	--	--	**318**
				Volume-Weighted Average (mg/kg)		**0.98**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
BS000061	0	137	2.5	37.0	37.0	93.95
FL000703	1	126	2.3	1.44	1.44	3.37
J3-2-6_E-9/10	2	6	0.1	ND (0.14)	0.14	0.02
J3-2-5_E/F-8/9	3	678	12.6	ND (0.14)	0.14	1.76
BS000060	4	0.9	0.02	18.7	18.7	0.33
FL000702	5	720	13.33	19.6	19.6	261.31
J3-2-5_E-7/8	6	687	12.71	ND (0.14)	0.14	1.78
J3-2-5_E-7/8	6a	114	2.12	ND (0.14)	0.14	0.30
J3-2-5_D/E-8/9	7	3,932	72.82	ND (0.12) [ND (0.13)]	0.13	9.10
J3-2-4_E-6/7	8	5	0.10	ND (0.16)	0.16	0.02
J3-2-4_E-6/7	8a	7	0.1	ND (0.16)	0.16	0.02

Table E-1B-28

Parcel J3-2-5
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-5_E/F-7/8	9	60	1.1	0.8	0.8	0.88
J3-2-5_E/F-7/8	9a	59	1.1	0.8	0.8	0.88
J3-2-5_D/E-8	10	1,802	33.4	ND (0.12)	0.12	4.00
J3-2-5_D/E-8	11	3,781	70.0	ND (0.12)	0.12	8.40
J3-2-5_D/E-7/8	12	4,588	85.0	ND (0.11)	0.11	9.35
J3-2-5_D/E-7/8	13	86	1.6	ND (0.11)	0.11	0.18
J3-2-5_D/E-7/8	14	726	13.4	ND (0.11)	0.11	1.48
Total	--	**17,517**	**324**	--	--	**397**
				Volume-Weighted Average (mg/kg)		**1.22**

Table E-1B-28
Parcel J3-2-5
Existing Conditions

J3-2-5 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	17,517	649	715	1.10

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-29

Parcel J3-2-5
Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-5_E/F-8/9	0	678	12.6	ND (0.14)	0.14	1.76
J3-2-6_E-9/10	1	6	0.1	ND (0.14)	0.14	0.02
FL000703	2	126	2.3	2.83 [2.78]	2.81	6.57
BS000060	3	0.9	0.02	17.7	***0.021***	0.00
FL000702	4	720	13.33	14.2	***0.021***	0.28
BS000061	5	137	2.54	33.0	***0.021***	0.05
J3-2-5_E-7/8	6	687	12.71	ND (0.14)	0.14	1.78
J3-2-5_E-7/8	6a	114	2.12	ND (0.14)	***0.021***	0.04
J3-2-5_D/E-8/9	7	3,932	72.82	ND (0.12) [ND (0.13)]	0.13	9.10
J3-2-4_E-6/7	8	5	0.10	ND (0.16)	0.16	0.02
J3-2-4_E-6/7	8a	7	0.1	ND (0.16)	***0.021***	0.00
J3-2-5_E/F-7/8	9	60	1.1	0.8	0.8	0.88
J3-2-5_E/F-7/8	9a	59	1.1	0.8	***0.021***	0.02
J3-2-5_D/E-8	10	1,802	33.4	ND (0.12)	0.12	4.00
J3-2-5_D/E-8	11	3,781	70.0	ND (0.12)	0.12	8.40
J3-2-5_D/E-7/8	12	4,588	85.0	ND (0.11)	0.11	9.35
J3-2-5_D/E-7/8	13	86	1.6	ND (0.11)	0.11	0.18
J3-2-5_D/E-7/8	14	726	13.4	ND (0.11)	0.11	1.48
Total	--	**17,517**	**324**	--	--	**44**
				Volume-Weighted Average (mg/kg)		**0.14**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
BS000061	0	137	2.5	37.0	***0.021***	0.05
FL000703	1	126	2.3	1.44	1.44	3.37
J3-2-6_E-9/10	2	6	0.1	ND (0.14)	0.14	0.02
J3-2-5_E/F-8/9	3	678	12.6	ND (0.14)	0.14	1.76
BS000060	4	0.9	0.02	18.7	***0.021***	0.00
FL000702	5	720	13.33	19.6	***0.021***	0.28
J3-2-5_E-7/8	6	687	12.71	ND (0.14)	0.14	1.78
J3-2-5_E-7/8	6a	114	2.12	ND (0.14)	***0.021***	0.04
J3-2-5_D/E-8/9	7	3,932	72.82	ND (0.12) [ND (0.13)]	0.13	9.10
J3-2-4_E-6/7	8	5	0.10	ND (0.16)	0.16	0.02
J3-2-4_E-6/7	8a	7	0.1	ND (0.16)	***0.021***	0.00

Table E-1B-29

Parcel J3-2-5

Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-5_E/F-7/8	9	60	1.1	0.8	0.8	0.88
J3-2-5_E/F-7/8	9a	59	1.1	0.8	***0.021***	0.02
J3-2-5_D/E-8	10	1,802	33.4	ND (0.12)	0.12	4.00
J3-2-5_D/E-8	11	3,781	70.0	ND (0.12)	0.12	8.40
J3-2-5_D/E-7/8	12	4,588	85.0	ND (0.11)	0.11	9.35
J3-2-5_D/E-7/8	13	86	1.6	ND (0.11)	0.11	0.18
J3-2-5_D/E-7/8	14	726	13.4	ND (0.11)	0.11	1.48
Total	**--**	**17,517**	**324**	**--**	**--**	**41**
				Volume-Weighted Average (mg/kg)		**0.13**

Table E-1B-29
Parcel J3-2-5
Post-Remediation Conditions

J3-2-5 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	17,517	649	85	0.13

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-30

Parcel J3-2-6

Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
FL001852	0	373	6.90	0.75	0.75	5.18
J3-2-6_F/G-10/11	1	177	3.27	1.7	1.7	5.56
J3-2-6_E/F-9/10	2	242	4.49	1.8/1.3	1.6	6.96
FL001851	3	72	1.34	7.1	7.1	9.52
BS000062	4	3	0.06	0.46	0.46	0.03
J3-2-6_E-9/10	5	1,861	34.46	ND (0.14)	0.14	4.83
FL000703	6	257	4.76	2.83 [2.78]	2.81	13.35
J3-2-6_E/F-10/11	7	1,390	25.73	ND (0.087)	0.087	2.24
J3-2-6_E/F-10	8	4,962	91.88	ND (0.092)	0.092	8.45
J3-2-5_D/E-8/9	9	11,464	212.30	ND (0.12) [ND (0.13)]	0.13	26.54
J3-2-5_D/E-8/9	10	722	13.37	ND (0.12) [ND (0.13)]	0.13	1.67
Total	**--**	**21,523**	**399**	**--**	**--**	**84**
				Volume-Weighted Average (mg/kg)		**0.21**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-6_F/G-10/11	0	413	7.65	1.7	1.7	13.01
J3-2-6_E/F-10/11	1	1,553	28.76	ND (0.087)	0.087	2.50
J3-2-6_E/F-9/10	2	242	4.49	1.8/1.3	1.6	6.96
BS000062	3	3	0.06	10.6	10.6	0.63
FL000703	4	257	4.76	1.44	1.44	6.85
J3-2-6_E-9/10	5	1,861	34.46	ND (0.14)	0.14	4.83
J3-2-6_E/F-10	6	5,007	92.72	ND (0.092)	0.092	8.53
J3-2-5_D/E-8/9	7	11,464	212.30	ND (0.12) [ND (0.13)]	0.13	26.54
J3-2-5_D/E-8/9	8	722	13.37	ND (0.12) [ND (0.13)]	0.13	1.67
Total	**--**	**21,523**	**399**	**--**	**--**	**72**
				Volume-Weighted Average (mg/kg)		**0.18**

Table E-1B-30
Parcel J3-2-6
Existing Conditions

J3-2-6 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	21,523	797	156	0.20

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-31

Parcel J3-2-6

Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
FL001852	0	373	6.90	0.75	0.75	5.18
J3-2-6_F/G-10/11	1	177	3.27	1.7	1.7	5.56
J3-2-6_E/F-9/10	2	242	4.49	1.8/1.3	1.6	6.96
FL001851	3	72	1.34	7.1	7.1	9.52
BS000062	4	3	0.06	0.46	***0.021***	0.00
J3-2-6_E-9/10	5	1,861	34.46	ND (0.14)	0.14	4.83
FL000703	6	257	4.76	2.83 [2.78]	2.81	13.35
J3-2-6_E/F-10/11	7	1,390	25.73	ND (0.087)	0.087	2.24
J3-2-6_E/F-10	8	4,962	91.88	ND (0.092)	0.092	8.45
J3-2-5_D/E-8/9	9	11,464	212.30	ND (0.12) [ND (0.13)]	0.13	26.54
J3-2-5_D/E-8/9	10	722	13.37	ND (0.12) [ND (0.13)]	0.13	1.67
Total	**--**	**21,523**	**399**	**--**	**--**	**84**
				Volume-Weighted Average (mg/kg)		**0.21**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
J3-2-6_F/G-10/11	0	413	7.65	1.7	1.7	13.01
J3-2-6_E/F-10/11	1	1,553	28.76	ND (0.087)	0.087	2.50
J3-2-6_E/F-9/10	2	242	4.49	1.8/1.3	1.6	6.96
BS000062	3	3	0.06	10.6	***0.021***	0.00
FL000703	4	257	4.76	1.44	1.44	6.85
J3-2-6_E-9/10	5	1,861	34.46	ND (0.14)	0.14	4.83
J3-2-6_E/F-10	6	5,007	92.72	ND (0.092)	0.092	8.53
J3-2-5_D/E-8/9	7	11,464	212.30	ND (0.12) [ND (0.13)]	0.13	26.54
J3-2-5_D/E-8/9	8	722	13.37	ND (0.12) [ND (0.13)]	0.13	1.67
Total	**--**	**21,523**	**399**	**--**	**--**	**71**
				Volume-Weighted Average (mg/kg)		**0.18**

Table E-1B-31

Parcel J3-2-6
Post-Remediation Conditions

J3-2-6 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	21,523	797	155	0.19

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-32

Parcel K3-1-2
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
FL001301	0	445	8.2	40.6	40.6	334.42
K3-1-2_D/E-4	1	255	4.7	63.0	63.0	297.65
K3-1-2_E-6/7	2	17,367	321.6	ND (0.13)	0.13	41.81
K3-1-2_C/D-5/6	3	4,078	75.5	0.18	0.18	13.59
BS000065	4	5	0.10	10.3	10.3	1.00
K3-1-2_E-5/6	5	753	13.95	7.5	7.5	104.64
K3-1-2_E-5/6	5a	152	2.82	7.5	7.5	21.17
K3-1-2_B-4	6	594	11.01	0.18	0.18	1.98
FL000706	7	619	11.47	6.09	6.09	69.83
K3-1-2_B-2	8	155	2.86	8.3	8.3	23.75
K3-1-2_B-2	8a	447	8.28	8.3	8.3	68.72
K3-1-2_C-3	9	693	12.84	14.0	14.0	179.73
K3-1-2_D-4/5	10	628	11.63	6.2	6.2	72.09
K3-1-2_C-4/5	11	856	15.86	1.7	1.7	26.96
FL001300	12	307	5.68	30.1	30.1	171.08
K3-1-2_B-5/6	13	2,994	55.45	ND (0.14)	0.14	7.76
K3-1-2_E-6/7	14	671	12.43	ND (0.13)	0.13	1.62
Total	--	**31,021**	**574**	--	--	**1,438**
				Volume-Weighted Average (mg/kg)		**2.50**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
FL001301	0	445	8.24	1.34	1.34	11.04
K3-1-2_D/E-4	1	255	4.72	63.0	63.0	297.65
K3-1-2_E-6/7	2	17,367	321.61	ND (0.13)	0.13	41.81
K3-1-2_C/D-5/6	3	4,078	75.52	0.18	0.18	13.59
BS000065	4	5	0.10	24.1	24.1	2.33
K3-1-2_E-5/6	5	753	13.95	7.5	7.5	104.64
K3-1-2_E-5/6	5a	152	2.82	7.5	7.5	21.17
K3-1-2_B-2	6	138	2.56	8.3	8.3	21.28
K3-1-2_B-2	6a	447	8.28	8.3	8.3	68.72
FL001300	7	307	5.68	9.62	9.62	54.68
FL000706	8	603	11.17	ND (0.501)	0.501	5.60
K3-1-2_B-4	9	594	11.01	0.18	0.18	1.98

Table E-1B-32

Parcel K3-1-2
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
K3-1-2_C-3	10	693	12.84	14.0	14.0	179.73
K3-1-2_D-4/5	11	628	11.63	6.2	6.2	72.09
K3-1-2_C-4/5	12	856	15.86	1.7	1.7	26.96
FL000705	13	32	0.6	ND (0.501)	0.501	0.30
K3-1-2_B-5/6	14	2,994	55.5	ND (0.14)	0.14	7.76
K3-1-2_E-6/7	15	671	12.4	ND (0.13)	0.13	1.62
Total	--	**31,021**	**574**	--	--	**933**
				Volume-Weighted Average (mg/kg)		**1.62**

Table E-1B-32
Parcel K3-1-2
Existing Conditions

K3-1-2 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	31,021	1,149	2,371	2.06

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-33

Parcel K3-1-2
Existing Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
K3-1-2_D/E-4	0	540	20.0	23.0	23.0	459.73
K3-1-2_E-5/6	1	943	34.9	8.4	8.4	293.26
K3-1-2_E-6/7	2	22,086	818.0	ND (0.1)	0.1	81.80
K3-1-2_B-4	3	1,532	56.8	ND (0.12)	0.12	6.81
K3-1-2_C-3	4	851	31.5	3.1	3.1	97.73
K3-1-2_C-4/5	5	2,560	94.8	0.63	0.63	59.74
K3-1-2_D-4/5	6	1,545	57.2	ND (0.11)	0.11	6.30
K3-1-2_B-2	7	964	35.7	3.1/0.79	1.9	69.43
Total	--	**31,021**	**1,149**	--	--	**1,075**
				Volume-Weighted Average (mg/kg)		**0.94**

Table E-1B-33

Parcel K3-1-2
Existing Conditions

K3-1-2 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 2-Foot Depth Increment	31,021	1,149	1,075	0.94

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-34

Parcel K3-1-2

Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
FL001301	0	445	8.2	40.6	***0.021***	0.17
K3-1-2_D/E-4	1	255	4.7	63.0	***0.021***	0.10
K3-1-2_E-6/7	2	17,367	321.6	ND (0.13)	0.13	41.81
K3-1-2_C/D-5/6	3	4,078	75.5	0.18	0.18	13.59
BS000065	4	5	0.10	10.3	***0.021***	0.00
K3-1-2_E-5/6	5	753	13.95	7.5	7.5	104.64
K3-1-2_E-5/6	5a	152	2.82	7.5	***0.021***	0.06
K3-1-2_B-4	6	594	11.01	0.18	0.18	1.98
FL000706	7	619	11.47	6.09	6.09	69.83
K3-1-2_B-2	8	155	2.86	8.3	8.3	23.75
K3-1-2_B-2	8a	447	8.28	8.3	***0.021***	0.17
K3-1-2_C-3	9	693	12.84	14.0	***0.021***	0.27
K3-1-2_D-4/5	10	628	11.63	6.2	6.2	72.09
K3-1-2_C-4/5	11	856	15.86	1.7	1.7	26.96
FL001300	12	307	5.68	30.1	***0.021***	0.12
K3-1-2_B-5/6	13	2,994	55.45	ND (0.14)	0.14	7.76
K3-1-2_E-6/7	14	671	12.43	ND (0.13)	0.13	1.62
Total	--	**31,021**	**574**	--	--	**365**
				Volume-Weighted Average (mg/kg)		**0.64**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
FL001301	0	445	8.24	1.34	***0.021***	0.17
K3-1-2_D/E-4	1	255	4.72	63.0	***0.021***	0.10
K3-1-2_E-6/7	2	17,367	321.61	ND (0.13)	0.13	41.81
K3-1-2_C/D-5/6	3	4,078	75.52	0.18	0.18	13.59
BS000065	4	5	0.10	24.1	***0.021***	0.00
K3-1-2_E-5/6	5	753	13.95	7.5	7.5	104.64
K3-1-2_E-5/6	5a	152	2.82	7.5	***0.021***	0.06
K3-1-2_B-2	6	138	2.56	8.3	8.3	21.28
K3-1-2_B-2	6a	447	8.28	8.3	***0.021***	0.17
FL001300	7	307	5.68	9.62	***0.021***	0.12
FL000706	8	603	11.17	ND (0.501)	0.501	5.60
K3-1-2_B-4	9	594	11.01	0.18	0.18	1.98

Table E-1B-34

Parcel K3-1-2
Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
K3-1-2_C-3	10	693	12.84	14.0	***0.021***	0.27
K3-1-2_D-4/5	11	628	11.63	6.2	6.2	72.09
K3-1-2_C-4/5	12	856	15.86	1.7	1.7	26.96
FL000705	13	32	0.6	ND (0.501)	0.501	0.30
K3-1-2_B-5/6	14	2,994	55.5	ND (0.14)	0.14	7.76
K3-1-2_E-6/7	15	671	12.4	ND (0.13)	0.13	1.62
Total	**--**	**31,021**	**574**	**--**	**--**	**299**
				Volume-Weighted Average (mg/kg)		**0.52**

Table E-1B-34
Parcel K3-1-2
Post-Remediation Conditions

K3-1-2 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	31,021	1,149	663	0.58

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-35

Parcel K3-1-2
Post-Remediation Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
K3-1-2_D/E-4	0	540	20.0	23.0	23.0	459.73
K3-1-2_E-5/6	1	943	34.9	8.4	8.4	293.26
K3-1-2_E-6/7	2	22,086	818.0	ND (0.1)	0.1	81.80
K3-1-2_B-4	3	1,532	56.8	ND (0.12)	0.12	6.81
K3-1-2_C-3	4	851	31.5	3.1	3.1	97.73
K3-1-2_C-4/5	5	2,560	94.8	0.63	0.63	59.74
K3-1-2_D-4/5	6	1,545	57.2	ND (0.11)	0.11	6.30
K3-1-2_B-2	7	964	35.7	3.1/0.79	1.9	69.43
Total	--	**31,021**	**1,149**	--	--	**1,075**
				Volume-Weighted Average (mg/kg)		**0.94**

Table E-1B-35
Parcel K3-1-2
Post-Remediation Conditions

K3-1-2 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 2-Foot Depth Increment	31,021	1,149	1,075	0.94

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-35

Parcel K2-1-10
Existing Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
BS000102	0a	288	5.3	2.33	2.33	12.45
K2-1-10_E-2	1	533	9.9	28.0	28.0	276.54
K2-1-10_E-3/4	2	3,652	67.6	ND (0.14)	0.14	9.47
K2-1-10_D-2/3	3	764	14.1	27.0	27.0	381.84
K2-1-10_D-3/4	4	16,497	305.5	ND (0.14)	0.14	42.77
K2-1-10_E-2/3	5	889	16.5	ND (0.13)	0.13	2.14
K2-1-10_D-3	6	1,148	21.3	1.6	1.6	34.03
FL000917	7	1,074	19.9	4.25	4.25	84.50
FL001569	8	404	7.5	55.8	55.8	417.33
FL000915	9	86	1.6	4.2	4.2	6.70
FL001859	10	200	3.7	35.0	35.0	129.61
FL001859	10A	243	4.5	35.0	35.0	157.22
FL001859	10B	454	8.4	35.0	35.0	294.06
K2-1-10_B-3/4	11	17,058	315.9	ND (0.094)	0.094	29.69
K2-1-10_B-3/4	12	4	0.07	ND (0.094)	0.094	0.01
FL000916	13	836	15.48	5.65	5.65	87.48
K2-1-10_C-2/3	14	652	12.07	24.0	24.0	289.60
K2-1-10_C-3/4	15	20,238	374.78	ND (0.13) [ND (0.11)]	0.12	44.97
K2-1-10_C-3/4	16	475	8.79	ND (0.13) [ND (0.11)]	0.12	1.06
K2-1-10_C-3/4	17	95	1.75	ND (0.13) [ND (0.11)]	0.12	0.21
BS000101	18a	39	0.7	1.65	1.65	1.19
K2-1-10_B-2/3	19	520	9.6	46.0	46.0	442.99
K2-1-10_B-3/4	20	1,016	18.8	ND (0.094)	0.094	1.77
K2-1-10_C-3/4	21	1,206	22.3	ND (0.13) [ND (0.11)]	0.12	2.68
Total	--	**68,371**	**1,266**	--	--	**2,750**
				Volume-Weighted Average (mg/kg)		**2.17**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
BS000102	0a	288	5.3	0.416	0.416	2.22
K2-1-10_E-2	1	533	9.9	28.0	28.0	276.54
K2-1-10_E-3/4	2	3,652	67.6	ND (0.14)	0.14	9.47
K2-1-10_E-2/3	3	889	16.5	ND (0.13)	0.13	2.14
K2-1-10_C-3/4	4	20,238	374.8	ND (0.13) [ND (0.11)]	0.12	44.97

Table E-1B-35

Parcel K2-1-10
Existing Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
K2-1-10_C-3/4	4A	6	0.1	ND (0.13) [ND (0.11)]	0.12	0.01
K2-1-10_C-3/4	5	475	8.8	ND (0.13) [ND (0.11)]	0.12	1.06
K2-1-10_C-3/4	6	95	1.8	ND (0.13) [ND (0.11)]	0.12	0.21
K2-1-10_D-3/4	7	16,497	305.5	ND (0.14)	0.14	42.77
FL000917	8	1,074	19.9	0.227	0.227	4.51
FL000917	8A	1	0.02	0.227	0.227	0.00
FL001569	9	404	7.48	99.5	99.5	744.16
FL000915	10	86	1.60	ND (0.504)	0.504	0.80
K2-1-10_D-2/3	11	1,006	18.63	27.0	27.0	503.12
K2-1-10_D-3	12	1,148	21.27	1.6	1.6	34.03
K2-1-10_D-3	12A	193	3.57	1.6	1.6	5.71
K2-1-10_B-3/4	13	17,058	315.89	ND (0.094)	0.094	29.69
K2-1-10_B-3/4	14	4	0.07	ND (0.094)	0.094	0.01
K2-1-10_B-2/3	15	520	9.63	46.0	46.0	442.99
BS000101	16a	39	0.7	0.758	0.758	0.55
K2-1-10_C-2/3	17	1,105	20.5	24.0	24.0	491.24
FL000916	18	836	15.5	0.376	0.376	5.82
K2-1-10_C-3/4	19	1,206	22.3	ND (0.13) [ND (0.11)]	0.12	2.68
K2-1-10_B-3/4	20	1,016	18.8	ND (0.094)	0.094	1.77
Total	--	**68,371**	**1,266**	--	--	**2,646**
				Volume-Weighted Average (mg/kg)		**2.09**

Table E-1B-35
Parcel K2-1-10
Existing Conditions

K2-1-10 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	68,371	2,532	5,397	2.13

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-36

Parcel K2-1-10
Existing Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
K2-1-10_E-2	0	744	27.5	51.0	51.0	1,404.70
K2-1-10_E-2/3	1	3,644	135.0	ND (0.11)	0.11	14.85
K2-1-10_C-2/3	2	1,776	65.8	7.2/23.0	15	993.28
K2-1-10_D-3	3	4,646	172.1	ND (0.11)	0.11	18.93
K2-1-10_C-3/4	4	36,516	1352.4	ND (0.12)	0.12	162.29
K2-1-10_D-2/3	5	1,184	43.9	39.0 [30.0]	34.5	1,513.06
K2-1-10_B-2/3	6	1,473	54.5	0.36	0.36	19.64
K2-1-10_B-3/4	7	18,385	680.9	ND (0.09)	0.09	61.28
K2-1-10_B-3/4	8	4	0.1	ND (0.09)	0.09	0.01
Total	--	**68,371**	**2,532**	--	--	**4,188**
				Volume-Weighted Average (mg/kg)		**1.65**

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
K2-1-10_E-2/3	0	26,285	973.5	ND (0.09)	0.09	87.62
K2-1-10_E-2	1	744	27.5	140.0	140.0	3,856.05
K2-1-10_C-2/3	2	37,987	1406.9	ND (0.11)	0.11	154.76
K2-1-10_D-2/3	3	3,356	124.3	0.18	0.18	22.37
Total	--	**68,371**	**2,532**	--	--	**4,121**
				Volume-Weighted Average (mg/kg)		**1.63**

3- to 4-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
K2-1-10_E-2/3	0	3,737	138.4	ND (0.0092)	0.0092	1.27
K2-1-10_E-2	1	744	27.5	15.0	15.0	413.15
K2-1-10_D-3	2	61,639	2282.9	0.012	0.012	27.40
K2-1-10_D-2/3	3	2,251	83.4	0.17	0.17	14.18
Total	--	**68,371**	**2,532**	--	--	**456**
				Volume-Weighted Average (mg/kg)		**0.18**

Table E-1B-36
Parcel K2-1-10
Existing Conditions

K2-1-10 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 4-Foot Depth Increment	68,371	7,597	8,765	1.15

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-37

Parcel K2-1-10
Post-Remediation Conditions

0- to 0.5-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
BS000102	0a	288	5.3	2.33	***0.021***	0.11
K2-1-10_E-2	1	533	9.9	28.0	***0.021***	0.21
K2-1-10_E-3/4	2	3,652	67.6	ND (0.14)	0.14	9.47
K2-1-10_D-2/3	3	764	14.1	27.0	***0.021***	0.30
K2-1-10_D-3/4	4	16,497	305.5	ND (0.14)	0.14	42.77
K2-1-10_E-2/3	5	889	16.5	ND (0.13)	0.13	2.14
K2-1-10_D-3	6	1,148	21.3	1.6	1.6	34.03
FL000917	7	1,074	19.9	4.25	4.25	84.50
FL001569	8	404	7.5	55.8	***0.021***	0.16
FL000915	9	86	1.6	4.2	4.2	6.70
FL001859	10	200	3.7	35.0	***0.021***	0.08
FL001859	10A	243	4.5	35.0	***0.021***	0.09
FL001859	10B	454	8.4	35.0	***0.021***	0.18
K2-1-10_B-3/4	11	17,058	315.9	ND (0.094)	0.094	29.69
K2-1-10_B-3/4	12	4	0.07	ND (0.094)	0.094	0.01
FL000916	13	836	15.48	5.65	5.65	87.48
K2-1-10_C-2/3	14	652	12.07	24.0	***0.021***	0.25
K2-1-10_C-3/4	15	20,238	374.78	ND (0.13) [ND (0.11)]	0.12	44.97
K2-1-10_C-3/4	16	475	8.79	ND (0.13) [ND (0.11)]	0.12	1.06
K2-1-10_C-3/4	17	95	1.75	ND (0.13) [ND (0.11)]	0.12	0.21
BS000101	18a	39	0.7	1.65	***0.021***	0.02
K2-1-10_B-2/3	19	520	9.6	46.0	***0.021***	0.20
K2-1-10_B-3/4	20	1,016	18.8	ND (0.094)	0.094	1.77
K2-1-10_C-3/4	21	1,206	22.3	ND (0.13) [ND (0.11)]	0.12	2.68
Total	--	**68,371**	**1,266**	--	--	**349**
				Volume-Weighted Average (mg/kg)		**0.28**

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
BS000102	0a	288	5.3	0.416	***0.021***	0.11
K2-1-10_E-2	1	533	9.9	28.0	***0.021***	0.21
K2-1-10_E-3/4	2	3,652	67.6	ND (0.14)	0.14	9.47
K2-1-10_E-2/3	3	889	16.5	ND (0.13)	0.13	2.14
K2-1-10_C-3/4	4	20,238	374.8	ND (0.13) [ND (0.11)]	0.12	44.97

Table E-1B-37

Parcel K2-1-10
Post-Remediation Conditions

0.5- to 1-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
K2-1-10_C-3/4	4A	6	0.1	ND (0.13) [ND (0.11)]	***0.021***	0.00
K2-1-10_C-3/4	5	475	8.8	ND (0.13) [ND (0.11)]	0.12	1.06
K2-1-10_C-3/4	6	95	1.8	ND (0.13) [ND (0.11)]	0.12	0.21
K2-1-10_D-3/4	7	16,497	305.5	ND (0.14)	0.14	42.77
FL000917	8	1,074	19.9	0.227	0.227	4.51
FL000917	8A	1	0.02	0.227	***0.021***	0.00
FL001569	9	404	7.48	99.5	***0.021***	0.16
FL000915	10	86	1.60	ND (0.504)	0.504	0.80
K2-1-10_D-2/3	11	1,006	18.63	27.0	***0.021***	0.39
K2-1-10_D-3	12	1,148	21.27	1.6	1.6	34.03
K2-1-10_D-3	12A	193	3.57	1.6	***0.021***	0.07
K2-1-10_B-3/4	13	17,058	315.89	ND (0.094)	0.094	29.69
K2-1-10_B-3/4	14	4	0.07	ND (0.094)	0.094	0.01
K2-1-10_B-2/3	15	520	9.63	46.0	***0.021***	0.20
BS000101	16a	39	0.7	0.758	***0.021***	0.02
K2-1-10_C-2/3	17	1,105	20.5	24.0	***0.021***	0.43
FL000916	18	836	15.5	0.376	0.376	5.82
K2-1-10_C-3/4	19	1,206	22.3	ND (0.13) [ND (0.11)]	0.12	2.68
K2-1-10_B-3/4	20	1,016	18.8	ND (0.094)	0.094	1.77
Total	--	**68,371**	**1,266**	--	--	**182**
				Volume-Weighted Average (mg/kg)		**0.14**

Table E-1B-37

Parcel K2-1-10
Post-Remediation Conditions

K2-1-10 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
0- to 1-Foot Depth Increment	68,371	2,532	531	0.21

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Table E-1B-38

Parcel K2-1-10
Post-Remediation Conditions

1- to 2-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
K2-1-10_E-2	0	744	27.5	51.0	51.0	1,404.70
K2-1-10_E-2/3	1	3,644	135.0	ND (0.11)	0.11	14.85
K2-1-10_C-2/3	2	1,776	65.8	7.2/23.0	15	993.28
K2-1-10_D-3	3	4,646	172.1	ND (0.11)	0.11	18.93
K2-1-10_C-3/4	4	36,516	1352.4	ND (0.12)	0.12	162.29
K2-1-10_D-2/3	5	1,184	43.9	39.0 [30.0]	34.5	1,513.06
K2-1-10_B-2/3	6	1,473	54.5	0.36	0.36	19.64
K2-1-10_B-3/4	7	18,385	680.9	ND (0.09)	0.09	61.28
K2-1-10_B-3/4	8	4	0.1	ND (0.09)	0.09	0.01
Total	--	**68,371**	**2,532**	--	--	**4,188**
				Volume-Weighted Average (mg/kg)		**1.65**

2- to 3-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
K2-1-10_E-2/3	0	26,285	973.5	ND (0.09)	0.09	87.62
K2-1-10_E-2	1	744	27.5	140.0	140.0	3,856.05
K2-1-10_C-2/3	2	37,987	1406.9	ND (0.11)	0.11	154.76
K2-1-10_D-2/3	3	3,356	124.3	0.18	0.18	22.37
Total	--	**68,371**	**2,532**	--	--	**4,121**
				Volume-Weighted Average (mg/kg)		**1.63**

3- to 4-Foot Depth Increment

Location ID	Polygon ID	Polygon Area (sq ft)	Volume (cy)	PCB (mg/kg)	Average PCB (mg/kg)	Average PCB x Volume (mg/kg cy)
K2-1-10_E-2/3	0	3,737	138.4	ND (0.0092)	0.0092	1.27
K2-1-10_E-2	1	744	27.5	15.0	15.0	413.15
K2-1-10_D-3	2	61,639	2282.9	0.012	0.012	27.40
K2-1-10_D-2/3	3	2,251	83.4	0.17	0.17	14.18
Total	--	**68,371**	**2,532**	--	--	**456**
				Volume-Weighted Average (mg/kg)		**0.18**

Table E-1B-38

Parcel K2-1-10
Post-Remediation Conditions

K2-1-10 Summary

Sample Depth (ft bgs)	Total Area (sq ft)	Total Volume (cy)	Total Average PCB x Volume (mg/kg cy)	Volume-Weighted Average PCB (mg/kg)
1- to 4-Foot Depth Increment	68,371	7,597	8,765	1.15

Notes:

1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.

cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Notes for Appendix I, Attachment 2 Evaluation Tables
Bold = new since Conceptual

Notes:
1. Non-detect PCB concentrations were included **as the detection limit** in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (i.e., 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.
cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

Notes:
1. Non-detect PCB concentrations were included as the detection limit in calculations.
2. For instances where a duplicate sample was collected, the concentration is shown in brackets. The duplicate was averaged with the parent sample and included in the calculations (resulting value shown in Average PCB column).
3. For instances where an EPA split sample was collected, the concentration is shown following a "/" (i.e., GE analytical result/EPA Split analytical result). The EPA split was averaged with the GE sample and included in the calculations (resulting value shown in Average PCB column.
4. Calculations and rounding are performed by the computer software; therefore, certain quantities are displayed as rounded numbers for clarity.
5. For instances where two discrete six-inch samples were collected within the same one-foot interval (ie. 1 to 2 feet, 2 to 3 feet, etc.), the concentrations from each sample were averaged and included in the calculations. The PCB and Average PCB columns both show the averaged result. Discrete sample results are presented in Attachment 3.
cy - cubic yards
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
ND - non-detect
PCB - polychlorinated biphenyl (Aroclor)
sq ft - square feet

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Attachment 3
Data Used in PCB Evaluations

Table 1a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
I6-3-13	FL000815	0.0 –0.5	6.53
I6-3-13	FL000815	0.5 –1.0	4.89
I6-3-13	FL000909	0.0 –0.5	10.4
I6-3-13	FL000909	0.5 –1.0	20
I6-3-13	FL000910	0.0 –0.5	17
I6-3-13	FL000910	0.5 –1.0	119
I6-3-13	FL000911	0.0 –0.5	11.7
I6-3-13	FL000911	0.5 –1.0	11.9
I6-3-13	FL001254	0.0 –0.5	0.428 J
I6-3-13	FL001254	0.5 –1.0	0.501 U
I6-3-13	FL001255	0.0 –0.5	1.01
I6-3-13	FL001255	0.5 –1.0	0.502 U
I6-3-13	FL001465	0.0 –0.5	10.3
I6-3-13	FL001465	0.5 –1.0	0.021
I6-3-13	FL001466	0.0 –0.5	23.5
I6-3-13	FL001466	0.5 –1.0	74.4
I6-3-13	FL001831	0.0 –0.5	19.0 J
I6-3-13	I6-3-13_I-11	0.0 –1.0	0.93
I6-3-13	I6-3-13_I-11	1.0 –2.0	0.44
I6-3-13	I6-3-13_I-11	2.0 –3.0	0.029 U
I6-3-13	I6-3-13_I-13	0.0 –1.0	0.27
I6-3-13	I6-3-13_I-13	1.0 –2.0	0.026 U
I6-3-13	I6-3-13_I-13	2.0 –3.0	0.33
I6-3-13	I6-3-13_I-15	0.0 –1.0	0.54
I6-3-13	I6-3-13_I-15	1.0 –2.0	0.97
I6-3-13	I6-3-13_I-9	0.0 –1.0	0.92
I6-3-13	I6-3-13_I-9	1.0 –2.0	0.027 U
I6-3-13	I6-3-13_I-9	2.0 –3.0	0.029 U
I6-3-13	I6-3-13_J-10	0.0 –1.0	3.1
I6-3-13	I6-3-13_J-10	1.0 –2.0	10.7
I6-3-13	I6-3-13_J-10	2.0 –3.0	2.3
I6-3-13	I6-3-13_J-11	0.0 –1.0	5.2
I6-3-13	I6-3-13_J-11	1.0 –2.0	1.4
I6-3-13	I6-3-13_J-11	2.0 –3.0	3
I6-3-13	I6-3-13_K-10	0.0 –1.0	1.08
I6-3-13	I6-3-13_K-10	1.0 –2.0	0.45
I6-3-13	I6-3-13_K-10	2.0 –2.7	0.029 U
I6-3-13	I6-3-13_K-11	0.0 –1.0	0.22
I6-3-13	I6-3-13_K-11	1.0 –2.0	0.18
I6-3-13	I6-3-13_K-11	2.0 –2.5	0.49
I6-3-13	I6-3-13_K-8	0.0 –1.0	2.8
I6-3-13	I6-3-13_K-8	1.0 –2.0	1.68
I6-3-13	I6-3-13_K-8	2.0 –3.0	5.2

Table 1a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
I6-3-13	I6-3-13_K-9	0.0 –1.0	0.23
I6-3-13	I6-3-13_K-9	1.0 –2.0	1.07
I6-3-13	I6-3-13_K-9	2.0 –3.0	0.6
I6-3-13	I6-3-13_L-10	0.0 –1.0	2
I6-3-13	I6-3-13_L-10	1.0 –2.0	0.34
I6-3-13	I6-3-13_L-11	0.0 –1.0	4.5 [4.1]
I6-3-13	I6-3-13_L-11	1.0 –2.0	0.17
I6-3-13	I6-3-13_L-12	0.0 –1.0	1.9
I6-3-13	I6-3-13_L-12	1.0 –2.0	2.4
I6-3-13	I6-3-13_L-12	2.0 –3.0	0.028 U
I6-3-13	I6-3-13_L-12/13	0.0 –1.0	3.2
I6-3-13	I6-3-13_L-12/13	1.0 –2.0	0.63
I6-3-13	I6-3-13_L-7	0.0 –1.0	6.5
I6-3-13	I6-3-13_L-7	1.0 –2.0	0.57
I6-3-13	I6-3-13_L-7	2.0 –3.0	0.196
I6-3-13	I6-3-13_L-8	0.0 –1.0	5
I6-3-13	I6-3-13_L-8	1.0 –2.0	0.1
I6-3-13	I6-3-13_L-8	2.0 –3.0	0.03 U
I6-3-13	I6-3-13_L-9	0.0 –1.0	2.9 [2.7]
I6-3-13	I6-3-13_L-9	1.0 –2.0	0.031 U
I6-3-13	I6-3-13_L-9	2.0 –3.0	0.031 U
I6-3-13	I6-3-13_M-10	0.0 –1.0	6.3
I6-3-13	I6-3-13_M-10	1.0 –2.0	0.39
I6-3-13	I6-3-13_M-11	0.0 –1.0	6
I6-3-13	I6-3-13_M-11	1.0 –2.0	0.5
I6-3-13	I6-3-13_M-11/12	0.0 –1.0	5
I6-3-13	I6-3-13_M-11/12	1.0 –2.0	0.036 J
I6-3-13	I6-3-13_M-7	0.0 –1.0	6.8
I6-3-13	I6-3-13_M-7	1.0 –2.0	0.57
I6-3-13	I6-3-13_M-8	0.0 –1.0	6.2
I6-3-13	I6-3-13_M-8	1.0 –2.0	0.19
I6-3-13	I6-3-13_M-9	0.0 –1.0	4.7
I6-3-13	I6-3-13_M-9	1.0 –2.0	0.26
I6-3-13	I6-3-13_N-10	0.0 –1.0	41.0 [34.0]
I6-3-13	I6-3-13_N-10	1.0 –2.0	7.9
I6-3-13	I6-3-13_N-10	2.0 –3.0	0.027 U
I6-3-13	I6-3-13_N-11	0.0 –1.0	29
I6-3-13	I6-3-13_N-11	1.0 –2.0	4.8
I6-3-13	I6-3-13_N-11	2.0 –3.0	0.026 U
I6-3-13	I6-3-13_N-8	0.0 –1.0	50
I6-3-13	I6-3-13_N-8	1.0 –2.0	15.5
I6-3-13	I6-3-13_N-8	2.0 –3.0	0.131 J
I6-3-13	I6-3-13_N-9	0.0 –1.0	61

Table 1a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
I6-3-13	I6-3-13_N-9	1.0 –2.0	6.4
I6-3-13	I6-3-13_N-9	2.0 –3.0	0.027 U
I6-3-13	I6-3-13A	0.0 –0.5	1.4
I6-3-13	I6-3-13B	0.0 –0.5	1.8

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 1b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
I6-3-13	I6-3-13_AC-7	2.0–3.0	0.011 U
I6-3-13	I6-3-13_AC-7	3.0–4.0	0.01 U
I6-3-13	I6-3-13_AC-7	4.0–5.0	0.01 U
I6-3-13	I6-3-13_AC-7	5.0–6.0	0.01 U
I6-3-13	I6-3-13_AD-6	0.0–1.0	42.0 J
I6-3-13	I6-3-13_AD-6	1.0–2.0	50.0 J
I6-3-13	I6-3-13_AD-6	2.0–3.0	4.4 J
I6-3-13	I6-3-13_AD-6	3.0–4.0	0.32
I6-3-13	I6-3-13_AD-6	4.0–5.0	0.013 U
I6-3-13	I6-3-13_AD-6	5.0–6.0	0.013 U
I6-3-13	I6-3-13_AD-8	2.0–3.0	0.062
I6-3-13	I6-3-13_AD-8	3.0–4.0	0.011 U
I6-3-13	I6-3-13_AD-8	4.0–5.0	0.011 U
I6-3-13	I6-3-13_AD-8	5.0–6.0	0.011 U
I6-3-13	I6-3-13_AE-10	3.0–4.0	0.012 U
I6-3-13	I6-3-13_AE-10	4.0–5.0	0.011 U
I6-3-13	I6-3-13_AE-10	5.0–6.0	0.011 U
I6-3-13	I6-3-13_AE-6	0.0–1.0	43.0 J
I6-3-13	I6-3-13_AE-6	1.0–2.0	19.0 J [51.0 J]
I6-3-13	I6-3-13_AE-6	2.0–3.0	18
I6-3-13	I6-3-13_AE-6	3.0–4.0	13
I6-3-13	I6-3-13_AE-6	4.0–5.0	5.5
I6-3-13	I6-3-13_AE-6	5.0–6.0	6.3
I6-3-13	I6-3-13_AE-7	0.0–1.0	27.0 J
I6-3-13	I6-3-13_AE-7	1.0–2.0	40.0 J
I6-3-13	I6-3-13_AE-7	2.0–3.0	57.0 J
I6-3-13	I6-3-13_AE-7	3.0–4.0	6.4
I6-3-13	I6-3-13_AE-7	4.0–5.0	6.5
I6-3-13	I6-3-13_AE-7	5.0–6.0	20
I6-3-13	I6-3-13_AF/AG-4	0.0–1.0	9.8
I6-3-13	I6-3-13_AF/AG-4	1.0–2.0	17
I6-3-13	I6-3-13_AF/AG-4	2.0–3.0	5.5 J
I6-3-13	I6-3-13_AF/AG-4	3.0–4.0	5.4
I6-3-13	I6-3-13_AF/AG-4	4.0–5.0	1
I6-3-13	I6-3-13_AF/AG-4	5.0–6.0	0.020 J [0.011 U]
I6-3-13	I6-3-13_AF-6	0.0–1.0	10
I6-3-13	I6-3-13_AF-6	1.0–2.0	10
I6-3-13	I6-3-13_AF-6	2.0–3.0	7.9
I6-3-13	I6-3-13_AF-6	3.0–4.0	46
I6-3-13	I6-3-13_AF-6	4.0–5.0	30
I6-3-13	I6-3-13_AF-6	5.0–6.0	12
I6-3-13	I6-3-13_AF-9	0.0–1.0	61
I6-3-13	I6-3-13_AF-9	1.0–2.0	65

Table 1b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
I6-3-13	I6-3-13_AF-9	2.0–3.0	1.1
I6-3-13	I6-3-13_AF-9	3.0–4.0	4.3 [5.8]
I6-3-13	I6-3-13_AF-9	4.0–5.0	9.3 J
I6-3-13	I6-3-13_AF-9	5.0–6.0	16
I6-3-13	I6-3-13_AG-6	0.0–1.0	29
I6-3-13	I6-3-13_AG-6	1.0–2.0	7.2
I6-3-13	I6-3-13_AG-6	2.0–3.0	29.0 J
I6-3-13	I6-3-13_AG-6	3.0–4.0	33
I6-3-13	I6-3-13_AG-6	4.0–5.0	63
I6-3-13	I6-3-13_AG-6	5.0–6.0	7.6
I6-3-13	I6-3-13_AG-8	0.0–1.0	140.0 J
I6-3-13	I6-3-13_AG-8	1.0–2.0	260.0 J
I6-3-13	I6-3-13_AG-8	2.0–3.0	58.0 J
I6-3-13	I6-3-13_AG-8	3.0–4.0	16
I6-3-13	I6-3-13_AG-8	4.0–5.0	12
I6-3-13	I6-3-13_AG-8	5.0–5.9	4.8
I6-3-13	I6-3-13_AH/AI-3	0.0–1.0	16.0 J
I6-3-13	I6-3-13_AH/AI-3	1.0–2.0	80.0 J
I6-3-13	I6-3-13_AH/AI-3	2.0–3.0	100.0 J
I6-3-13	I6-3-13_AH/AI-3	3.0–4.0	13
I6-3-13	I6-3-13_AH/AI-3	4.0–5.0	9.9
I6-3-13	I6-3-13_AH/AI-3	5.0–5.85	0.071
I6-3-13	I6-3-13_AI-5	0.0–1.0	32.0 J
I6-3-13	I6-3-13_AI-5	1.0–2.0	190 J [280 J]
I6-3-13	I6-3-13_AI-5	2.0–3.0	27.0 J
I6-3-13	I6-3-13_AI-5	3.0–4.0	18
I6-3-13	I6-3-13_AI-5	4.0–5.0	16
I6-3-13	I6-3-13_AI-5	5.0–6.0	8
I6-3-13	I6-3-13_AI-7	0.0–1.0	21.0 J
I6-3-13	I6-3-13_AI-7	1.0–2.0	16.0 J
I6-3-13	I6-3-13_AI-7	2.0–3.0	16.0 J
I6-3-13	I6-3-13_AI-7	3.0–4.0	17
I6-3-13	I6-3-13_AI-7	4.0–5.0	12
I6-3-13	I6-3-13_AI-7	5.0–5.9	24
I6-3-13	I6-3-13_AJ/AK-4	0.0–1.0	15
I6-3-13	I6-3-13_AJ/AK-4	1.0–2.0	49
I6-3-13	I6-3-13_AJ/AK-4	2.0–3.0	78
I6-3-13	I6-3-13_AJ/AK-4	3.0–4.0	100
I6-3-13	I6-3-13_AJ/AK-4	4.0–5.0	250
I6-3-13	I6-3-13_AJ/AK-4	5.0–5.7	160
I6-3-13	I6-3-13_AK-2	0.0–1.0	16.0 J
I6-3-13	I6-3-13_AK-2	1.0–2.0	37.0 J
I6-3-13	I6-3-13_AK-2	2.0–3.0	64.0 J

Table 1b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
I6-3-13	I6-3-13_AK-2	3.0–4.0	87
I6-3-13	I6-3-13_AK-2	4.0–5.0	21
I6-3-13	I6-3-13_AK-2	5.0–5.8	44

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 1c
Summary of EPA Split Sample Data Used in PCB Evaluations

Parcel ID	EPA Location ID	Parent Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
I6-3-13	H3A-FL002091-0-0S28	I6-3-13_AI-5	0.0–1.0	25.0 [28.0]
I6-3-13	H3A-FL002092-0-0S28	I6-3-13_AK	0.0–1.0	10
I6-3-13	H3A-FL002097-0-0S30	I6-3-13_AJ/AK	1.0–2.0	40
I6-3-13	H3-FL002042	I6-3-13_M-11/12	0.0–1.0	4.5 J

Notes:

Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.

Duplicate sample results are shown in brackets with parent sample results.

bgs: below ground surface

EPA: U.S. Environmental Protection Agency

J: estimated value is less than quantification limit

mg/kg: milligram per kilogram (equivalent to parts per million)

PCB: polychlorinated biphenyl (Aroclor)

U: not detected, number in parentheses is associated quantitation limit

Table 2a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-1-11	BS000089	0.0–0.5	10.6
J3-1-11	BS000089	0.5–1.0	21.9
J3-1-11	FL000756	0.0–0.5	0.501 U
J3-1-11	FL000756	0.5–1.0	0.502 U
J3-1-11	FL000757	0.0–0.5	0.422 J
J3-1-11	FL000757	0.5–1.0	0.5 U
J3-1-11	FL000758	0.0–0.5	0.502 U
J3-1-11	FL000758	0.5–1.0	0.502 U
J3-1-11	FL001682	0.0–0.5	31
J3-1-11	FL001682	0.0–0.5	33
J3-1-11	FL001682	0.5–1.0	9.5
J3-1-11	FL001683	0.0–0.5	4.6
J3-1-11	FL001683	0.5–1.0	3.71

Notes:

Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.

Duplicate sample results are shown in brackets with parent sample results.

bgs: below ground surface

J: estimated value is less than quantification limit

mg/kg: milligram per kilogram (equivalent to parts per million)

PCB: polychlorinated biphenyl (Aroclor)

U: not detected, number in parentheses is associated quantitation limit

Table 2b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-1-11	J3-1-10_M-6/7	0.0–1.0	1.3
J3-1-11	J3-1-10_M-6/7	1.0–2.0	0.18 J
J3-1-11	J3-1-10_M-6/7	2.0–3.0	0.11 U
J3-1-11	J3-1-10_M-7/8	0.0–1.0	0.18 J
J3-1-11	J3-1-10_M-7/8	1.0–2.0	0.086 U
J3-1-11	J3-1-10_M-7/8	2.0–3.0	0.099 U
J3-1-11	J3-1-11_J/K-7/8	0.0–1.0	0.13 J
J3-1-11	J3-1-11_J/K-7/8	1.0–2.0	0.12 U
J3-1-11	J3-1-11_J/K-7/8	2.0–3.0	0.12 U
J3-1-11	J3-1-11_K/L-7/8	0.0–1.0	0.39 J
J3-1-11	J3-1-11_K/L-7/8	1.0–2.0	0.22 J
J3-1-11	J3-1-11_K/L-7/8	2.0–3.0	0.56 J
J3-1-11	J3-1-11_K/L-8	0.0–1.0	0.45 J
J3-1-11	J3-1-11_K/L-8	1.0–2.0	0.54 J
J3-1-11	J3-1-11_K/L-8	2.0–3.0	0.13 U
J3-1-11	J3-1-11_L/M-7/8	0.0–1.0	0.71 J [0.38 J]
J3-1-11	J3-1-11_L/M-7/8	1.0–2.0	0.11 U
J3-1-11	J3-1-11_L/M-7/8	2.0–3.0	0.092 U
J3-1-11	J3-1-11_L-8/9	0.0–1.0	3.1 J
J3-1-11	J3-1-11_L-8/9	1.0–2.0	0.15 J
J3-1-11	J3-1-12_I/J-7/8	0.0–1.0	0.12 U
J3-1-11	J3-1-12_I/J-7/8	1.0–2.0	0.46 J
J3-1-11	J3-1-12_I/J-7/8	2.0–3.0	0.1 U
J3-1-11	J3-1-12_I-7/8	0.0–1.0	0.14 J
J3-1-11	J3-1-12_I-7/8	1.0–2.0	0.13 U
J3-1-11	J3-1-12_I-7/8	2.0–3.0	0.088 U
J3-1-11	J3-1-12_J-8	0.0–1.0	0.22 J [0.25 J]
J3-1-11	J3-1-12_J-8	1.0–2.0	0.098 U
J3-1-11	J3-1-12_J-8	2.0–3.0	0.088 U

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 3a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-1-12	BS000089	0.0–0.5	10.6
J3-1-12	BS000089	0.5–1.0	21.9
J3-1-12	BS000090	0.0–0.5	15.2
J3-1-12	BS000090	0.5–1.0	16.3 J
J3-1-12	FL000758	0.0–0.5	0.502 U
J3-1-12	FL000758	0.5–1.0	0.502 U
J3-1-12	FL000759	0.0–0.5	0.501 U
J3-1-12	FL000759	0.5–1.0	0.501 U
J3-1-12	FL001684	0.0–0.5	19.6
J3-1-12	FL001684	0.5–1.0	26
J3-1-12	FL001685	0.0–0.5	0.122 J
J3-1-12	FL001685	0.5–1.0	0.034

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 3b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-1-12	J3-1-11_J/K-7/8	0.0–1.0	0.13 J
J3-1-12	J3-1-11_J/K-7/8	1.0–2.0	0.12 U
J3-1-12	J3-1-11_J/K-7/8	2.0–3.0	0.12 U
J3-1-12	J3-1-12_H-7/8	0.0–1.0	0.093 U
J3-1-12	J3-1-12_H-7/8	1.0–2.0	0.17 J
J3-1-12	J3-1-12_H-7/8	2.0–3.0	0.095 J
J3-1-12	J3-1-12_I/J-7/8	0.0–1.0	0.12 U
J3-1-12	J3-1-12_I/J-7/8	1.0–2.0	0.46 J
J3-1-12	J3-1-12_I/J-7/8	2.0–3.0	0.1 U
J3-1-12	J3-1-12_I/J-8	0.0–1.0	0.11 U
J3-1-12	J3-1-12_I/J-8	1.0–2.0	0.11 U
J3-1-12	J3-1-12_I/J-8	2.0–3.0	0.1 U
J3-1-12	J3-1-12_I-7/8	0.0–1.0	0.14 J
J3-1-12	J3-1-12_I-7/8	1.0–2.0	0.13 U
J3-1-12	J3-1-12_I-7/8	2.0–3.0	0.088 U
J3-1-12	J3-1-12_J-8	0.0–1.0	0.22 J [0.25 J]
J3-1-12	J3-1-12_J-8	1.0–2.0	0.098 U
J3-1-12	J3-1-12_J-8	2.0–3.0	0.088 U
J3-1-12	J3-1-13_G/H-7/8	0.0–1.0	0.09 U
J3-1-12	J3-1-13_G/H-7/8	1.0–2.0	0.11 U
J3-1-12	J3-1-13_G/H-7/8	2.0–3.0	0.13 U
J3-1-12	J3-1-13_G-7/8	0.0–1.0	0.1 U
J3-1-12	J3-1-13_G-7/8	1.0–2.0	0.13 U
J3-1-12	J3-1-13_G-7/8	2.0–3.0	0.12 U

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
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PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 4a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-1-13	BS000091	0.0–0.5	6.07
J3-1-13	BS000091	0.5–1.0	8.3
J3-1-13	FL000595	0.0–0.5	0.018 U
J3-1-13	FL000595	0.5–1.0	0.098
J3-1-13	FL000760	0.0–0.5	0.502 U
J3-1-13	FL000760	0.5–1.0	0.501 U
J3-1-13	FL000761	0.0–0.5	0.501 U
J3-1-13	FL000761	0.5–1.0	0.501 U
J3-1-13	FL001686	0.0–0.5	8.6
J3-1-13	FL001686	0.5–1.0	16.8 J
J3-1-13	FL001687	0.0–0.5	2.53
J3-1-13	FL001687	0.5–1.0	3.42

Notes:

Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.

Duplicate sample results are shown in brackets with parent sample results.

bgs: below ground surface

J: estimated value is less than quantification limit

mg/kg: milligram per kilogram (equivalent to parts per million)

PCB: polychlorinated biphenyl (Aroclor)

U: not detected, number in parentheses is associated quantitation limit

Table 4b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-1-13	J3-1-12_H-7/8	0.0–1.0	0.093 U
J3-1-13	J3-1-12_H-7/8	1.0–2.0	0.17 J
J3-1-13	J3-1-12_H-7/8	2.0–3.0	0.095 J
J3-1-13	J3-1-13_F/G-7/8	0.0–1.0	0.12 U [0.11 U]
J3-1-13	J3-1-13_F/G-7/8	1.0–2.0	0.1 U
J3-1-13	J3-1-13_F/G-7/8	2.0–3.0	0.12 U
J3-1-13	J3-1-13_F-7/8	0.0–1.0	0.29 J
J3-1-13	J3-1-13_F-7/8	1.0–2.0	0.12 U
J3-1-13	J3-1-13_F-7/8	2.0–3.0	0.11 U
J3-1-13	J3-1-13_F-8	0.0–1.0	3
J3-1-13	J3-1-13_F-8	1.0–2.0	0.49 J
J3-1-13	J3-1-13_F-8	2.0–3.0	0.11 U
J3-1-13	J3-1-13_G/H-7/8	0.0–1.0	0.09 U
J3-1-13	J3-1-13_G/H-7/8	1.0–2.0	0.11 U
J3-1-13	J3-1-13_G/H-7/8	2.0–3.0	0.13 U
J3-1-13	J3-1-13_G-7/8	0.0–1.0	0.1 U
J3-1-13	J3-1-13_G-7/8	1.0–2.0	0.13 U
J3-1-13	J3-1-13_G-7/8	2.0–3.0	0.12 U

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 4c
Summary of EPA Split Sample Data Used in PCB Evaluations

Parcel ID	EPA Location ID	Parent Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-1-13	H3A-FL002107-0-0C28	J3-1-13_F-8	0.0–1.0	2

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
EPA: U.S. Environmental Protection Agency
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 5a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-2-2	BS000059	0.0–0.5	12.2 J
J3-2-2	BS000059	0.5–1.0	17.7
J3-2-2	FL000914	0.0–0.5	18.1
J3-2-2	FL000914	0.5–1.0	0.517
J3-2-2	FL001323	0.0–0.5	93.7
J3-2-2	FL001323	0.5–1.0	8.72
J3-2-2	FL001323	0.5–1.0	14
J3-2-2	FL001324	0.0–0.5	40.4
J3-2-2	FL001324	0.5–1.0	18
J3-2-2	FL001849	0.0–0.5	19
J3-2-2	J3-2-2-SB-1	0.0–0.5	20.8
J3-2-2	J3-2-2-SB-1	0.5–1.0	31.4
J3-2-2	J3-2-2-SB-1	1.0–1.5	4.41
J3-2-2	J3-2-2-SB-1	1.5–2.0	0.238 U
J3-2-2	J3-2-3-SB-1	1.0–1.5	0.154 U
J3-2-2	J3-2-3-SB-1	1.5–2.0	4.48
J3-2-2	J3-2-3-SS-1	0.0–0.5	0.128 U
J3-2-2	J3-2-3-SS-1	0.5–1.0	0.122 U
J3-2-2	J3-2-3-SS-2	0.0–0.5	0.122 U
J3-2-2	J3-2-3-SS-2	0.5–1.0	0.113 U
J3-2-2	J3-2-3-SS-4	0.0–0.5	0.172 U
J3-2-2	J3-2-3-SS-4	0.5–1.0	0.146 U

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 5b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-2-2	EA22-R-12	0.5–1.0	0.977
J3-2-2	J3-2-2_F/G-2	0.0–1.0	0.12 U
J3-2-2	J3-2-2_F/G-2	1.0–2.0	0.12 U
J3-2-2	J3-2-2_G/H-2/3	0.0–1.0	0.17 J
J3-2-2	J3-2-2_G/H-2/3	1.0–2.0	0.083 U
J3-2-2	J3-2-2_H/I-2/3	0.0–1.0	5.6 J
J3-2-2	J3-2-2_H/I-2/3	1.0–2.0	0.9 J
J3-2-2	J3-2-2_J/K-2/3	0.0–1.0	11 J [15 J]
J3-2-2	J3-2-2_J/K-2/3	1.0–2.0	46.0 J
J3-2-2	J3-2-3_F-4/5	1.0–2.0	0.1 U
J3-2-2	J3-2-3_G-3/4	1.0–2.0	0.12 U
J3-2-2	J3-2-3_I/J-3/4	0.0–1.0	8.5
J3-2-2	J3-2-3_I/J-3/4	1.0–2.0	0.16 UJ
J3-2-2	J3-2-4_E/F-5/6	1.0–2.0	0.13 U
J3-2-2	J3-2-4_E/F-6	1.0–2.0	0.12 U [0.12 U]

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 5c
Summary of EPA Split Sample Data Used in PCB Evaluations

Parcel ID	EPA Location ID	Parent Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-2-2	H3A-FL002101-0-0C08	J3-2-2_H/I-2/3	1.0–2.0	6.6

Notes:

Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.

Duplicate sample results are shown in brackets with parent sample results.

bgs: below ground surface

EPA: U.S. Environmental Protection Agency

J: estimated value is less than quantification limit

mg/kg: milligram per kilogram (equivalent to parts per million)

PCB: polychlorinated biphenyl (Aroclor)

U: not detected, number in parentheses is associated quantitation limit

Table 6a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-2-3	BS000058	0.0–0.5	20.6
J3-2-3	BS000058	0.5–1.0	0.596 U
J3-2-3	BS000059	0.0–0.5	12.2 J
J3-2-3	BS000059	0.5–1.0	17.7
J3-2-3	FL000699	0.0–0.5	6.1
J3-2-3	FL000699	0.5–1.0	11.3
J3-2-3	FL000700	0.0–0.5	18.7
J3-2-3	FL000700	0.5–1.0	3.34
J3-2-3	FL000914	0.0–0.5	18.1
J3-2-3	FL000914	0.5–1.0	0.517
J3-2-3	FL001323	0.0–0.5	93.7
J3-2-3	FL001323	0.5–1.0	8.72
J3-2-3	FL001323	0.5–1.0	14
J3-2-3	FL001324	0.0–0.5	40.4
J3-2-3	FL001324	0.5–1.0	18
J3-2-3	J3-2-2-SB-1	0.0–0.5	20.8
J3-2-3	J3-2-2-SB-1	0.5–1.0	31.4
J3-2-3	J3-2-2-SB-1	1.0–1.5	4.41
J3-2-3	J3-2-2-SB-1	1.5–2.0	0.238 U
J3-2-3	J3-2-2-SB-1	2.0–2.5	0.19 U
J3-2-3	J3-2-2-SB-1	2.5–3.0	0.144 U
J3-2-3	J3-2-3-SB-1	0.0–0.5	20.6
J3-2-3	J3-2-3-SB-1	0.5–1.0	1.6
J3-2-3	J3-2-3-SB-1	1.0–1.5	0.154 U
J3-2-3	J3-2-3-SB-1	1.5–2.0	4.48
J3-2-3	J3-2-3-SB-1	2.0–2.5	0.48
J3-2-3	J3-2-3-SB-1	2.5–3.0	0.363 J
J3-2-3	J3-2-3-SB-2	0.0–0.5	9.26
J3-2-3	J3-2-3-SB-2	0.5–1.0	5.02
J3-2-3	J3-2-3-SB-2	1.0–1.5	0.416
J3-2-3	J3-2-3-SB-2	1.5–2.0	1.83
J3-2-3	J3-2-3-SB-2	2.0–2.5	0.829
J3-2-3	J3-2-3-SB-2	2.5–3.0	0.634
J3-2-3	J3-2-3-SB-3	0.0–0.5	19
J3-2-3	J3-2-3-SB-3	0.5–1.0	8.4
J3-2-3	J3-2-3-SB-3	1.0–1.5	0.22
J3-2-3	J3-2-3-SB-3	1.5–2.0	0.149 U [0.16 U]
J3-2-3	J3-2-3-SB-3	2.0–2.5	0.144
J3-2-3	J3-2-3-SB-3	2.5–3.0	0.14 U
J3-2-3	J3-2-3-SB-4	0.0–0.5	9.23
J3-2-3	J3-2-3-SB-4	0.5–1.0	10.8
J3-2-3	J3-2-3-SB-4	1.0–1.5	4.03
J3-2-3	J3-2-3-SB-4	1.5–2.0	1.85
J3-2-3	J3-2-3-SB-4	2.0–2.5	11.4

Table 6a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-2-3	J3-2-3-SB-4	2.5–3.0	1.08 [0.952]
J3-2-3	J3-2-3-SB-5	1.0–1.5	1.39
J3-2-3	J3-2-3-SB-5	1.5–2.0	0.426
J3-2-3	J3-2-3-SB-5	2.0–2.5	0.136 U
J3-2-3	J3-2-3-SS-1	0.0–0.5	0.128 U
J3-2-3	J3-2-3-SS-1	0.5–1.0	0.122 U
J3-2-3	J3-2-3-SS-2	0.0–0.5	0.122 U
J3-2-3	J3-2-3-SS-2	0.5–1.0	0.113 U
J3-2-3	J3-2-3-SS-3	0.0–0.5	19
J3-2-3	J3-2-3-SS-3	0.5–1.0	5.84
J3-2-3	J3-2-3-SS-4	0.0–0.5	0.172 U
J3-2-3	J3-2-3-SS-4	0.5–1.0	0.146 U
J3-2-3	J3-2-3-SS-5	0.0–0.5	0.23 [0.156]
J3-2-3	J3-2-3-SS-5	0.5–1.0	0.17 U

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 6b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-2-3	J3-2-2_F/G-2	1.0–2.0	0.12 U
J3-2-3	J3-2-2_H/I-2/3	1.0–2.0	0.9 J
J3-2-3	J3-2-2_J/K-2/3	0.0–1.0	11.0 J [15.0 J]
J3-2-3	J3-2-2_J/K-2/3	1.0–2.0	46.0 J
J3-2-3	J3-2-2_J/K-2/3	2.0–3.0	0.15 U
J3-2-3	J3-2-3_F/G-4	0.0–1.0	0.12 U
J3-2-3	J3-2-3_F/G-4	1.0–2.0	0.12 U
J3-2-3	J3-2-3_F/G-4	2.0–3.0	0.11 U
J3-2-3	J3-2-3_F-4/5	0.0–1.0	0.12 U
J3-2-3	J3-2-3_F-4/5	1.0–2.0	0.1 U
J3-2-3	J3-2-3_G-3/4	0.0–1.0	0.12 U
J3-2-3	J3-2-3_G-3/4	1.0–2.0	0.12 U
J3-2-3	J3-2-3_H/I-3/4	0.0–1.0	29
J3-2-3	J3-2-3_H/I-3/4	1.0–2.0	0.52
J3-2-3	J3-2-3_H/I-3/4	2.0–3.0	0.35
J3-2-3	J3-2-3_I/J-3/4	0.0–1.0	8.5
J3-2-3	J3-2-3_I/J-3/4	1.0–2.0	0.16 UJ
J3-2-3	J3-2-4_E/F-5/6	0.0–1.0	0.14 U
J3-2-3	J3-2-4_E/F-5/6	1.0–2.0	0.13 U
J3-2-3	J3-2-4_E/F-6	1.0–2.0	0.12 U [0.12 U]
J3-2-3	J3-2-4_E/F-6/7	2.0–3.0	0.51 J
J3-2-3	J3-2-4_F-5/6	2.0–3.0	0.14 U
J3-2-3	J3-2-5_D/E-7/8	1.0–2.0	0.1 U

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 7a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-2-4	BS000057	0.0–0.5	16.2
J3-2-4	BS000057	0.5–1.0	0.507 U
J3-2-4	BS000060	0.0–0.5	17.7
J3-2-4	BS000060	0.5–1.0	18.7
J3-2-4	FL000699	0.0–0.5	6.1
J3-2-4	FL000699	0.5–1.0	11.3
J3-2-4	FL000701	0.0–0.5	22.8
J3-2-4	FL000701	0.5–1.0	19.2
J3-2-4	J3-2-3-SB-4	0.0–0.5	9.23
J3-2-4	J3-2-3-SB-4	0.5–1.0	10.8
J3-2-4	J3-2-3-SB-4	1.0–1.5	4.03
J3-2-4	J3-2-3-SB-4	1.5–2.0	1.85
J3-2-4	J3-2-3-SB-4	2.0–2.5	11.4
J3-2-4	J3-2-3-SB-4	2.5–3.0	1.08 [0.952]
J3-2-4	J3-2-3-SS-1	0.0–0.5	0.128 U
J3-2-4	J3-2-3-SS-1	0.5–1.0	0.122 U
J3-2-4	J3-2-3-SS-5	0.0–0.5	0.23 [0.156 U]
J3-2-4	J3-2-3-SS-5	0.5–1.0	0.17 U

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 7b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-2-4	J3-2-3_F-4/5	1.0–2.0	0.1 U
J3-2-4	J3-2-4_E/F-5/6	0.0–1.0	0.14 U
J3-2-4	J3-2-4_E/F-5/6	1.0–2.0	0.13 U
J3-2-4	J3-2-4_E/F-6	0.0–1.0	0.15 U
J3-2-4	J3-2-4_E/F-6	1.0–2.0	0.12 U [0.12 U]
J3-2-4	J3-2-4_E/F-6/7	0.0–1.0	16
J3-2-4	J3-2-4_E/F-6/7	1.0–2.0	24
J3-2-4	J3-2-4_E/F-6/7	2.0–3.0	0.51 J
J3-2-4	J3-2-4_E-6/7	0.0–1.0	0.16 U
J3-2-4	J3-2-4_E-6/7	1.0–2.0	0.12 U
J3-2-4	J3-2-4_F/G-5/6	0.0–1.0	12.0 [16.0]
J3-2-4	J3-2-4_F/G-5/6	1.0–2.0	60
J3-2-4	J3-2-4_F/G-5/6	2.0–3.0	67.0 J
J3-2-4	J3-2-4_F-5/6	0.0–1.0	15.0 J
J3-2-4	J3-2-4_F-5/6	1.0–2.0	15
J3-2-4	J3-2-4_F-5/6	2.0–3.0	0.14 U
J3-2-4	J3-2-5_D/E-7/8	0.0–1.0	0.11 U
J3-2-4	J3-2-5_D/E-7/8	1.0–2.0	0.1 U
J3-2-4	J3-2-5_E-7/8	0.0–1.0	0.14 U
J3-2-4	J3-2-5_E-7/8	1.0–2.0	0.11 U

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 8a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-2-5	BS000060	0.0–0.5	17.7
J3-2-5	BS000060	0.5–1.0	18.7
J3-2-5	BS000061	0.0–0.5	33
J3-2-5	BS000061	0.5–1.0	37
J3-2-5	FL000702	0.0–0.5	14.2
J3-2-5	FL000702	0.5–1.0	19.6
J3-2-5	FL000703	0.0–0.5	2.83
J3-2-5	FL000703	0.0–0.5	2.78
J3-2-5	FL000703	0.5–1.0	1.44

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 8b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-2-5	J3-2-4_E-6/7	0.0–1.0	0.16 U
J3-2-5	J3-2-4_E-6/7	1.0–2.0	0.12 U
J3-2-5	J3-2-5_D/E-7/8	0.0–1.0	0.11 U
J3-2-5	J3-2-5_D/E-7/8	1.0–2.0	0.1 U
J3-2-5	J3-2-5_D/E-8	0.0–1.0	0.12 U
J3-2-5	J3-2-5_D/E-8	1.0–2.0	0.12 U
J3-2-5	J3-2-5_D/E-8/9	0.0–1.0	0.12 U [0.13 U]
J3-2-5	J3-2-5_D/E-8/9	1.0–2.0	0.12 U
J3-2-5	J3-2-5_E/F-7/8	0.0–1.0	0.8
J3-2-5	J3-2-5_E/F-7/8	1.0–2.0	0.12 U
J3-2-5	J3-2-5_E/F-8/9	0.0–1.0	0.14 U
J3-2-5	J3-2-5_E/F-8/9	1.0–2.0	0.11 U
J3-2-5	J3-2-5_E-7/8	0.0–1.0	0.14 U
J3-2-5	J3-2-5_E-7/8	1.0–2.0	0.11 U
J3-2-5	J3-2-6_E-9/10	0.0–1.0	0.14 U
J3-2-5	J3-2-6_E-9/10	1.0–2.0	0.1 U

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 9a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-2-6	BS000062	0.0–0.5	0.46 J
J3-2-6	BS000062	0.5–1.0	10.6
J3-2-6	FL000703	0.0–0.5	2.83
J3-2-6	FL000703	0.0–0.5	2.78
J3-2-6	FL000703	0.5–1.0	1.44
J3-2-6	FL001851	0.0–0.5	7.1
J3-2-6	FL001852	0.0–0.5	0.75

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 9b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-2-6	J3-2-5_D/E-8/9	0.0–1.0	0.12 U [0.13 U]
J3-2-6	J3-2-5_D/E-8/9	1.0–2.0	0.12 U
J3-2-6	J3-2-5_E/F-8/9	1.0–2.0	0.11 U
J3-2-6	J3-2-6_E/F-10	0.0–1.0	0.092 U
J3-2-6	J3-2-6_E/F-10	1.0–2.0	0.11 U
J3-2-6	J3-2-6_E/F-10/11	0.0–1.0	0.087 U
J3-2-6	J3-2-6_E/F-10/11	1.0–2.0	0.093 U
J3-2-6	J3-2-6_E/F-9/10	0.0–1.0	1.8 J
J3-2-6	J3-2-6_E/F-9/10	1.0–2.0	0.16 J
J3-2-6	J3-2-6_E-9/10	0.0–1.0	0.14 U
J3-2-6	J3-2-6_E-9/10	1.0–2.0	0.1 U
J3-2-6	J3-2-6_F/G-10/11	0.0–1.0	1.7 J
J3-2-6	J3-2-6_F/G-10/11	1.0–2.0	0.09 U

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 9c
Summary of EPA Split Sample Data Used in PCB Evaluations

Parcel ID	EPA Location ID	Parent Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J3-2-6	H3A-FL002100-0-0C07	J3-2-6_E/F-9/10	0.0–1.0	1.3

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
EPA: U.S. Environmental Protection Agency
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 10a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-2-3	BS000100	0.0–0.5	16.7
J6-2-3	BS000100	0.5–1.0	38.9 J [37.5]
J6-2-3	J6-2-10_H-25	0.0–1.0	0.089 J
J6-2-3	J6-2-2_I/J-24	0.0–1.0	3.9 J
J6-2-3	J6-2-2_I/J-24	1.0–2.0	0.036 J
J6-2-3	J6-2-2_J/K-23/24	0.0–1.0	29.0 J
J6-2-3	J6-2-2_J/K-23/24	1.0–2.0	16.0 J
J6-2-3	J6-2-2_J/K-23/24	2.0–3.0	5.3 J
J6-2-3	J6-2-2_J-24	0.0–1.0	6.3 J
J6-2-3	J6-2-2_J-24	1.0–2.0	10.4 J
J6-2-3	J6-2-2_J-24	2.0–3.0	0.049 U
J6-2-3	J6-2-3_I-26	0.0–1.0	0.063 J
J6-2-3	J6-2-3_K/L-27/28	0.0–1.0	0.57 UJ
J6-2-3	J6-2-3_K-25	0.0–1.0	0.21 J
J6-2-3	J6-2-3_L/M-26/27	0.0–1.0	0.63 U
J6-2-3	J6-2-3_M-29	0.0–1.0	0.074 J [0.074 J]
J6-2-3	J6-2-3_N-27	0.0–1.0	0.35 J

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 10b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-2-3	J6-2-3_J/K-2/3	1.0–2.0	0.0079 U
J6-2-3	J6-2-3_J/K-2/3	2.0–3.0	0.0081 U
J6-2-3	J6-2-3_K/L-3	0.0–1.0	14.0 J
J6-2-3	J6-2-3_K-4	0.0–1.0	2.1 [2.7]
J6-2-3	J6-2-3_K-4	1.0–2.0	1.3
J6-2-3	J6-2-3_K-4	2.0–3.0	1.7
J6-2-3	J6-2-3_L/M-5	0.0–1.0	11.0 J
J6-2-3	J6-2-3_L/M-5	1.0–2.0	80.0 J
J6-2-3	J6-2-3_L/M-6	0.0–1.0	13.0 J
J6-2-3	J6-2-3_L/M-6	1.0–2.0	73.0 J
J6-2-3	J6-2-3_L/M-7	0.0–1.0	0.064
J6-2-3	J6-2-3_L/M-7	1.0–2.0	0.0086 U
J6-2-3	J6-2-3_L/M-7	2.0–3.0	0.017 J
J6-2-3	J6-2-3_L-4	0.0–1.0	12 J [13 J]
J6-2-3	J6-2-3_L-5/6	1.0–2.0	2.6
J6-2-3	J6-2-3_M/N-7	0.0–1.0	40.0 J

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 10c
Summary of EPA Split Sample Data used in PCB Evaluations

Parcel ID	EPA Location ID	Parent Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-2-3	H3-FL002088	J6-2-2_J/K-23/24	0.0–1.0	27
J6-2-3	H3A-FL002094-0-0S29	J6-2-3_K/L-3	0.0–1.0	10

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
EPA: U.S. Environmental Protection Agency
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 10d
Summary of Supplementary Data Collection Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-2-3	J6-2-3_K-6	0.0–1.0	0.157
J6-2-3	J6-2-3_K-6	1.0–2.0	0.002 U
J6-2-3	J6-2-3_M/N-9	0.0–1.0	0.0725 J
J6-2-3	J6-2-3_M/N-9	1.0–2.0	0.0018 U [0.0018 U]
J6-2-3	J6-2-3_M-8	0.0–1.0	0.0021 U [0.002 U]
J6-2-3	J6-2-3_M-8	1.0–2.0	0.0145 J
J6-2-3	J6-2-3_N-10	0.0–1.0	0.120 [0.128]
J6-2-3	J6-2-3_N-10	1.0–2.0	0.0408 J
J6-2-3	J6-2-3_N-10	2.0–2.5	0.397

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 11a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-3-1	BS000147	0.0–0.5	30.7
J6-3-1	BS000147	0.5–1.0	16.6
J6-3-1	F0489601	0.0–0.5	0.485 J
J6-3-1	F0489602	0.0–0.5	0.504 UJ
J6-3-1	F0489602	0.5–1.0	0.85 J
J6-3-1	F0489603	0.0–0.5	0.502 UJ
J6-3-1	F0489604	0.0–0.5	5.42 J
J6-3-1	F0489604	0.5–1.0	8.75 J
J6-3-1	F0489605	0.0–0.5	9.89 J
J6-3-1	F0489606	0.0–0.5	10.9 J
J6-3-1	F0489606	0.5–1.0	26.8 J
J6-3-1	F0489607	0.0–0.5	16.7 J
J6-3-1	FL001281	0.0–0.5	16.6
J6-3-1	FL001281	0.5–1.0	30.9
J6-3-1	FL001282	0.0–0.5	0.501 U
J6-3-1	FL001282	0.5–1.0	2.03
J6-3-1	J6-3-1_A/B-8	0.0–1.0	3.6
J6-3-1	J6-3-1_A/B-8	1.0–2.0	21.0 J
J6-3-1	J6-3-1_A/B-8	2.0–4.0	8.7 J
J6-3-1	J6-3-1_A/B-8	4.0–6.0	150.0 J
J6-3-1	J6-3-1_A/B-8	6.0–8.0	26.0 J
J6-3-1	J6-3-1_A/B-8	8.0–10.0	53.0 J
J6-3-1	J6-3-1_A/B-9	0.0–1.0	9.3 J
J6-3-1	J6-3-1_A/B-9	1.0–2.0	13.3 J
J6-3-1	J6-3-1_A/B-9	2.0–4.0	75.0 J [71.0 J]
J6-3-1	J6-3-1_A/B-9	4.0–6.0	25.0 J
J6-3-1	J6-3-1_A/B-9	6.0–8.0	42.0 J
J6-3-1	J6-3-1_A/B-9	8.0–10.0	56.0 J
J6-3-1	J6-3-1_B/C-10	0.0–1.0	4.5 J
J6-3-1	J6-3-1_B/C-10	1.0–2.0	22.0 J
J6-3-1	J6-3-1_B/C-10	2.0–4.0	69.0 J
J6-3-1	J6-3-1_B/C-10	4.0–6.0	150.0 J
J6-3-1	J6-3-1_B/C-10	6.0–8.0	29.0 J
J6-3-1	J6-3-1_B/C-10	8.0–10.0	68.0 J
J6-3-1	J6-3-1_B/C-6	0.0–1.0	1.44
J6-3-1	J6-3-1_B/C-6	1.0–2.0	0.44 J
J6-3-1	J6-3-1_B/C-6	2.0–4.0	0.024 U
J6-3-1	J6-3-1_B/C-6	4.0–6.0	0.024 U
J6-3-1	J6-3-1_B/C-8	0.0–1.0	1.6 J
J6-3-1	J6-3-1_B/C-8	1.0–2.0	0.2
J6-3-1	J6-3-1_B/C-8	2.0–4.0	0.026 U
J6-3-1	J6-3-1_B/C-8	4.0–6.0	0.026 J
J6-3-1	J6-3-1_B/C-8	6.0–8.0	0.028 U
J6-3-1	J6-3-1_B/C-8	8.0–10.0	0.024 U

Table 11a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-3-1	J6-3-1_B-7	0.0–1.0	2.7 [3.5]
J6-3-1	J6-3-1_B-7	1.0–2.0	6.0 J
J6-3-1	J6-3-1_B-7	2.0–4.0	88.0 J
J6-3-1	J6-3-1_B-7	4.0–6.0	96.0 J
J6-3-1	J6-3-1_B-7	6.0–8.0	5.2 J [1.1 J]
J6-3-1	J6-3-1_B-7	8.0–10.0	0.035 U
J6-3-1	J6-3-1_B-9	0.0–1.0	38.0 J
J6-3-1	J6-3-1_B-9	1.0–2.0	47.0 J
J6-3-1	J6-3-1_B-9	2.0–4.0	120.0 J
J6-3-1	J6-3-1_B-9	4.0–6.0	43
J6-3-1	J6-3-1_B-9	6.0–8.0	11
J6-3-1	J6-3-1_B-9	8.0–10.0	0.3
J6-3-1	J6-3-1_B-9/10	0.0–1.0	5.0 J
J6-3-1	J6-3-1_B-9/10	1.0–2.0	46.0 J
J6-3-1	J6-3-1_B-9/10	2.0–4.0	83.0 J [109.0 J]
J6-3-1	J6-3-1_B-9/10	4.0–6.0	150.0 J
J6-3-1	J6-3-1_B-9/10	6.0–8.0	24.8 J
J6-3-1	J6-3-1_B-9/10	8.0–10.0	16.0 J
J6-3-1	J6-3-1_C/D-5	0.0–1.0	0.17
J6-3-1	J6-3-1_C/D-5	1.0–2.0	0.15 J
J6-3-1	J6-3-1_C/D-5	2.0–4.0	0.026 U
J6-3-1	J6-3-1_C/D-5	4.0–6.0	0.026 U
J6-3-1	J6-3-1_C-6	0.0–1.0	0.99
J6-3-1	J6-3-1_C-6	1.0–2.0	0.027 U
J6-3-1	J6-3-1_C-6	2.0–4.0	0.026 U
J6-3-1	J6-3-1_C-6	4.0–6.0	0.026 U
J6-3-1	J6-3-1_C-6	6.0–8.0	0.065
J6-3-1	J6-3-1_C-7	0.0–1.0	7.4 J
J6-3-1	J6-3-1_C-7	1.0–2.0	0.85
J6-3-1	J6-3-1_C-7	2.0–4.0	0.027 U
J6-3-1	J6-3-1_C-7	4.0–6.0	0.024 U
J6-3-1	J6-3-1_C-7	6.0–8.0	0.025 U
J6-3-1	J6-3-1_C-8	0.0–1.0	8.7 J [5.9 J]
J6-3-1	J6-3-1_C-8	1.0–2.0	5.7 J
J6-3-1	J6-3-1_C-8	2.0–4.0	0.026 J
J6-3-1	J6-3-1_C-8	4.0–6.0	0.025 U
J6-3-1	J6-3-1_C-9	0.0–1.0	5.0 J
J6-3-1	J6-3-1_C-9	1.0–2.0	0.26
J6-3-1	J6-3-1_C-9	2.0–4.0	0.05 J
J6-3-1	J6-3-1_C-9	4.0–6.0	0.024 U
J6-3-1	J6-3-1_C-9	6.0–8.0	0.044 J
J6-3-1	J6-3-1_C-9/10	0.0–1.0	6.4 J
J6-3-1	J6-3-1_C-9/10	1.0–2.0	44.0 J
J6-3-1	J6-3-1_C-9/10	2.0–4.0	26.0 J

Table 11a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-3-1	J6-3-1_C-9/10	4.0–6.0	0.034 U
J6-3-1	J6-3-1_C-9/10	6.0–8.0	0.027 U
J6-3-1	J6-3-1_C-9/10	8.0–10.0	0.025 U
J6-3-1	J6-3-1_D-4/5	0.0–1.0	0.14
J6-3-1	J6-3-1_D-4/5	1.0–2.0	0.031 U
J6-3-1	J6-3-1_D-4/5	2.0–4.0	0.026 U
J6-3-1	J6-3-1_D-4/5	4.0–6.0	0.025 U
J6-3-1	J6-3-1_D-6	0.0–1.0	0.17
J6-3-1	J6-3-1_D-6	1.0–2.0	0.028 U
J6-3-1	J6-3-1_D-6	2.0–4.0	0.026 U
J6-3-1	J6-3-1_D-6	4.0–6.0	0.026 U
J6-3-1	J6-3-1_D-7	0.0–1.0	0.61
J6-3-1	J6-3-1_D-7	1.0–2.0	0.24
J6-3-1	J6-3-1_D-7	2.0–4.0	0.026 J
J6-3-1	J6-3-1_D-7	4.0–6.0	0.024 U
J6-3-1	J6-3-1_D-8	0.0–1.0	8.0 J
J6-3-1	J6-3-1_D-8	1.0–2.0	3.3
J6-3-1	J6-3-1_D-8	2.0–4.0	0.53
J6-3-1	J6-3-1_D-8	4.0–6.0	0.59
J6-3-1	J6-3-1_E/F-3	0.0–1.0	2.2
J6-3-1	J6-3-1_E/F-3	1.0–2.0	2.8
J6-3-1	J6-3-1_E/F-3	2.0–4.0	6.8 J
J6-3-1	J6-3-1_E/F-3	4.0–6.0	0.27
J6-3-1	J6-3-1_E/F-3	6.0–8.0	0.023 U
J6-3-1	J6-3-1_E-4	0.0–1.0	0.063 J
J6-3-1	J6-3-1_E-4	1.0–2.0	0.026 U
J6-3-1	J6-3-1_E-4	2.0–4.0	0.024 U
J6-3-1	J6-3-1_E-4	4.0–6.0	0.024 U
J6-3-1	J6-3-1_E-5	0.0–1.0	0.16
J6-3-1	J6-3-1_E-5	1.0–2.0	0.031 J
J6-3-1	J6-3-1_E-5	2.0–4.0	0.025 U
J6-3-1	J6-3-1_E-5	4.0–6.0	0.025 U
J6-3-1	J6-3-1_E-8	0.0–1.0	0.24
J6-3-1	J6-3-1_E-8	1.0–2.0	0.055
J6-3-1	J6-3-1_E-8	2.0–4.0	0.088 J
J6-3-1	J6-3-1_E-8	4.0–6.0	0.52
J6-3-1	J6-3-1_F/G-1/2	0.0–1.0	4.1 J
J6-3-1	J6-3-1_F/G-1/2	1.0–2.0	1.56
J6-3-1	J6-3-1_F/G-1/2	2.0–4.0	5.3 J
J6-3-1	J6-3-1_F/G-1/2	4.0–6.0	7.2 J
J6-3-1	J6-3-1_F/G-1/2	6.0–8.0	7.1 J
J6-3-1	J6-3-1_F/G-1/2	8.0–10.0	0.7
J6-3-1	J6-3-1_F-2/3	0.0–1.0	1.23 J
J6-3-1	J6-3-1_F-2/3	1.0–2.0	3.9

Table 11a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-3-1	J6-3-1_F-2/3	2.0–4.0	3.2
J6-3-1	J6-3-1_F-2/3	4.0–6.0	0.28 J
J6-3-1	J6-3-1_F-2/3	6.0–8.0	0.028 U
J6-3-1	J6-3-1_F-4	0.0–1.0	0.27
J6-3-1	J6-3-1_F-4	1.0–2.0	0.089 J
J6-3-1	J6-3-1_F-4	2.0–4.0	0.025 U [0.024 U]
J6-3-1	J6-3-1_F-4	4.0–6.0	0.13 U
J6-3-1	J6-3-1_F-8	0.0–1.0	0.78 [0.79]
J6-3-1	J6-3-1_F-8	1.0–2.0	0.29
J6-3-1	J6-3-1_F-8	2.0–4.0	0.64
J6-3-1	J6-3-1_F-8	4.0–6.0	0.026 U
J6-3-1	J6-3-1_G/H-4/5	0.0–1.0	1.24 J
J6-3-1	J6-3-1_G/H-4/5	1.0–2.0	0.069
J6-3-1	J6-3-1_G/H-4/5	2.0–4.0	0.025 U [0.024 U]
J6-3-1	J6-3-1_G/H-4/5	4.0–6.0	0.023 U
J6-3-1	J6-3-1_G-2	0.0–1.0	3.5 J
J6-3-1	J6-3-1_G-2	1.0–2.0	1.47
J6-3-1	J6-3-1_G-2	2.0–4.0	0.037 J
J6-3-1	J6-3-1_G-2	4.0–6.0	0.027 U
J6-3-1	J6-3-1_G-2	6.0–8.0	0.028 U
J6-3-1	J6-3-1_G-8	0.0–1.0	0.186
J6-3-1	J6-3-1_G-8	1.0–2.0	0.024 U
J6-3-1	J6-3-1_G-8	2.0–4.0	0.023 U
J6-3-1	J6-3-1_G-8	4.0–6.0	0.024 U
J6-3-1	J6-3-1_H-3	0.0–1.0	0.032 J
J6-3-1	J6-3-1_H-3	1.0–2.0	0.056 J
J6-3-1	J6-3-1_H-3	2.0–4.0	0.024 U
J6-3-1	J6-3-1_H-3	4.0–6.0	0.033 J
J6-3-1	J6-3-1-SB-1	0.0–0.5	5.96
J6-3-1	J6-3-1-SB-1	0.5–1.0	0.136
J6-3-1	J6-3-1-SB-1	1.0–1.5	0.281
J6-3-1	J6-3-1-SB-1	1.5–2.0	0.114 U
J6-3-1	J6-3-1-SB-10	1.0–1.5	0.12 U
J6-3-1	J6-3-1-SB-10	1.5–2.0	0.114 U
J6-3-1	J6-3-1-SB-10	2.0–2.5	0.121 U
J6-3-1	J6-3-1-SB-10	2.5–3.0	0.115 U [0.119 U]
J6-3-1	J6-3-1-SB-11	1.0–1.5	7.11
J6-3-1	J6-3-1-SB-11	1.5–2.0	0.897
J6-3-1	J6-3-1-SB-11	2.0–2.5	1.86
J6-3-1	J6-3-1-SB-11	2.5–3.0	9.54
J6-3-1	J6-3-1-SB-12	1.0–1.5	0.5
J6-3-1	J6-3-1-SB-12	1.5–2.0	0.125 U
J6-3-1	J6-3-1-SB-12	2.0–2.5	0.144 U [0.197]
J6-3-1	J6-3-1-SB-13	0.0–0.5	70

Table 11a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-3-1	J6-3-1-SB-13	0.5–1.0	90.5
J6-3-1	J6-3-1-SB-13	1.0–1.5	129
J6-3-1	J6-3-1-SB-13	1.5–2.0	23.9
J6-3-1	J6-3-1-SB-13	2.0–2.5	20.1
J6-3-1	J6-3-1-SB-13	2.5–3.0	2.09
J6-3-1	J6-3-1-SB-13	3.0–3.5	0.822
J6-3-1	J6-3-1-SB-13	3.5–4.0	0.766
J6-3-1	J6-3-1-SB-14	0.0–0.5	18.2
J6-3-1	J6-3-1-SB-14	0.5–1.0	13.2
J6-3-1	J6-3-1-SB-14	1.0–1.5	15.3
J6-3-1	J6-3-1-SB-14	1.5–2.0	199
J6-3-1	J6-3-1-SB-14	2.0–2.5	50.5
J6-3-1	J6-3-1-SB-14	2.5–3.0	98.1
J6-3-1	J6-3-1-SB-14	3.0–3.5	68.8
J6-3-1	J6-3-1-SB-14	3.5–4.0	25.3
J6-3-1	J6-3-1-SB-15	0.0–0.5	38.2
J6-3-1	J6-3-1-SB-15	0.5–1.0	35.5
J6-3-1	J6-3-1-SB-15	1.0–1.5	88.5
J6-3-1	J6-3-1-SB-15	1.5–2.0	143
J6-3-1	J6-3-1-SB-15	2.0–2.5	157
J6-3-1	J6-3-1-SB-15	2.5–3.0	28.3
J6-3-1	J6-3-1-SB-15	3.0–3.5	16.1
J6-3-1	J6-3-1-SB-15	3.5–4.0	23.9
J6-3-1	J6-3-1-SB-2	0.0–0.5	3.57
J6-3-1	J6-3-1-SB-2	0.5–1.0	0.181
J6-3-1	J6-3-1-SB-2	1.0–1.5	0.114 U
J6-3-1	J6-3-1-SB-2	1.5–2.0	0.123 U
J6-3-1	J6-3-1-SB-3	0.0–0.5	0.135 U
J6-3-1	J6-3-1-SB-3	0.5–1.0	0.124 U
J6-3-1	J6-3-1-SB-3	1.0–1.5	0.126 U
J6-3-1	J6-3-1-SB-3	1.5–2.0	0.125 U
J6-3-1	J6-3-1-SB-4	0.0–0.5	1.28
J6-3-1	J6-3-1-SB-4	0.5–1.0	0.118 U [0.122 U]
J6-3-1	J6-3-1-SB-4	1.0–1.5	0.121 U
J6-3-1	J6-3-1-SB-4	1.5–2.0	0.116 U
J6-3-1	J6-3-1-SB-5	0.0–0.5	0.127
J6-3-1	J6-3-1-SB-5	0.5–1.0	0.114 U
J6-3-1	J6-3-1-SB-5	1.0–1.5	0.118 U
J6-3-1	J6-3-1-SB-5	1.5–2.0	0.129 U
J6-3-1	J6-3-1-SB-9	0.0–0.5	2.85
J6-3-1	J6-3-1-SB-9	0.5–1.0	2.68
J6-3-1	J6-3-1-SB-9	0.5–1.0	2.78
J6-3-1	J6-3-1-SB-9	1.0–1.5	0.808
J6-3-1	J6-3-1-SB-9	1.5–2.0	0.142

Table 11a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-3-1	J6-3-1-SS-1	0.0–0.5	0.45 [0.449]
J6-3-1	J6-3-1-SS-1	0.5–1.0	0.15
J6-3-1	J6-3-1-SS-2	0.0–0.5	1.46
J6-3-1	J6-3-1-SS-2	0.5–1.0	0.254
J6-3-1	J6-3-1-SS-3	0.0–0.5	8.1
J6-3-1	J6-3-1-SS-3	0.5–1.0	7.25
J6-3-1	J6-3-1-SS-4	0.0–0.5	0.133 U
J6-3-1	J6-3-1-SS-4	0.5–1.0	0.126 U
J6-3-1	J6-3-1-SS-5	0.0–0.5	0.135 U
J6-3-1	J6-3-1-SS-5	0.5–1.0	0.136 U
J6-3-1	J6-3-1-SS-6	0.0–0.5	0.153 U
J6-3-1	J6-3-1-SS-6	0.5–1.0	0.135 U
J6-3-1	J6-3-1-SS-7	0.0–0.5	0.941
J6-3-1	J6-3-1-SS-7	0.5–1.0	0.127 U
J6-3-1	J6-3-1-SS-8	0.0–0.5	0.128 U [0.136 U]
J6-3-1	J6-3-1-SS-8	0.5–1.0	0.12 U
J6-3-1	J6-3-1-SS-9	0.0–0.5	4.51
J6-3-1	J6-3-1-SS-9	0.5–1.0	1.15

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 11b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-3-1	EA08-E-2	0.0–0.5	8.96
J6-3-1	EA08-E-2	0.5–1.0	6.58

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 11c
Summary of EPA Split Sample Data used in PCB Evaluations

Parcel ID	EPA Location ID	Parent Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-3-1	H3-FL002086	J6-3-1_C-9	0.0–1.0	2.5
J6-3-1	H3-FL002087	J6-3-1_D-7	0.0–1.0	0.62

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
EPA: U.S. Environmental Protection Agency
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 11d

Summary of Supplementary Data Collection Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-3-1	J6-3-1_C/D-10	0.0–1.0	18.3 J
J6-3-1	J6-3-1_C/D-10	1.0–2.0	16.9 D
J6-3-1	J6-3-1_C/D-10	2.0–3.0	14.7 DJ
J6-3-1	J6-3-1_C/D-10	3.0–4.0	0.153
J6-3-1	J6-3-1_C/D-10/11	0.0–1.0	1.59
J6-3-1	J6-3-1_C/D-10/11	1.0–2.0	1.1
J6-3-1	J6-3-1_C/D-10/11	2.0–3.0	0.97
J6-3-1	J6-3-1_C/D-10/11	3.0–4.0	1.64
J6-3-1	J6-3-1_C/D-10/11	4.0–5.0	1.34
J6-3-1	J6-3-1_C/D-10/11	5.0–6.0	1.42
J6-3-1	J6-3-1_C/D-10/11	6.0–7.0	5.06 D
J6-3-1	J6-3-1_C/D-10/11	7.0–8.0	1.06
J6-3-1	J6-3-1_D/E-10	0.0–1.0	0.597
J6-3-1	J6-3-1_D/E-10	1.0–2.0	0.0249 J
J6-3-1	J6-3-1_D/E-10	2.0–3.0	0.0017 U
J6-3-1	J6-3-1_D/E-10	3.0–4.0	0.0433 J
J6-3-1	J6-3-1_D/E-10	4.0–5.0	0.0019 U
J6-3-1	J6-3-1_D/E-10	5.0–6.0	0.0019 U
J6-3-1	J6-3-1_D/E-11	0.0–1.0	2.31
J6-3-1	J6-3-1_D/E-11	1.0–2.0	2.51
J6-3-1	J6-3-1_D/E-11	2.0–3.0	2.05
J6-3-1	J6-3-1_D/E-11	3.0–4.0	5.47
J6-3-1	J6-3-1_D/E-11	4.0–5.0	1.84
J6-3-1	J6-3-1_D/E-11	5.0–6.0	3.34 J
J6-3-1	J6-3-1_D/E-11	6.0–7.0	3.66 D
J6-3-1	J6-3-1_D/E-11	7.0–8.0	24.2 DJ
J6-3-1	J6-3-1_E/F-10	0.0–1.0	0.672
J6-3-1	J6-3-1_E/F-10	1.0–2.0	0.0252
J6-3-1	J6-3-1_E/F-10	2.0–3.0	0.039
J6-3-1	J6-3-1_E/F-10	3.0–4.0	0.0407
J6-3-1	J6-3-1_E/F-10	4.0–5.0	0.0019 U
J6-3-1	J6-3-1_E/F-10	5.0–6.0	0.0019 U
J6-3-1	J6-3-1_E/F-10	6.0–7.0	0.0019 U
J6-3-1	J6-3-1_E/F-10	7.0–8.0	0.0186 J
J6-3-1	J6-3-1_E/F-11	0.0–1.0	2.28
J6-3-1	J6-3-1_E/F-11	1.0–2.0	6.81 DJ
J6-3-1	J6-3-1_E/F-11	2.0–3.0	31.5 DJ
J6-3-1	J6-3-1_E/F-11	3.0–4.0	42.6 DJ
J6-3-1	J6-3-1_E/F-11	4.0–5.0	111 DJ
J6-3-1	J6-3-1_E/F-11	5.0–6.0	0.0019 U
J6-3-1	J6-3-1_E/F-11	6.0–7.0	5.07 D
J6-3-1	J6-3-1_E/F-11	7.0–8.0	2.46
J6-3-1	J6-3-1_E/F-11/12	0.0–1.0	0.799

Table 11d

Summary of Supplementary Data Collection Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
J6-3-1	J6-3-1_E/F-11/12	1.0–2.0	0.781
J6-3-1	J6-3-1_E/F-11/12	2.0–3.0	1.06
J6-3-1	J6-3-1_E/F-11/12	3.0–4.0	2.99
J6-3-1	J6-3-1_E/F-11/12	4.0–5.0	1.11
J6-3-1	J6-3-1_E/F-11/12	5.0–6.0	1.58 DJ
J6-3-1	J6-3-1_F/G-10	0.0–1.0	0.923
J6-3-1	J6-3-1_F/G-11	0.0–1.0	0.612
J6-3-1	J6-3-1_F/G-11	1.0–2.0	0.994
J6-3-1	J6-3-1_F/G-11	2.0–3.0	0.942
J6-3-1	J6-3-1_F/G-11	3.0–4.0	0.0160 J
J6-3-1	J6-3-1_F/G-11	4.0–5.0	0.0017 U
J6-3-1	J6-3-1_F/G-11	5.0–6.0	0.0019 U
J6-3-1	J6-3-1_F/G-11	6.0–7.0	0.0019 U
J6-3-1	J6-3-1_F/G-11	7.0–8.0	0.0149 J
J6-3-1	J6-3-1_F/G-11/12	0.0–1.0	7.48 DJ
J6-3-1	J6-3-1_F/G-11/12	1.0–2.0	7.01 DJ
J6-3-1	J6-3-1_F/G-11/12	2.0–3.0	25.7 DJ
J6-3-1	J6-3-1_F/G-11/12	3.0–4.0	55.8 DJ
J6-3-1	J6-3-1_F/G-11/12	4.0–5.0	31.9 DJ
J6-3-1	J6-3-1_G/H-10	0.0–1.0	0.0647

Notes:

Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.

Duplicate sample results are shown in brackets with parent sample results.

bgs: below ground surface

J: estimated value is less than quantification limit

mg/kg: milligram per kilogram (equivalent to parts per million)

PCB: polychlorinated biphenyl (Aroclor)

U: not detected, number in parentheses is associated quantitation limit

Table 12a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
K2-1-10	BS000101	0.0–0.5	1.65
K2-1-10	BS000101	0.5–1.0	0.758
K2-1-10	BS000102	0.0–0.5	2.33
K2-1-10	BS000102	0.5–1.0	0.416 J
K2-1-10	FL000915	0.0–0.5	4.2
K2-1-10	FL000915	0.5–1.0	0.504 U
K2-1-10	FL000916	0.0–0.5	5.65 J
K2-1-10	FL000916	0.5–1.0	0.376 J
K2-1-10	FL000917	0.0–0.5	4.25
K2-1-10	FL000917	0.5–1.0	0.227 J
K2-1-10	FL001569	0.0–0.5	55.8
K2-1-10	FL001569	0.5–1.0	99.5
K2-1-10	FL001859	0.0–0.5	35

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 12b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
K2-1-10	K2-1-10_B-2/3	0.0 –1.0	46.0 J
K2-1-10	K2-1-10_B-2/3	1.0 –2.0	0.36 J
K2-1-10	K2-1-10_B-3/4	0.0 –1.0	0.094 U
K2-1-10	K2-1-10_B-3/4	1.0 –2.0	0.09 U
K2-1-10	K2-1-10_C-2/3	0.0 –1.0	24.0 J
K2-1-10	K2-1-10_C-2/3	1.0 –2.0	7.2 J
K2-1-10	K2-1-10_C-2/3	2.0 –3.0	0.11 U
K2-1-10	K2-1-10_C-3/4	0.0 –1.0	13.0 U [11.0 U]
K2-1-10	K2-1-10_C-3/4	1.0 –2.0	0.12 U
K2-1-10	K2-1-10_D-2/3	0.0 –1.0	27.0 J
K2-1-10	K2-1-10_D-2/3	1.0 –2.0	39 J [30 J]
K2-1-10	K2-1-10_D-2/3	2.0 –3.0	0.18 J
K2-1-10	K2-1-10_D-2/3	3.0 –4.0	0.17 J
K2-1-10	K2-1-10_D-3	0.0 –1.0	1.6 J
K2-1-10	K2-1-10_D-3	1.0 –2.0	0.11 U
K2-1-10	K2-1-10_D-3	3.0 –4.0	0.012 J
K2-1-10	K2-1-10_D-3/4	0.0 –1.0	0.14 U
K2-1-10	K2-1-10_E-2	0.0 –1.0	28.0 J
K2-1-10	K2-1-10_E-2	1.0 –2.0	51.0 J
K2-1-10	K2-1-10_E-2	2.0 –3.0	140.0 J
K2-1-10	K2-1-10_E-2	3.0 –4.0	15
K2-1-10	K2-1-10_E-2/3	0.0 –1.0	0.13 U
K2-1-10	K2-1-10_E-2/3	1.0 –2.0	0.11 U
K2-1-10	K2-1-10_E-2/3	2.0 –3.0	0.09 U
K2-1-10	K2-1-10_E-2/3	3.0 –4.0	0.0092 U
K2-1-10	K2-1-10_E-3/4	0.0 –1.0	0.14 U

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 12c
Summary of EPA Split Sample Data Used in PCB Evaluations

Parcel ID	EPA Location ID	Parent Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
K2-1-10	H3A-FL002103-0-0C15	K2-1-10_C-2/3	1.0–2.0	23

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
EPA: U.S. Environmental Protection Agency
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 13a
Summary of Historical Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
K3-1-2	BS000065	0.0–0.5	10.3
K3-1-2	BS000065	0.5–1.0	24.1
K3-1-2	FL000705	0.5–1.0	0.501 U
K3-1-2	FL000706	0.0–0.5	6.09
K3-1-2	FL000706	0.5–1.0	0.501 U
K3-1-2	FL001300	0.0–0.5	30.1
K3-1-2	FL001300	0.5–1.0	9.62
K3-1-2	FL001301	0.0–0.5	40.6
K3-1-2	FL001301	0.5–1.0	1.34

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 13b
Summary of Pre-Design Investigation Data Used in PCB Evaluations

Parcel ID	Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
K3-1-2	K3-1-2_B-2	0.0–1.0	8.3 J
K3-1-2	K3-1-2_B-2	1.0–2.0	3.1 J
K3-1-2	K3-1-2_B-2	2.0–3.0	0.55 J
K3-1-2	K3-1-2_B-4	0.0–1.0	0.18 J
K3-1-2	K3-1-2_B-4	1.0–2.0	0.12 U
K3-1-2	K3-1-2_B-5/6	0.0–1.0	0.14 U
K3-1-2	K3-1-2_C/D-5/6	0.0–1.0	0.18 J
K3-1-2	K3-1-2_C-3	0.0–1.0	14.0 J
K3-1-2	K3-1-2_C-3	1.0–2.0	3.1 J
K3-1-2	K3-1-2_C-3	2.0–3.0	0.24 J
K3-1-2	K3-1-2_C-4/5	0.0–1.0	1.7 J
K3-1-2	K3-1-2_C-4/5	1.0–2.0	0.63 J
K3-1-2	K3-1-2_D/E-4	0.0–1.0	63.0 J
K3-1-2	K3-1-2_D/E-4	1.0–2.0	23.0 J
K3-1-2	K3-1-2_D/E-4	2.0–3.0	0.14 U
K3-1-2	K3-1-2_D-4/5	0.0–1.0	6.2 J
K3-1-2	K3-1-2_D-4/5	1.0–2.0	0.11 U
K3-1-2	K3-1-2_E-5/6	0.0–1.0	7.5 J
K3-1-2	K3-1-2_E-5/6	1.0–2.0	8.4 J
K3-1-2	K3-1-2_E-5/6	2.0–3.0	0.14 U

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Table 13c
Summary of EPA Split Sample Data Used in PCB Evaluations

Parcel ID	EPA Location ID	Parent Location ID	Depth Increment (feet bgs)	Total PCB (mg/kg)
K3-1-2	H3A-FL002102-0-0C12	K3-1-2_B-2	1.0–2.0	0.79

Notes:
Only PCB sample locations that create a polygon or polygons within the Residential Floodplain are included.
Duplicate sample results are shown in brackets with parent sample results.
bgs: below ground surface
EPA: U.S. Environmental Protection Agency
J: estimated value is less than quantification limit
mg/kg: milligram per kilogram (equivalent to parts per million)
PCB: polychlorinated biphenyl (Aroclor)
U: not detected, number in parentheses is associated quantitation limit

Appendix J
Revised Non-Residential Exposure Area PCB Evaluations

Appendix J
Revised Non-Residential Exposure Area PCB Evaluations

1 Introduction

As described in Section 2 of the General Electric Company's (GE's) *Final Remedial Design/Remedial Action Work Plan for Reach 5A* (Final RD/RA Work Plan), the U.S. Environmental Protection Agency's (EPA's) *Human Health Risk Assessment* (HHRA; EPA 2005) divided the Rest of River (ROR) floodplain into 90 Exposure Areas (EAs) for the assessment of direct human contact with floodplain soils. Of those 90 EAs, 38 are located within Reach 5A, as shown on Figure 1-1.

Several properties that comprise seven of those EAs (EAs 3, 8,[1] 9, 23, 25, 28, and 30) within the Reach 5A floodplain are subject to the Residential Performance Standards for polychlorinated biphenyls (PCBs), as described in Section II.B.3.a.(1)(d) of the Revised Final Resource Conservation and Recovery Act Permit Modification (Revised Final Permit) for the Housatonic ROR (EPA 2020). The remaining 31 EAs within the Reach 5A floodplain are subject to the non-residential Performance Standards described in Section II.B.3.a of the Revised Final Permit. Those EAs are referred to herein as "non-residential EAs," although some of them include portions of residential properties that are subject to non-residential Performance Standards. In addition, several of those non-residential EAs contain overlying direct contact subareas, which are typically characterized by a different and/or more frequent exposure scenario. Further, in the ROR *Housatonic River – Rest of River, Revised Corrective Measures Study Report* (RCMS Report; Arcadis et al. 2010), GE identified "heavily used subareas" within EAs that were identified as "frequently used" in the *Housatonic River – Rest of River,*

[1] As described in Section 3.1.3 of GE's 2025 *Addendum to Supplemental Data Collection Work Plan for Reach 5A* (Anchor QEA 2025), non-residential EA 8 comprises Pittsfield Tax Parcel J6-3-2. This non-residential EA was evaluated in the HHRA and subsequently evaluated in GE's *Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A* (Conceptual RD/RA Work Plan; Anchor QEA et al. 2023) using the recreational canoeist exposure scenario for older child and adult receptors. It was GE's understanding based on available tax mapping that this parcel was owned by the Massachusetts Audubon Society (Mass Audubon). However, during discussions with Mass Audubon regarding property access, GE was notified that Parcel J6-3-2 is not owned by Mass Audubon. Further, a large portion of this parcel is located in the former right-of-way for the Holmes Road Bridge that existed prior to relocation to its current location. Accordingly, the legal ownership of this property is not clear. However, during discussions with the owner of the adjacent residential property (Parcel J6-3-1), that property owner indicated that he maintains a large portion of Parcel J6-3-2 as a lawn area as part of his property. Given this information, GE proposed (with EPA approval) to conservatively re-evaluate Parcels J6-3-1 and J6-3-2 as a single residential parcel. That revised evaluation, which now includes the area previously defined as non-residential EA 8, is provided in Appendix I to the Final RD/RA Work Plan. In this situation, non-residential EA 8 has been removed from the non-residential floodplain soil evaluations described herein.

Corrective Measures Study Proposal (Arcadis BBL and QEA 2007). These heavily used subareas are referred to as "Frequently Used Subareas" in the Revised Final Permit and in this appendix.

GE's *Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A* (Conceptual RD/RA Work Plan; Anchor QEA et al. 2023), submitted in September 2023, delineated 4.9 acres and 8,230 cubic yards (cy) of floodplain soil removal in 19 EAs/subareas to meet the applicable non-residential floodplain Performance Standards. That Conceptual RD/RA Work Plan was conditionally approved by EPA in a letter dated December 3, 2024. That letter contained six conditions pertaining to soil remediation in the non-residential floodplain EAs. Those six conditions, quoted in full, are as follows:

- **Condition 121:** "Floodplain areas with high PCB concentrations and erosion potential: EPA and GE have conducted an evaluation of additional floodplain areas that should be remediated due to a combination of erosion risk, high PCB concentrations, and adjacent bank removals, and have identified some such areas. Attachment 3 contains a series of figures showing non-residential floodplain areas that have been identified for remediation, including those areas previously identified in the Conceptual RD/RA Work Plan and (where applicable) the additional areas to be remediated based on this evaluation (Note that some of the figures in this attachment do not show any additional remediation areas because there are none in the subject Exposure Area.). In the Final RD/RA Work Plan, GE shall propose to conduct remediation at all floodplain areas identified for remediation in Attachment 3."
- **Condition 122:** "Core Area 1 Habitat: EPA and GE have conducted an evaluation of the need for additional remediation in several Exposure Areas (EAs) containing Core Area 1 habitat to meet the standard of section II.B.3.a.(2)(c)(iii) of the Permit, and have agreed upon some additional remediation. As indicated in Condition #121, Attachment 3 contains a series of figures showing non-residential floodplain areas that have been identified for remediation, including, as applicable, in addition to the previously identified areas and those identified based on the evaluation described in the foregoing condition, the additional areas to be remediated based on the evaluation of EAs containing Core Area 1 habitat. In the Final RD/RA Work Plan, GE shall propose to conduct remediation at all floodplain areas identified for remediation in Attachment 3."
- **Condition 123:** "Frequently Used Subareas: Consistent with the Revised Permit and the approved PDI Work Plan and Summary Report for the Reach 5A Non-Residential Floodplain Exposure Areas, GE calculated EPCs only for the 0-3 foot depth in the FUSAs. However, EPA has determined that the common-sense interpretation of the FUSAs supports the conclusion that the 0-1 foot interval in those subareas should also be evaluated to ensure that exposure to the surficial soil (where exposure is most likely to occur) is not diluted if lower concentrations are present in the 1-3 foot intervals. Therefore, in the Final RD/RA Work Plan, GE shall evaluate the

0-1 foot interval in FUSAs against the Performance Standards in addition to the 0-3 foot interval, as noted in Condition #31."

- **Condition 124:** "EA19: The area in the southwest corner of EA19 is shown as walkable on the figures. This area is not walkable and should be classified as boatable. In the Final RD/RA Work Plan, GE shall designate this area as boatable and shall recalculate the EPC."
- **Condition 125:** "EA27: As determined by the City of Pittsfield, EA 27 may encompass an area associated with future recreational water access. Prior to submission of the Final RD/RA Work Plan, GE shall coordinate with both the City and EPA to discuss potential future use of this property. If a likely location for a boat launch is identified, GE shall consider whether this would change the applicable exposure scenario or result in a FUSA with the same or a different exposure scenario and, if so, whether additional floodplain soil/bank sampling and/or remediation is warranted in anticipation of a change in future use."
- **Condition 126:** "EA22a: EA22a is shown as difficult/wadable. This is incorrect; while a small part of this subarea may be difficult to access, the majority is not and has specifically been noted as a dirt biking area. EPA has conducted field reconnaissance and confirmed that this area is not difficult to access. In the Final RD/RA Work Plan, GE shall reevaluate the accessibility of EA22a and recalculate the resulting EPCs and required removals."

During the final remedial design process, the following activities were conducted:

- The supplemental removal areas shown in Attachment 3 of EPA's conditional approval letter were added to the final removal footprint in response to EPA Conditions 121 and 122.
- Additional floodplain soil PCB data were collected in EAs 19, 22, and 33 in 2024 and 2025, as part of the Supplemental Data Collection (SDC) program. These data were used in part to better characterize PCB concentrations in EA 19 and to further delineate the extent of the 1 milligram per kilogram (mg/kg) PCB isopleth in EAs 22 and 33. A summary of those supplemental floodplain soil PCB data was provided in GE's *Supplemental Data Collection Summary Report for Reach 5A* (SDC Summary Report; Anchor QEA et al. 2026). These data were used to update the PCB evaluations to determine the extent of remediation needed to achieve the applicable Performance Standards in each of these three EAs.
- PCB evaluations were updated in response to EPA Conditions 123, 124, and 126.
- For constructability, the removal footprints were smoothed along the soil excavation boundaries and aligned with the surveyed boundaries for any adjacent top-of-riverbank, backwaters, vernal pools, and tributaries. The reason for this smoothing is that the non-residential floodplain removal areas are determined based on calculations performed using a three-by-three-meter grid (see Appendix F to the Conceptual RD/RA Work Plan) and the resulting grid-based removal footprints are not constructable.

For EA 27 (discussed in EPA Condition 125), GE and the City of Pittsfield had an initial discussion regarding the potential future use of Parcel K3-1-19 in this EA during a meeting held on October 17, 2025. It is GE's understanding that the City of Pittsfield is evaluating potential future uses of property but has not determined whether the current use of this property would change in the future. Accordingly, this EA has been evaluated using the high-use general recreation scenario for adults and older children (unchanged from the exposure scenario evaluated for this EA in the Conceptual RD/RA Work Plan), and no new Frequently Used Subareas have been defined for this property.

This remainder of this document contains the following sections:

- Section 2 describes the updates to the non-residential floodplain EA-specific PCB evaluations.
- Section 3 describes modifications to the removal areas and volumes derived from the updated PCB evaluations, the additional removal areas in response to EPA's December 3, 2024, conditional approval letter, and the subsequent adjustments to the removal footprint for constructability.
- Section 4 describes the updated methods used to determine the segregation of the excavated floodplain soils that will be subject to disposal at the Upland Disposal Facility (UDF) from those subject to disposal at an off-site disposal facility.
- Section 5 provides detailed evaluations for each of the EAs/subareas (and one Frequently Used Subarea) subject to remediation. The total number of EAs/subareas has increased from 19 (in the Conceptual RD/RA Work Plan) to 21 in this final design as a result of the various EPA conditions. This section also provides the results of the disposal evaluation for the excavated floodplain soils in each EA/subarea.

2 Updated PCB Evaluations

PCB evaluations were performed to calculate the existing (pre-remediation) exposure point concentration (EPC) in each EA and subarea according to the methods described in Section 2 of Appendix F to the Conceptual RD/RA Work Plan. Updates to the PCB evaluations include the following:

- In accordance with EPA Condition 124, the habitat access in the southwestern corner of EA 19 was changed from walkable to boatable. As a result, the habitat access for the same habitat feature in the northwestern corner of EAs 20 and 63 immediately bordering EA 19 was also classified as boatable.
- In accordance with EPA Condition 126, the habitat access for EA 22a was changed from difficult/wadable to walkable consistent with EPA's field reconnaissance results. The updated accessibility for EAs 19, 20, and 22a is shown in the upper-left panel on Figures 2-1l, 2-1m, and 2-1o, respectively.

- Additional PCB data were collected in EAs 19, 22, and 33 as part of the SDC program. As described in the SDC Summary Report, three rounds of supplemental floodplain soil sampling were conducted in 2024 and 2025 for these EAs to refine the PCB characterization for EA 19 and to further delineate the extent of the 1 mg/kg PCB isopleth for EAs 22 and 33. Figures showing the revised 1 mg/kg PCB isopleth in EAs 22 and 33 relative to the original isopleth are provided in Attachment 1 to this appendix. The relevant data were incorporated in the PCB interpolation prior to the PCB evaluation. The updated PCB concentrations in EAs 19, 22, and 33 and the updated 1 mg/kg PCB isopleth are shown in the upper-right, lower-left, and lower-right panels on Figures 2-1l, 2-1o, and 2-1v, respectively.

The updated habitat access and soil PCB concentrations in 0- to 0.5-foot, 0.5- to 1-foot, and 0- to 1-foot depth intervals for all 31 EAs are presented on Figure 2-1. The updated soil PCB concentrations in 0- to 1-foot, 1- to 2-foot, 2- to 3-foot, and 0- to 3-foot depth intervals for the three Frequently Used Subareas are shown on Figure 2-2. Table 1 summarizes the updated floodplain soil EPCs (0- to 1-foot) for each of the 31 non-residential EAs (and subareas) in Reach 5A. Table 2 provides both 0- to 1-foot and 0- to 3-foot EPCs for each of the three Frequently Used Subareas in Reach 5A. Consistent with the Conceptual RD/RA Work Plan, these tables also show the following: (1) the exposure scenario and receptors assigned to each EA and subarea in EPA's HHRA; (2) whether each EA intersects with Core Area 1 habitat; and (3) the corresponding Primary and, where relevant, Secondary Performance Standards that apply to each exposure scenario under Tables 1 and 2 of the Revised Final Permit. In accordance with the Revised Final Permit, the Secondary Performance Standards are relevant only in EAs that contain Core Area 1 habitat. EPCs that exceed the applicable Primary Performance Standard are highlighted in gray in Tables 1 and 2. As provided in the Revised Final Permit, EAs where the EPC exceeds the Primary Performance Standard will require some amount of remediation to achieve the Performance Standards, although remediation will also be conducted for other concerns in a few EAs where EPCs were below the Performance Standard, as described in Section 3.

3 Updated Removal Areas and Volumes

As described in Section 3 of Appendix F to the Conceptual RD/RA Work Plan, removal limits were calculated using an iterative evaluation process to ensure that the post-remediation EPCs for the non-residential EAs achieved the applicable Performance Standards. Removal areas were further adjusted as needed for constructability, mainly to minimize habitat disturbances and avoid overlap with planned removal in residential properties (described in Appendix I to the Final RD/RA Work Plan) and any vernal pools subject to excavation as part of the vernal pool pilot study.

The delineation method was updated for Frequently Used Subareas such that the Primary

Performance Standard will be achieved for both the 0- to 1-foot and 0- to 3-foot depth intervals, as required by EPA Condition 123. The evaluation was first conducted for the 0- to 1-foot layer with areas containing elevated PCB concentrations being removed until the Primary Performance Standard was achieved. The evaluation was then conducted for the 0- to 3-foot layer incorporating the previously determined 0- to 1-foot removals.

Additional areas were incorporated into the removal footprint in response to EPA Conditions 121 and 122. These areas were shown as "supplemental removal" areas in Attachment 3 to EPA's conditional approval letter and are described as follows:

- EPA Condition 121 requires additional removal within areas along the shoreline that have a combination of being adjacent to a planned bank remediation area, have high erosion potential, and have elevated PCB concentrations (e.g., above 25 mg/kg in most cases) in the 0- to 1-foot interval. This resulted in additional removal in 13 EAs—namely, EAs 1, 2, 7, 16, 17, 18, 19, 20, 22, 26, 31, 33, and 34. It should be noted that three of those EAs (EAs 1, 17, and 26) have pre-remediation EPCs that are below the applicable Primary Performance Standard and thus do not require remediation to achieve the applicable numeric Performance Standard. Accordingly, the removal in those EAs to address EPA's condition goes beyond what is required to meet that standard in most instances.
- EPA Condition 122 requires additional removal within areas outside Core Area 1 habitat in EAs 10 and 20 to further reduce the post-remediation EPCs. During the conceptual design, the proposed removal in EA 10 and EA 20 yielded post-remediation EPCs of 6.6 and 22 mg/kg, respectively, which achieved the respective Secondary Performance Standards for these EAs (which are applicable in these EAs due to the presence of Core Area 1 habitat), but were above the respective Primary Performance Standards. In this situation, GE agreed with EPA to remediate additional areas outside Core Area 1 habitat in these two EAs where PCB concentrations in the 0- to 1-foot depth increment, adjusted using the applicable "use factors,"[2] exceed the applicable Primary Performance Standard. Note that EA 19, another EA that contains Core Area 1 habitat, was similarly determined during the conceptual design to have a post-remediation EPC (22 mg/kg) between the applicable Primary and Secondary Performance Standards for that EA. However, no additional removal outside Core Area 1 habitat is required for this EA because such remediation would have yielded only a nominal additional reduction in the post-remediation EPC.

[2] "Use factors" were developed by EPA as weighting factors to account for the habitat accessibility in human health risk assessment. The entire floodplain in Reaches 5 and 6 was mapped into four accessibility categories (i.e., walkable, wadable, difficult, and boatable), and use factors of 1.0, 0.2, 0.2, and 0.0 were assigned for each of these areas, respectively.

In addition. consistent with the evaluations performed during the conceptual design, adjustments to certain removal areas were performed to eliminate small, isolated removal areas (with an expansion of removal footprint in other contiguous areas as needed to compensate).

Removal areas were also adjusted for constructability during final design. As described in Section 2 of Appendix F to the Conceptual RD/RA Work Plan, the PCB evaluations were performed using PCB concentrations on three-by-three-meter grid cells converted from Thiessen polygons. As a result, the removal areas delineated from those evaluations were also in the three-by-three-meter grid format. Given concerns related to constructability, the "grid-like" removal footprints were "smoothed" by adjusting the removal boundaries to be more consistent with the underlying Thiessen polygons in the 0- to 0.5-foot and/or 0.5- to 1-foot depth intervals that determined the need for removal. In addition, as stated previously, the grid-like removal footprints were smoothed for constructability along surveyed boundaries for any adjacent top-of-riverbank, backwaters, vernal pools, and tributaries.

After adjustments to the non-residential floodplain remediation areas, the post-remediation EPCs were recomputed to verify achievement of the applicable Performance Standard. A summary of the evaluation results and the subsequent modifications for each EA/subarea is presented in Section 5.

4 Methods for Disposal Evaluation

As described in Sections II.B.5 and II.B.6 of the Revised Final Permit, the ROR Remedial Action will use a hybrid disposal approach that includes a combination of disposal at a UDF and off-site disposal. Attachment E to the Revised Final Permit describes the criteria and methods for determining whether material excavated during the ROR Remedial Action may be disposed of in the UDF. As provided in that Attachment E floodplain soil to be disposed of in the UDF must have a volume-weighted average PCB concentration of less than 50 mg/kg for each EA. If the volume-weighted average PCB concentration in the soil to be removed from a given EA equals or exceeds 50 mg/kg, the soils with the highest PCB concentrations in the EA will be segregated for off-site disposal until the average concentration of the remainder of the soil to be removed in the EA decreases to less than 50 mg/kg for subsequent disposal at the UDF. Since removal to achieve Residential Performance Standards (described separately in Appendix I of the Final RD/RA Work Plan) overlaps in most cases with the required removal at the non-residential EAs, the entire volume within the boundary of an individual EA (non-residential and residential) was combined for the disposal assessment.[3]

For the final design, the approach for determining the segregation of the excavated floodplain soils to be disposed of at the UDF from those that will require disposal at an off-site disposal facility was

[3] As described in footnote 1, residential floodplain Parcel J6-3-1 was expanded to include non-residential EA 8 area. For that reason, the disposal evaluation for that expanded residential property was evaluated individually.

generally consistent with the approach used in the conceptual design. For each EA where remediation is required, a volume-weighted average PCB concentration of the soils to be removed was calculated using the PCB concentrations within the removal footprints and the associated removal areas and depths. For floodplain soil removals at the non-residential EAs, the interpolated PCB concentrations for each three-by-three-meter grid cell were used for the evaluation. For the removals at residential properties, the PCB Thiessen polygons generated as part of the residential remedial evaluations (described in Appendix I) were used for the evaluation.

If the volume-weighted average PCB concentration for a given EA was below 50 mg/kg, the entire quantity of floodplain soils to be removed from that EA was designated for disposal at the UDF. For EAs with a volume-weighted average PCB concentration of 50 mg/kg or greater, the soils with the highest PCB concentrations in the EA were designated for off-site disposal until the average concentration of the remainder of the soil to be removed in the EA decreased to less than 50 mg/kg; the remaining soils were then designated for disposal at the UDF. One exception to this relates to EAs that include excavation of floodplain soils at depths below one foot. If any of the excavated soil in the top one-foot depth interval was designated for off-site disposal, all floodplain soils to be removed from the remaining depth intervals at the same location were also designated for off-site disposal. The disposal volumes for each EA are presented in Section 5.

5 Remedial Evaluation Results by Exposure Area

This section summarizes the remedial evaluation results for each of the 21 EAs/subareas and one Frequently Used Subarea requiring remediation. To streamline the evaluation results, the evaluations of subareas within EAs (including the Frequently Used Subarea) are included with the description provided for each of the main EAs (e.g., Subareas 10a and 10b are summarized together with EA 10).

The proposed removals have been divided into the following two categories based on how the removal area was identified:

- Base removal refers to removal in areas identified for remediation to achieve the applicable numeric Performance Standard, with refinements based on EPA Conditions 123, 124, and 126. Most of the base removal areas are identical to those proposed in the Conceptual RD/RA Work Plan, with notable changes occurring only in EAs 19, 22, 33 and Frequently Used Subarea 4/61.
- Supplemental removal refers to removal in areas identified in EPA Conditions 121 and 122 (see Section 3). These areas consist of: (1) areas where removal will be conducted to address potential erosion risks where elevated PCB concentrations were found adjacent to the planned bank remediation areas (EPA Condition 121); and (2) additional areas in EAs 10 and 20 outside Core Area 1 habitat where PCB concentrations adjusted based on use factors are above the applicable Primary Performance Standard (EPA Condition 122). It should be noted that removal in these supplemental removal areas is generally not required to meet the applicable numeric

Performance Standards in the EAs/subareas where they were identified. Rather, it consists of supplemental removal in areas identified in Attachment 3 to EPA's conditional approval letter to address the two conditions described above. In several cases, these supplemental removal areas were identified in EAs where pre-remediation EPCs are already below the applicable Performance Standard or in EAs where the base removal sufficiently reduced the post-remediation EPCs below the applicable Performance Standard.

The proposed removal footprints for both the base removal and supplemental removal are shown on Figures 5-1a through 5-1r. These figures also show the distribution of super habitats and habitat accessibility side-by-side with the interpolated 0- to 1-foot PCB concentrations used for the evaluation (and the interpolated 0- to 3-foot PCB concentrations for Frequently Used Subareas 4/61). Removal areas where the removed soil has been designated for off-site disposal versus disposal in the UDF are shown on the design drawings provided in Appendix A to the Final RD/RA Work Plan. A summary of proposed removal areas and volumes associated with each EA and subarea is presented in Table 3. Table 4 presents a summary of the estimated disposal volumes for each EA/subarea and identifies the volumes subject to disposal in the UDF and those subject to off-site disposal.

Exposure Area 1

EA 1 occupies approximately 14 acres and is classified as a medium-use general recreation area for adult and older child; it is shown on Figure 5-1a. A relatively large portion of this EA (nearly half) is difficult to access, with a small portion considered boatable. There are four vernal pools within this EA; one of these vernal pools will be subject to future remediation following the pilot study and the remaining three vernal pools do not require any remediation. There is no Core Area 1 habitat or Frequently Used Subareas within this EA.

The Primary Performance Standard for EA 1 is 21 mg/kg. Since there is no Core Area 1 habitat in this EA, the Secondary Performance Standard is not relevant. The existing (pre-remediation) EPC for this EA is 16 mg/kg, which is below the Primary Performance Standard. As a result, no remediation was proposed for this EA in the Conceptual RD/RA Work Plan and no base removal is proposed here. However, supplemental removal was added in this EA, as required by EPA Condition 121.

The proposed final remedial action in this EA consists of removal/backfill of approximately 640 cy of floodplain soils to a depth of one foot below ground surface (bgs), as shown on Figure 5-1a. This supplemental removal covers approximately 0.4 acres of area adjacent to the planned bank remediation, where floodplain soil PCB concentrations range from 37 to 101 mg/kg. This supplemental remediation will result in a further reduction of the EPC from 16 to 13.9 mg/kg (Table 3).

As shown in Table 4, the volume-weighted average PCB concentration of soil to be removed from EA 1 is 63 mg/kg. In this situation, approximately 230 cy of excavated soils with the highest PCB

concentrations will be segregated for off-site disposal, and the remaining 410 cy (averaging less than 50 mg/kg) will be subject to disposal in the UDF.

Exposure Area 2

EA 2 occupies approximately 31 acres and is classified as a high-use general recreation area for adults and older children; it is shown on Figure 5-1b. The Primary Performance Standard for EA 2 is 14 mg/kg. There is no Core Area 1 habitat within this EA, so the Secondary Performance Standard is not relevant. The existing (pre-remediation) EPC in EA 2 is 18 mg/kg, which exceeds the Primary Performance Standard; therefore, this EA requires remediation. There are two subareas within EA 2 (Subareas 2a and 2b), neither of which requires remediation.[4] This EA also contains two maintained utility easements (EAs 4 and 61) and a Frequently Used Subarea 4/61. As shown in Tables 1 and 2, based on the calculated existing EPCs, EA 4 and Frequently Used Subarea 4/61 both require remediation. The remedial evaluations for EA 4 and Frequently Used Subarea 4/61 were performed separately (see below) and prior to the evaluation of EA 2. There are eight vernal pools within this EA; two of those vernal pools will be subject to soil excavation (5A-VP-4 and 5A-VP-7) and one (5A-VP-9) will be subject to placement of amendment as part of the vernal pool pilot study. Of the remaining five vernal pools, four will be subject to future remediation following the pilot study. Most of EA 2 is considered walkable.

The proposed final remedial action for EA 2 includes removal/backfill of approximately 1,850 cy (1.2 acres) of floodplain soils to a depth of one foot bgs, as shown on Figure 5-1b. This includes approximately 1,050 cy of base removal and 800 cy of supplemental removal. Soil PCB concentrations within the proposed removal area range from 17 to 176 mg/kg. The proposed remedial action for EA 2, along with the excavation in pilot study vernal pools 5A-VP-4 and 5A-VP-7 (evaluated separately) and the removal in EA 4 and Frequently Used Subarea 4/61 (discussed below), will reduce the post-remediation EPC in EA 2 to 13.6 mg/kg (Table 3) and thus achieve the Primary Performance Standard.

These remedial quantities for EA 2 do not include the remediation that will occur in EA 4 and Frequently Used Subarea 4/61, which are also shown on Figure 5-1b; those quantities are presented in the next section. As shown in Table 4, the volume-weighted average PCB concentration of soil to be removed from EA 2 is 82 mg/kg. In this situation, approximately 1,050 cy of excavated soils with the highest PCB concentrations will be segregated for off-site disposal, and the remaining 800 cy (averaging less than 50 mg/kg) will be subject to disposal in the UDF.

[4] As shown in Table 1, Subarea 2a constitutes a low-use general recreation area for older children, where the existing EPC is 74 mg/kg, below the applicable Primary Performance Standard of 80 mg/kg. Subarea 2b constitutes a high-use general recreation area for older children, where the existing EPC is 9.4 mg/kg, below the applicable Primary Performance Standard of 27 mg/kg.

Exposure Area 4 and Frequently Used Subarea 4/61

EA 4 is a 3.3-acre maintained utility easement that intersects portions of EAs 2, 5, and 7; it is shown on Figure 5-1c. Frequently Used Subarea 4/61 is an approximate 0.2-acre portion of EA 4, as shown on Figure 5-1d. The entire EA (including the Frequently Used Subarea) is considered walkable. None of the area is considered Core Area 1 habitat, and there are no vernal pools in this EA.

EA 4 and Frequently Used Subarea 4/61 are classified as high-use general recreation areas for adults and older children. The Primary Performance Standard is 14 mg/kg in both areas. (Since there is no Core Area 1 habitat in these areas, the Secondary Performance Standard is not relevant.) The Performance Standard applies to the top one foot in EA 4 and both the top one foot and three feet in Frequently Used Subarea 4/61 (as required by EPA Condition 123). Both areas have pre-remediation EPCs of 20 mg/kg, which exceed the Performance Standard; therefore, both areas require remediation.

The proposed final remedial action includes removal/backfill of approximately 660 cy (0.3 acres) of floodplain soil (Figure 5-1c), including 390 cy to a depth of one foot bgs in EA 4 and Frequently Used Subarea 4/61, and 270 cy to a depth of three feet bgs in Frequently Used Subarea 4/61 (Figure 5-1d).

For Frequently Used Subarea 4/61, the proposed removal is considered base removal that covers approximately 0.1 acres, with excavated soil PCB concentrations in the range of 0.07 to 56 mg/kg (Figure 5-1d). The removal area is slightly expanded from the conceptual design based on the updated PCB evaluations required by EPA Condition 123. The proposed removal will reduce the post-remediation 0- to 1-foot and 0- to 3-foot EPCs to 7.6 and 13.2 mg/kg, respectively (Table 3), which will achieve the Primary Performance Standard for this subarea.

For EA 4, the proposed removal is considered base removal that covers approximately 0.2 acre, which is consistent with the proposed removal area in the Conceptual RD/RA Work Plan. The excavated soil PCB concentrations are in the range of 29 to 76 mg/kg (Figure 5-1c). Most of the soil removal footprint is located along the north-south portion of this EA, with one small area of removal located in the east-west portion of this EA. The proposed remedial action in EA 4, in conjunction with the remediation in Frequently Used Subarea 4/61, will reduce the post-remediation EPC in EA 4 to 13.8 mg/kg (Table 3), which will achieve the Primary Performance Standard for this EA.

As shown in Table 4, the volume-weighted average PCB concentration for EA 4 (including Frequently Used Subarea 4/61) is approximately 43 mg/kg; therefore, all excavated soil removed from EA 4 and Frequently Used Subarea 4/61 will be subject to disposal in the UDF.

Exposure Area 5

EA 5 is an approximate 2.4-acre area classified as a high-use general recreation area for adults and older children; it is shown on Figure 5-1e. Most of this EA is considered walkable, except for a portion

of one vernal pool 5A-VP-13, which will be subject to the remediation described in Section 10.1.3 of the Final RD/RA Work Plan. None of EA 5 is considered Core Area 1 habitat, and it contains no Frequently Used Subareas.

The Primary Performance Standard for this EA is 14 mg/kg. (Since there is no Core Area 1 habitat in this EA, the Secondary Performance Standard is not relevant.) The pre-remediation EPC in EA 5 is 59 mg/kg, which exceeds the Primary Performance Standard; therefore, this EA requires remediation.

The proposed final remedial action for EA 5 includes removal/backfill of approximately 160 cy of floodplain soils to a depth of one foot bgs, as shown on Figure 5-1e. The proposed removal is considered base removal, with a footprint that is unchanged from the conceptual design. The total removal area is approximately 0.1 acre in two discrete polygons near the river where PCB concentrations are the highest in this EA (i.e., greater than 120 mg/kg). The proposed remedial action in EA 5 will reduce the EPC to 13.2 mg/kg (Table 3), which will achieve the Primary Performance Standard for this EA. This includes 130 cy of excavation in vernal pool 5A-VP-13 located within EA 5.

In summary, a total of approximately 290 cy of soil will be removed within EA 5. This includes 130 cy of removal from the portion of vernal pool 5A-VP-13 within EA 5 and an additional 160 cy of removal within this EA outside the vernal pool. As summarized in Table 4, the volume-weighted average PCB concentration of soil to be removed is 79 mg/kg. In this situation, approximately 160 cy of excavated soils with the highest PCB concentrations outside the vernal pool will be segregated for off-site disposal, and the remaining 130 cy excavated from the vernal pool (averaging less than 50 mg/kg) will be subject to disposal in the UDF.

Exposure Area 7

EA 7 is an approximate six-acre area classified as a high-use general recreation area for adults and older children; it is shown on Figure 5-1f.[5] The southwestern portion of this EA overlaps with residential Parcel I6-3-13, which has been evaluated separately as part of the residential floodplain properties evaluation (see Appendix I of the Final RD/RA Work Plan). Most of this EA is considered walkable, with a few areas considered difficult to access. There are seven vernal pools (or portions thereof) within this EA; one of those vernal pools will include soil excavation as part of the vernal pool pilot study (5A-VP-16) and another (5A-VP-13) is being remediated in advance of completing the pilot study because it overlaps with residential Parcel I6-3-13 (see discussion in Appendix I and in Section 10.1.3 of the Final RD/RA Work Plan). Of the remaining five vernal pools, four will be subject

[5] The northwestern corner of this EA (which partially overlaps with residential Parcel I6-3-13) has been modified to exclude the portion of this parcel that was remediated previously under the Actual/Potential Lawn (A/P Lawn) program.

to future remediation. None of EA 7 is considered Core Area 1 habitat, and it contains no Frequently Used Subareas.

The Primary Performance Standard for this EA is 14 mg/kg. (Since there is no Core Area 1 habitat in this EA, the Secondary Performance Standard is not relevant.) The pre-remediation EPC in EA 7 is 20 mg/kg, which exceeds the Primary Performance Standard; therefore, this EA requires remediation.

The proposed final remedial action includes removal/backfill of approximately 260 cy of floodplain soils to the depth of one foot bgs, as shown on Figure 5-1f. This includes approximately 120 cy of base removal from the southwestern portion of the EA adjacent to residential Parcel I6-3-13 and 140 cy of supplemental removal adjacent to a planned bank remediation area in the southeastern portion of the EA. The excavated soil PCB concentrations are in the range of 18 to 104 mg/kg. The proposed remedial action, in conjunction with the removal in residential Parcel I6-3-13 and vernal pools 5A-VP-16 and 5A-VP-13, will reduce the post-remediation EPC in EA 7 to 13.2 mg/kg (Table 3), which will meet the Primary Performance Standard for this EA.

A total of approximately 3,370 cy of soil will be removed within the boundary of EA 7. This includes 3,080 cy of removal from residential Parcel I6-3-13 (see Appendix I of the Final RD/RA Work Plan), 30 cy of removal from the portion of vernal pool 5A-VP-13 within EA 7, and an additional 260 cy of removal from the non-residential portion of this EA. As shown in Table 4, the volume-weighted average PCB concentration of soil to be removed is 73 mg/kg. In this situation, approximately 1,370 cy of excavated soil with the highest PCB concentrations will be segregated for off-site disposal, and the remaining 2,000 cy (averaging less than 50 mg/kg) will be subject to disposal in the UDF.

Exposure Areas 10, 10a, and 10b

EA 10 is an approximate 60-acre area classified as a high-use general recreation exposure area for adults and young children; it is shown on Figure 5-1g. It contains two subareas (Subareas 10a and 10b) that occupy approximately 0.5- and 9.1-acre portions of EA 10, respectively. More than half of EA 10 is considered difficult to access or boatable, and it contains two relatively small vernal pools, one of which will be subject to future remediation. Approximately 7.5 acres of the southwestern portion of EA 10 are considered Core Area 1 habitat. There are no Frequently Used Subareas within the EA.

The Primary and Secondary Performance Standards for EA 10 are 4.6 and 6.9 mg/kg, respectively. For EAs 10a and 10b, both the Primary and Secondary Performance Standards are 4.6 mg/kg. The pre-remediation EPCs for EAs 10, 10a, and 10b are 13 mg/kg, 27 mg/kg, and 6.8 mg/kg, respectively. All three areas exceed their respective Primary Performance Standards; therefore, remediation is required in each of these three areas.

The proposed final remedial action includes removal/backfill of approximately 3,800 cy of floodplain soils to the depth of one foot bgs, including 276 cy in Subarea 10a, 2,519 cy in Subarea 10b, and 1,007 cy in the remainder of EA 10 (Figure 5-1g). Approximately 1,590 cy (1.0 acre) of the removal is considered base removal, while the remaining 2,210 cy (1.4 acres) was added as supplemental removal to address areas outside Core Area 1 habitat in EA 10 where use-factor-adjusted PCB concentrations are greater than the Primary Performance Standard (pursuant to EPA Condition 122). The supplemental removal also includes a small portion of floodplain located within Core Area 1 habitat that extends from the proposed base removal (immediately south of backwater BW5A-1) to address the highest PCB concentration area in EA 10 (approaching 120 mg/kg). The excavated soil PCB concentrations are in the range of 8 to 119 mg/kg. The proposed remedial action covers approximately 2.4 acres and will reduce the post-remediation EPCs in EAs 10, 10a, and 10b to 3.9 mg/kg, 3.2 mg/kg, and 3.8 mg/kg, respectively (Table 3). Those EPCs are below the Secondary Performance Standards (applicable to EA 10 due to the presence of Core Area 1 habitat) and also below the applicable Primary Performance Standards.

As shown in Table 4, the volume-weighted average PCB concentration of the 3,800 cy of soil removed from EA 10 is approximately 43 mg/kg; therefore, all excavated soils from this EA will be disposed of in the UDF.

Exposure Area 11

EA 11 is a 1.9-acre area classified as a high-use general recreation area for adults; it is shown on Figure 5-1h. All of EA 11 is considered walkable, with no vernal pools or Core Area 1 habitat in this area.

The Primary Performance Standard for this EA is 14 mg/kg. (Since there is no Core Area 1 habitat in this EA, the Secondary Performance Standard is not relevant.) The pre-remediation EPC in EA 11 is 15 mg/kg, which exceeds the Primary Performance Standard; therefore, this EA requires remediation.

The proposed final remedial action includes removal/backfill of approximately 60 cy of floodplain soils to a depth of one foot bgs (Figure 5-1h). The proposed removal is considered base removal, and no supplemental removal areas were identified for this EA. The proposed removal area is approximately 0.04 acre at the southern end of the EA, where the soil PCB concentration is 38 mg/kg. The proposed remedial action will reduce the EPC to 13.9 mg/kg (Table 3), which will achieve the Primary Performance Standard for this EA.

As shown in Table 4, the volume-weighted average PCB concentration of soil to be removed from EA 11 is 38 mg/kg; therefore, all excavated soils from this EA will be disposed of in the UDF.

Exposure Area 16

EA 16 is a 2.7-acre area classified as a high-use general recreation area for adults; it is shown on Figure 5-1i.[6] The majority of this EA is considered walkable, and it contains one vernal pool (5A-VP-27), which will be subject to placement of amendment in the vernal pool pilot study. There is no Core Area 1 habitat or Frequently Used Subarea within this EA.

The Primary Performance Standard for this EA is 14 mg/kg. (Since there is no Core Area 1 habitat in this EA, the Secondary Performance Standard is not relevant.) The pre-remediation EPC in EA 16 is 34 mg/kg, which exceeds the Primary Performance Standard; therefore, this EA requires remediation.

The proposed final remedial action includes removal/backfill of approximately 690 cy of floodplain soils to a depth of one foot bgs, as shown on Figure 5-1i. This includes 660 cy of base removal that is consistent with the conceptual design and 30 cy of supplemental removal. The supplemental removal covers 0.02 acre of area that is adjacent to a planned bank remediation and has a soil PCB concentration of 26 mg/kg. Overall, the proposed remedial action covers approximately 0.4 acre of area where PCB concentrations are in the range of 25 to 45 mg/kg. It will reduce the post-remediation EPC in EA 16 to 7.4 mg/kg (Table 3), which is well below the Primary Performance Standard for this EA.

As shown in Table 4, the volume-weighted average PCB concentration of soil to be removed from EA 16 is 31 mg/kg; therefore, all excavated soils from this EA will be disposed of in the UDF.

Exposure Area 17

EA 17 is an approximately 8.1-acre area classified as a high-use general recreation area for adults; it is shown on Figure 5-1i. The western portion of this EA consists of the utility easement included in EA 12. Most of this EA is considered walkable, but it does contain some areas that are difficult to access. There is one vernal pool in this EA (5A-VP-28A) which will be subject to future remediation. EA 17 also contains approximately 1.8 acres of Core Area 1 habitat (immediately adjacent to the river). There are no Frequently Used Subareas in this EA.

The Primary Performance and Secondary Performance Standards for EA 17 are 14 and 38 mg/kg, respectively. The pre-remediation EPC for this EA is 13 mg/kg, which is below the Primary Performance Standard. As a result, no base removal was proposed for this EA in the Conceptual RD/RA Work Plan and none is proposed here. However, supplemental removal has been added to this EA as required by EPA Condition 121.

[6] The EA boundary has been modified to eliminate the area west of EA 12 that has been addressed previously under the A/P Lawn program.

The proposed final remedial action for EA 17 includes removal/backfill of approximately 120 cy of floodplain soils to a depth of one foot bgs (Figure 5-1i). This supplemental removal covers approximately 0.07 acre inside Core Area 1 habitat which are adjacent to a planned bank remediation area and which have soil PCB concentrations in the range from 53 to 69 mg/kg. The proposed remedial action will reduce the EPC to 12.3 mg/kg (Table 3), which will meet the Primary Performance Standard for this EA.

As shown in Table 4, the volume-weighted average PCB concentration of soil to be removed from EA 17 is 55 mg/kg; therefore, all removed soil will be segregated for off-site disposal.

Exposure Area 18

EA 18 is a 17-acre area classified as a medium-use general recreation area for adults; it is shown on Figure 5-1j. Most of this EA is considered difficult to access or boatable. EA 18 contains 4.3 acres of Core Area 1 habitat, but it does not contain any vernal pools or Frequently Used Subareas.

The Primary and Secondary Performance Standards for this EA are 21 and 58 mg/kg, respectively. The pre-remediation EPC in EA 18 is 32 mg/kg, which exceeds the Primary Performance Standard; therefore, this EA requires remediation.

The proposed final remedial action includes removal/backfill of approximately 1,320 cy of floodplain soils to a depth of one foot bgs (Figure 5-1j). It includes 60 cy of base removal and 1,260 cy of supplemental removal to address elevated floodplain soil PCB concentrations adjacent to a planned bank remediation area (outside the Core Area 1 habitat area in this EA). The proposed remedial action covers approximately 0.8 acre of area where soil PCB concentrations range from 29 to 247 mg/kg. It will reduce the post-remediation EPC in EA 18 to 16.5 mg/kg (Table 3), which is considerably lower than the Primary Performance Standard for this EA.

As shown in Table 4, the volume-weighted average PCB concentration of soil to be removed from EA 18 is approximately 100 mg/kg (Table 4). In this situation, approximately 1,150 cy of excavated soils with the highest PCB concentrations will be segregated for off-site disposal, and the remaining 170 cy (averaging less than 50 mg/kg) will be subject to disposal in the UDF.

Exposure Area 19

EA 19 is an approximate 35-acre area classified as a high-use general recreation area for adults; it is shown on Figure 5-1k. Nearly half of this EA is considered difficult to access, and it includes six vernal pools, all of which will be subject to future remediation. Nearly 70% of EA 19 is considered Core Area 1 habitat.

The Primary and Secondary Performance Standards for this EA are 14 and 38 mg/kg, respectively. As described in Section 2, PCB evaluations were updated in EA 19 in response to EPA Condition 124 and

to include the additional PCB data collected during the SDC program. The updated pre-remediation EPC in EA 19 is 23 mg/kg, which exceeds the Primary Performance Standard; therefore, this EA requires remediation.

The proposed final remedial action includes removal/backfill of approximately 710 cy of floodplain soils to a depth of one foot bgs within the Core Area 1 habitat area in the southeastern corner of this EA, as shown on Figure 5-1k. This is considered to be a supplemental floodplain removal area, which contains PCB concentrations ranging from 19 to 101 mg/kg and is adjacent to a planned bank remediation area; it has been added in response to EPA Condition 121. It should be noted that the Conceptual RD/RA Work Plan identified a small base removal area (20 cy) in the southwestern quadrant of EA 19 (outside the Core Area 1 habitat area) that resulted from a data interpolation issue; however, that removal area has been eliminated in the final design because the supplemental data collected during the SDC in this area indicated that the PCB concentration was relatively low (3 mg/kg). The proposed supplemental remediation in EA 19 covers an area of 0.44 acre and will result in a post-remediation EPC of 22.1 mg/kg (Table 3). While this EPC exceeds the Primary Performance Standard (14 mg/kg), it is considerably lower than the Secondary Performance Standard (38 mg/kg), which is the controlling standard in this EA given the extent of Core Area 1 habitat.

As shown in Table 4, the volume-weighted average PCB concentration of soil to be removed from EA 19 is 53 mg/kg. In this situation, approximately 160 cy of excavated soil with the highest PCB concentrations will be segregated for off-site disposal, and the remaining 550 cy (averaging less than 50 mg/kg) will be subject to disposal in the UDF.

Exposure Area 20

EA 20 is an 8.9-acre area classified as a high-use general recreation area for adults; it is shown on Figure 5-1l. Nearly half of this EA is considered difficult to access. Approximately 2.5 acres of the northern portion of EA 20 are considered Core Area 1 habitat. There are no vernal pools and no Frequently Used Subareas in this EA.

The Primary and Secondary Performance Standards for this EA are 14 and 38 mg/kg, respectively. As described in Section 2, the PCB evaluation for EA 20 has been updated as required by EPA Condition 124. The updated pre-remediation EPC in EA 20 is 28 mg/kg, which exceeds the Primary Performance Standard; therefore, this EA requires remediation.

The proposed final remedial action includes removal/backfill of approximately 3,830 cy of floodplain soils to a depth of one foot bgs (Figure 5-1l). This includes 1,360 cy of base removal from five discrete areas located outside of Core Area 1 habitat and 2,470 cy of supplemental removal. A large portion of the supplemental removal was identified in areas outside Core Area 1 habitat where use-factor-adjusted PCB concentrations exceed the Primary Performance Standard; this removal was added in accordance with EPA Condition 122. The remaining supplemental removal is located

adjacent to a planned bank remediation area inside the Core Area 1 habitat area at the northern end of the EA, which was added in accordance with EPA Condition 121. The proposed remedial action in EA 20 covers 2.4 acres of area with PCB concentrations ranging from 14 to 140 mg/kg; and it will reduce the post-remediation EPC to 11.7 mg/kg (Table 3), which will achieve the Primary Performance Standard for this EA.

As shown in Table 4, the volume-weighted average PCB concentration of soil to be removed from EA 20 is approximately 49 mg/kg; therefore, all excavated soils from this EA will be disposed of in the UDF.

Exposure Areas 22 and 22a

EA 22 is a 19-acre area classified as a high-use general recreation area for adults and older children; it is shown on Figure 5-1m. Subarea 22a is a 1.8-acre area classified as dirt biking/ATVing area for older children in the northern portion of EA 22. The majority of EA 22 and the entire Subarea 22a are considered walkable. There are three small vernal pools in EA 22, none of which are located within Subarea 22a. All three of these vernal pools will be subject to future remediation. No portion of EA 22 or Subarea 22a is considered Core Area 1 habitat.

The Primary Performance Standards for EA 22 and Subarea 22a are both 14 mg/kg. (Since there is no Core Area 1 habitat in these areas, the Secondary Performance Standards for these areas are not relevant.) As described in Section 2, the PCB evaluations were updated for EA 22a as required by EPA Condition 126. Also, the PCB evaluation for EA 22 was revised to include an adjustment to the 1 mg/kg PCB isopleth that was made based on supplemental floodplain soil PCB data collected during the SDC program. The resulting pre-remediation EPCs in EAs 22 and 22a are 19 and 36 mg/kg, respectively. Both values exceed their applicable Primary Performance Standards; therefore, remedial action is required for this EA and subarea.

The proposed final remedial action includes removal/backfill of approximately 2,500 cy of floodplain soils to a depth of one foot bgs. This includes 1,140 cy (0.70 acre) in Subarea 22a and 1,360 cy (0.84 acre) in the remainder of EA 22 (Figure 5-1m). The proposed base removal footprint has expanded from that in the Conceptual RD/RA Work Plan in response to the change in habitat access in EA 22a required by EPA Condition 126. The remediation also includes supplemental removal of three elevated PCB concentration areas adjacent to planned bank remediation areas in the northern and southern portions of EA 22, which was added in accordance with EPA Condition 121. The proposed remedial action covers approximately 1.5 acres of area where PCB concentrations are in the range of 16 and 113 mg/kg. It will reduce post-remediation EPCs in both EA 22 and Subarea 22a to 13.9 mg/kg (Table 3), which will meet the applicable Primary Performance Standards.

As shown in Table 4, the volume-weighted average PCB concentration of soil to be removed from EA 22 is 56 mg/kg. In this situation, approximately 620 cy of excavated soil with the highest PCB

concentrations will be segregated for off-site disposal, and the remaining 1,880 cy (averaging less than 50 mg/kg) will be subject to disposal in the UDF.

Exposure Area 24

EA 24 is a 10-acre area classified as a high-use general recreation area for adults; it is shown on Figure 5-1n. Nearly half of this EA is considered difficult to access. There are six vernal pools in this EA, two of which will be subject to soil excavation as part of the vernal pool pilot study (5A-VP-52 and 5A-VP-57); the remaining four vernal pools will be subject to future remediation. None of EA 24 is considered Core Area 1 habitat.

The Primary Performance Standard for this EA is 14 mg/kg. (Since there is no Core Area 1 habitat in this EA, the Secondary Performance Standard is not relevant.) The pre-remediation EPC in EA 24 is 18 mg/kg, which exceeds the Primary Performance Standard; therefore, this EA requires remediation.

The proposed final remedial action includes removal/backfill of approximately 780 cy of floodplain soils to a depth of one foot bgs (Figure 5-1n). All three proposed removal areas are considered base removal areas. The proposed remedial action covers approximately 0.5 acre of area where soil PCB concentrations range from 45 to 61 mg/kg. In conjunction with the soil removal conducted in the pilot study vernal pools (5A-VP-52 and 5A-VP-57), the post-remediation EPC in EA 24 will be reduced to 13.9 mg/kg (Table 3), thereby achieving the Primary Performance Standard for this EA.

As shown in Table 4, the volume-weighted average PCB concentration of the soil to be removed from this EA is approximately 54 mg/kg. In this situation, approximately 370 cy of excavated soils with the highest PCB concentrations will be segregated for off-site disposal, and the remaining 410 cy (averaging less than 50 mg/kg) will be subject to disposal in the UDF.

Exposure Area 26

EA 26 is a 55-acre area shown on Figure 5-1o. This EA is divided into two subareas based on the current use: Subarea 26a is currently classified as high-use recreational areas for older children and adults, and Subarea 26b is currently classified as in agricultural use by farmers. It is expected that, in the future, the agricultural activities in Subarea 26b will cease and the entire EA 26 will be considered a high-use recreational area for older children and adults. Therefore, the latter use classification was used for the remedial design. A maintained utility easement runs across the western portion of Subarea 26a (as part of EA 12). Subarea 26a also contains a network of trails defined as a Frequently Used Subarea. Approximately half of EA 26 is classified as walkable, while the remainder is difficult to access. EA 26 also contains 11 vernal pools, six of which will be subject to future remediation. Nearly 13 acres of EAs 26 and 26a are considered Core Area 1 habitat.

For EAs 26 and 26a, the Primary and Secondary Performance Standards are 14 and 27 mg/kg, respectively. For EA 26b, the Primary Performance Standard is 12 mg/kg. (Since there is no Core Area 1

habitat in EA 26b), the Secondary Performance Standard is not relevant there). The pre-remediation EPCs for EAs 26a, 26b, and 26 are 3.1 mg/kg, 0.87 mg/kg, and 2.8 mg/kg, respectively, which are below their respective Primary Performance Standards; therefore, no base remediation is proposed. However, a small supplemental removal area has been added to EA 26 as required by EPA Condition 121.

The proposed final remedial action in EAs 26 includes removal/backfill of approximately 20 cy of floodplain soils to a depth of one foot bgs (Figure 5-1o). This supplemental removal covers approximately 0.012 acre of area adjacent to a planned bank remediation where soil PCB concentration is 62 mg/kg. The resulting post-remediation EPCs for EAs 26 will remain at 2.8 mg/kg (Table 3), well below the Primary Performance Standard for this EA.

As shown in Table 4, the volume-weighted average PCB concentration of soil to be removed from EA 26 is approximately 62 mg/kg. As a result, all 20 cy of excavated soil will be segregated for off-site disposal.

Subarea 31a

Subarea 31a is a 0.6-acre subarea within EA 31 classified as a high-use general recreation area for adults and older children; it is shown on Figure 5-1p. Most of this subarea is walkable, with a portion of the area considered to be difficult to access. The southeastern corner of Subarea 31a contains a portion of a large vernal pool (5A-VP-77) which will be subject to future remediation. This subarea contains no Core Area 1 habitat or Frequently Used Subareas.

The Primary Performance Standard for this subarea is 14 mg/kg. (Since there is no Core Area 1 habitat in this subarea, the Secondary Performance Standard is not relevant.) The pre-remediation EPC in Subarea 31a is 53 mg/kg, which exceeds the Primary Performance Standard; therefore, this subarea requires remediation.

The proposed final remedial action includes removal/backfill of approximately 150 cy of floodplain soils to a depth of one foot bgs (Figure 5-1p). This includes 146 cy of base removal and four cy of supplemental removal that was extended from the base removal area to address an additional high PCB concentration area (i.e., 52 mg/kg) adjacent to a planned bank remediation area (pursuant to EPA Condition 121). The proposed remedial action covers approximately 0.1 acre of area where soil PCB concentrations range from 31 to 53 mg/kg. It will reduce the post-remediation EPC in EA 31a to 12.2 mg/kg (Table 3), which is below the Primary Performance Standard for this EA.

As shown in Table 4, the volume-weighted average PCB concentration of soils to be removed from Subarea EA 31a is approximately 45 mg/kg; therefore, all excavated soil from this area will be subject to disposal in the UDF.

Exposure Area 33

EA 33 is a 34-acre area classified as a high-use general recreation area for adults; it is shown on Figure 5-1q. Most of this EA is considered walkable, but there are some areas considered difficult to access, including three vernal pools that will be subject to future remediation. There is no Core Area 1 habitat or Frequently Used Subarea in this EA.

The Primary Performance Standard for this EA is 14 mg/kg. (Since there is no Core Area 1 habitat in this EA, the Secondary Performance Standard is not relevant.) As described in Section 2, the 1 mg/kg PCB isopleth was adjusted for this EA and the interpolated PCB concentrations were updated after incorporating the supplemental floodplain soil PCB data collected during the SDC program. The updated pre-remediation EPC for EA 33 is 15 mg/kg, which exceeds the Primary Performance Standard; therefore, this EA requires remediation.

The proposed final remedial action includes removal and backfilling of approximately 640 cy of floodplain soils to a depth of one foot bgs (Figure 5-1q). This includes 280 cy of base removal south of vernal pool 5A-VP-80 and 360 cy of supplemental removal in two high PCB concentration areas adjacent to the planned bank remediation areas in the eastern part of this EA (pursuant to EPA Condition 121). The proposed remedial action covers approximately 0.4 acres of area where soil PCB concentrations range from 56 to 144 mg/kg. It will reduce the post-remediation EPC in EA 33 to 12.6 mg/kg (Table 3), which will achieve the Primary Performance Standard for this EA.

As shown in Table 4, the volume-weighted average PCB concentration of soil to be removed from EA 33 is 117 mg/kg. As a result, all 640 cy of excavated soil from this EA will be segregated for off-site disposal.

Exposure Area 34

EA 34 is a 7.3-acre area classified as a medium-use general recreation area for adults; it is shown on Figure 5-1r. Most of this EA is considered walkable, but it does contain some difficult-to-access area, including one small vernal pool that will be subject to future remediation. There is no Core Area 1 habitat or Frequently Used Subarea in this EA.

The Primary Performance Standard for this EA is 21 mg/kg. (Since there is no Core Area 1 habitat in this EA, the Secondary Performance Standard is not relevant.) The pre-remediation EPC in EA 34 is 22 mg/kg, which exceeds the Primary Performance Standard; therefore, this EA requires remediation.

The proposed final remedial action includes removal/backfill of approximately 370 cy of floodplain soils to a depth of one foot bgs (Figure 5-1r). This includes 60 cy of base removal in the eastern part of this EA, and 310 cy of supplemental removal expanded from the base removal area to cover a high PCB concentration area (65 mg/kg) along the planned bank remediation area (pursuant to EPA Condition 121). The proposed remedial action covers approximately 0.2 acres. It will reduce the

post-remediation EPC in EA 34 to 20.2 mg/kg (Table 3), which will achieve the Primary Performance Standard for this EA.

As shown in Table 4, the volume-weighted average PCB concentration of soil to be removed from EA 34 is 65 mg/kg; therefore, all 370 cy of excavated soil will be segregated for off-site disposal.

Other EAs Containing Residential Properties (EAs 9, 23, 25, 28, and 30)

As described in Section 10.1.1 and Appendix I of the Final RD/RA Work Plan, excavation of floodplain soils is required for 13 residential properties to achieve the Residential Performance Standards. Those residential properties overlap seven non-residential EAs (EAs 7, 8, 9, 23, 25, 28, and 30), some of which do not require any additional remediation to meet the non-residential floodplain Performance Standards. The evaluation of EA 7 was discussed above and included an assessment of the total volume of removal/disposal from that EA along with the overlapping residential Parcel I6-3-13. Also, as described in footnote 1, the area previously evaluated as EA 8 has now been included in the assessment of residential floodplain Parcel J6-3-1; therefore, the disposal evaluation was performed for this expanded residential property and is summarized below. The disposal evaluations for the remaining five non-residential EAs that contain residential properties, as well as Parcel J6-3-1, are as follows:

- **EA 9:** This EA contains one residential property (Parcel J6-2-3) that requires remediation. The proposed remediation includes removal/backfill of approximately 190 cy of floodplain soils. As shown in Table 4, the calculated volume-weighted average PCB concentration of soils to be removed from this area is 41 mg/kg; therefore, all excavated soil from this area will be subject to disposal in the UDF.
- **EA 23:** This EA contains three residential properties that require remediation (Parcels J3-1-11, J3-1-12, and J3-1-13). The proposed remediation includes removal/backfill of a total of approximately 90 cy of floodplain soil. As shown in Table 4, the calculated volume-weighted average PCB concentration of soils to be removed from this area is 9.3 mg/kg; therefore, all excavated soil from this area will be subject to disposal in the UDF.
- **EA 25:** This EA contains five residential properties that require remediation (Parcels J3-2-2, J3-2-3, J3-2-4, J3-2-5, and J3-2-6). The proposed remediation includes removal/backfill of a total of approximately 630 cy of floodplain soil. As shown in Table 4, the calculated volume-weighted average PCB concentration of soils to be removed from this area is 21 mg/kg; therefore, all excavated soil from this area will be subject to disposal in the UDF.
- **EA 28:** This EA contains one residential property (Parcel K3-1-2) that requires remediation. The proposed remediation includes removal/backfill of approximately 90 cy of floodplain soil. As shown in Table 4, the calculated volume-weighted average PCB concentration of soils to be

removed from this area is 20 mg/kg; therefore, all excavated soil from this area will be subject to disposal in the UDF.

- **EA 30:** This EA contains one residential property (Parcel K2-1-10) that requires remediation. The proposed remediation includes removal/backfill of approximately 150 cy of floodplain soils. As shown in Table 4, the calculated volume-weighted average PCB concentration of soils to be removed from this area is 32 mg/kg; therefore, all excavated soil from this area will be subject to disposal in the UDF.
- **Residential Parcel J6-3-1:** Because this property encompasses a former non-residential EA (i.e., EA 8), the disposal evaluation was performed for this residential property individually. The proposed remediation includes removal/backfill of approximately 1,180 cy of floodplain soil. As shown in Table 4, the calculated volume-weighted average PCB concentration of soils to be removed from this area is 50 mg/kg. In this situation, approximately 50 cy of excavated soils with the highest PCB concentrations will be segregated for off-site disposal, and the remaining 1,130 cy (averaging less than 50 mg/kg) will be subject to disposal in the UDF.

6 References

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Tables

Table 1
Calculated 0- to 1-Foot EPCs for Reach 5A Non-Residential Exposure Areas and Subareas

EA ID	EA Size (acres)[1]	Includes Core Area 1 Habitat	Exposure Scenario/Receptor	Performance Standards		0- to 1-foot EPC (mg/kg)[2]
				Primary (RME 10-5/ HI = 1)	Secondary (RME 10-4/ HI = 1)	
1	14		Medium-use general recreation, adult/older child	21	N/R	16
2	31		High-use general recreation, adult/older child	14	N/R	18
2a	2.2		Low-use general recreation, older child	80	N/R	74
2b	2.0		High-use general recreation, older child	27	N/R	9.4
3	0.35		High-use general recreation, adult	N/A		
4	3.3		High-use general recreation, adult/older child	14	N/R	20
5	2.4		High-use general recreation, adult/older child	14	N/R	59
6	3.3		Low-use general recreation, adult	43	N/R	25
7	6.1		High-use general recreation, adult/older child	14	N/R	20
8	0.54		Recreational canoeist	N/A		
9	0.03		Low-use general recreation, older child	N/A		
10	60	Yes	High-use general recreation, young child (high use)	4.6	6.9	13
10a	0.5	Yes	High-use general recreation, young child (high use)	4.6	4.6	27
10b	9.1		High-use general recreation, young child (high use)	4.6	N/R	6.8
11	1.9		High-use general recreation, adult	14	N/R	15
12	3.8	Yes	High-use general recreation, adult/older child	14	27	3.6
13	6.1		High-use general recreation, adult	14	N/R	8.1
14	3.8		High-use general recreation, adult	14	N/R	0.85
15	0.88		High-use general recreation, adult	14	N/R	1.7
16	2.7		High-use general recreation, adult	14	N/R	34
17	8.1	Yes	High-use general recreation, adult	14	38	13
18	17	Yes	Medium-use general recreation, adult	21	58	32
19	35	Yes	High-use general recreation, adult	14	38	23
20	8.9	Yes	High-use general recreation, adult	14	38	28
21	2.9		High-use general recreation, adult/older child	14	N/R	3.3
22	19		High-use general recreation, adult/older child	14	N/R	19
22a	1.8		Dirt biking/ATVing	14	N/R	36
23	0.14		Medium-use general recreation, older child	N/A		
24	10		High-use general recreation, adult	14	N/R	18
25	0.41		High-use general recreation, older child	N/A		
26a	47	Yes	High-use general recreation, adult/older child	14	27	3.1
26b	7.6		Agricultural use (based on direct contact by farmer)	12	N/R	0.87
26	55	Yes	High-use general recreation, adult/older child	14	27	2.8
27	6.5		High-use general recreation, adult/older child	14	N/R	4.0
27a	0.42		Dirt biking/ATVing	14	N/R	9.2
28	0.16		High-use general recreation, adult/older child	N/A		
28a	0.05		Dirt biking/ATVing	N/A		
29	0.35		Low-use general recreation, adult/older child	43	N/R	16
30	0.19		High-use general recreation, adult/older child	N/A		

Table 1
Calculated 0- to 1-Foot EPCs for Reach 5A Non-Residential Exposure Areas and Subareas

EA ID	EA Size (acres)[1]	Includes Core Area 1 Habitat	Exposure Scenario/Receptor	Performance Standards		0- to 1-foot EPC (mg/kg)[2]
				Primary (RME 10-5/ HI = 1)	Secondary (RME 10-4/ HI = 1)	
31	5.0		High-use general recreation, adult/older child	14	N/R	11
31a	0.63		High-use general recreation, adult/older child	14	N/R	53
32	7.0		High-use general recreation, adult	14	N/R	11
33	34		High-use general recreation, adult	14	N/R	15
34	7.3		Medium-use general recreation, adult	21	N/R	22
61	3.3		Utility worker	169	N/R	35
62	1.5	Yes	Utility worker	169	242	57
63	0.66	Yes	Utility worker	169	242	63
64	0.63		Utility worker	169	N/R	53

Notes:
EPCs were calculated using Aroclor PCB data.

1. Represents the area within the 1 mg/kg PCB isopleth.
2. EPCs that exceed the applicable Primary Performance Standard are highlighted in gray.

EA: Exposure Area
EPC: Exposure Point Concentrations
HI: Hazard Index
mg/kg: milligram per kilogram
N/A: The non-residential Performance Standards and EPC calculations are not applicable to this EA because the EA contains residential properties subject to the Residential Performance Standards.
N/R: Not relevant; the Secondary Performance Standards are relevant only in EAs that contain Core Area 1 habitat.
PCB: polychlorinated biphenyl
RME: Reasonable Maximum Exposure

Table 2
Calculated 0- to 3-Foot EPCs for Frequently Used Subareas

EA ID	Frequently Used Subarea Size (acres)[1]	Includes Core Area 1 Habitat	Exposure Scenario/Receptor	Performance Standards		0- to 1-foot EPC (mg/kg)[2]	0- to 3-foot EPC (mg/kg)[2]
				Primary (RME 10^{-5}/ HI = 1)	Secondary (RME 10^{-4}/ HI = 1)		
4/61	0.21		General Recreation, Adult/older child (high use)	14	N/R	30	20
12	1.8	Yes	General Recreation, Adult/older child (high use)	14	27	3.3	1.5
26a	0.28		General Recreation, Adult/older child (high use)	14	N/R	0.25	0.09

Notes:
EPCs were calculated using Aroclor PCB data.

1. Represents the area of the Frequently Used Subarea within the EA boundary.
2. EPCs that exceed the applicable Primary Performance Standard are highlighted in gray.

EA: Exposure Area
EPC: Exposure Point Concentrations
HI: Hazard Index
mg/kg: milligram per kilogram
N/R: Not relevant; the Secondary Performance Standards are relevant only in EAs that contain Core Area 1 habitat.
RME: Reasonable Maximum Exposure

Table 3
Removal Areas and Volume Estimates and Post-Remediation EPCs for Non-Residential Floodplain EAs and Subareas Requiring Remediation

EA ID	Depth Interval (feet)	Includes Core Area 1 Habitat	Performance Standards		Pre-Remediation EPC (mg/kg)	Post-Remediation EPC (mg/kg)[1]	Removal Area (acre)	Removal Volume (cy)
			Primary (RME 10^{-5}/ HI = 1)	Secondary (RME 10^{-4}/ HI = 1)				
1	0-1		21	N/R	16	13.9	0.40	641
2	0-1		14	N/R	18	13.6	1.15	1,852
4	0-1		14	N/R	20	13.8	0.19	311
4/61	0-1		14	N/R	30	7.6	0.048	78
	0-3		14	N/R	20	13.2	0.056	272
5	0-1		14	N/R	59	13.2	0.10	161
7	0-1		14	N/R	20	13.2	0.16	259
10	0-1	Yes	4.6	6.9	13	3.9	0.62	1,007
10a	0-1	Yes	4.6	4.6	27	3.2	0.17	276
10b	0-1		4.6	N/R	6.8	3.8	1.56	2,519
11	0-1		14	N/R	15	13.9	0.036	58
16	0-1		14	N/R	34	7.4	0.43	691
17	0-1	Yes	14	38	13	12.3	0.073	118
18	0-1	Yes	21	58	32	16.5	0.82	1,315
19	0-1	Yes	14	38	23	22.1	0.44	714
20	0-1	Yes	14	38	28	11.7	2.37	3,825
22	0-1		14	N/R	19	13.97	0.84	1,359
22a	0-1		14	N/R	36	13.9	0.70	1,136
24	0-1		14	N/R	18	13.9	0.48	775
26	0-1	Yes	14	27	3	2.8	0.012	19
31a	0-1		14	N/R	53	12.2	0.093	150
33	0-1		14	N/R	15	12.6	0.40	643
34	0-1		21	N/R	22	20.2	0.23	368
Total							**11.4**	**18,547**

Notes:
EPCs were calculated using Aroclor PCB data.

1. The post-remediation EPCs are truncated and generally shown to one decimal place to demonstrate achievement of the applicable Performance Standards.

cy: cubic yard
EA: Exposure Area
EPC: Exposure Point Concentrations
HI: Hazard Index
mg/kg: milligram per kilogram
N/R: Not relevant; the Secondary Performance Standards are relevant only in EAs that contain Core Area 1 habitat.
RME: Reasonable Maximum Exposure

Table 4
Floodplain Soil—Estimated Disposal Volumes Summary

EA	Residential Parcel(s) ID	Vernal Pool ID	Volume-Weighted Average Aroclor PCBs (mg/kg)	UDF Disposal		Off-Site Disposal		Total Volume (cy)
				Volume-Weighted Average Aroclor PCBs (mg/kg)	Volume (cy)	Volume-Weighted Average Aroclor PCBs (mg/kg)	Volume (cy)	
1	—	—	63	45	409	94	232	641
2	—	—	82	49.7	804	107	1,048	1,852
4	—	—	43	43	661	—	—	661
5	—	5A-VP-13	79	20	130	127	161	291
7	I6-3-13	5A-VP-13	73	47	1,997	112	1,368	3,365
9	J6-2-3	—	41	41	185	—	—	185
10	—	—	43	43	3,802	—	—	3,802
11	—	—	38	38	58	—	—	58
16	—	—	31	31	691	—	—	691
17	—	—	55	—	—	55	118	118
18	—	—	99	29	172	110	1,143	1,315
19	—	—	53	40	555	100	159	714
20	—	—	49	49	3,825	—	—	3,825
22	—	—	56	49	1,876	76	619	2,495
23	J3-1-11, J3-1-12, J3-1-13	—	9.3	9.3	94	—	—	94
24	—	—	54	49	409	60	366	775
25	J3-2-2, J3-2-3, J3-2-4, J3-2-5, J3-2-6	—	21	21	628	—	—	628
26	—	—	62	—	—	62	19	19
28	K3-1-2	—	20	20	85	—	—	85
30	K2-1-10	—	32	32	152	—	—	152
31a	—	—	45	45	150	—	—	150
33	—	—	117	—	—	117	643	643
34	—	—	65	—	—	65	368	368
—	J6-3-1	—	50	48	1,131	78	49	1,180
				Volume Totals	**17,814**	—	**6,293**	**24,107**

Notes:
cy: cubic yard
EA: Exposure Area
mg/kg: milligram per kilogram
PCB: polychlorinated biphenyl
UDF: Upland Disposal Facility

Figures

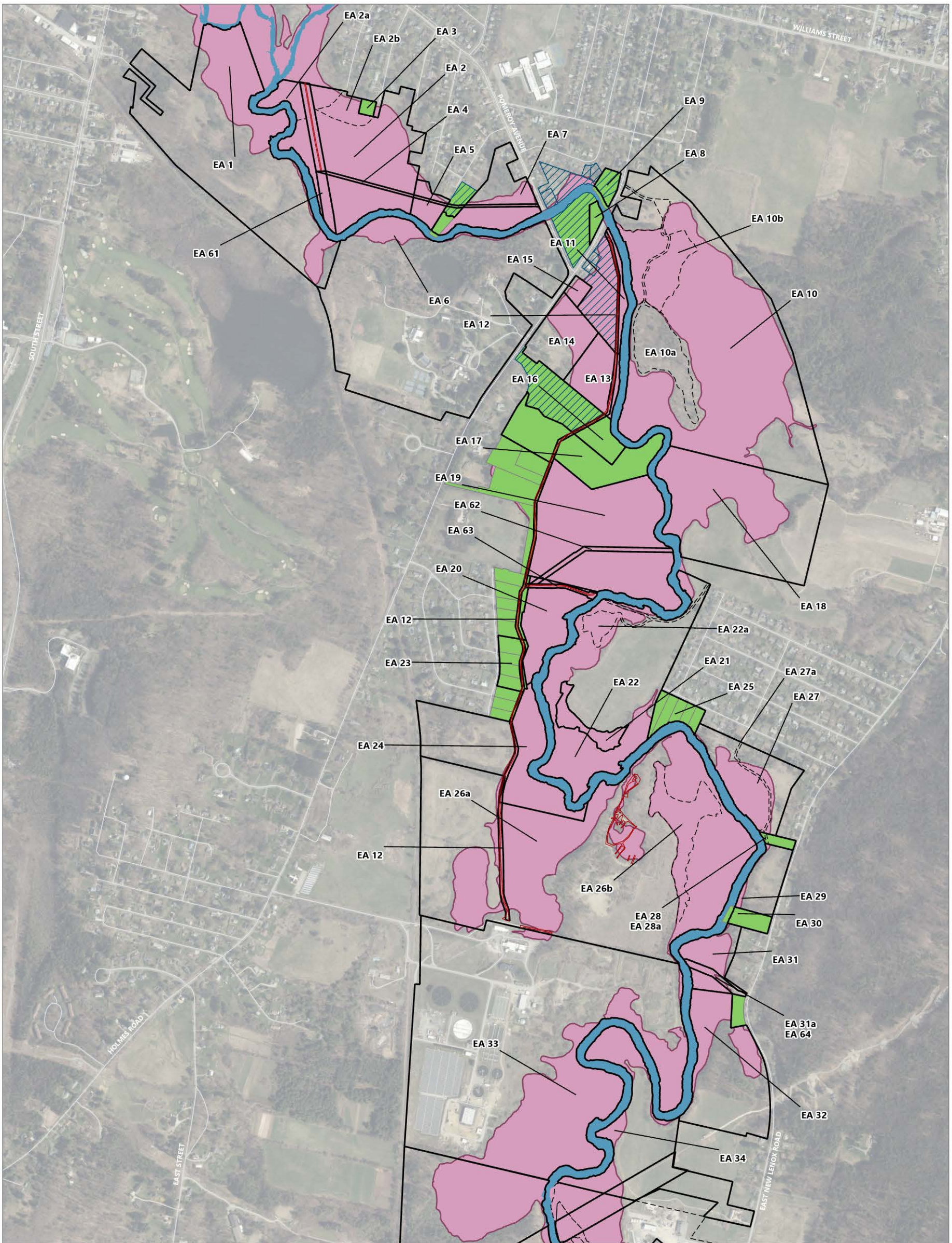

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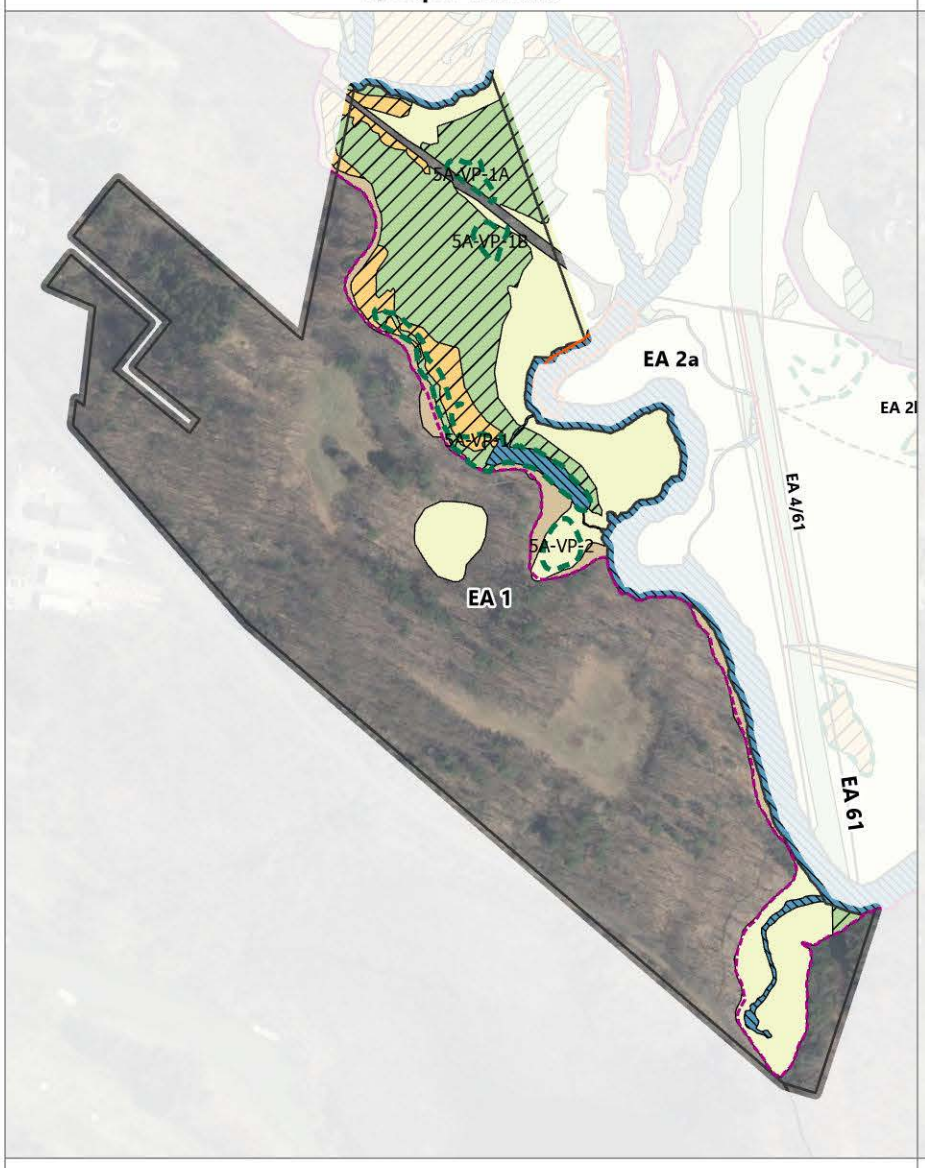
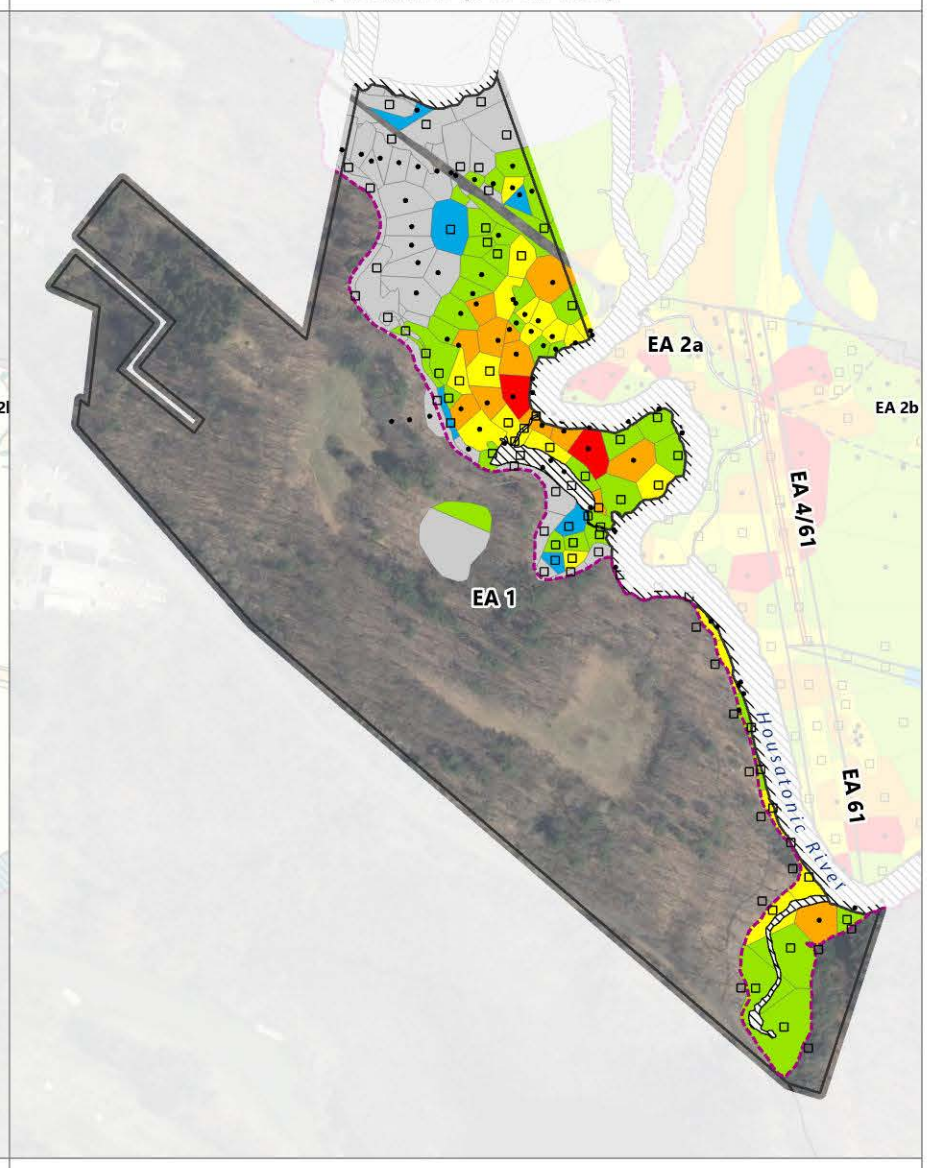
Figure 1-1
Exposure Areas, Subareas, and Frequently Used Subareas in Reach 5A
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

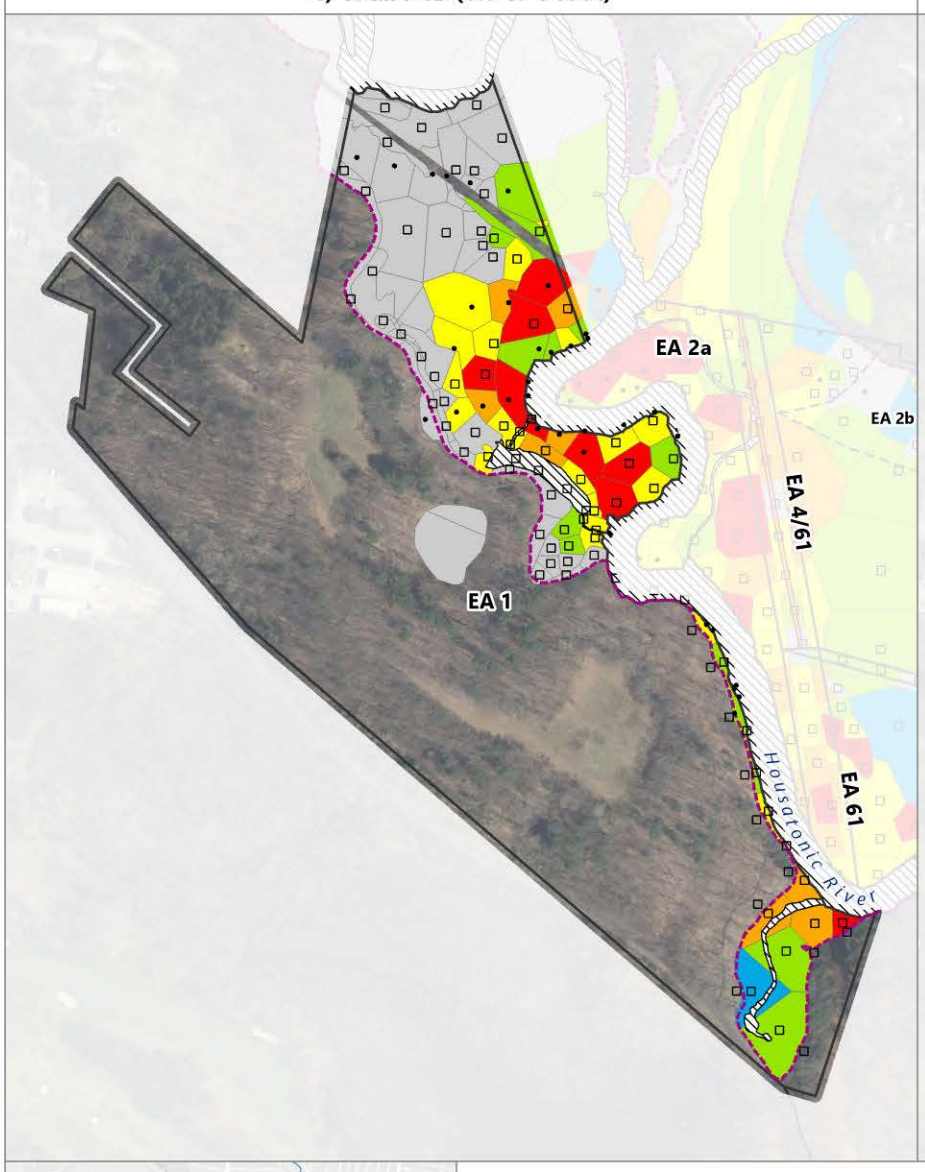
A) Super Habitats



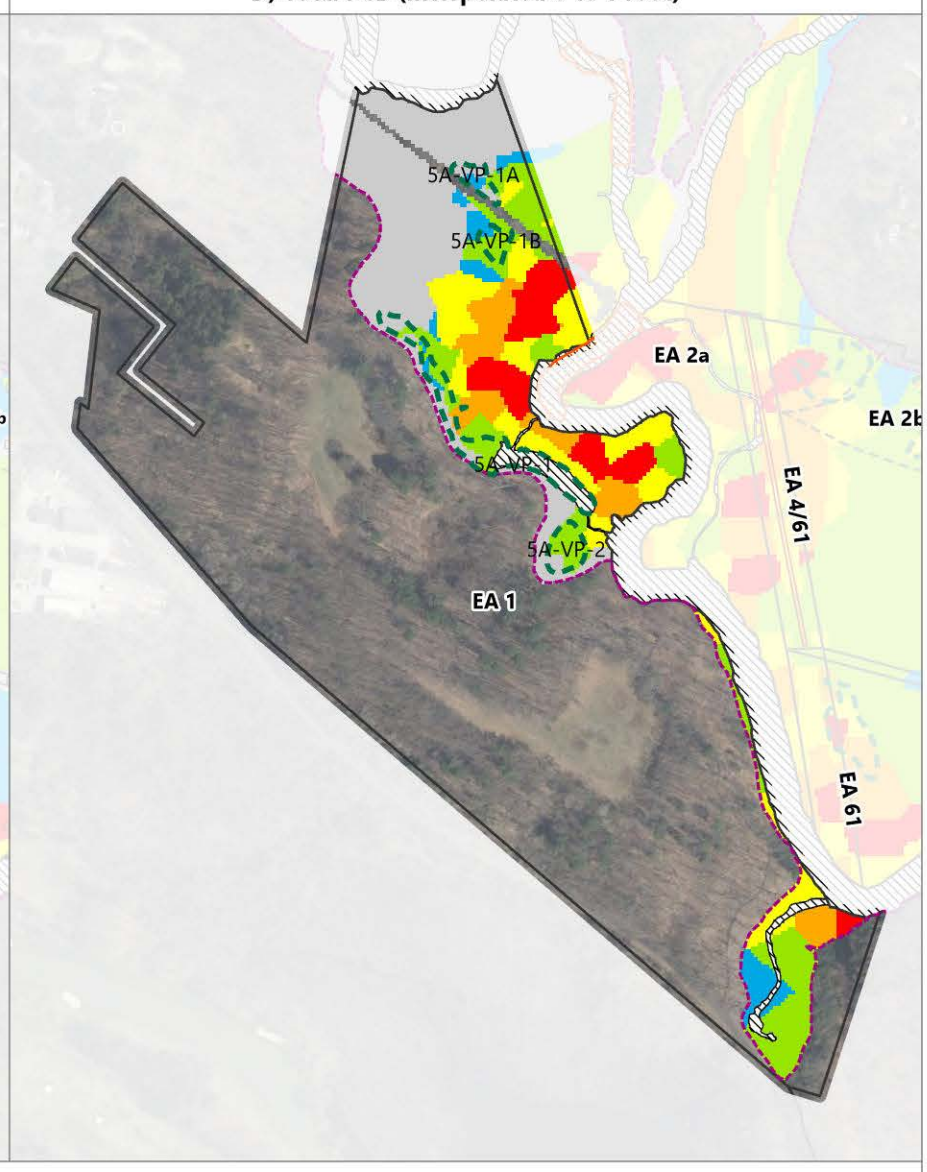
B) Total PCB (0 to 0.5 foot)

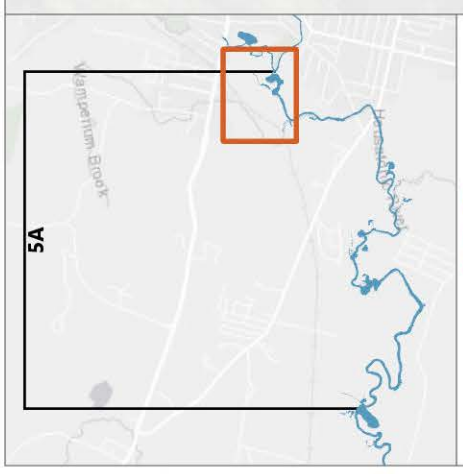


C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)





LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 520
Feet

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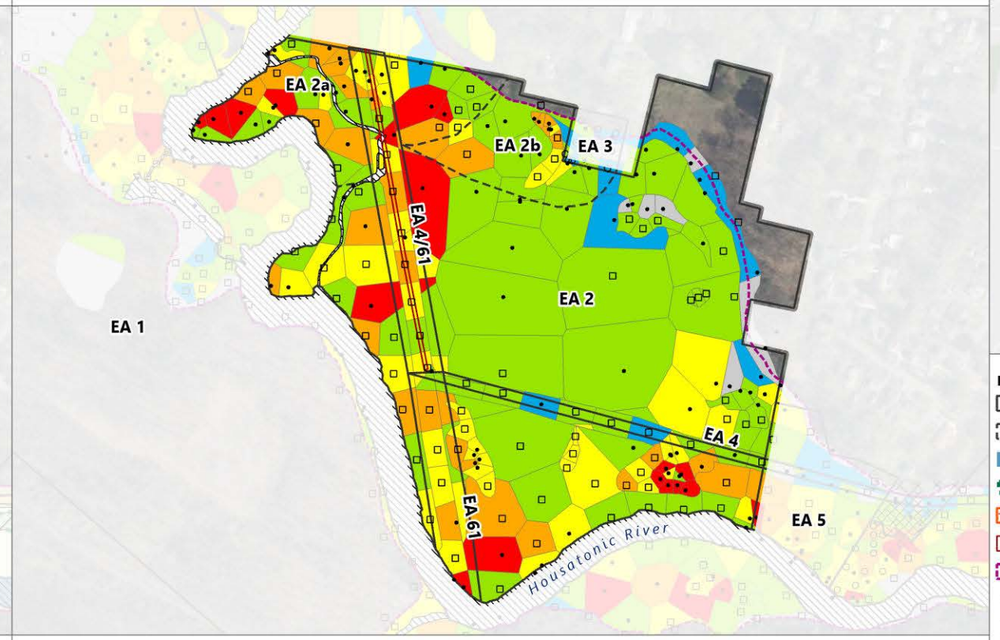
ANCHOR QEA

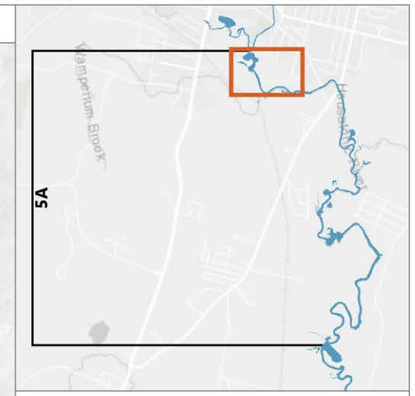
Figure 2-1a
Exposure Area 1
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

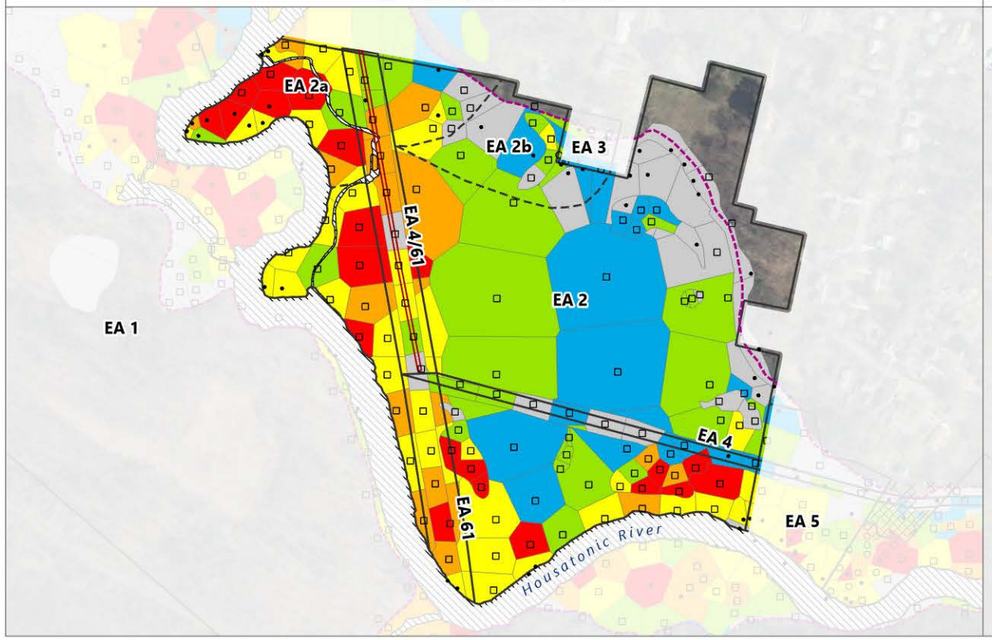


B) Total PCB (0 to 0.5 foot)

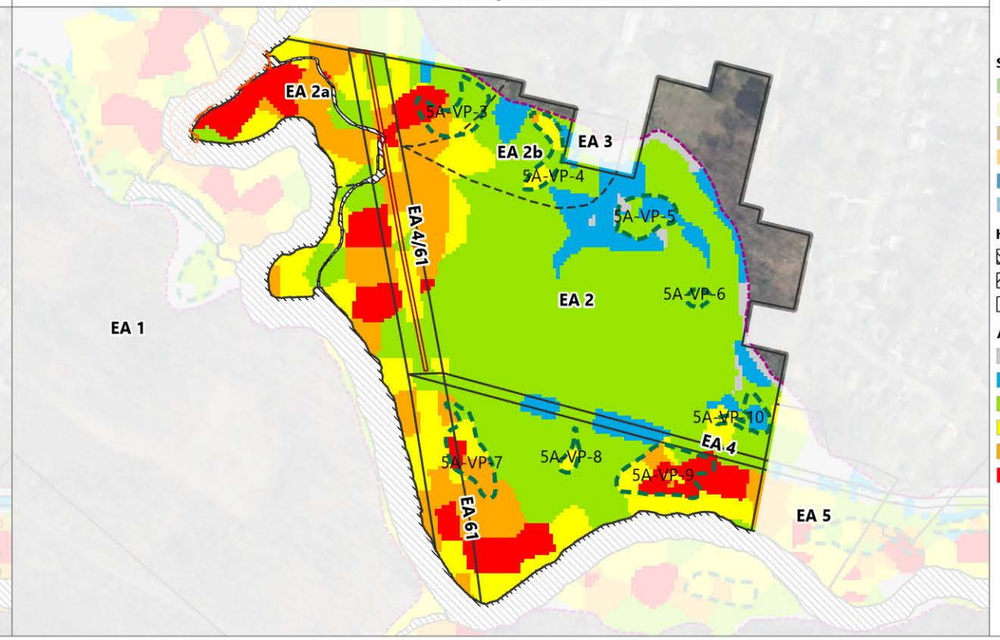




C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 400
Feet

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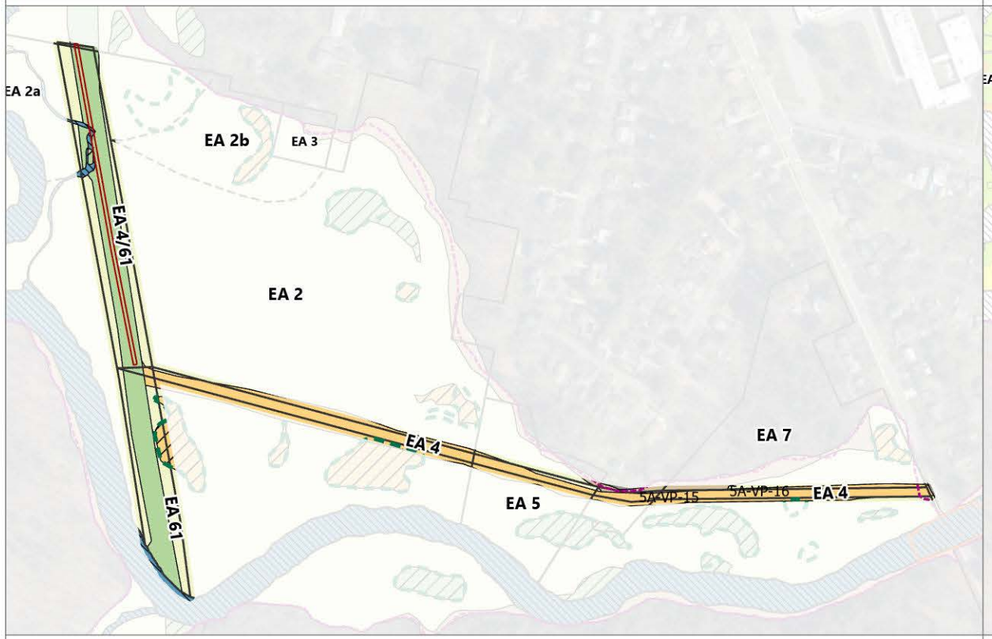
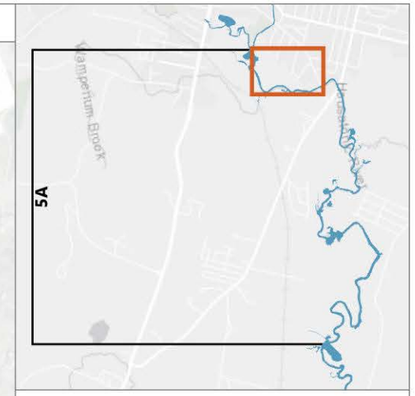
Figure 2-1b
Exposure Area 2
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

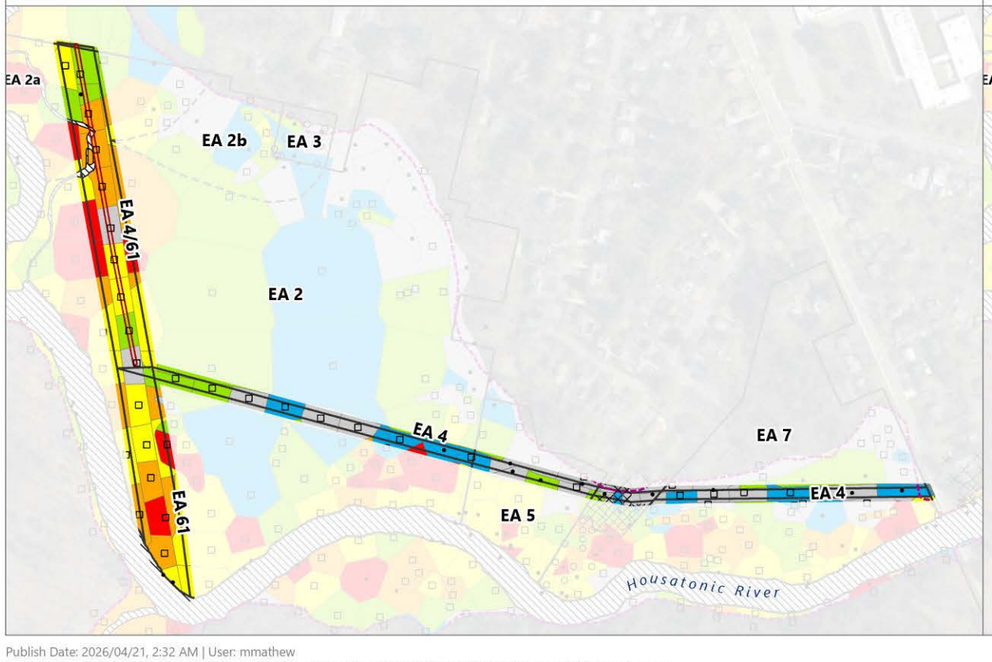


B) Total PCB (0 to 0.5 foot)





C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 400
Feet

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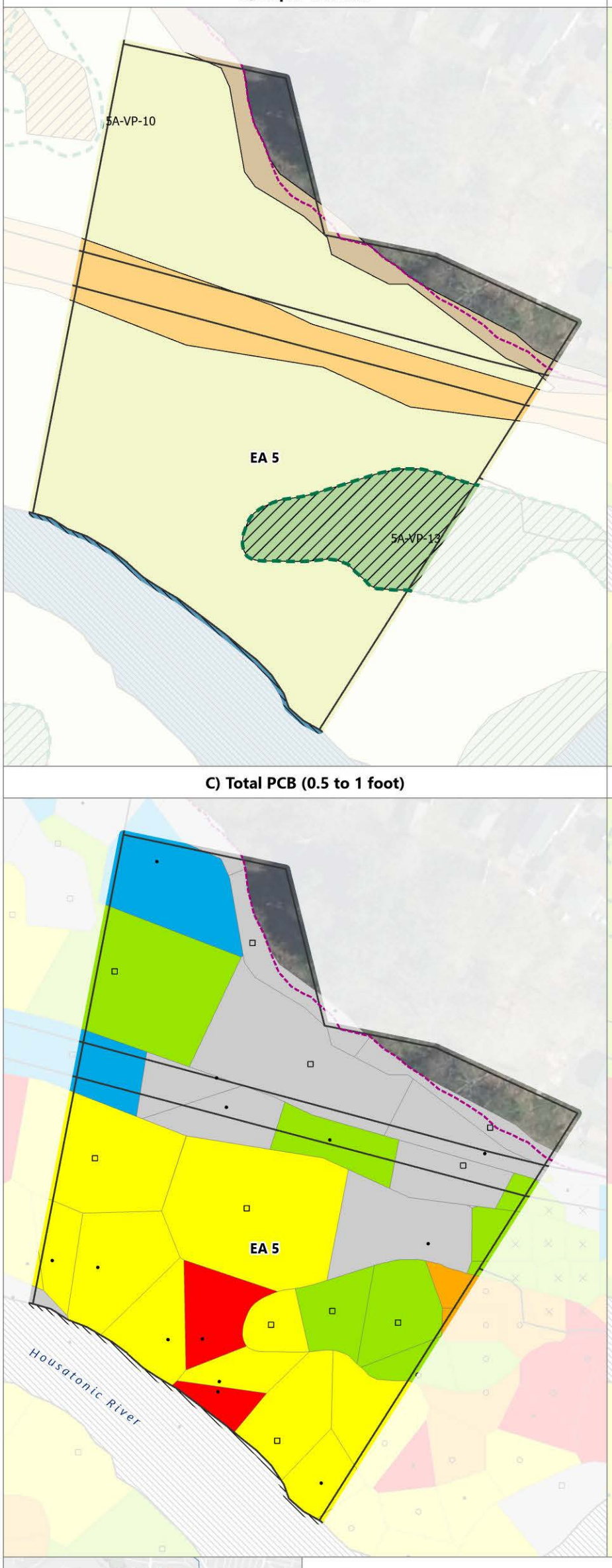
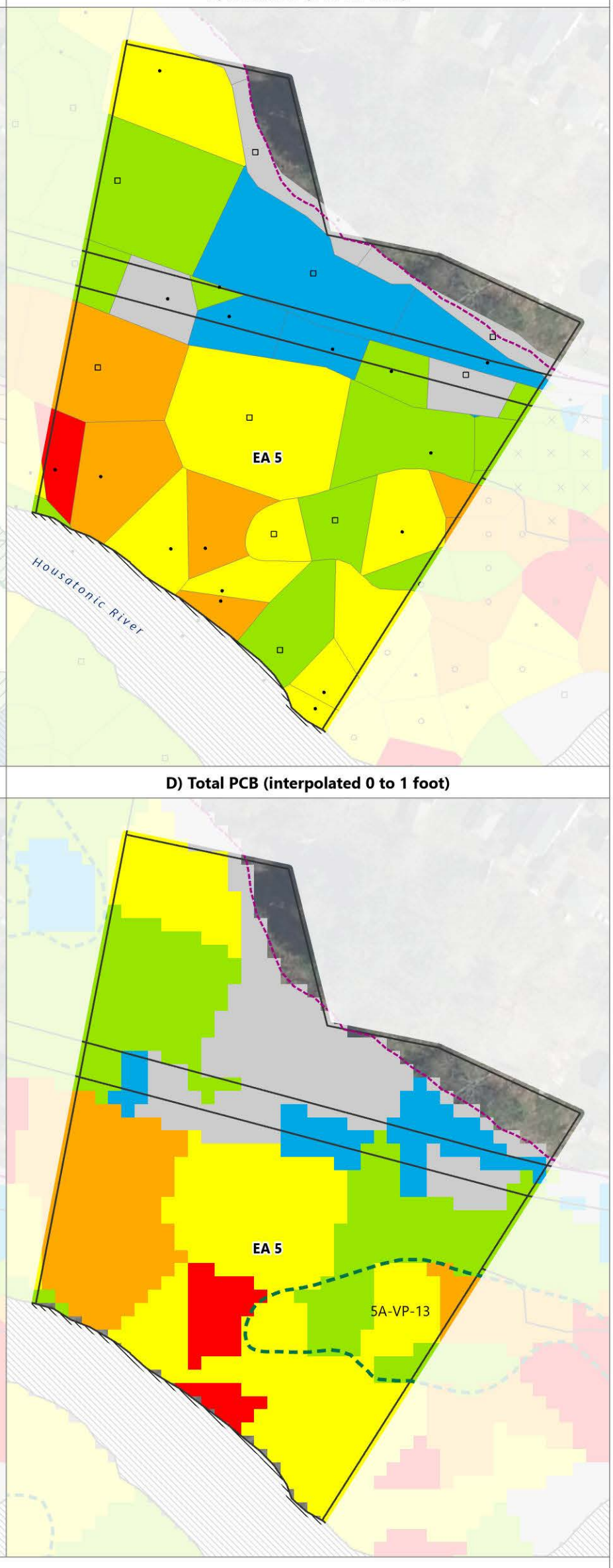
Figure 2-1c
Exposure Areas 4 and 61
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats



B) Total PCB (0 to 0.5 foot)



C) Total PCB (0.5 to 1 foot)

D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 90
Feet

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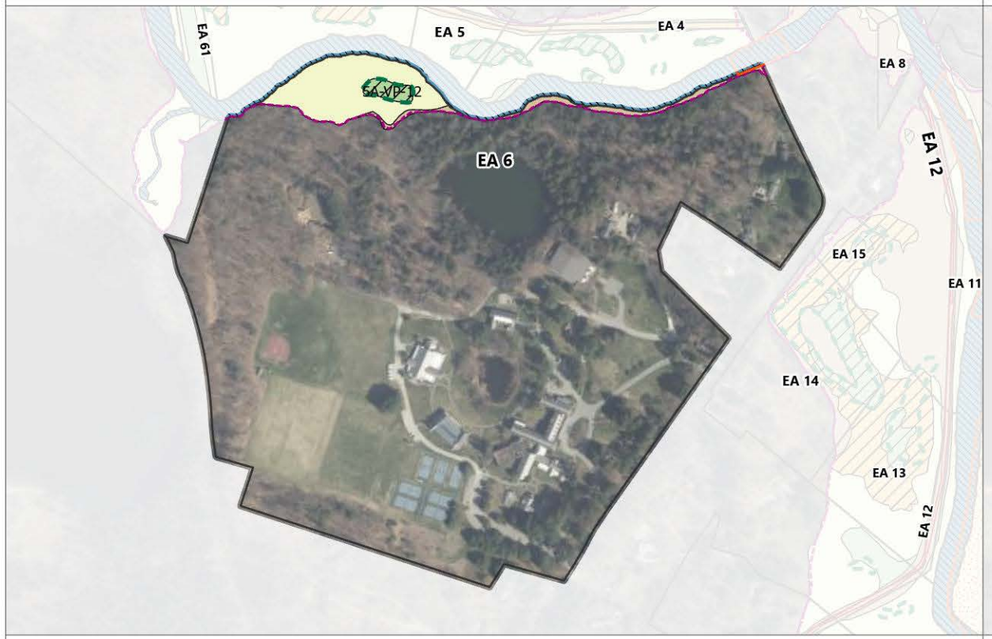
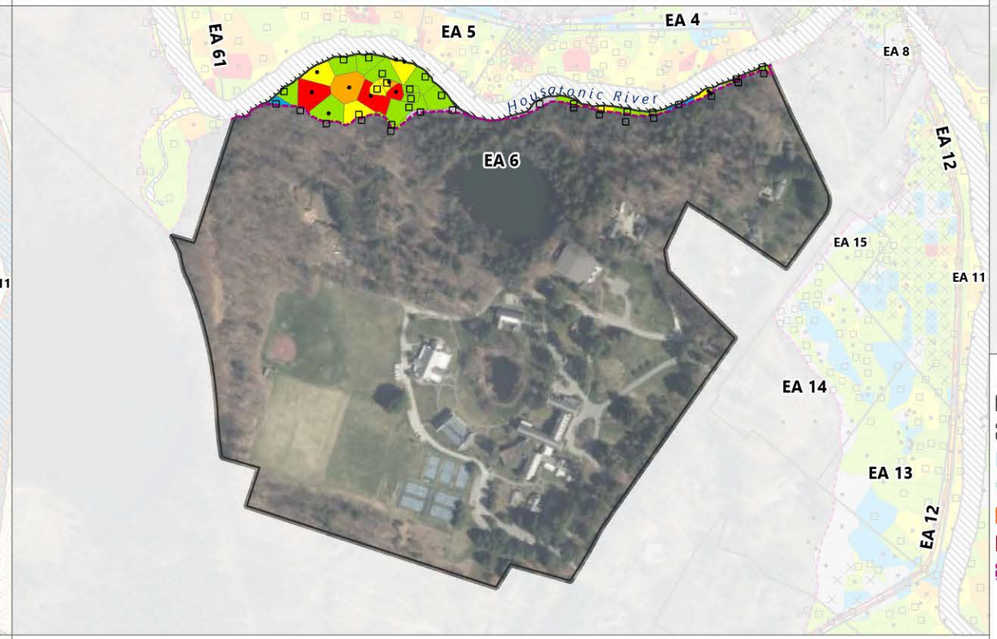
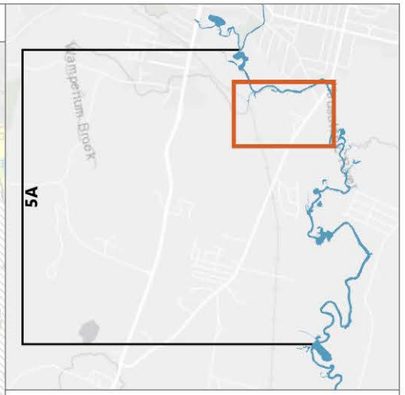
Figure 2-1d
Exposure Area 5
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

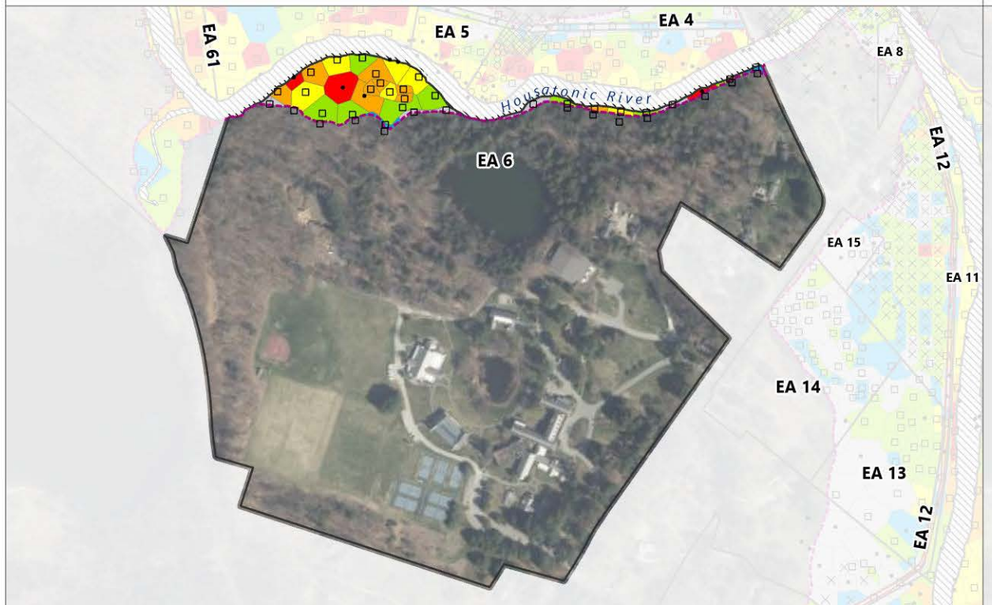


B) Total PCB (0 to 0.5 foot)

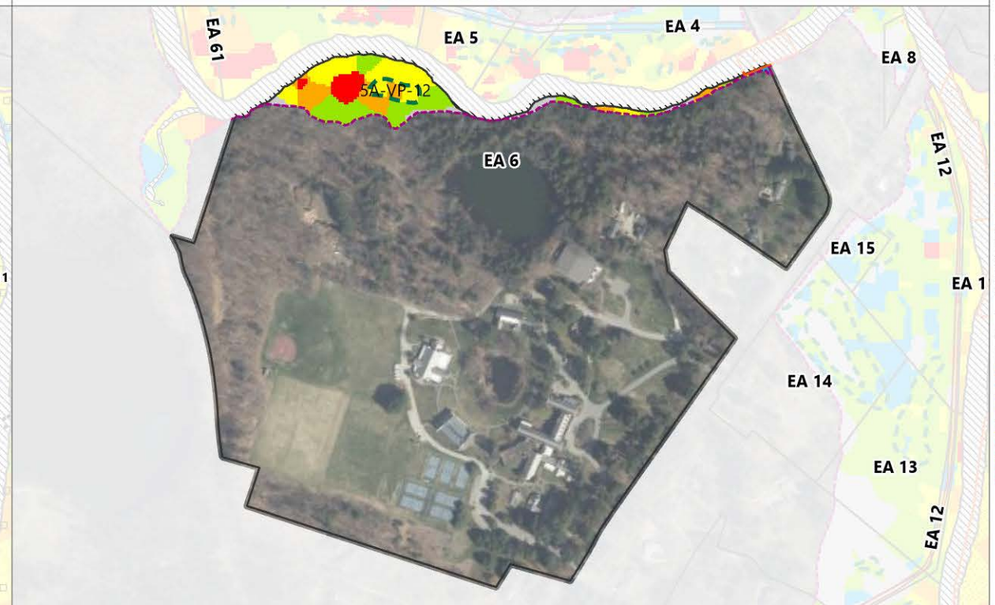




C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 500

Feet

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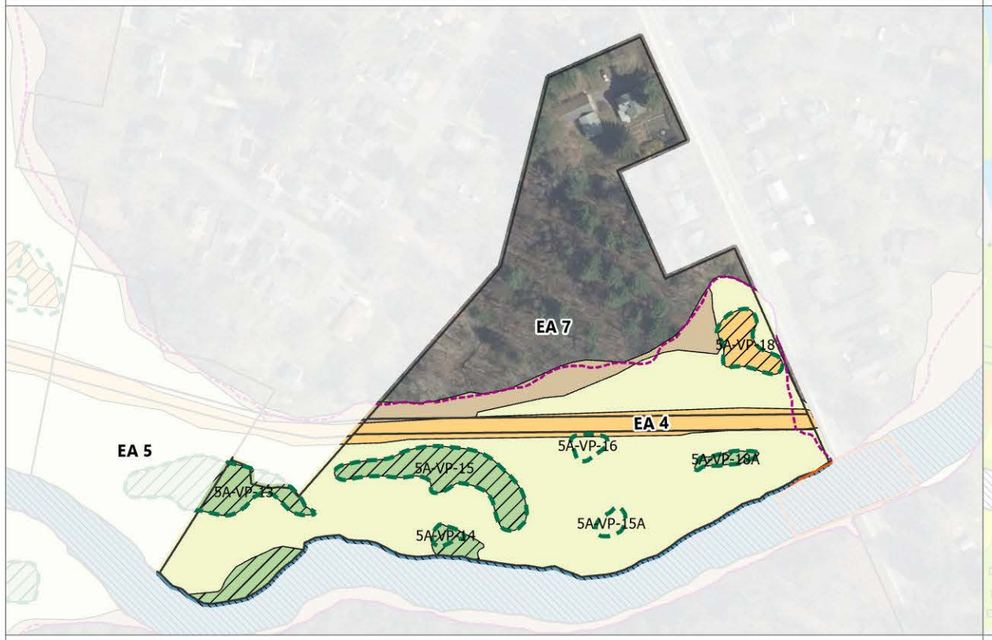
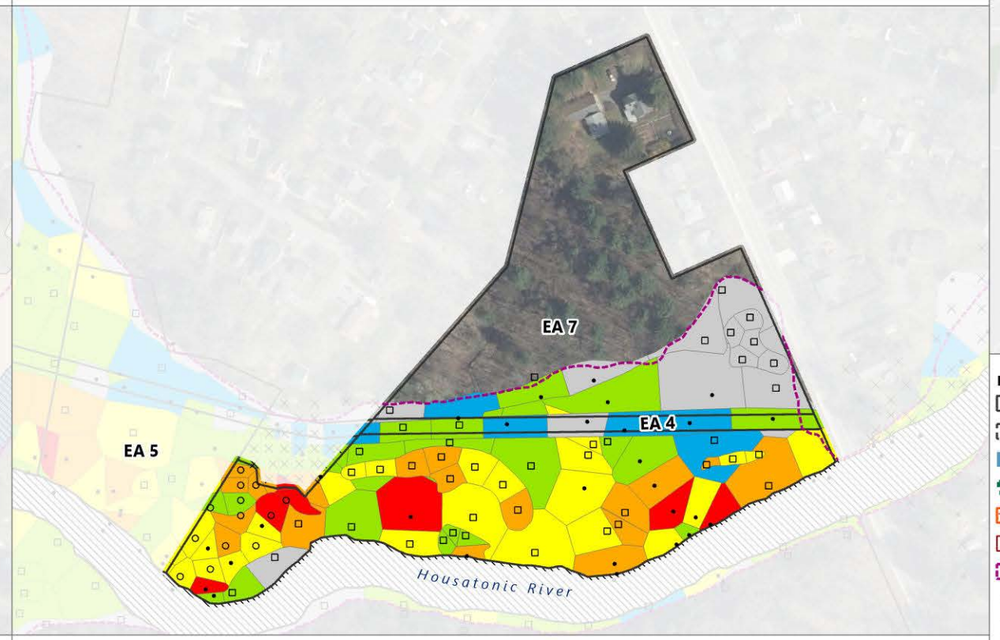
ANCHOR QEA

Figure 2-1e
Exposure Area 6
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

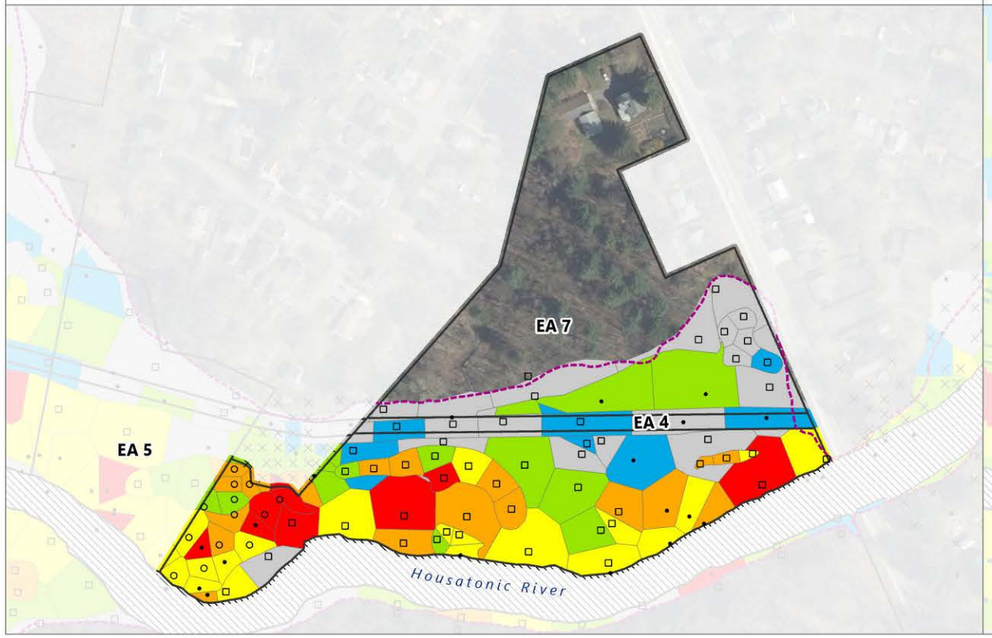


B) Total PCB (0 to 0.5 foot)

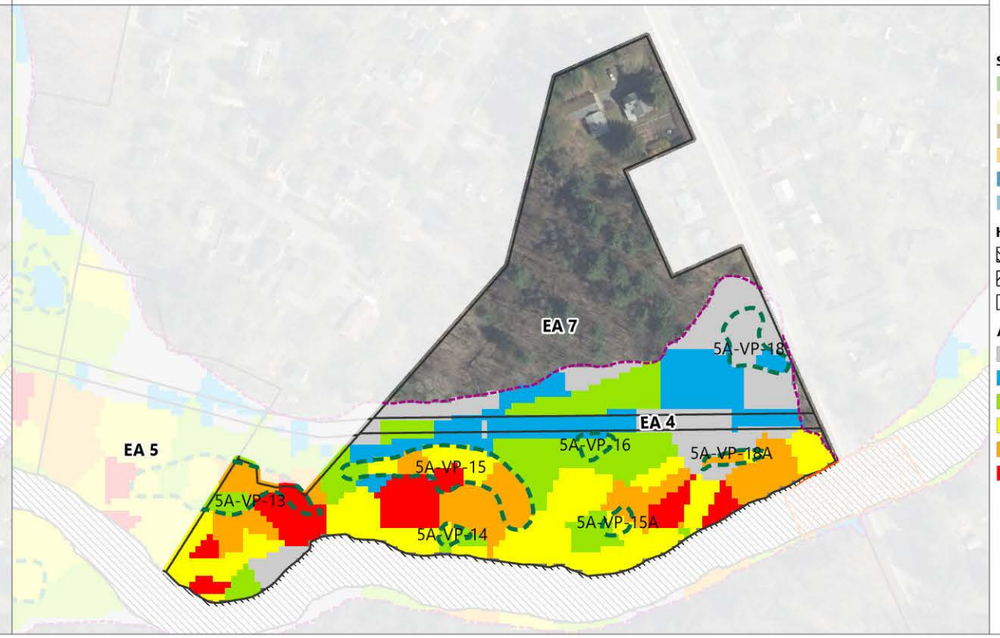




C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 200
Feet

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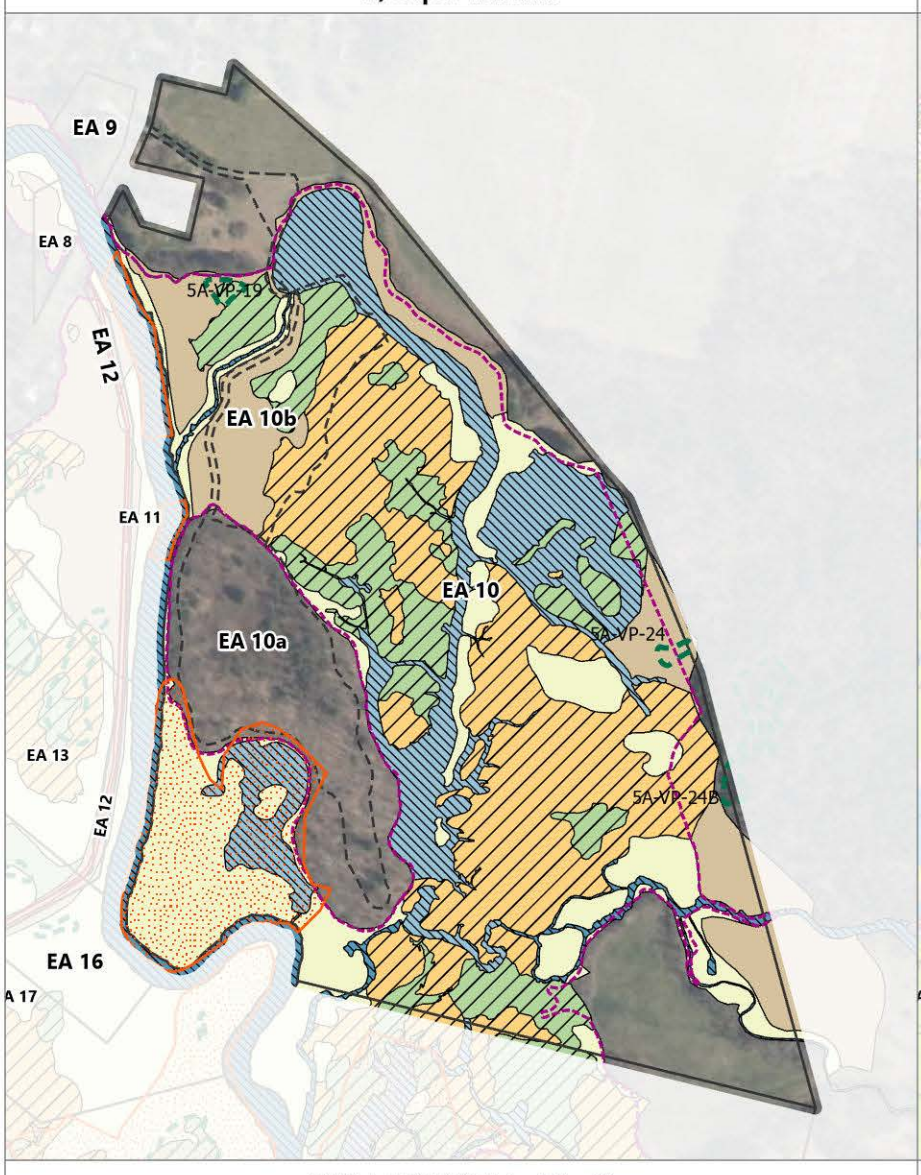
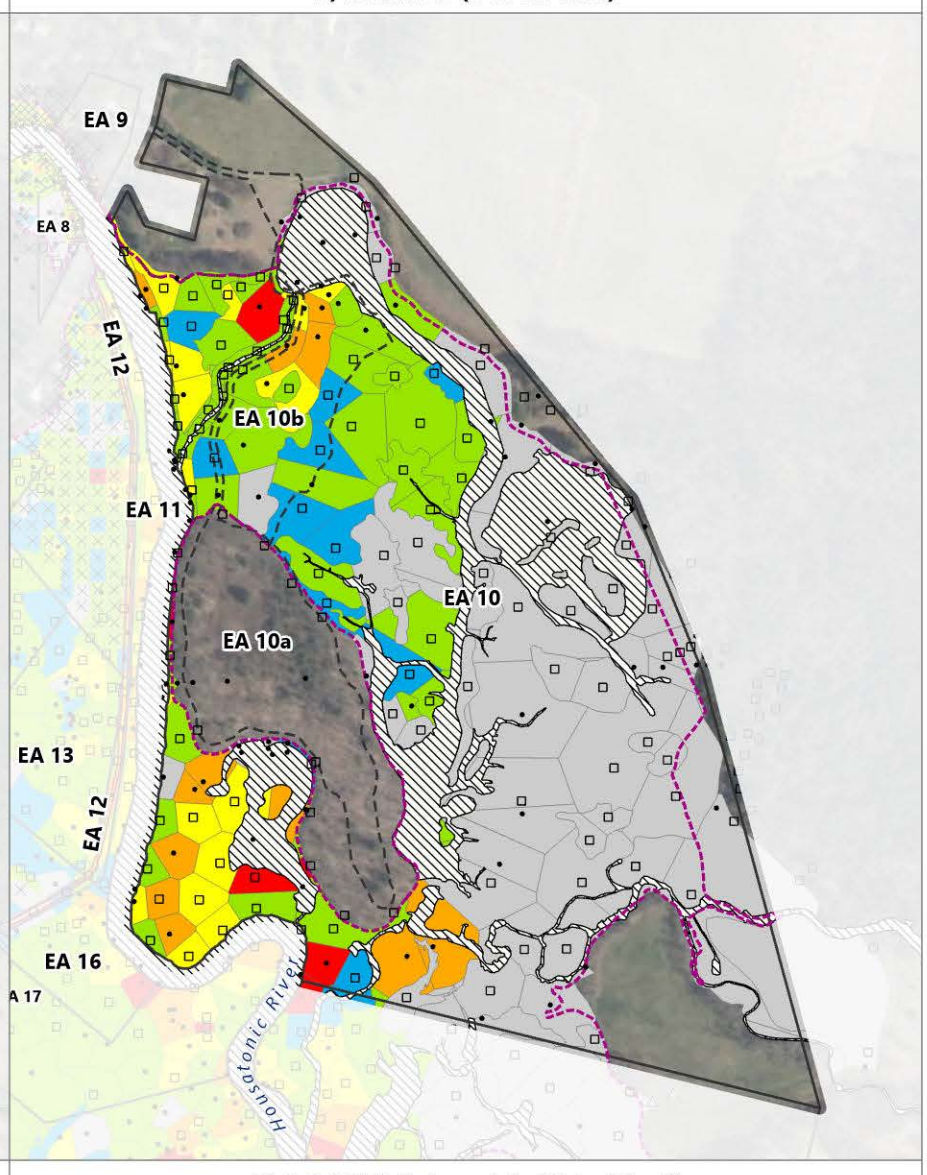
ANCHOR QEA

Figure 2-1f
Exposure Area 7
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

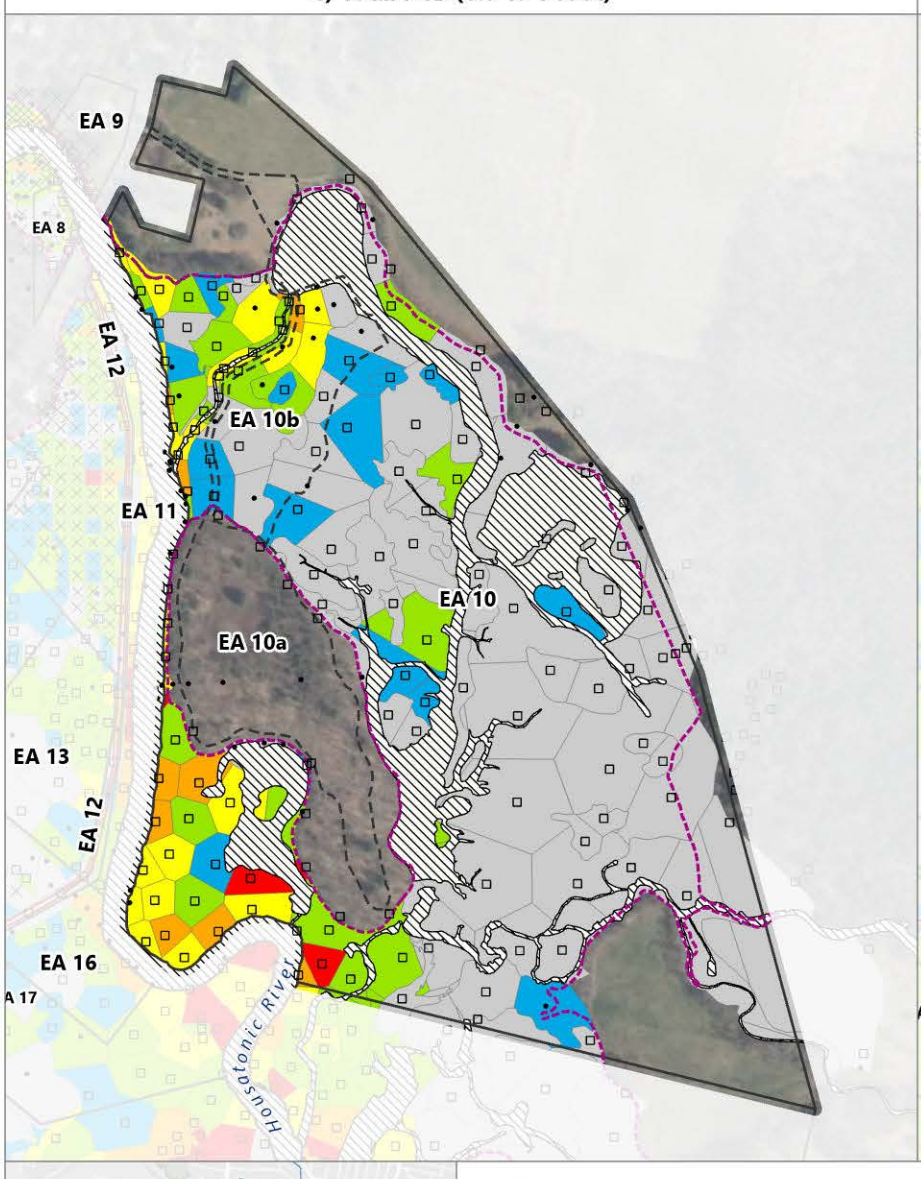
A) Super Habitats



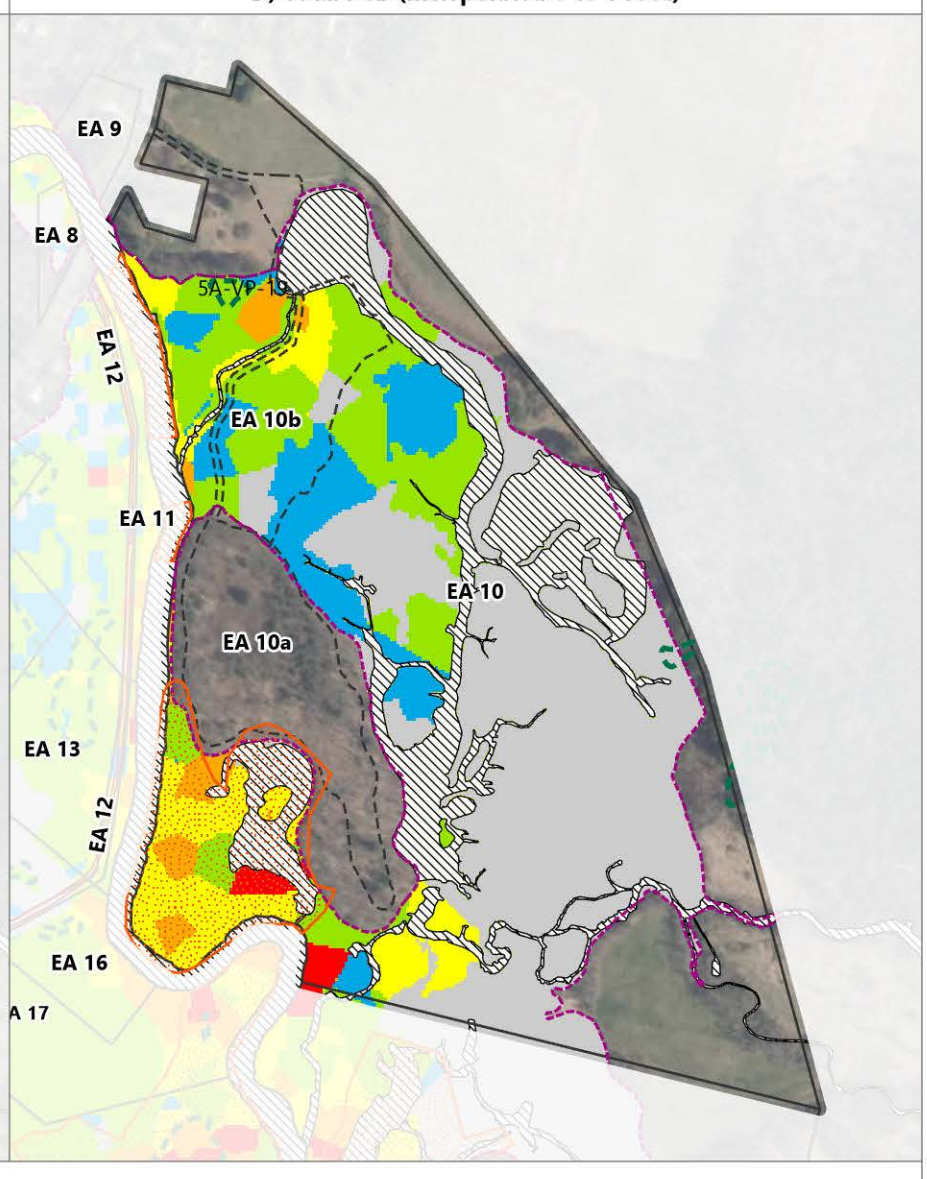
B) Total PCB (0 to 0.5 foot)



C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)





LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 600
Feet

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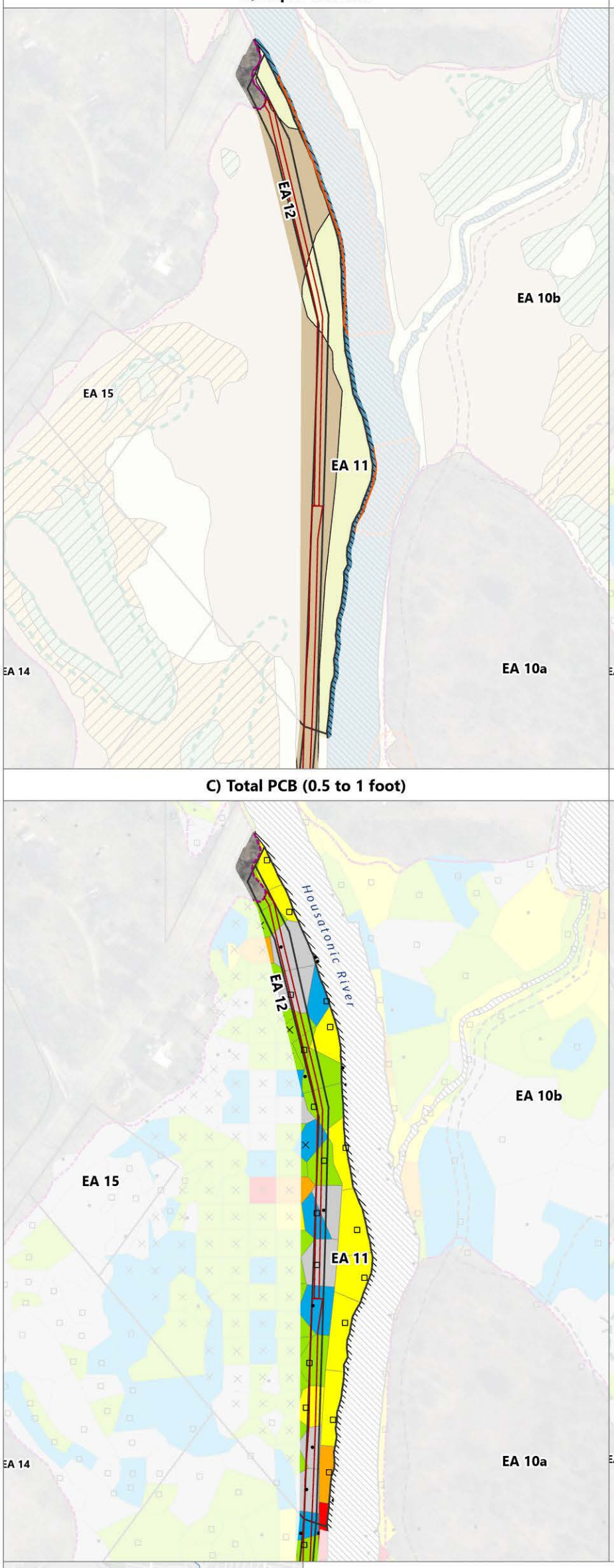
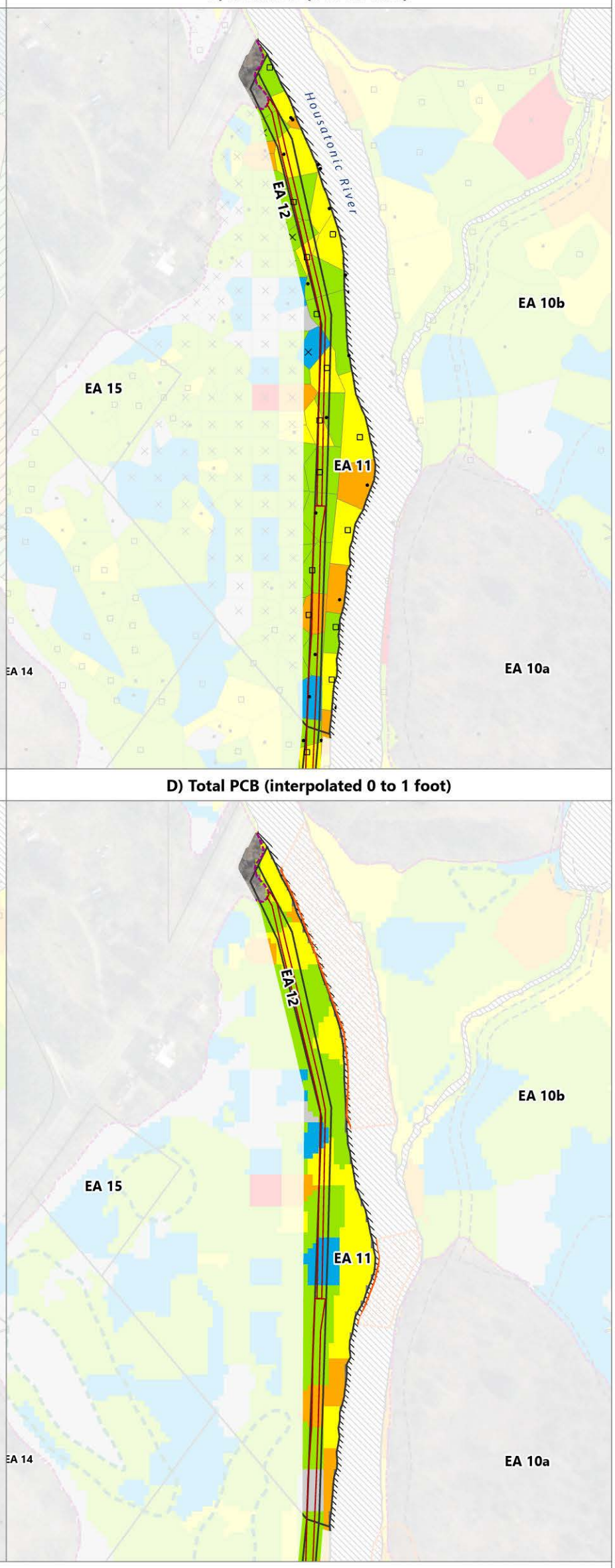
Figure 2-1g
Exposure Area 10
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats



B) Total PCB (0 to 0.5 foot)



C) Total PCB (0.5 to 1 foot)

D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 240
Feet

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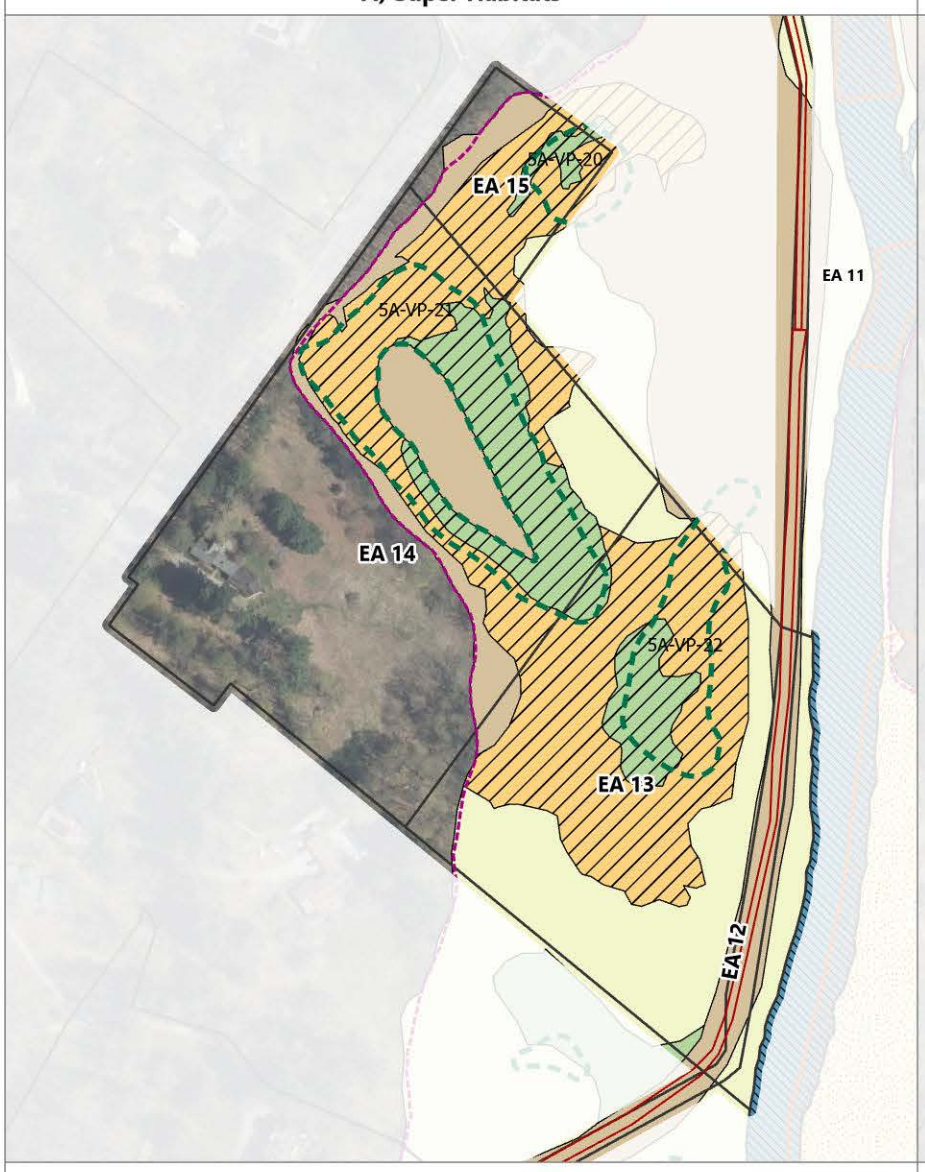
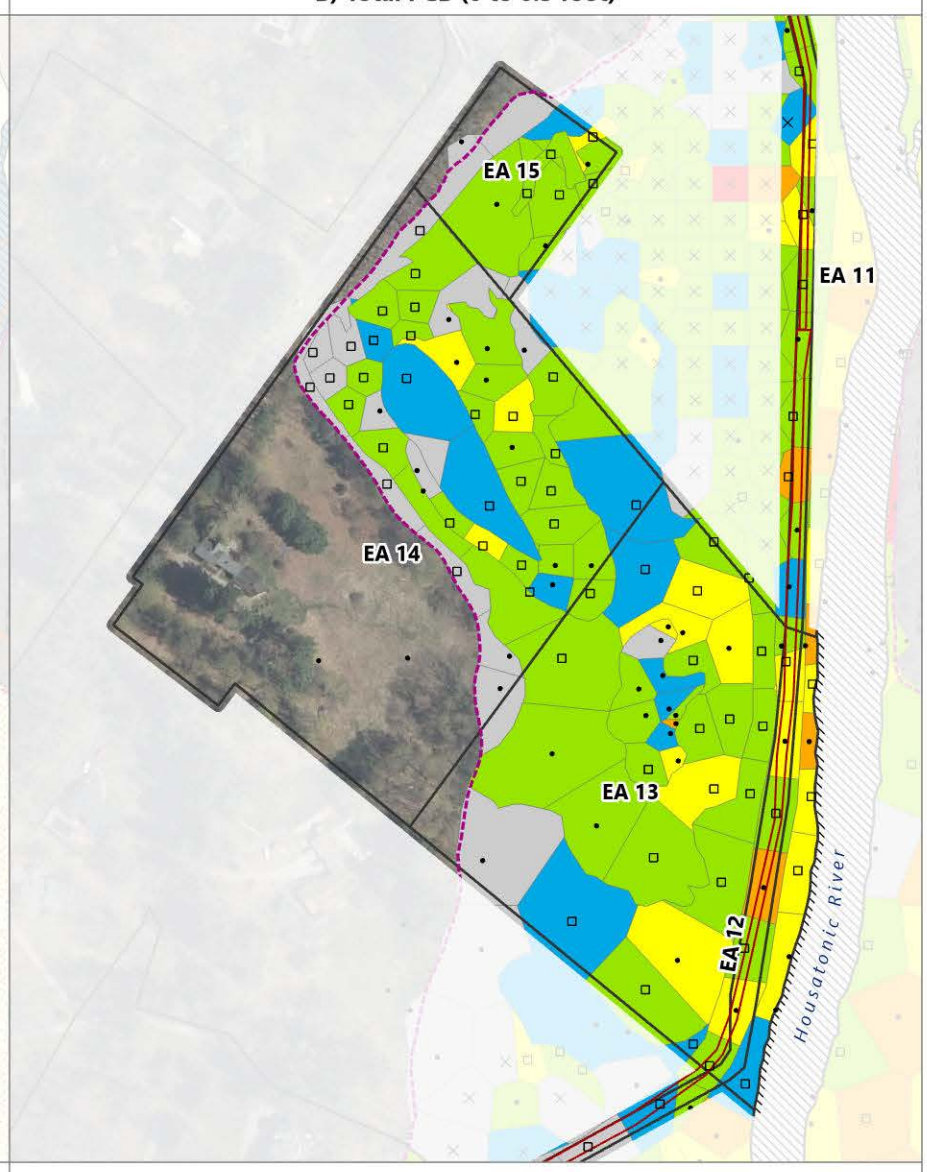
Figure 2-1h
Exposure Areas 11 and 12 (partial)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

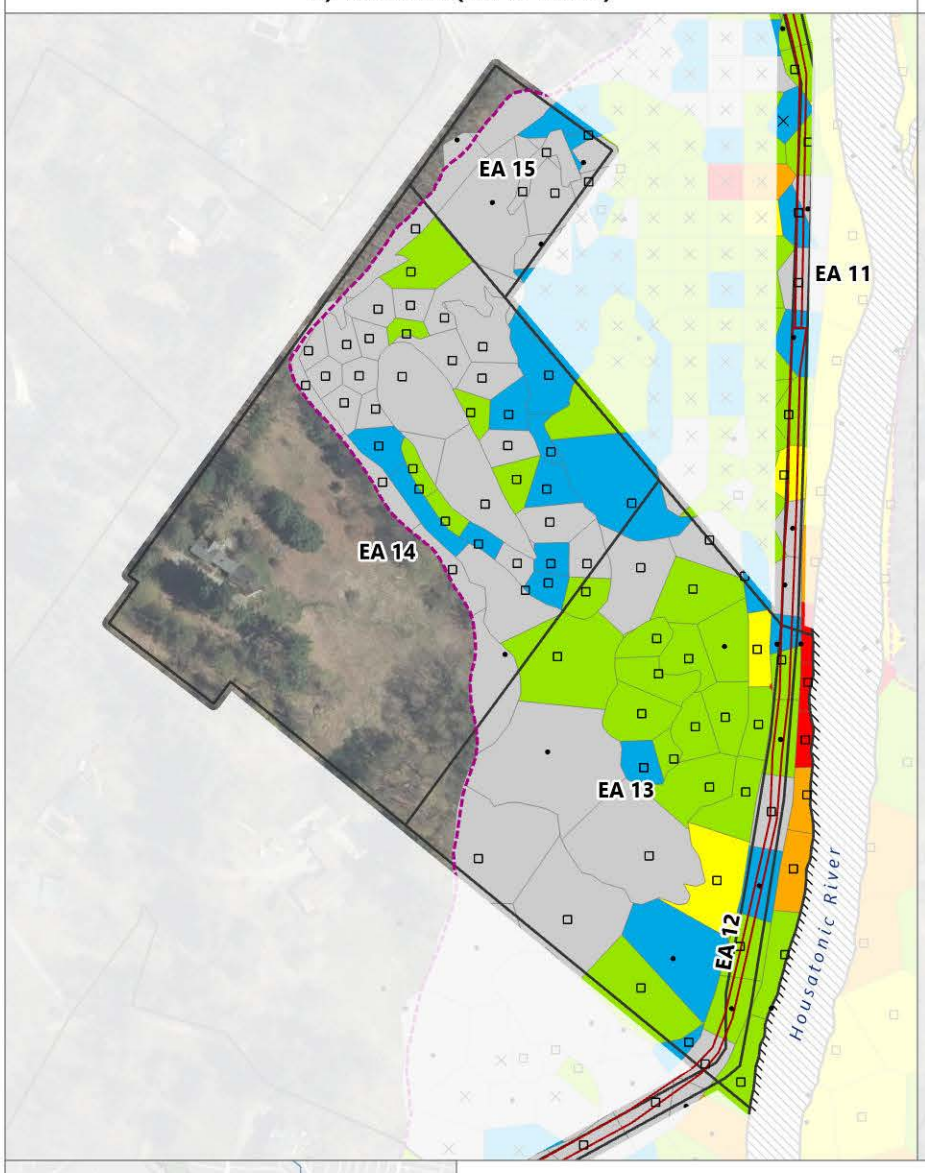
A) Super Habitats



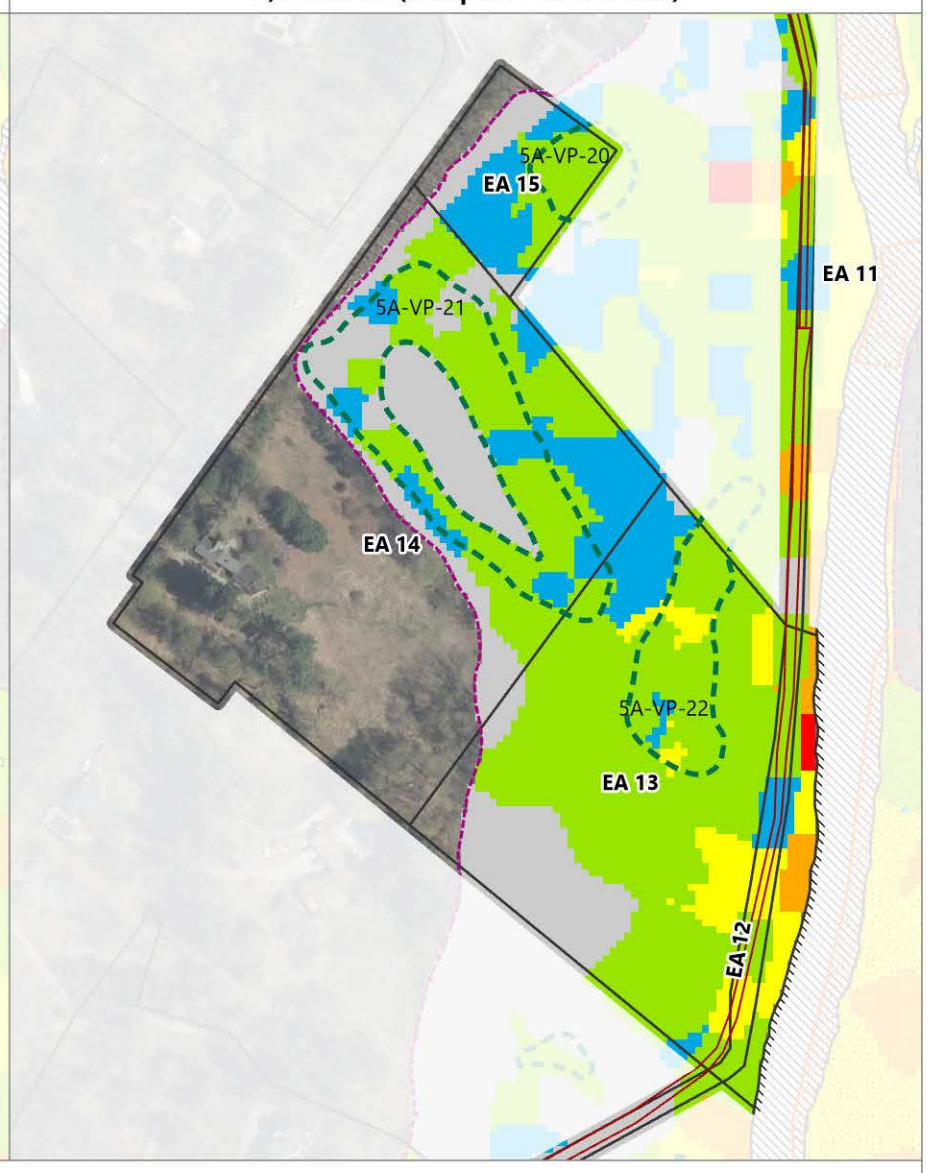
B) Total PCB (0 to 0.5 foot)



C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)





LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 250

Feet

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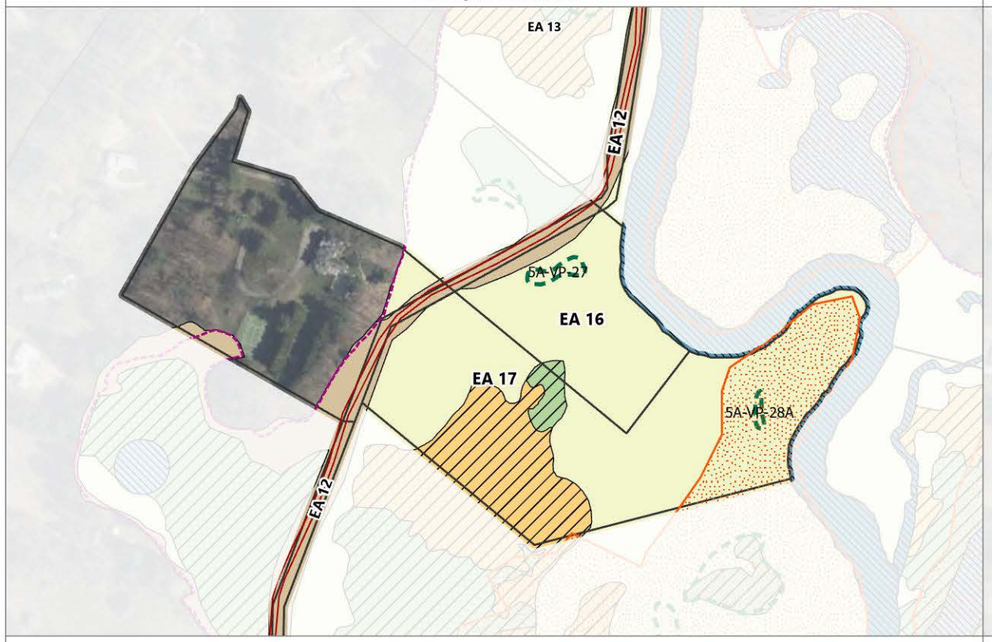
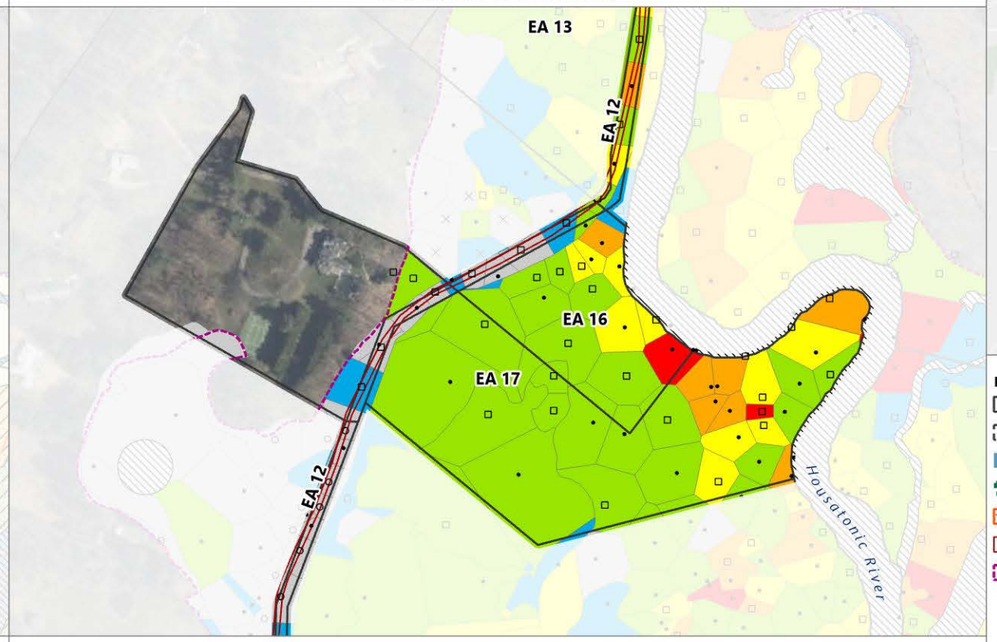
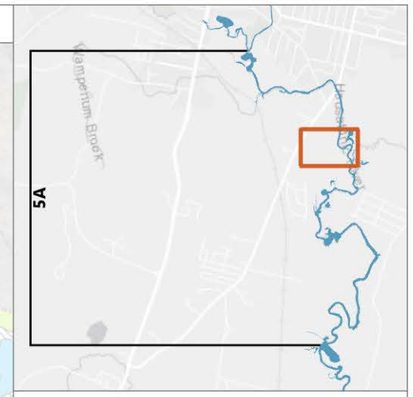
Figure 2-1i
Exposure Areas 13, 14, 15, and 12 (partial)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

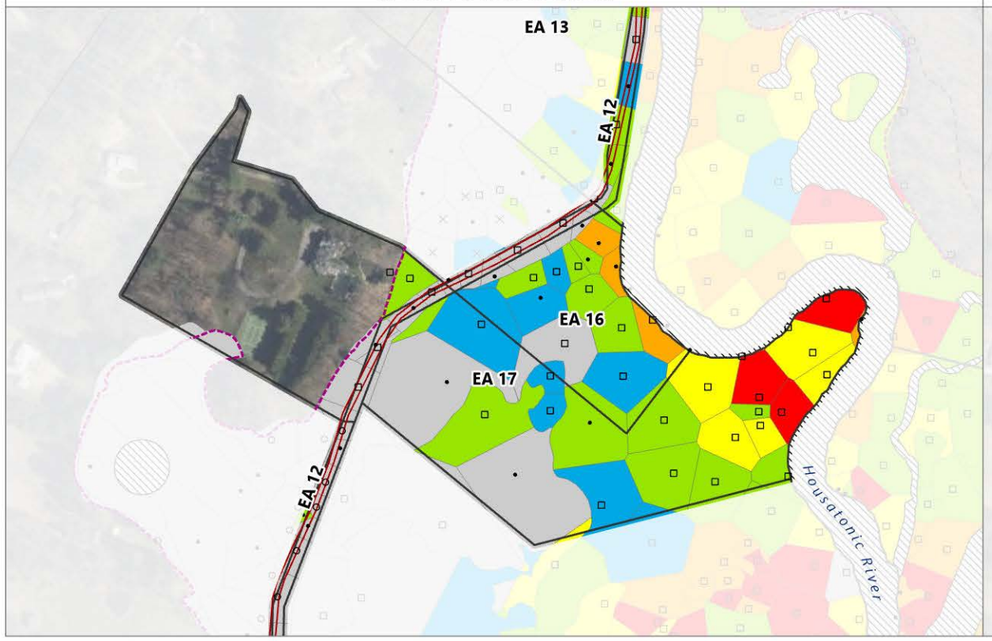


B) Total PCB (0 to 0.5 foot)

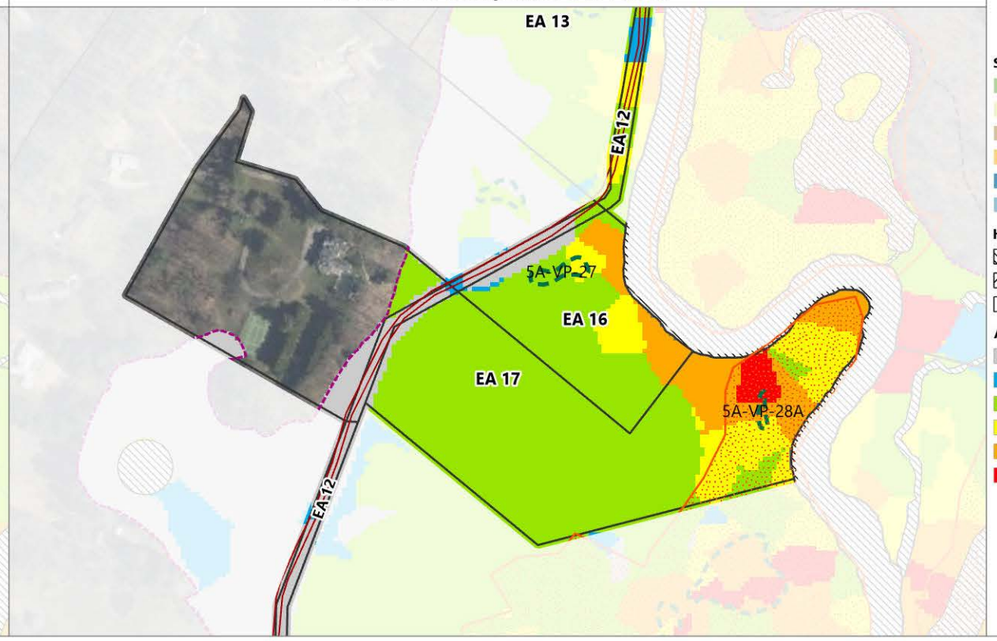




C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 300

Feet

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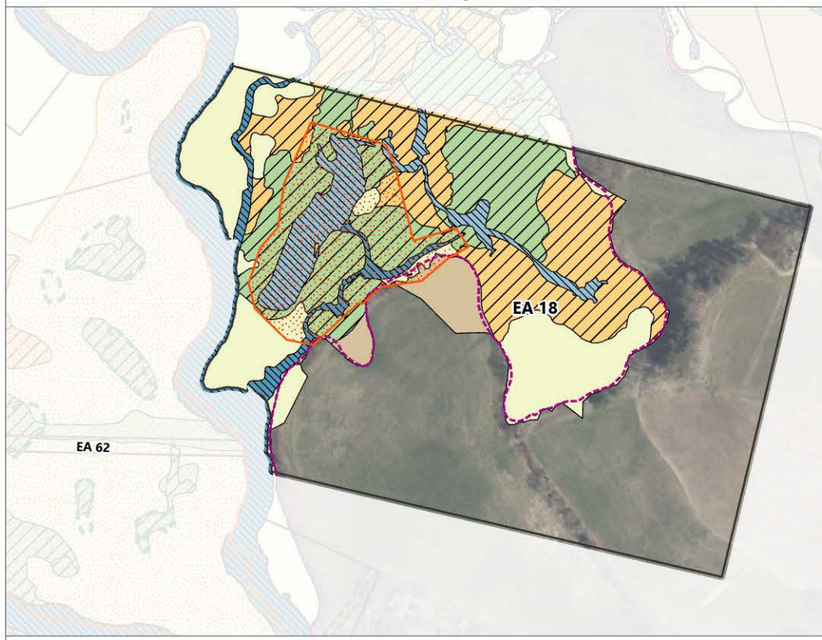
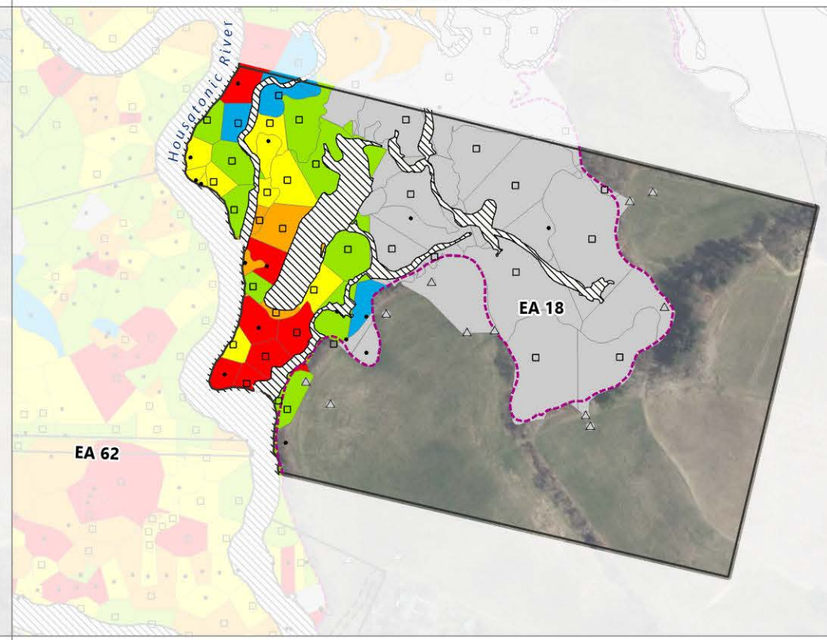
ANCHOR QEA

Figure 2-1j
Exposure Areas 16, 17, and 12 (partial)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

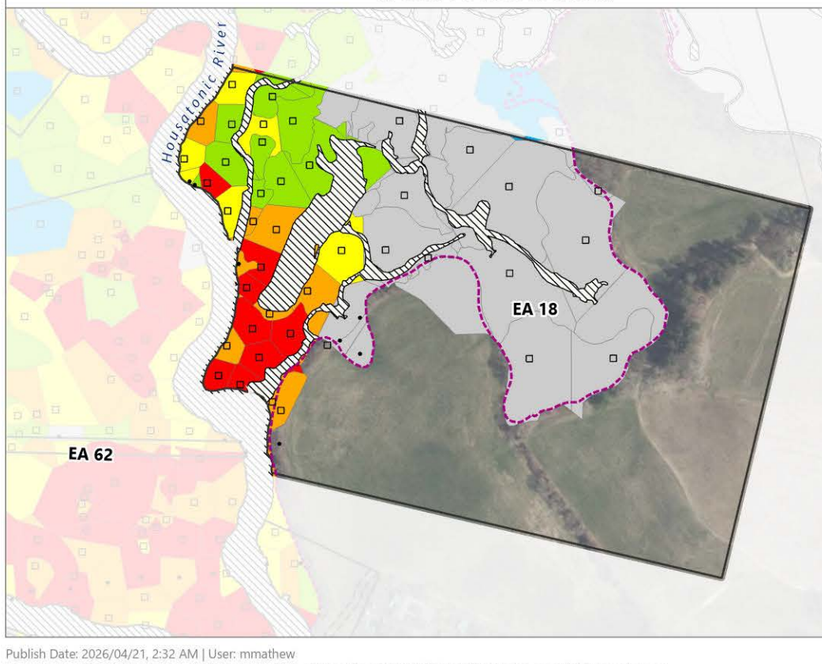
A) Super Habitats



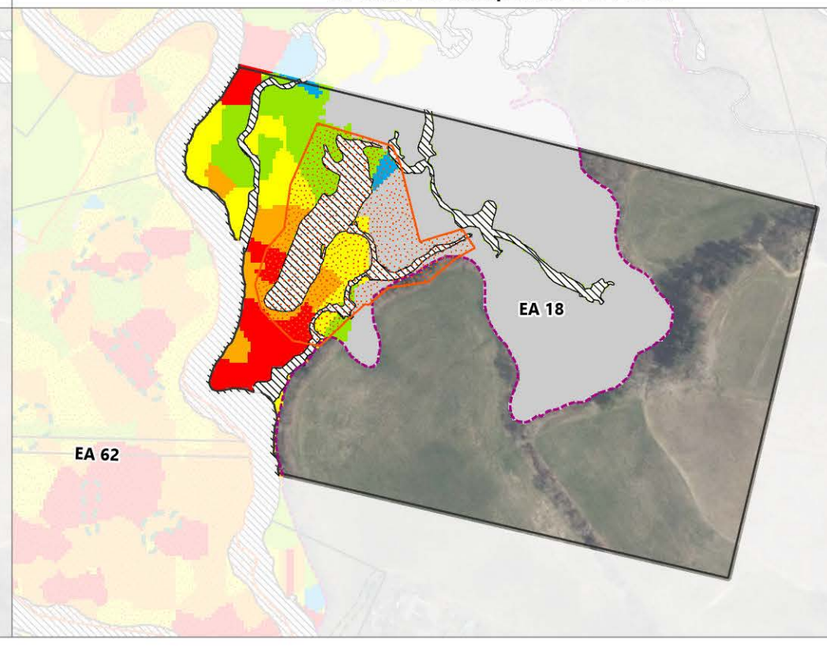
B) Total PCB (0 to 0.5 foot)

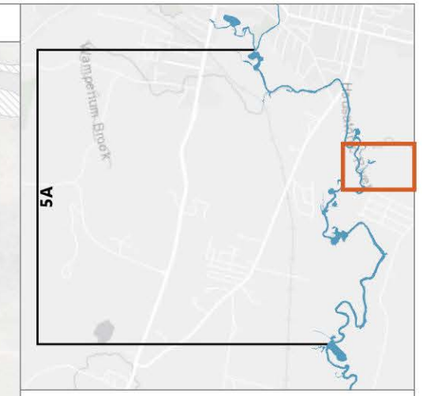


C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)





LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 400
Feet

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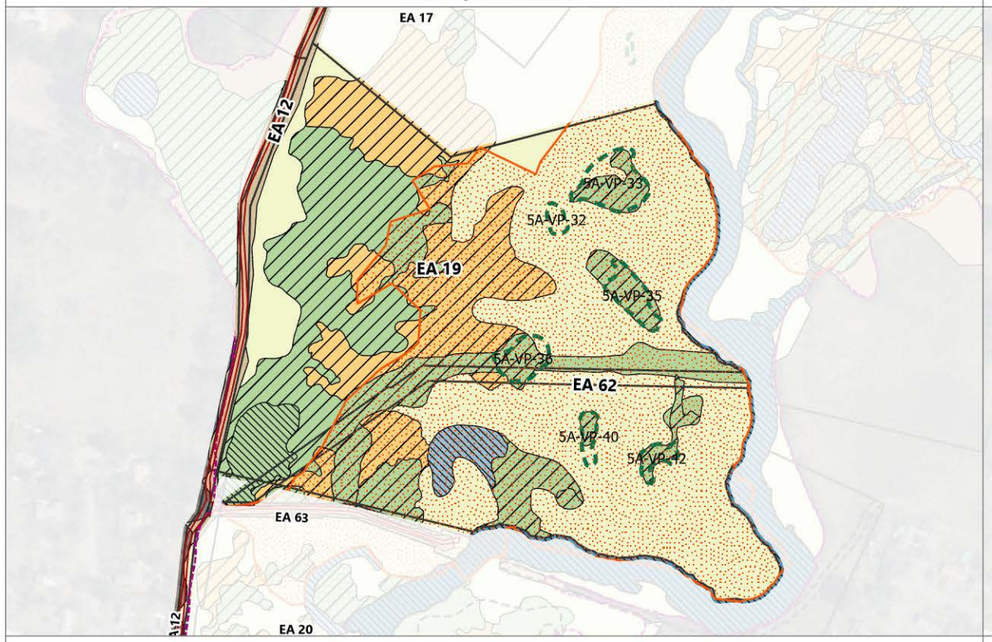
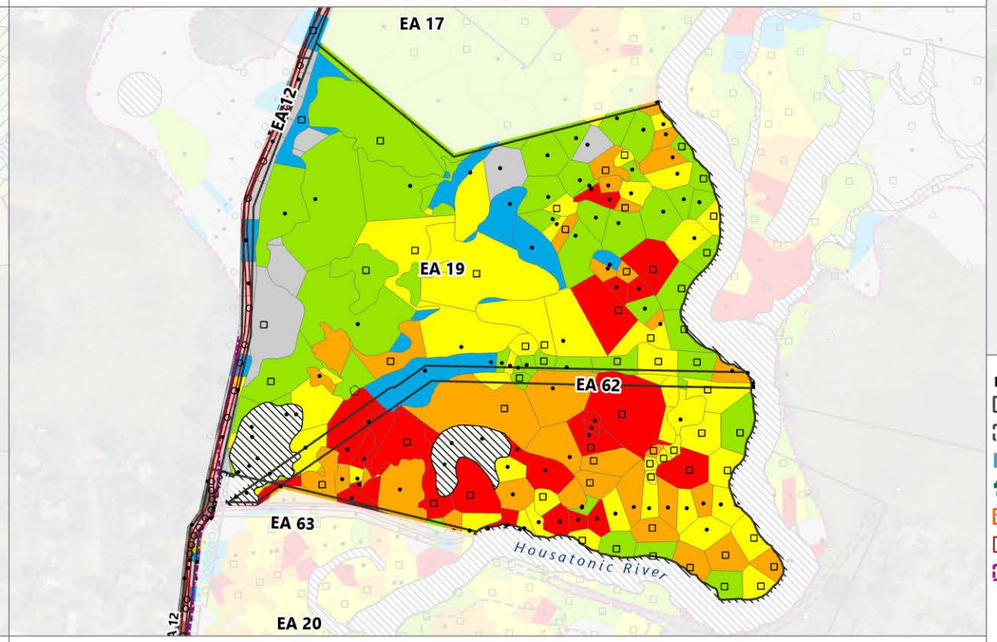
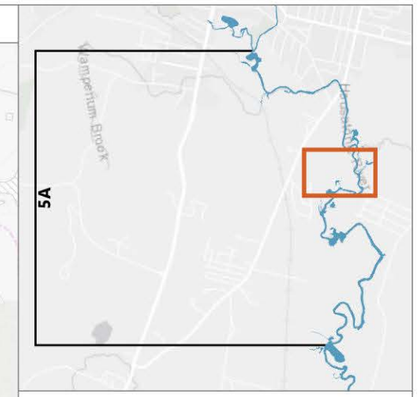
Figure 2-1k
Exposure Area 18
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

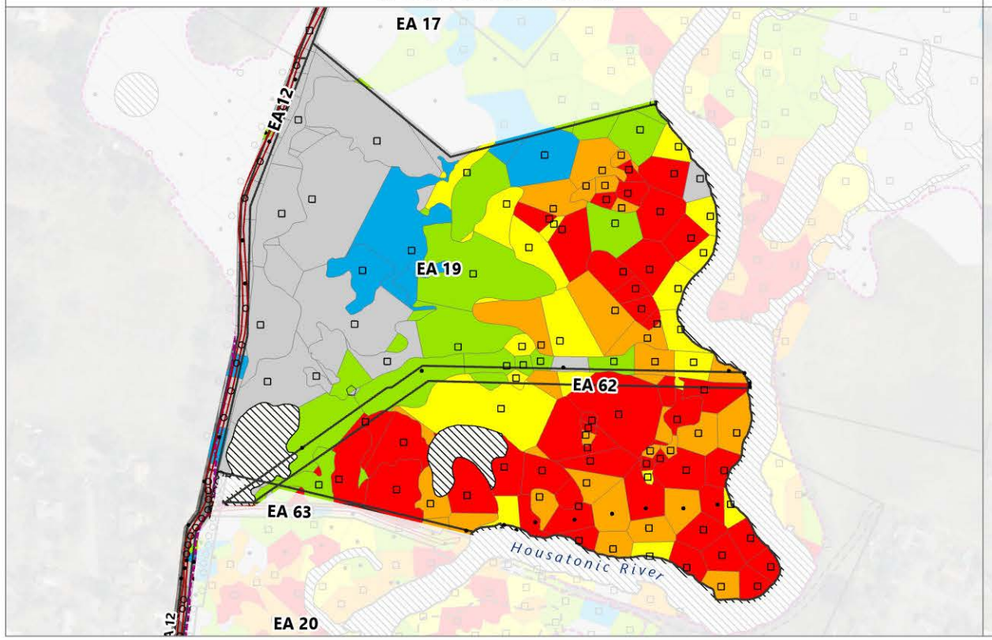


B) Total PCB (0 to 0.5 foot)

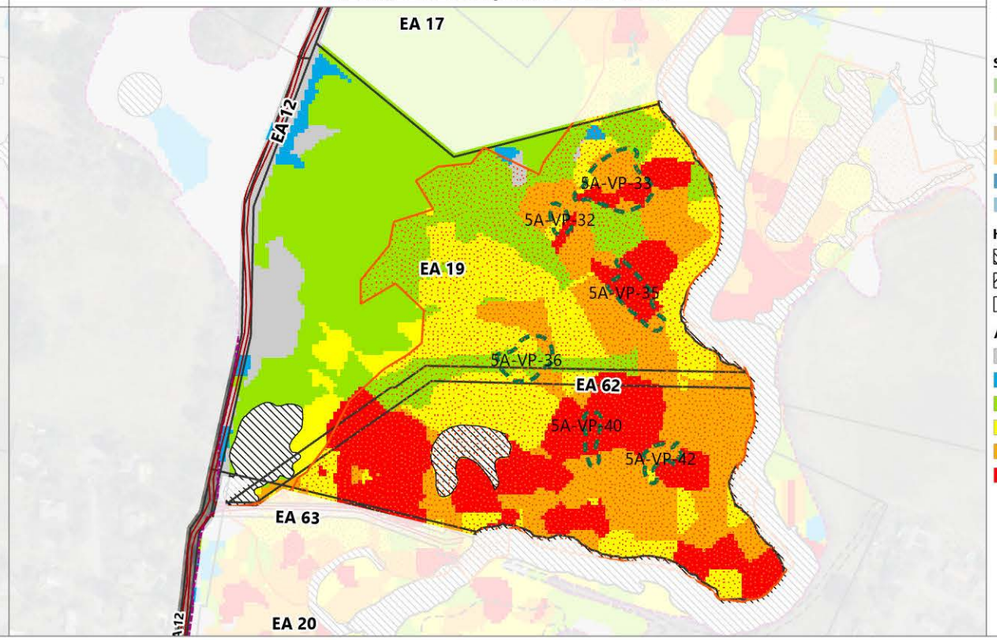




C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 400
Feet

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ANCHOR QEA

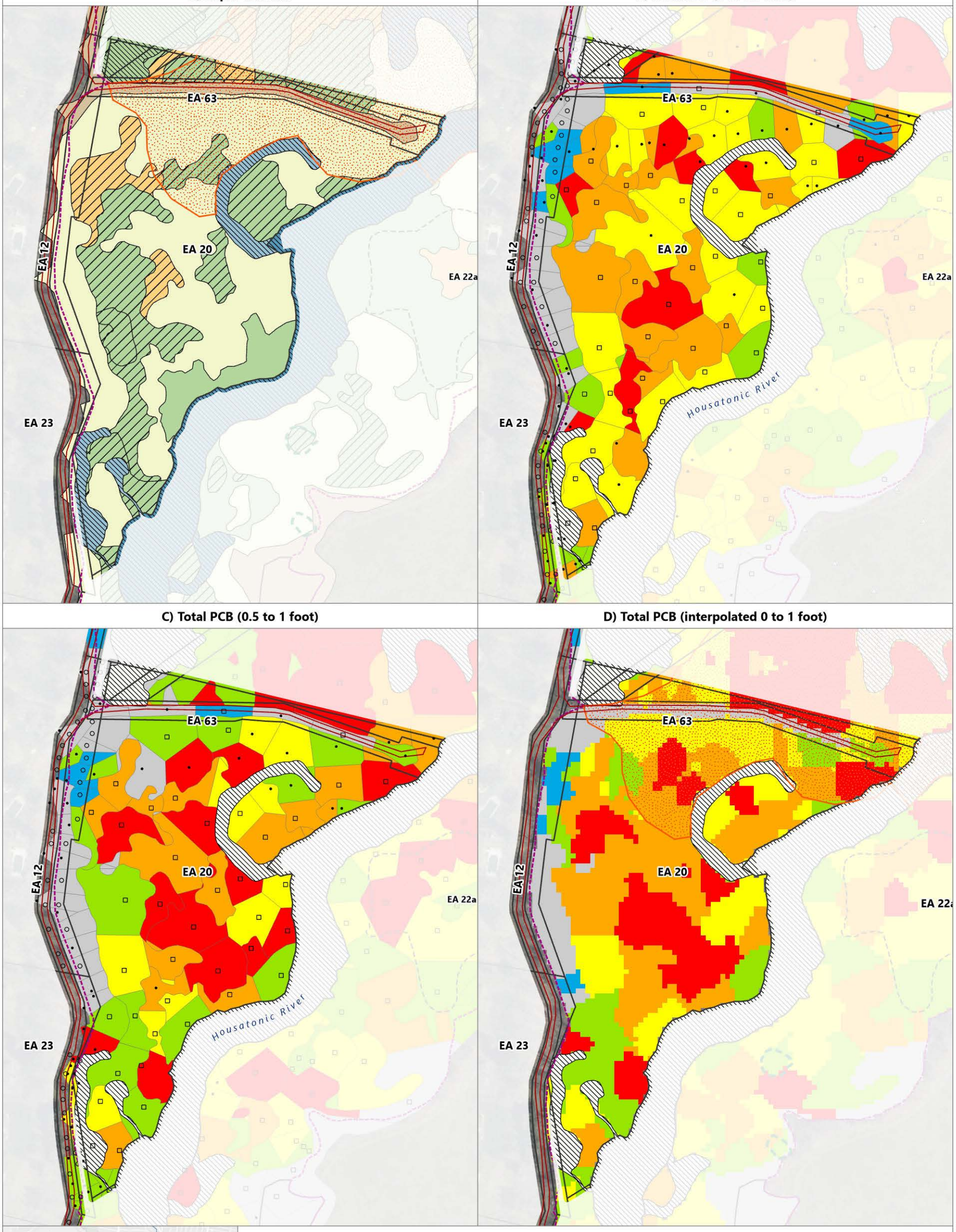
Figure 2-1l
Exposure Areas 19, 62, and 12 (partial)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (0 to 0.5 foot)

C) Total PCB (0.5 to 1 foot)

D) Total PCB (interpolated 0 to 1 foot)



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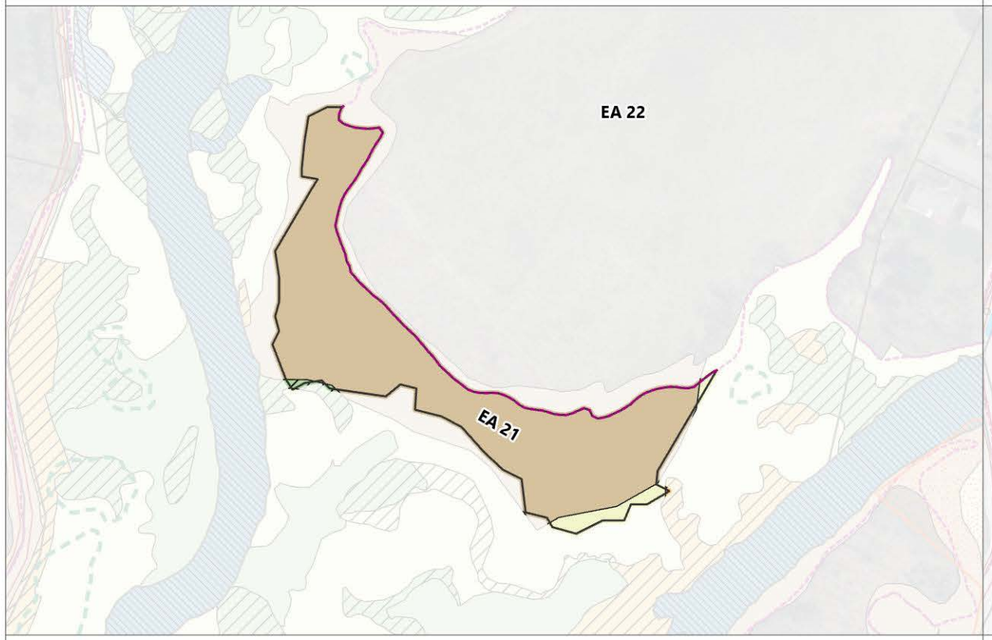
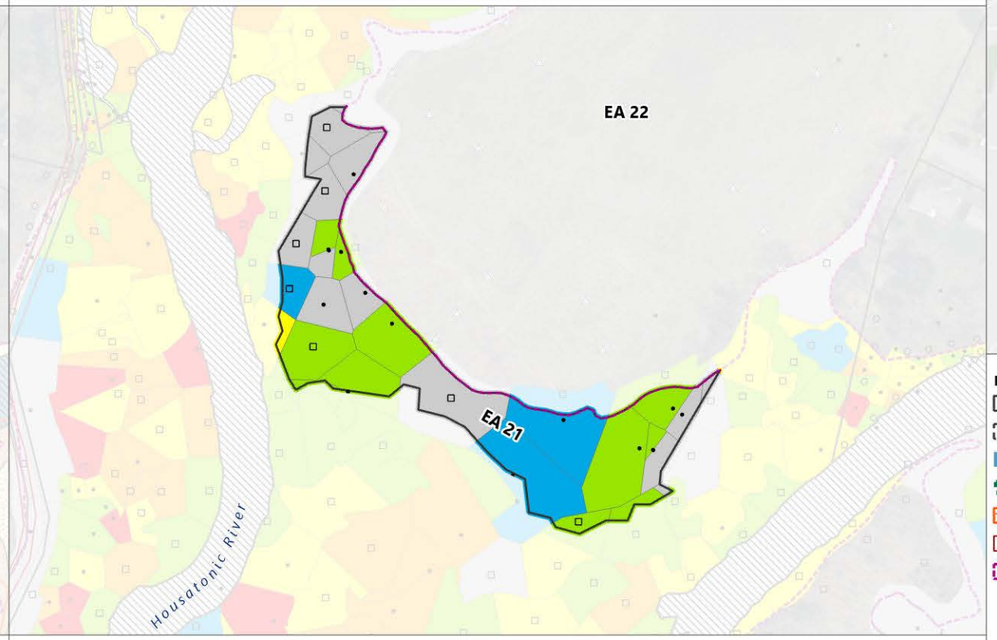
ANCHOR QEA

Figure 2-1m
Exposure Areas 20, 63, and 12 (partial)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

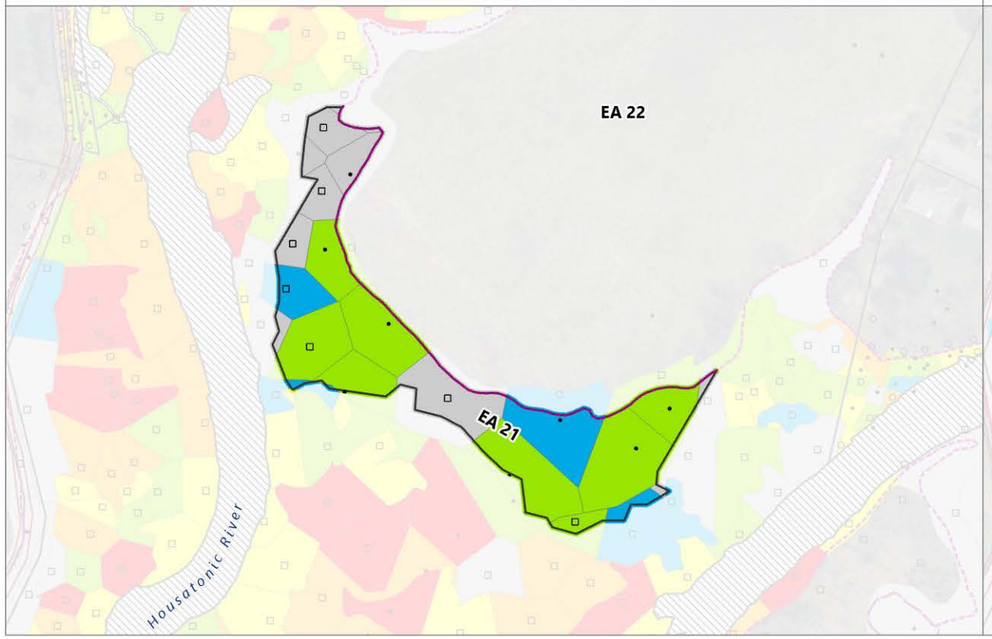


B) Total PCB (0 to 0.5 foot)

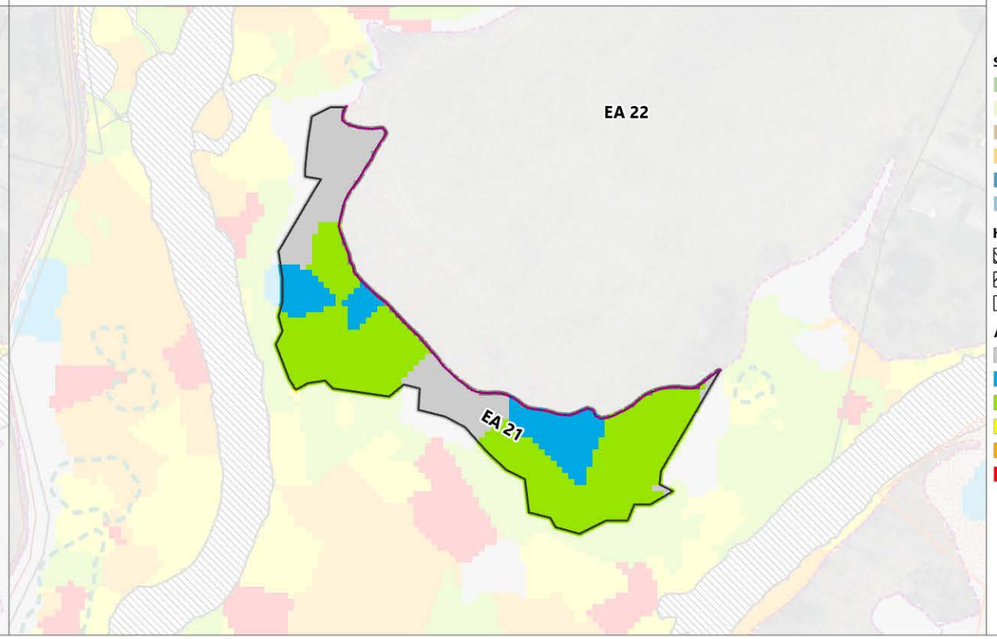




C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 200
Feet

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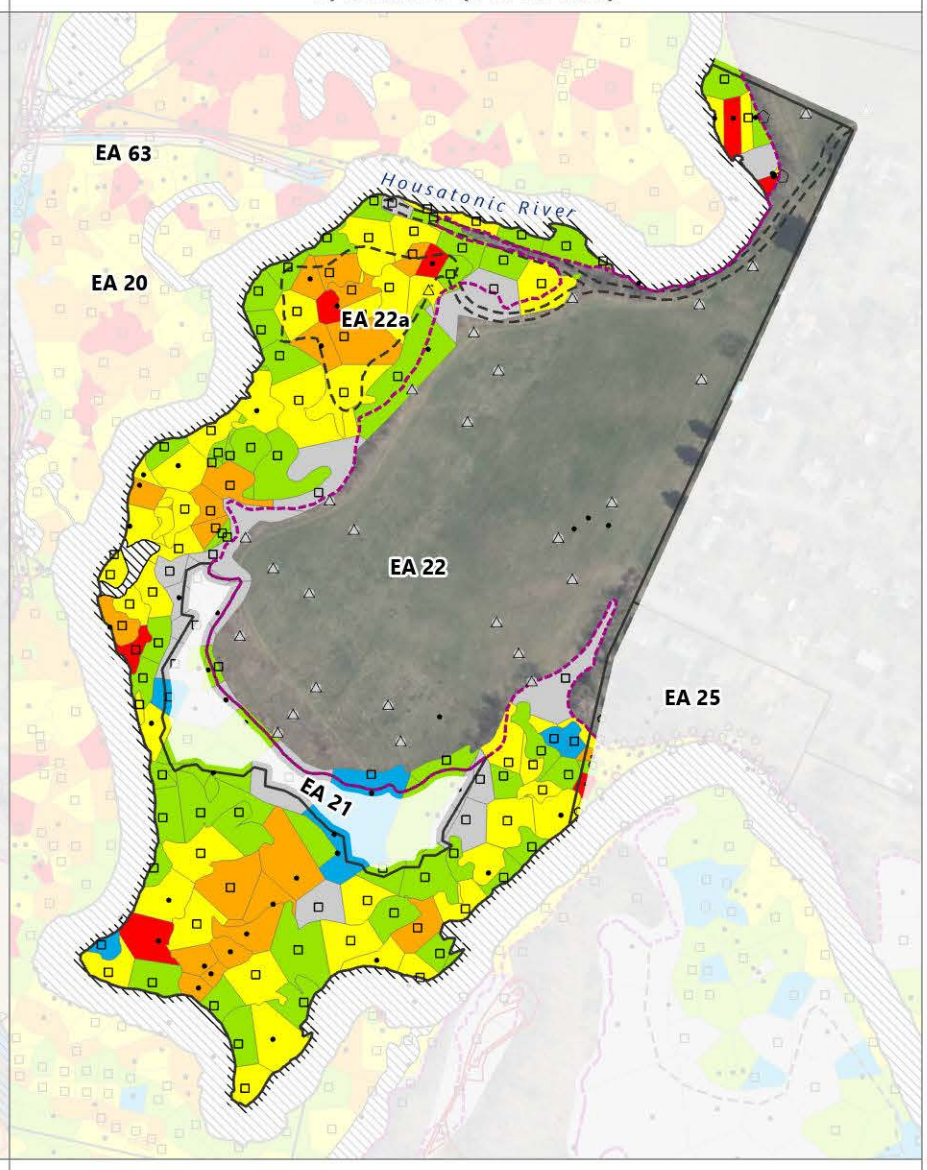
Figure 2-1n
Exposure Area 21
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

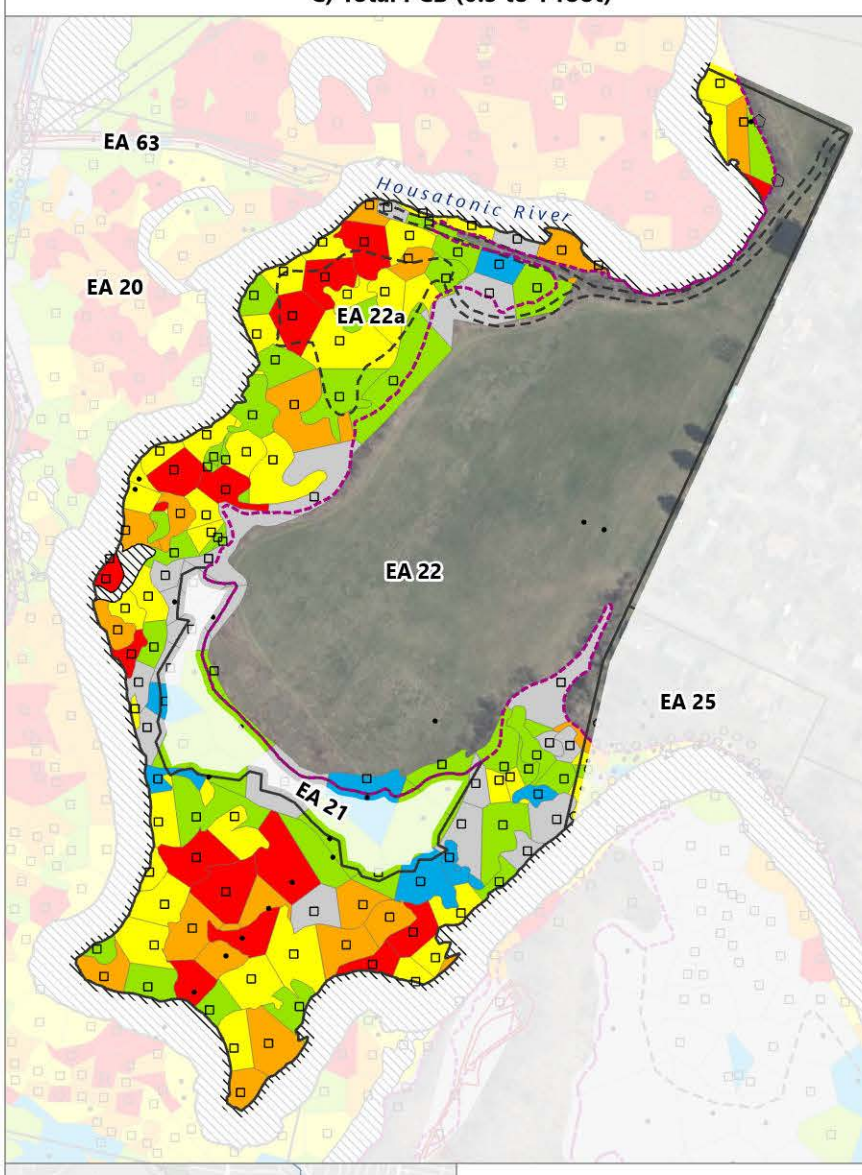
A) Super Habitats



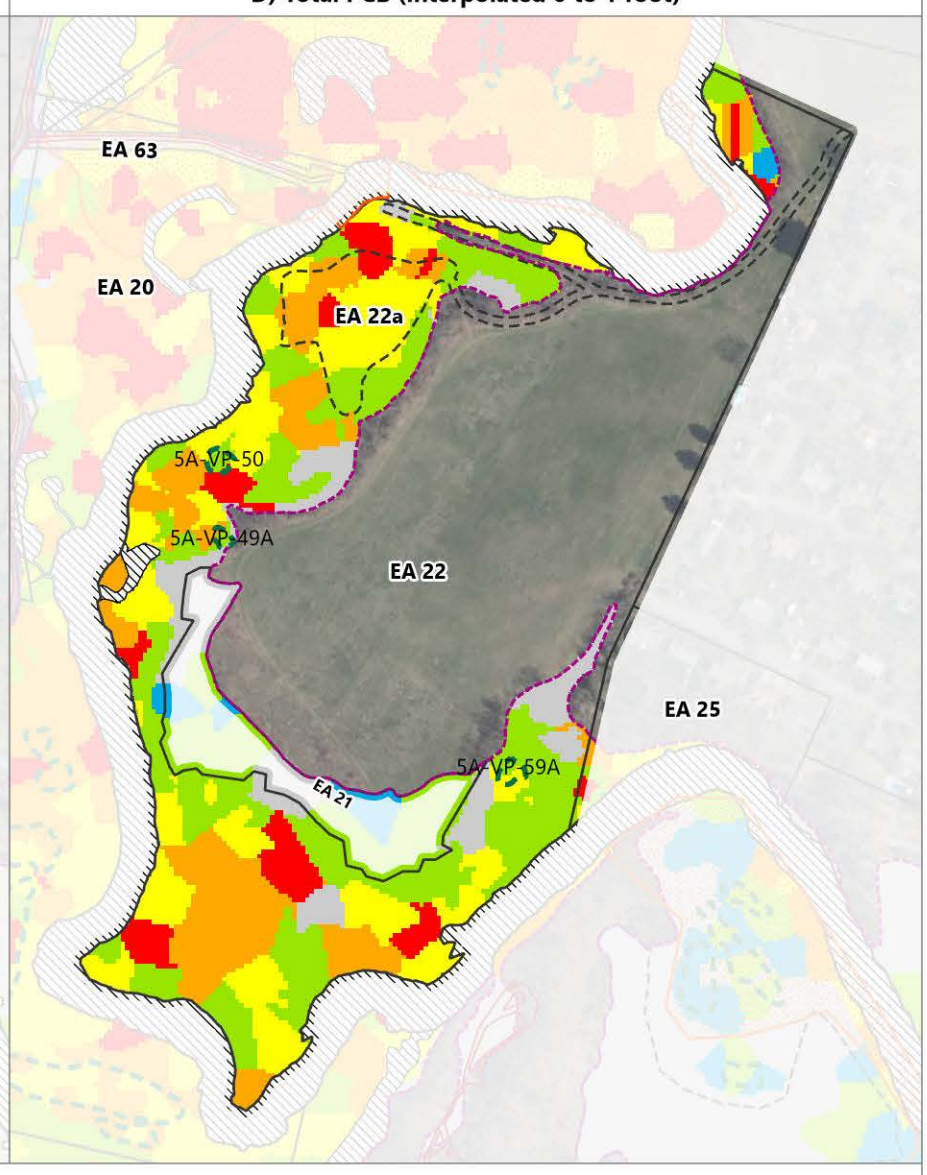
B) Total PCB (0 to 0.5 foot)

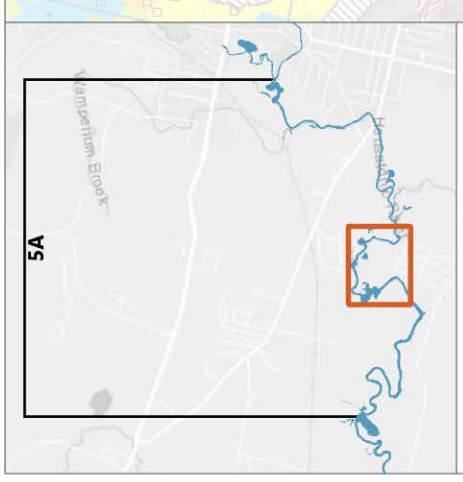


C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)





LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 410
Feet

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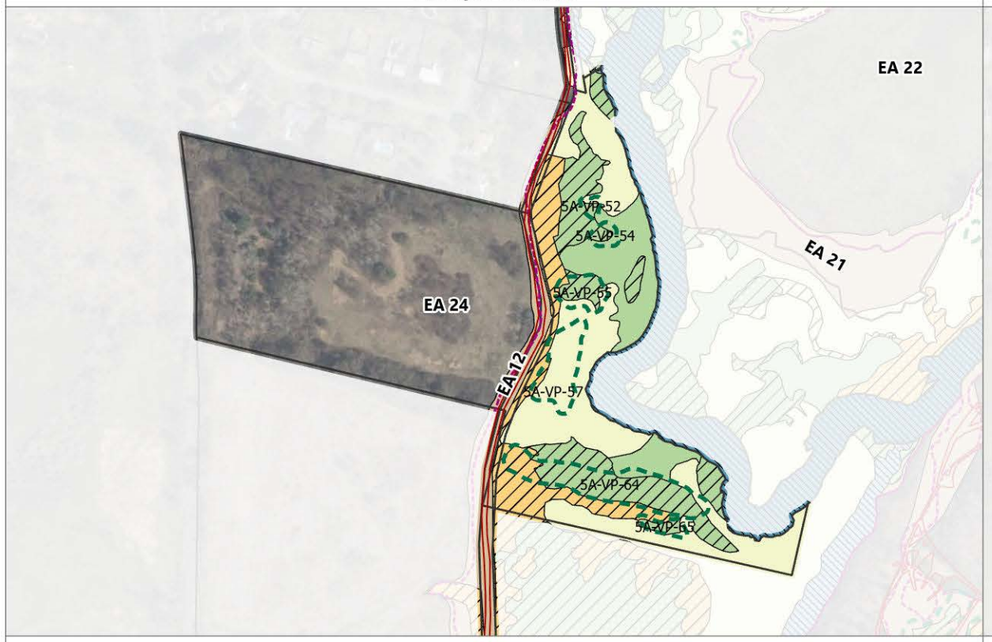
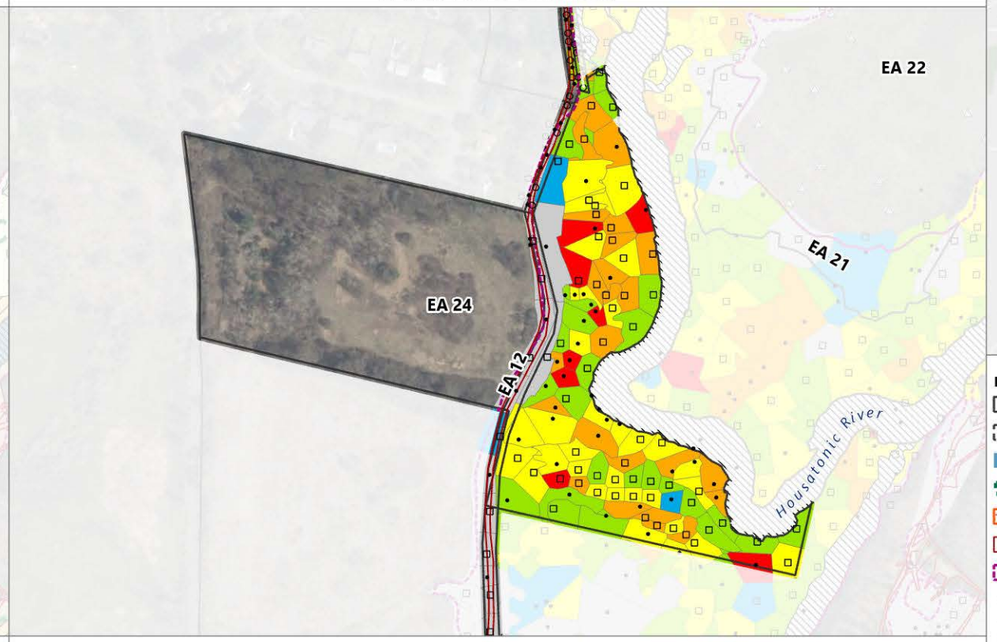
Figure 2-1o
Exposure Area 22
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

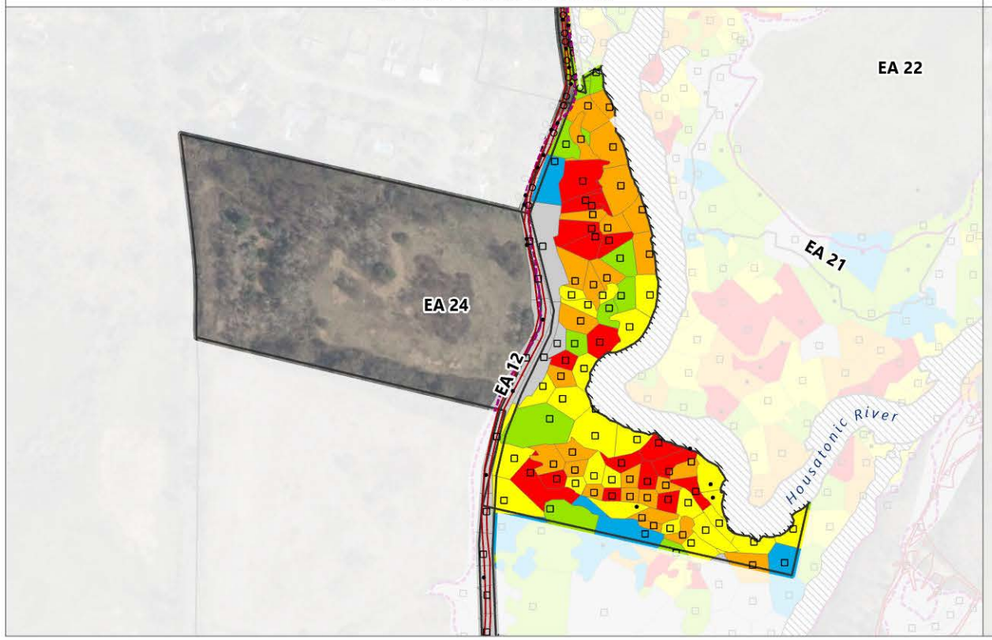


B) Total PCB (0 to 0.5 foot)

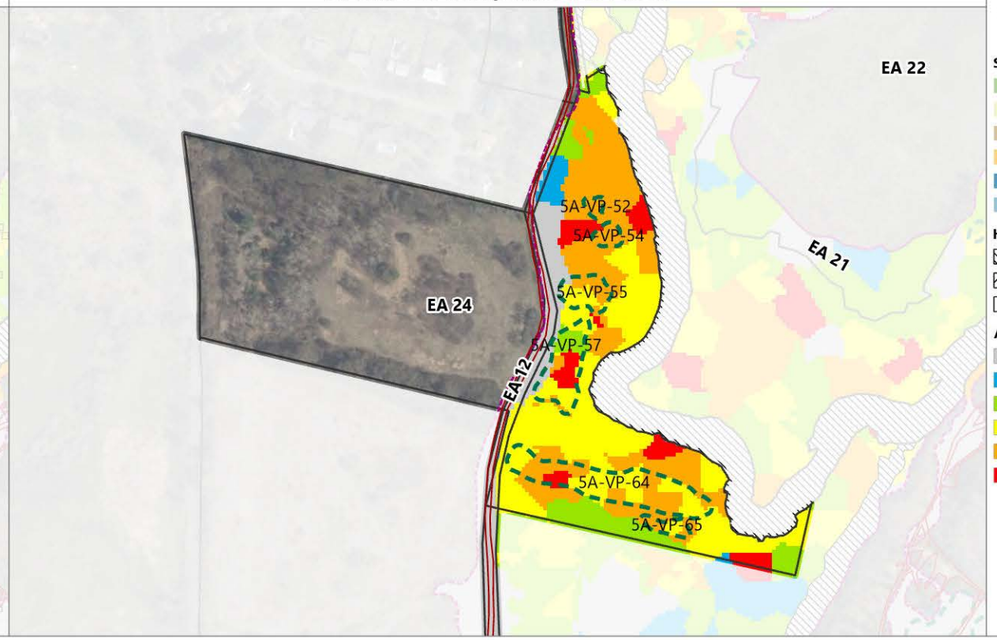




C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 400
Feet

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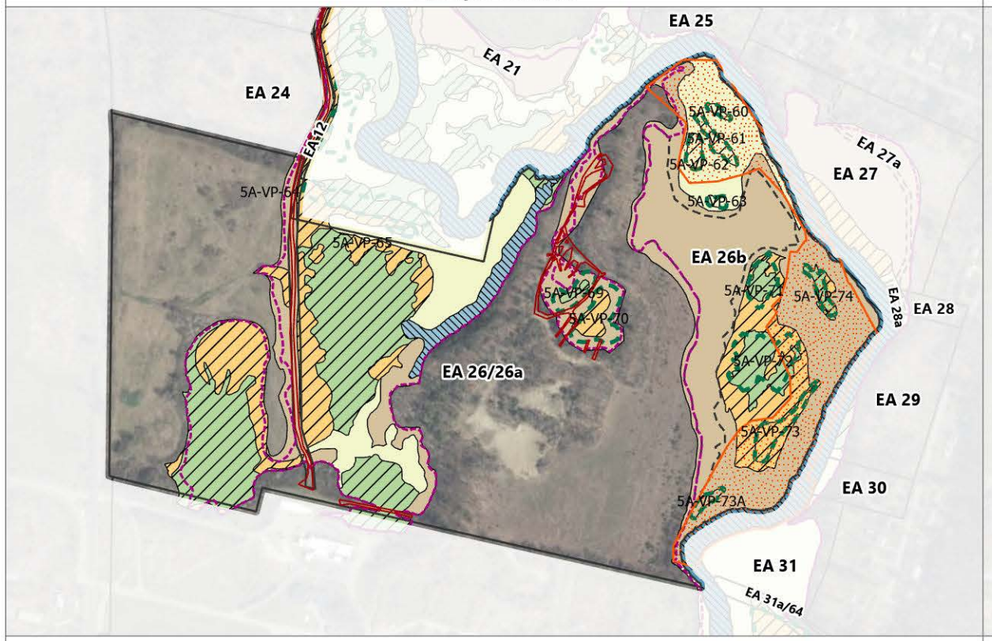
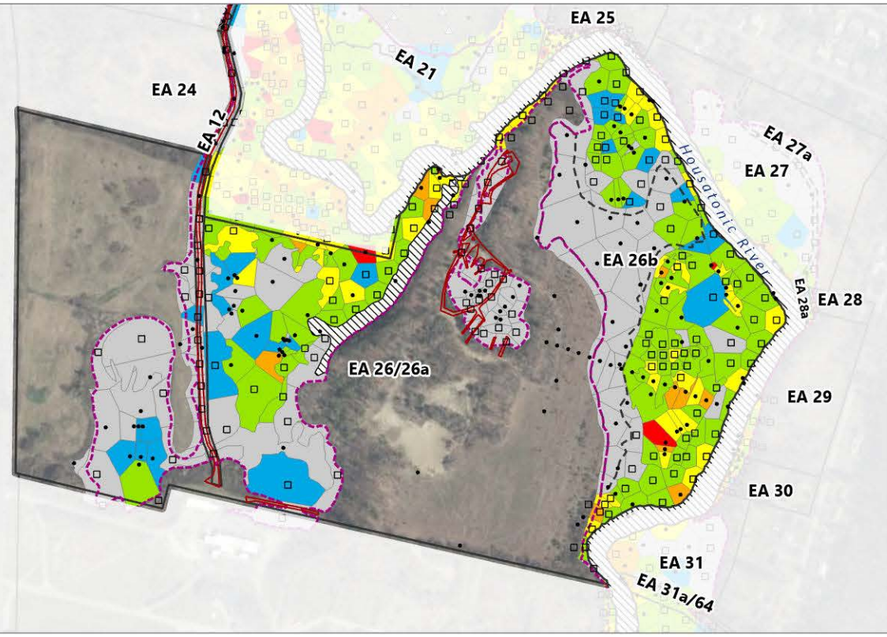
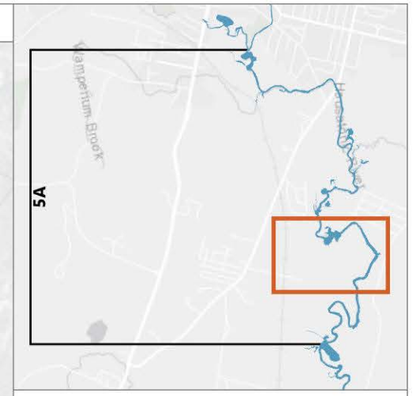
Figure 2-1p
Exposure Areas 24 and 12 (partial)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

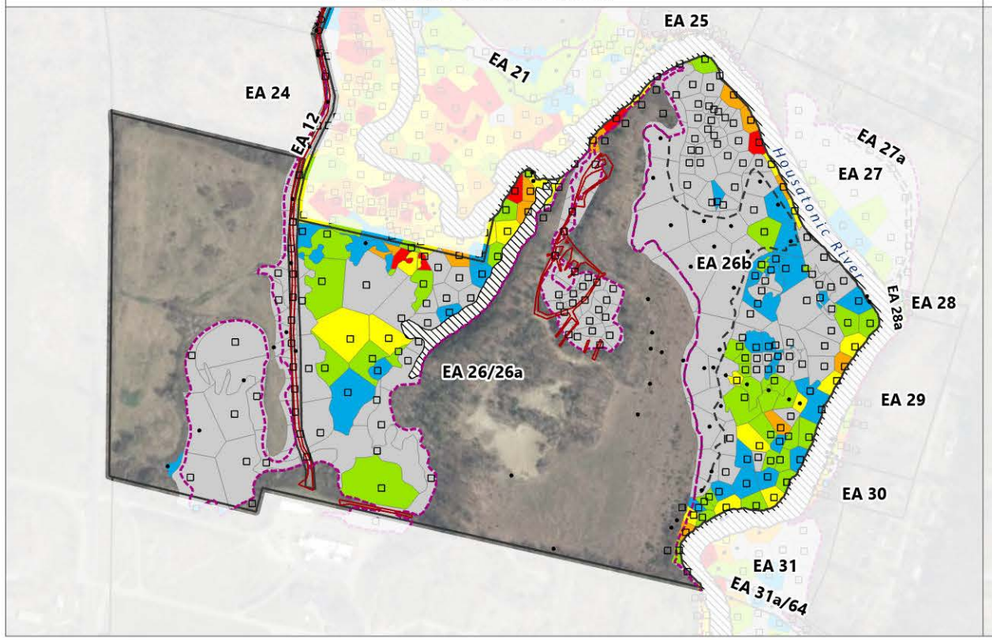


B) Total PCB (0 to 0.5 foot)

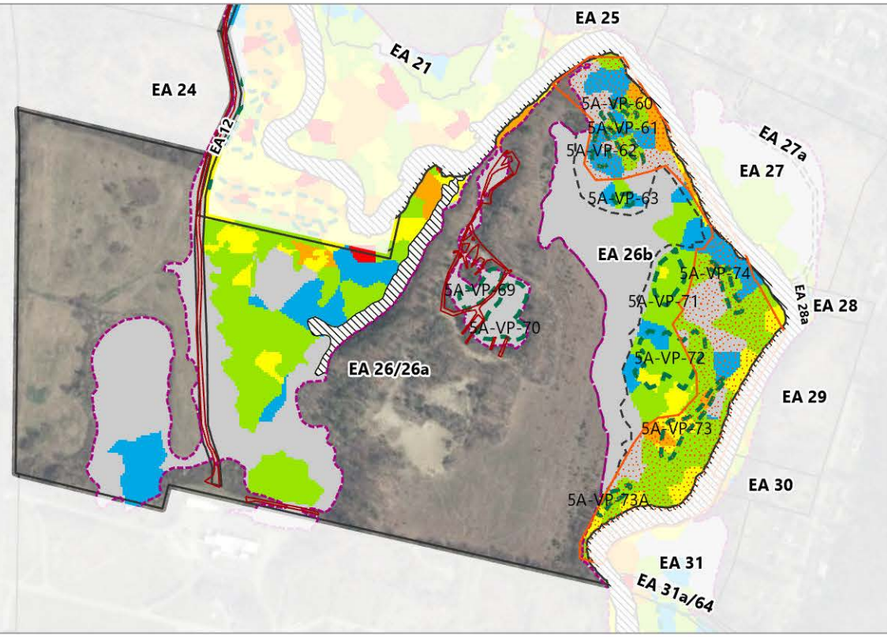




C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 600
Feet

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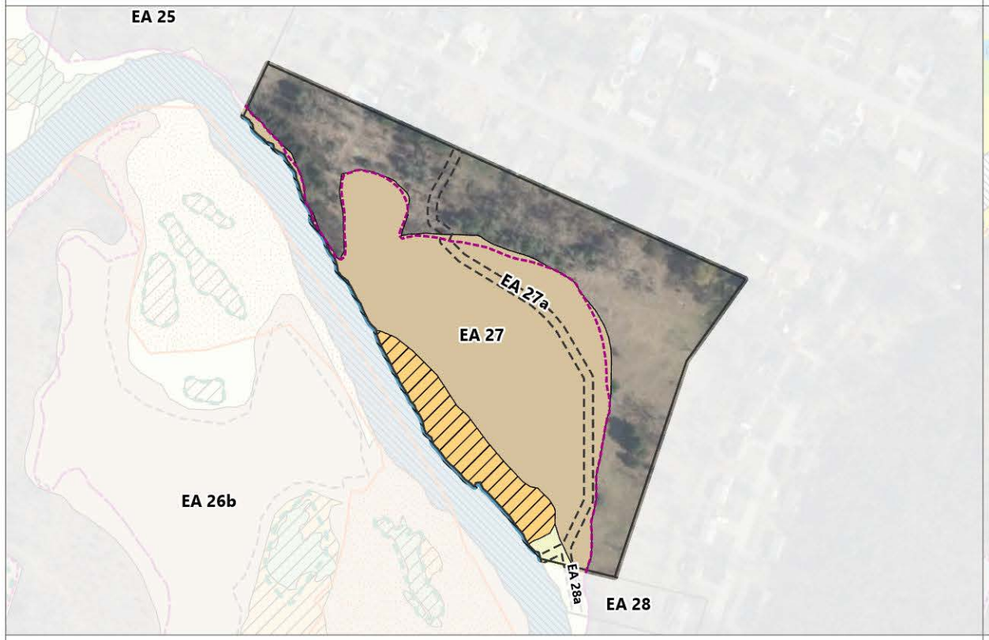
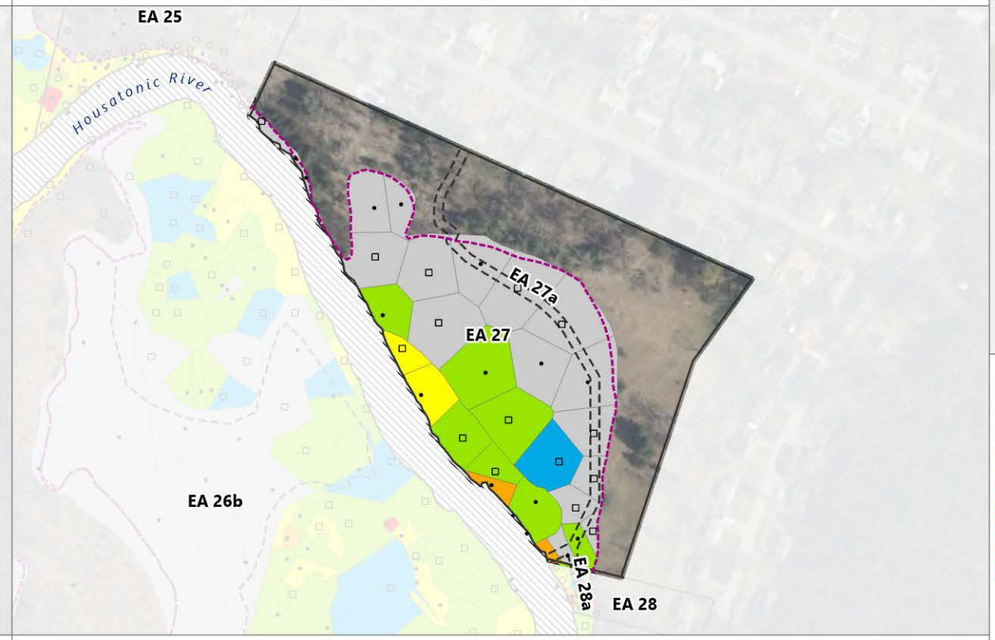
Figure 2-1q
Exposure Areas 26 and 12 (partial)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats



B) Total PCB (0 to 0.5 foot)

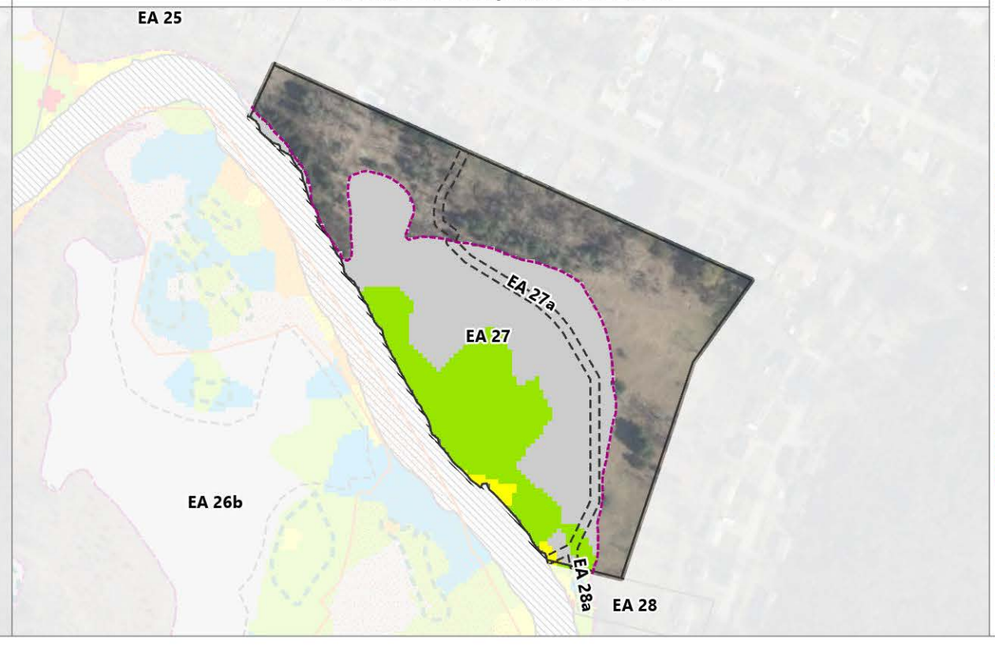




C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 300
Feet

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Figure 2-1r
Exposure Area 27
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River



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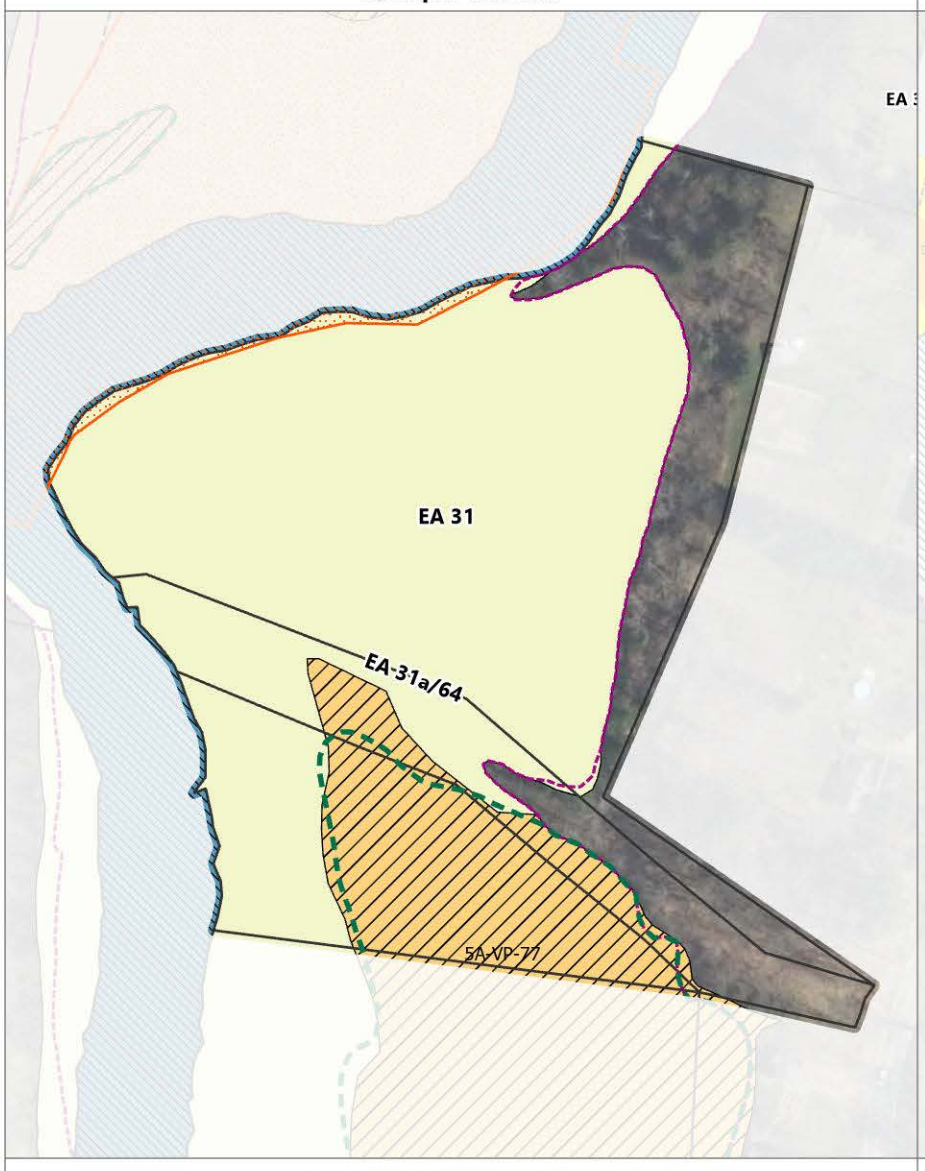
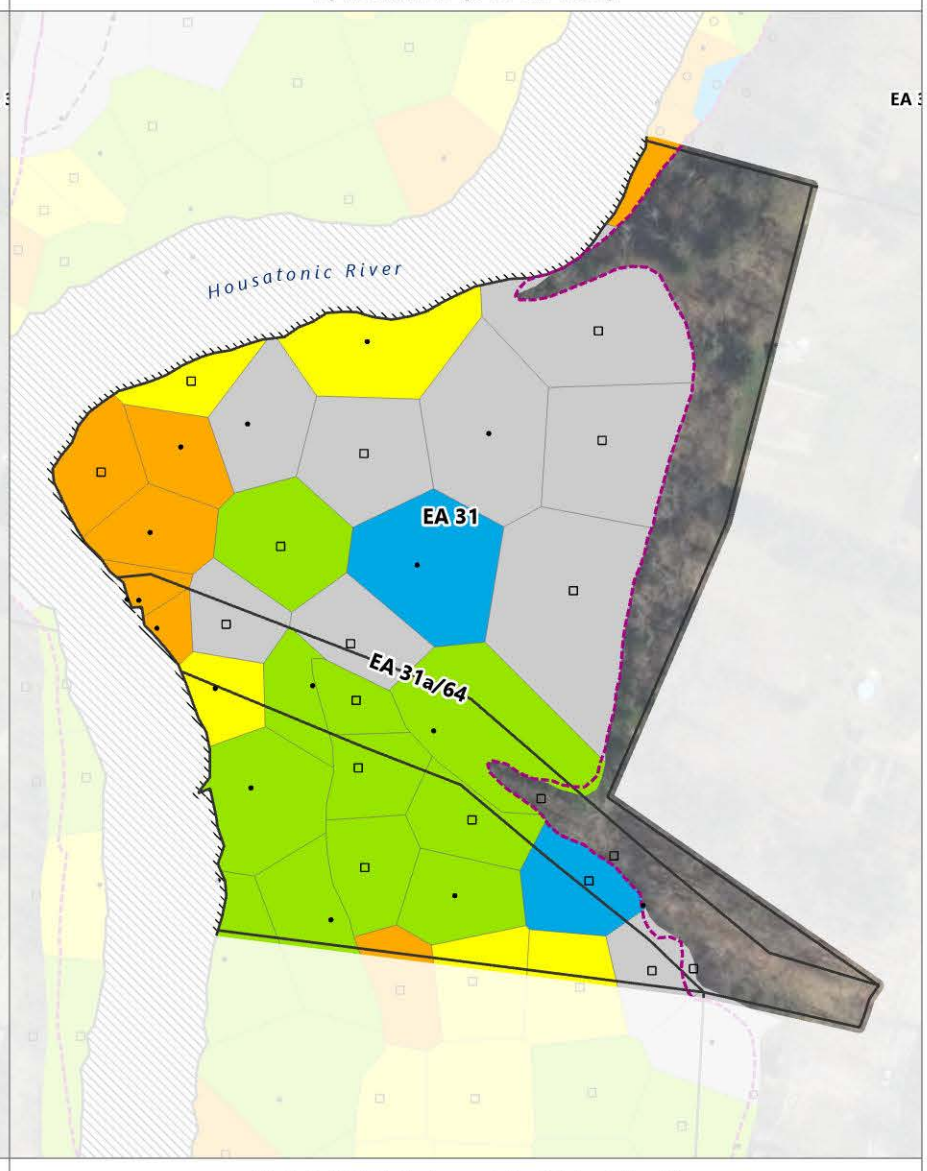
ANCHOR QEA

Figure 2-1s
Exposure Area 29
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

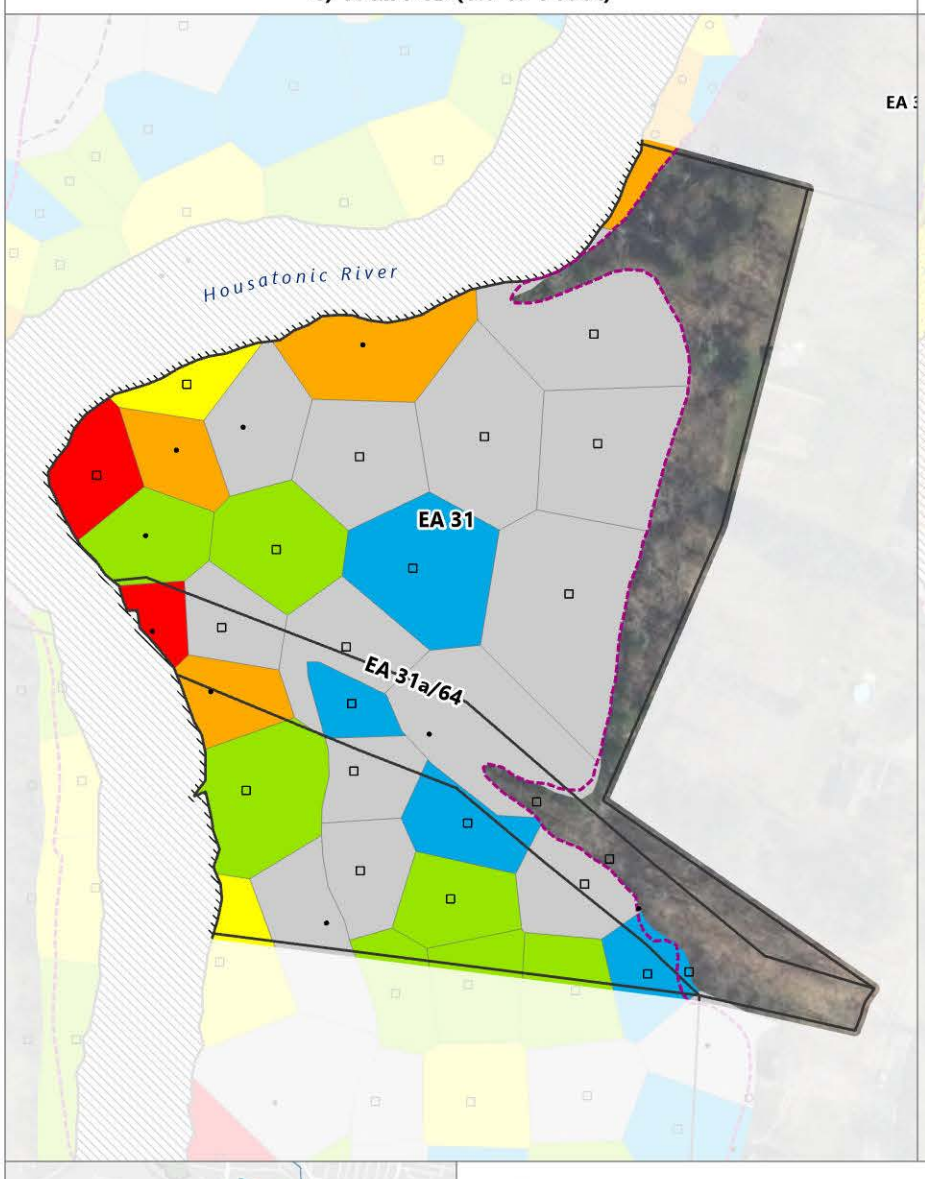
A) Super Habitats



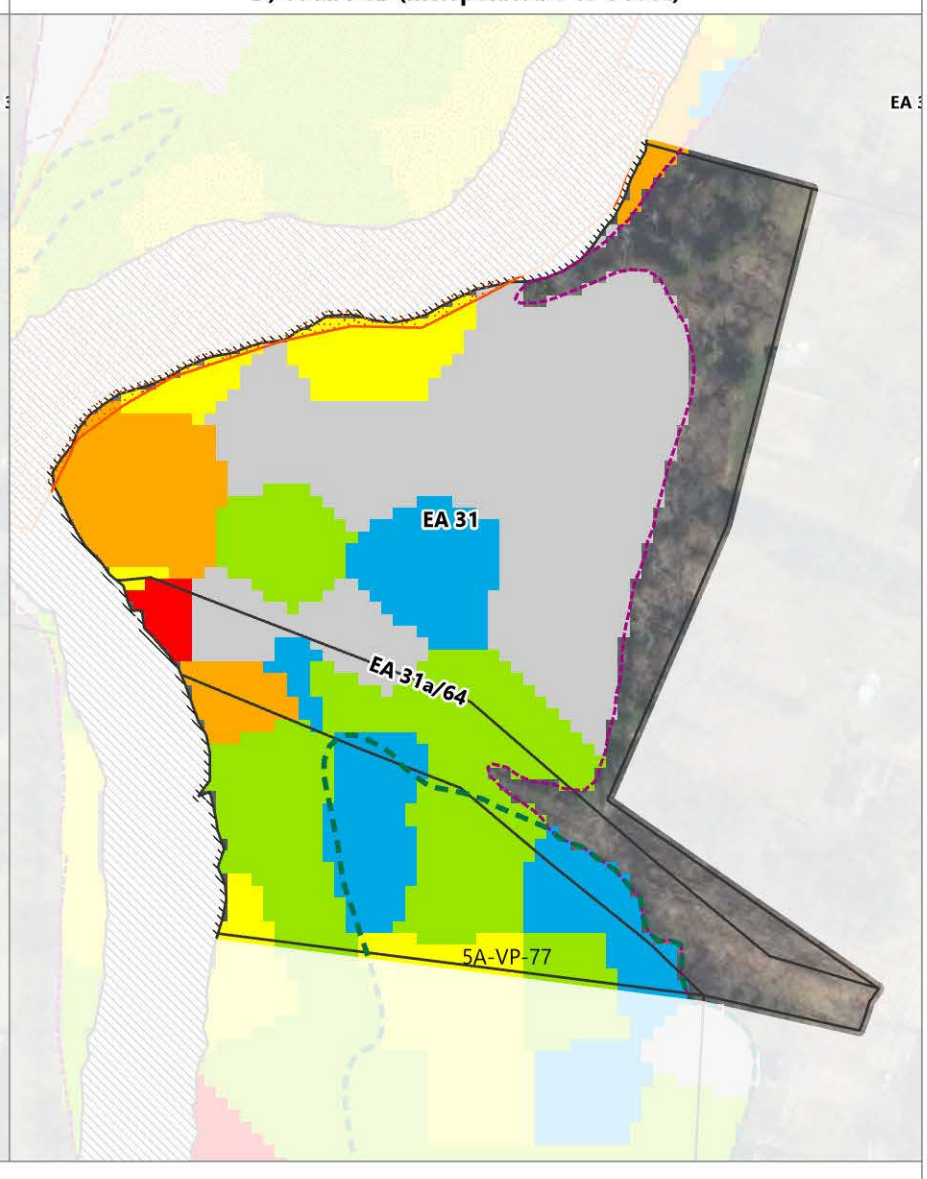
B) Total PCB (0 to 0.5 foot)



C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)





LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 150
Feet

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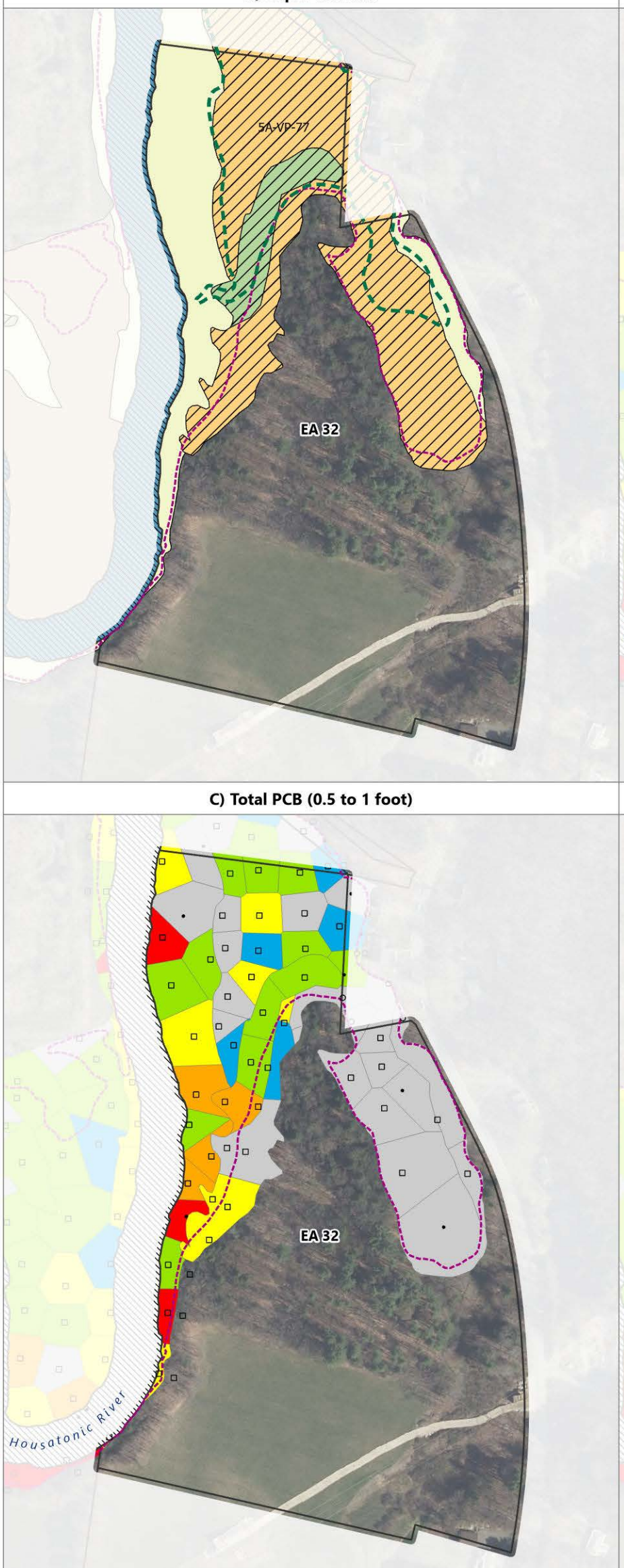
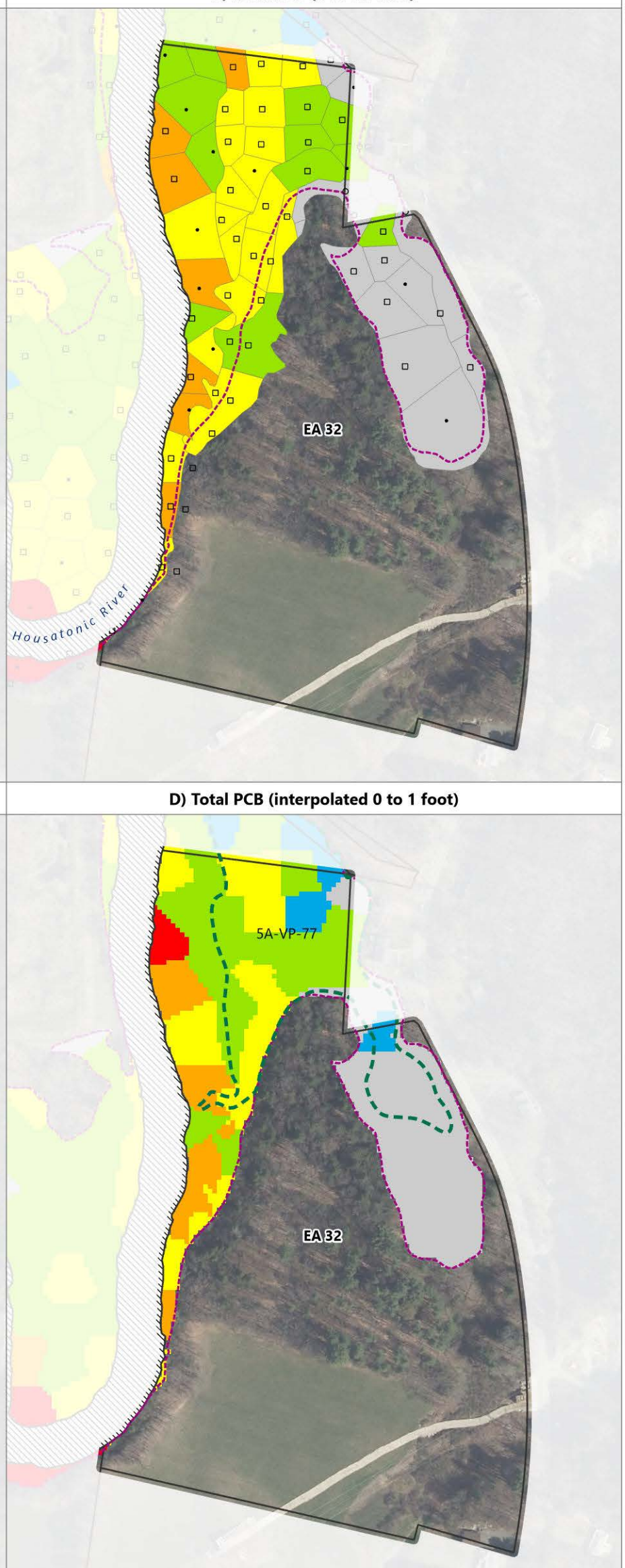
Figure 2-1t
Exposure Areas 31 and 64
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

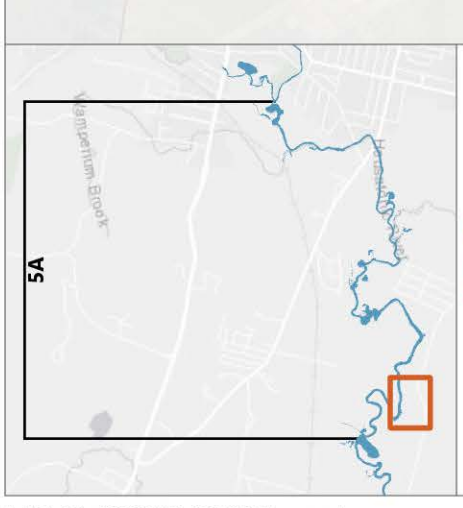


B) Total PCB (0 to 0.5 foot)



C) Total PCB (0.5 to 1 foot)

D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 260
Feet

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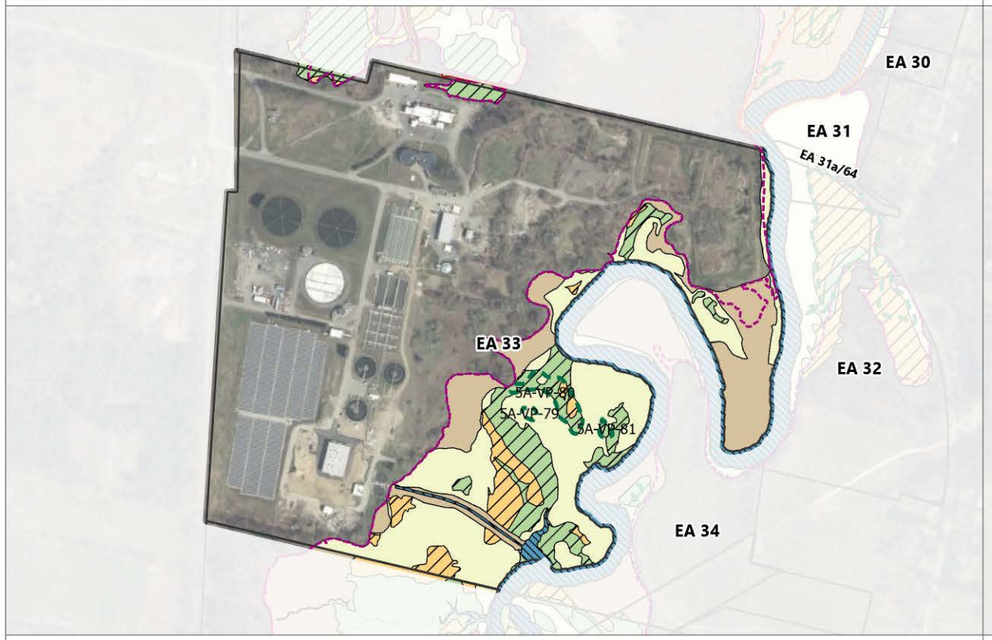
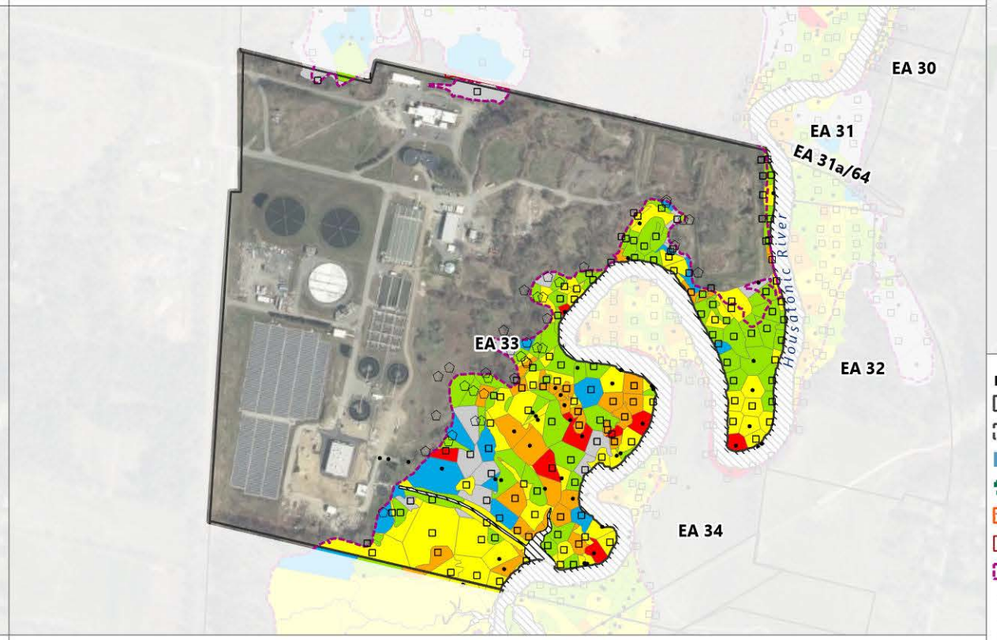
Figure 2-1u
Exposure Area 32
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

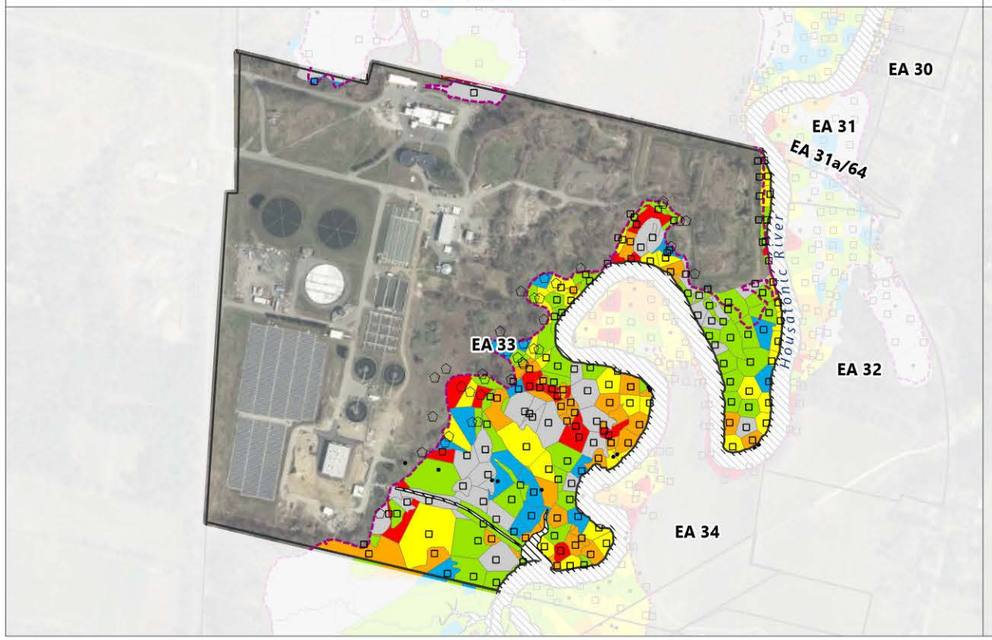


B) Total PCB (0 to 0.5 foot)

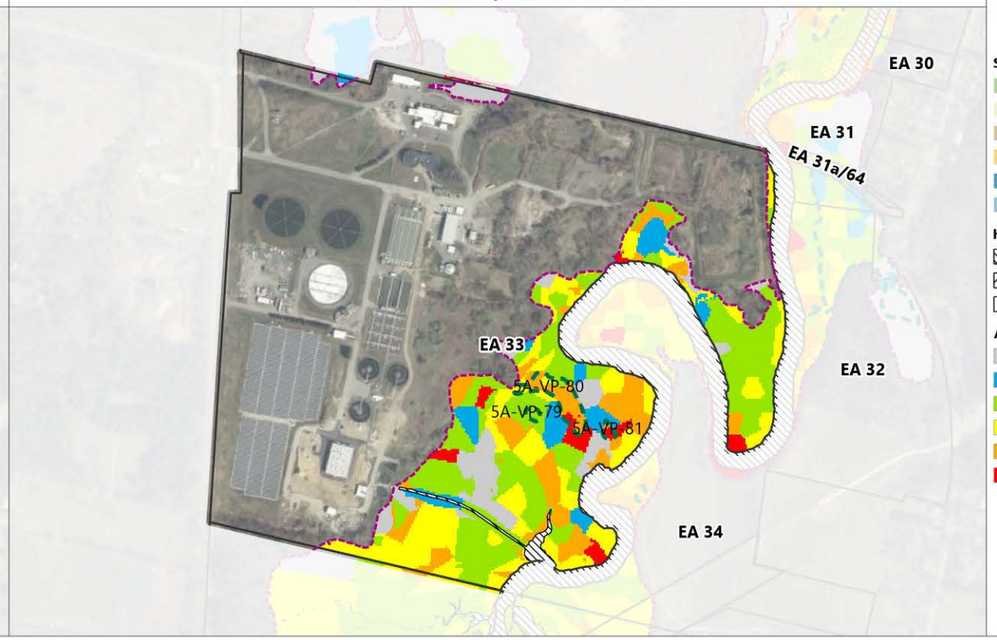




C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 700
Feet

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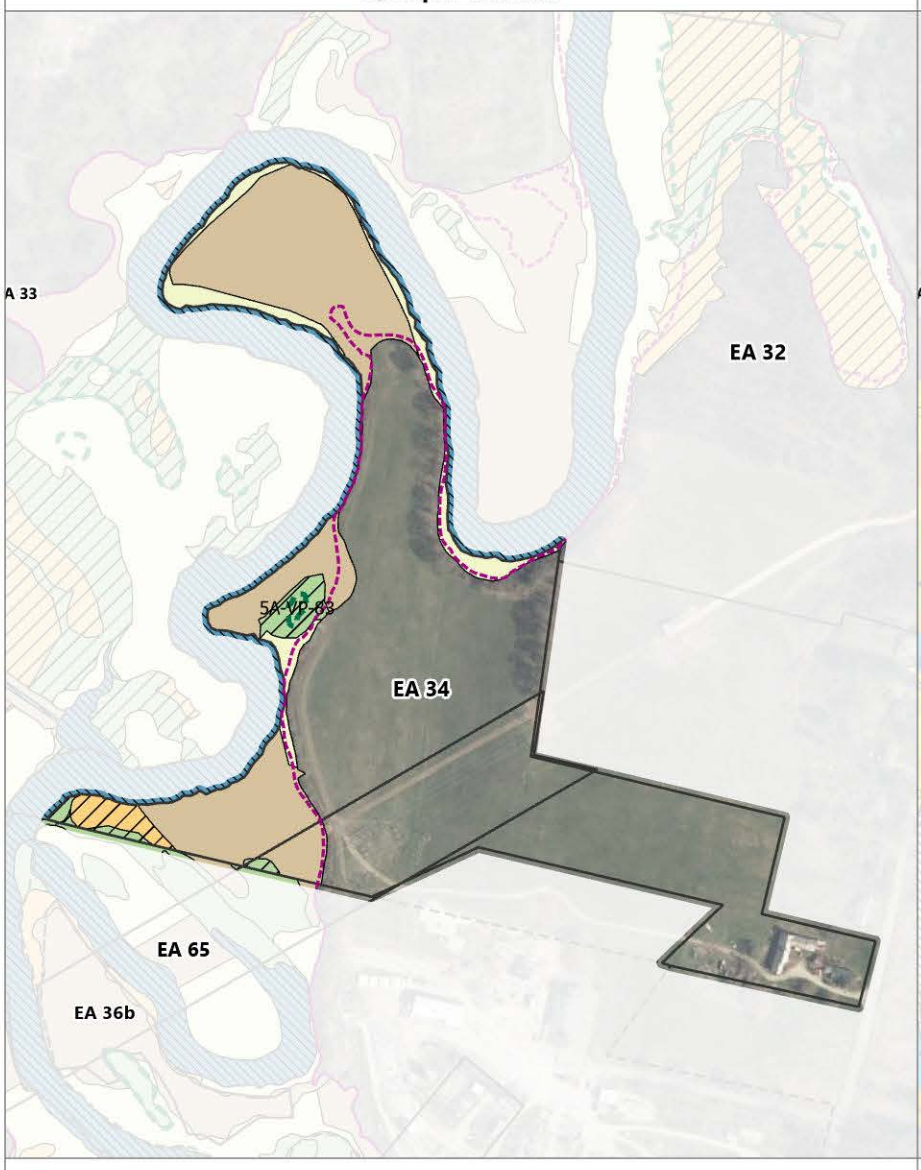
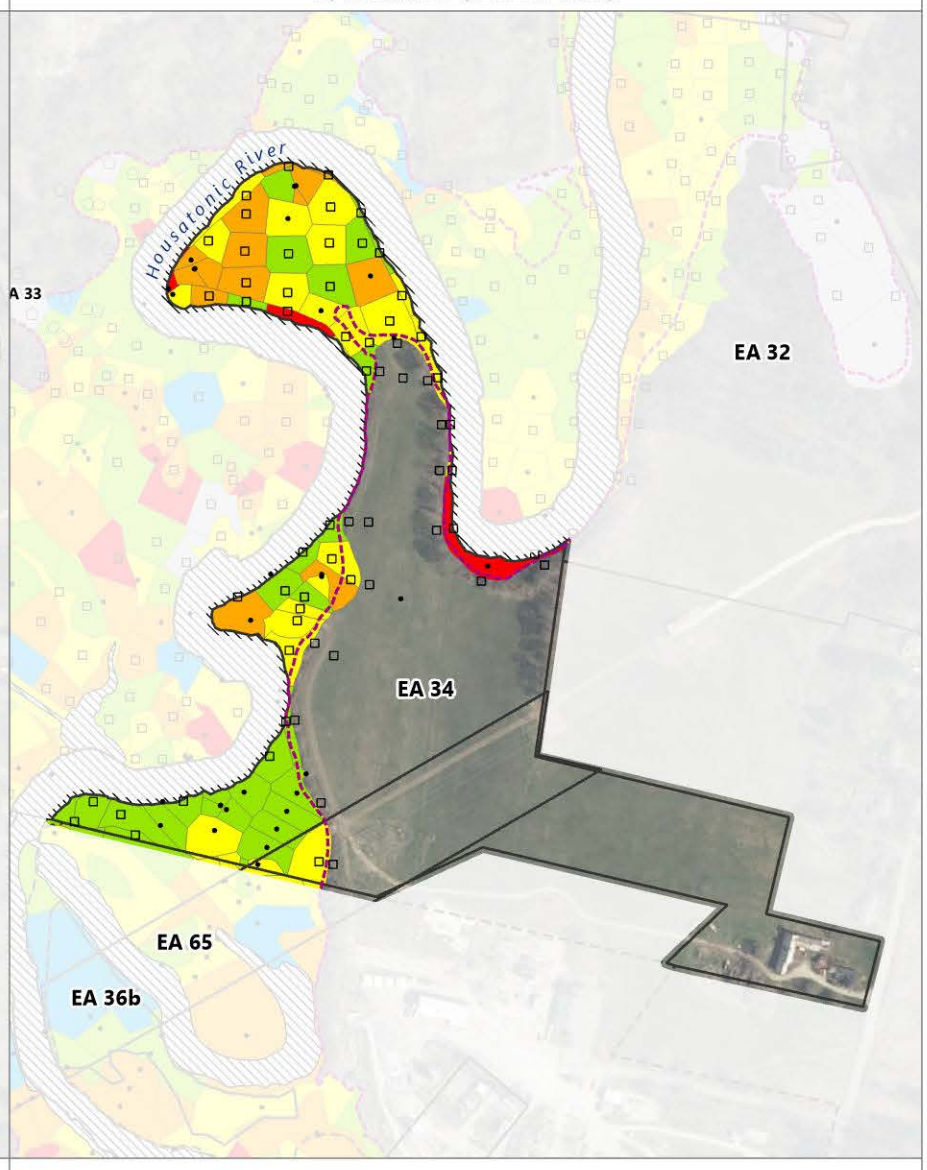
ANCHOR QEA

Figure 2-1v
Exposure Area 33
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

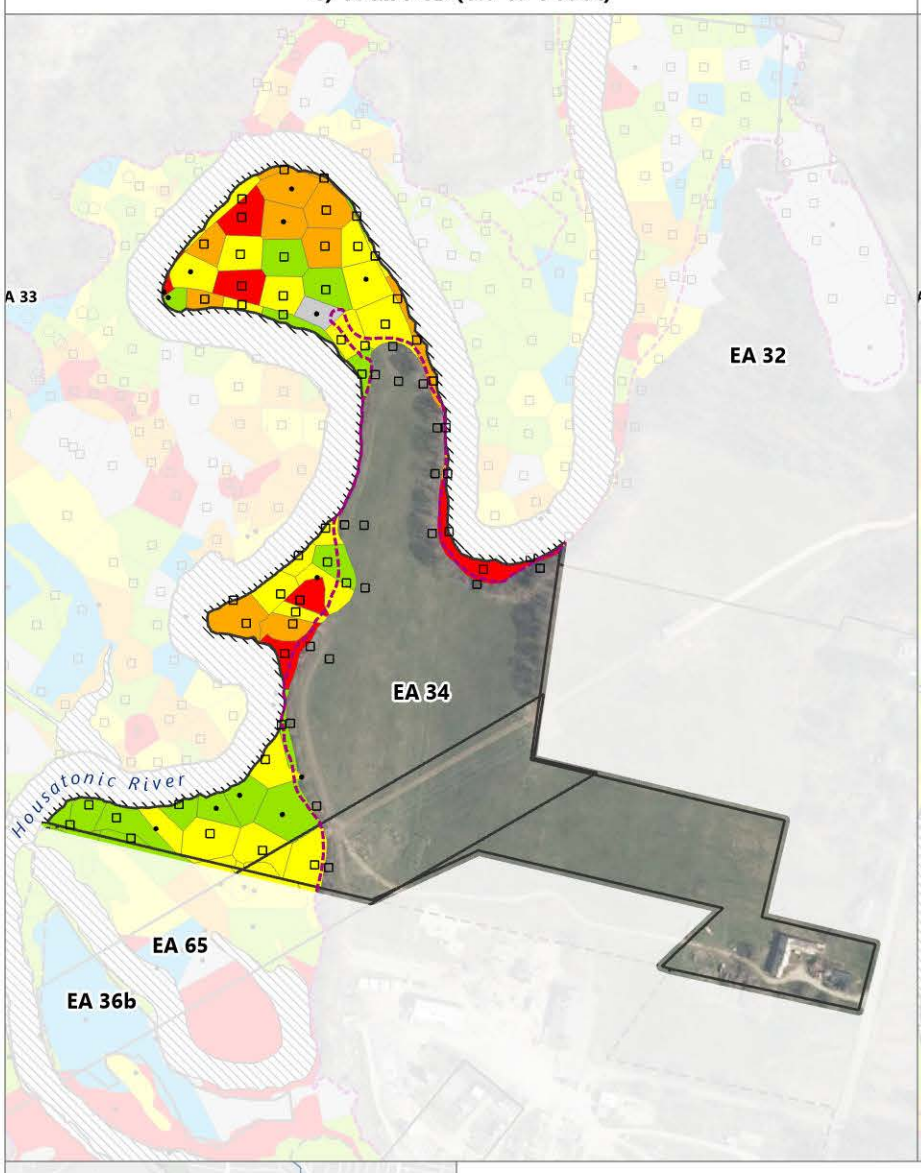
A) Super Habitats



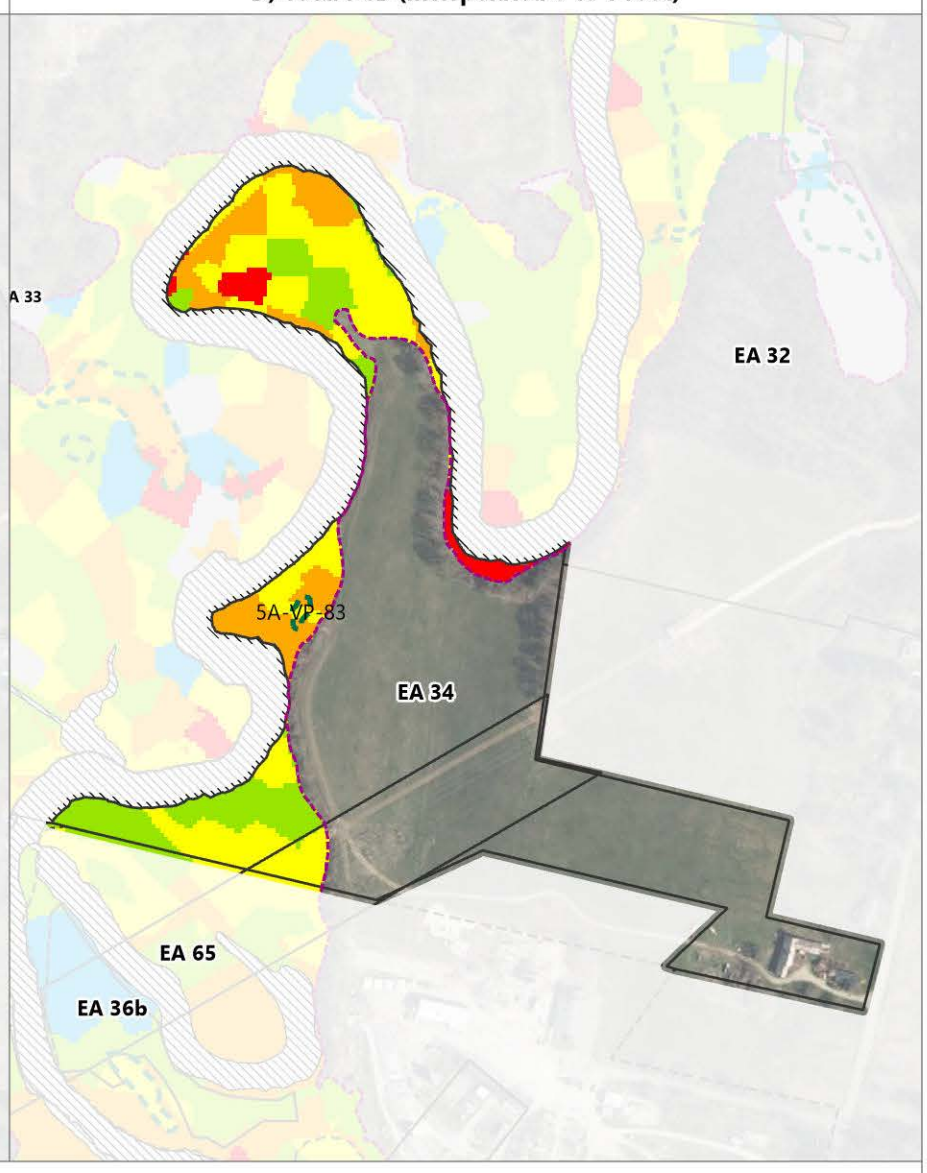
B) Total PCB (0 to 0.5 foot)



C) Total PCB (0.5 to 1 foot)



D) Total PCB (interpolated 0 to 1 foot)





LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

0 440
Feet

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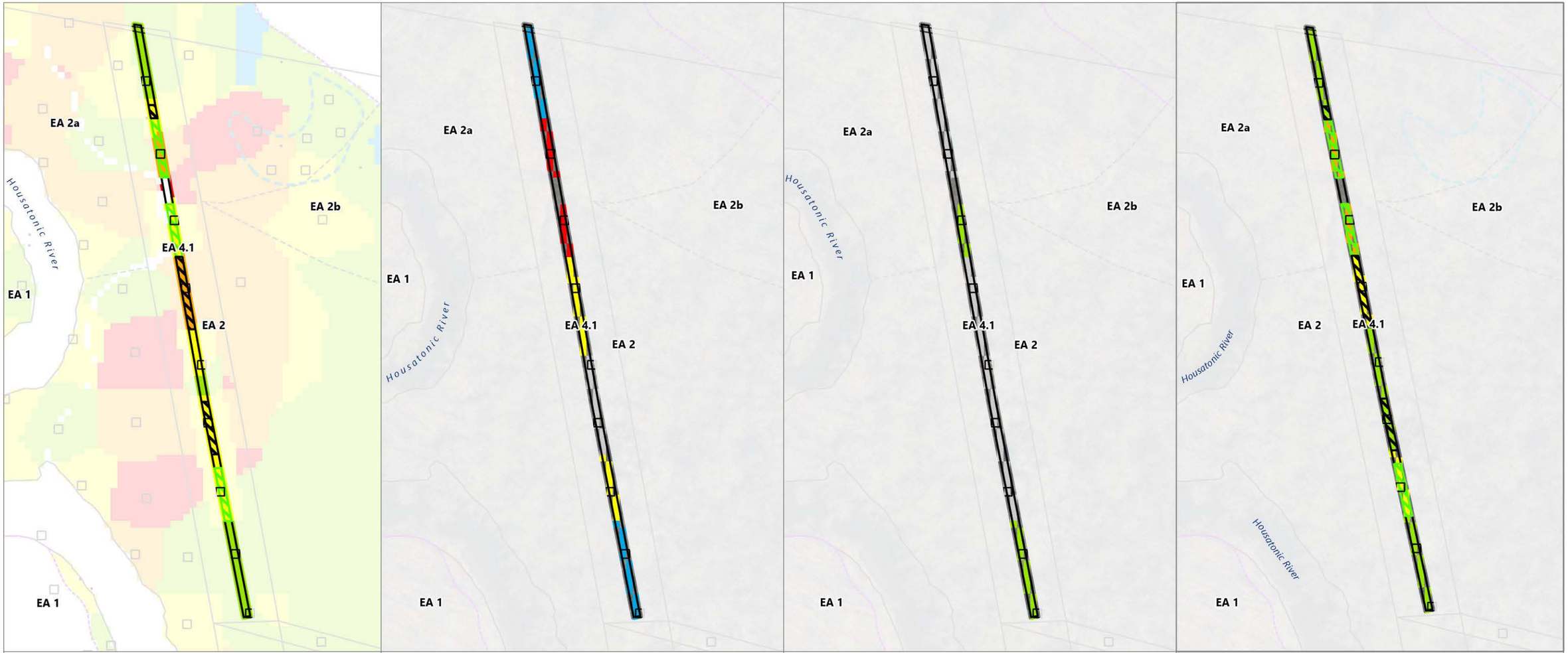
ANCHOR QEA

Figure 2-1w
Exposure Area 34
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River



Total PCB (0 to 1 foot)[1]	Total PCB (1 to 2 feet)	Total PCB (2 to 3 feet)	Total PCB (0 to 3 feet)

LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- 1 mg/kg PCB Isopleth
- Vernal Pools (AECOM 2020)
- Core Area 1 Habitat
- Walking Trails
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTES:
1. PCB concentrations represent the average concentration in the top 0 to 1 foot of soil based on 0- to 0.5-foot and 0.5- to 1-foot layers.
2. Aerial imagery from MassGIS 2021.

0 160
Feet



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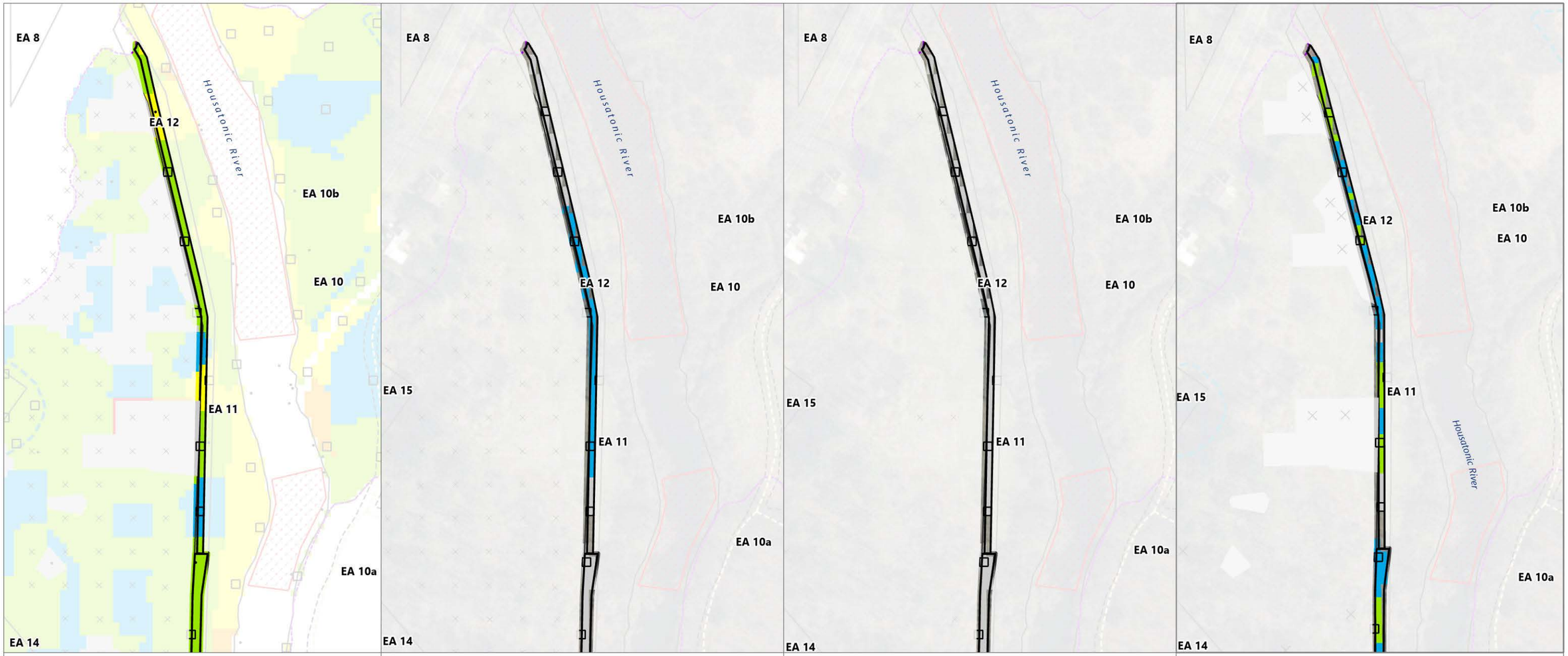
Figure 2-2a
Frequently Used Subarea (Exposure Area 4/61)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- 1 mg/kg PCB Isopleth
- Vernal Pools (AECOM 2020)
- Core Area 1 Habitat
- Walking Trails
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTES:
1. PCB concentrations represent the average concentration in the top 0 to 1 foot of soil based on 0- to 0.5-foot and 0.5- to 1-foot layers.
2. Aerial imagery from MassGIS 2021.

0 160
Feet



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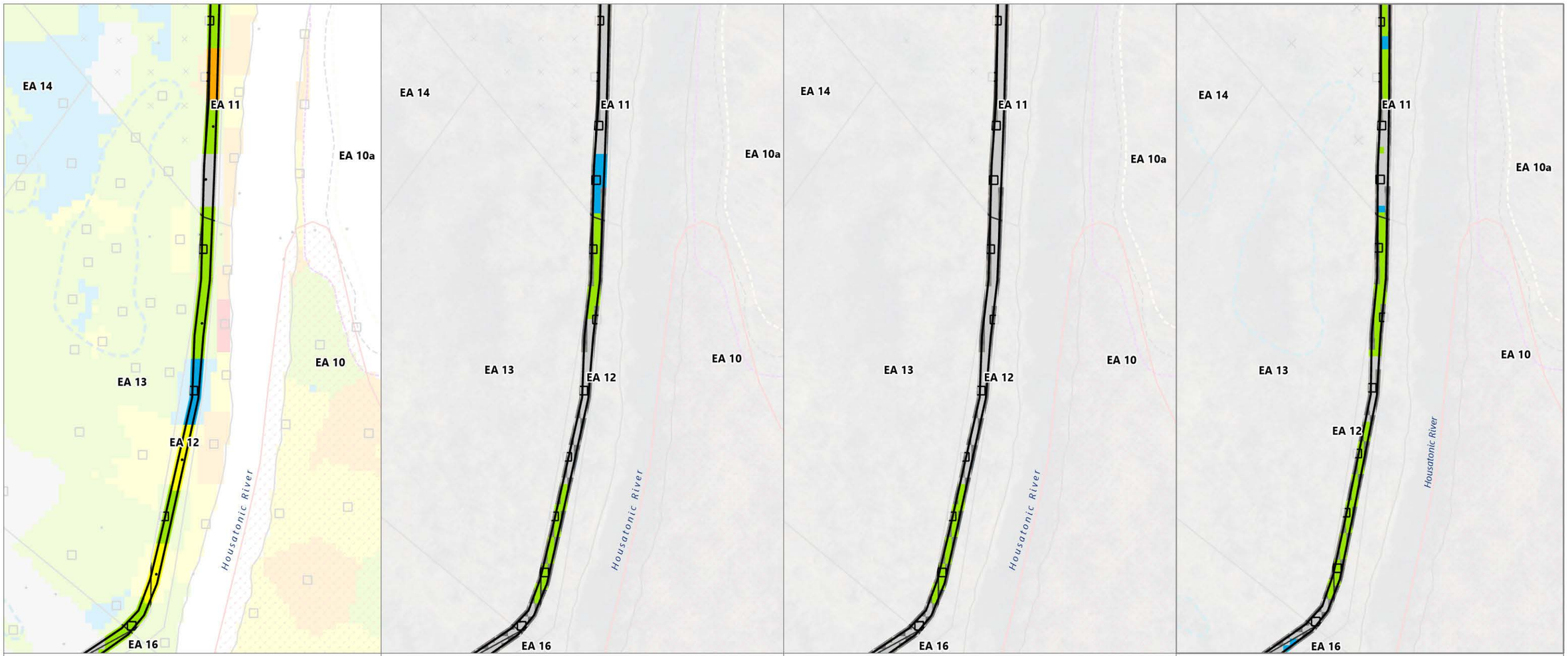
ANCHOR QEA

Figure 2-2b
Frequently Used Subarea (Exposure Area 12)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River



Total PCB (0 to 1 foot)[1] | **Total PCB (1 to 2 feet)** | **Total PCB (2 to 3 feet)** | **Total PCB (0 to 3 feet)**

LEGEND:

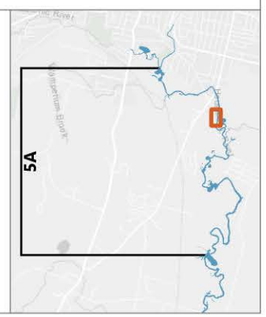
- Exposure Area Boundary
- Exposure Subarea Boundary
- 1 mg/kg PCB Isopleth
- Vernal Pools (AECOM 2020)
- Core Area 1 Habitat
- Walking Trails
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTES:
1. PCB concentrations represent the average concentration in the top 0 to 1 foot of soil based on 0- to 0.5-foot and 0.5- to 1-foot layers.
2. Aerial imagery from MassGIS 2021.

0 160
Feet



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ANCHOR QEA

Figure 2-2c
Frequently Used Subarea (Exposure Area 12)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River



Total PCB (0 to 1 foot)[1]	Total PCB (1 to 2 feet)	Total PCB (2 to 3 feet)	Total PCB (0 to 3 feet)

LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- 1 mg/kg PCB Isopleth
- Vernal Pools (AECOM 2020)
- Core Area 1 Habitat
- Walking Trails
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTES:
1. PCB concentrations represent the average concentration in the top 0 to 1 foot of soil based on 0- to 0.5-foot and 0.5- to 1-foot layers.
2. Aerial imagery from MassGIS 2021.

0 190
Feet



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Figure 2-2d
Frequently Used Subarea (Exposure Area 12)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River



Total PCB (0 to 1 foot)[1] | **Total PCB (1 to 2 feet)** | **Total PCB (2 to 3 feet)** | **Total PCB (0 to 3 feet)**

LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- 1 mg/kg PCB Isopleth
- Vernal Pools (AECOM 2020)
- Core Area 1 Habitat
- Walking Trails
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTES:
1. PCB concentrations represent the average concentration in the top 0 to 1 foot of soil based on 0- to 0.5-foot and 0.5- to 1-foot layers.
2. Aerial imagery from MassGIS 2021.

0 190
Feet



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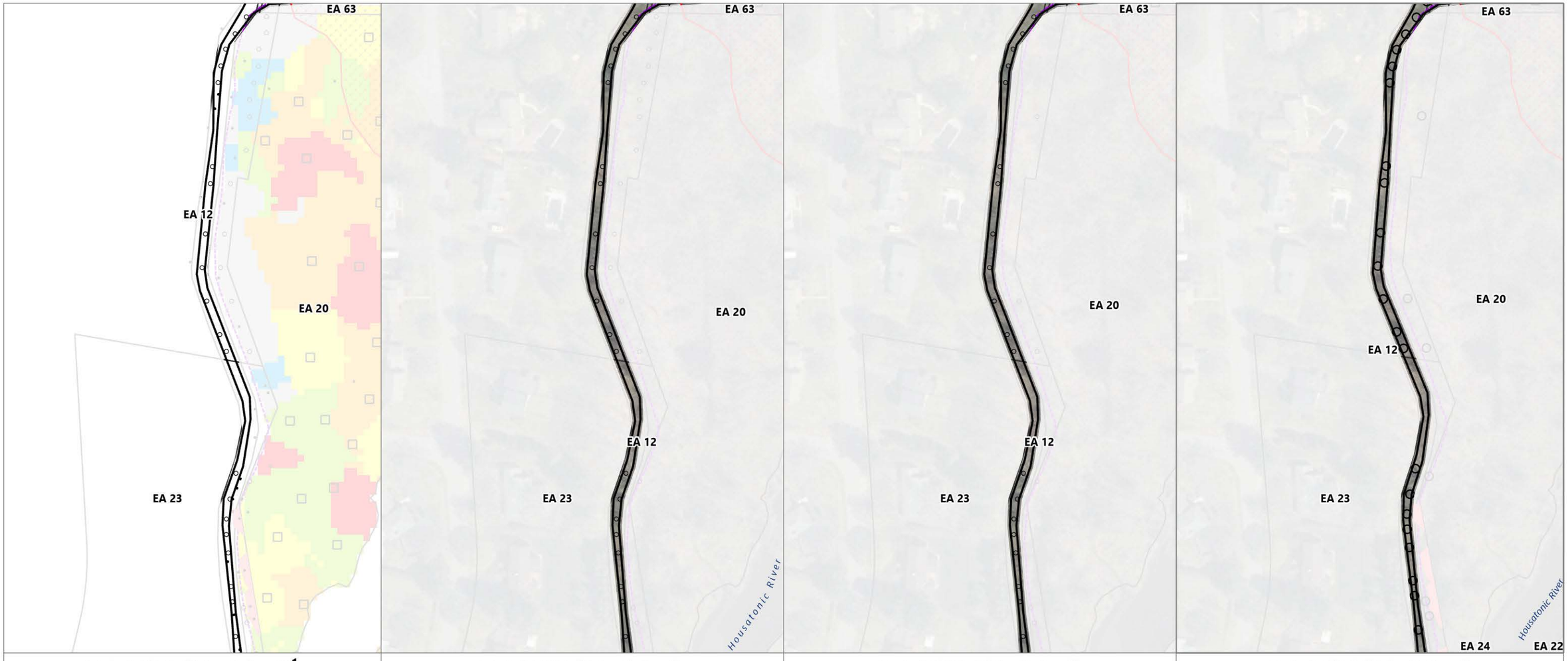
Figure 2-2e
Frequently Used Subarea (Exposure Area 12)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River



Total PCB (0 to 1 foot)[1]	Total PCB (1 to 2 feet)	Total PCB (2 to 3 feet)	Total PCB (0 to 3 feet)

LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- 1 mg/kg PCB Isopleth
- Vernal Pools (AECOM 2020)
- Core Area 1 Habitat
- Walking Trails
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTES:
1. PCB concentrations represent the average concentration in the top 0 to 1 foot of soil based on 0- to 0.5-foot and 0.5- to 1-foot layers.
2. Aerial imagery from MassGIS 2021.

0 160
Feet



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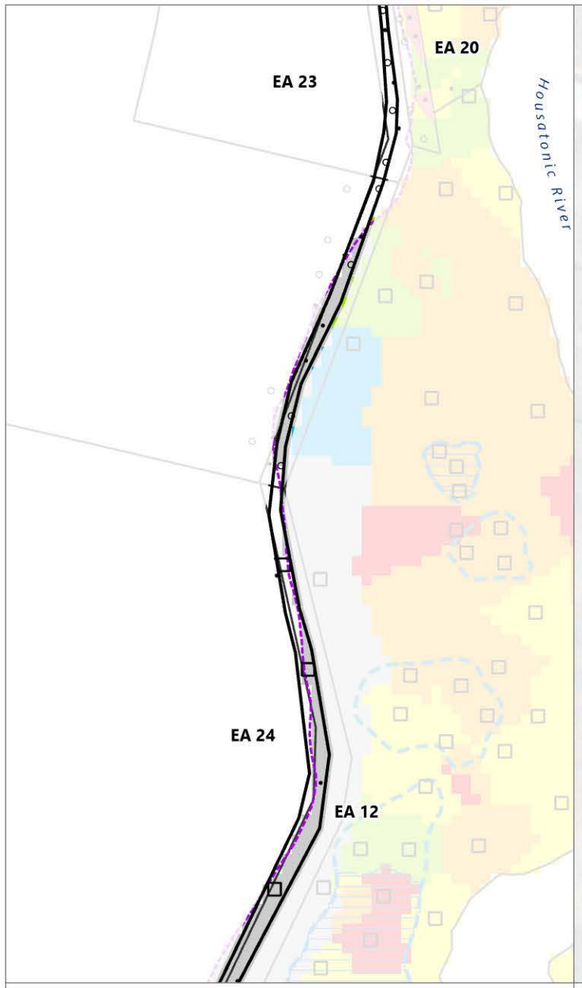
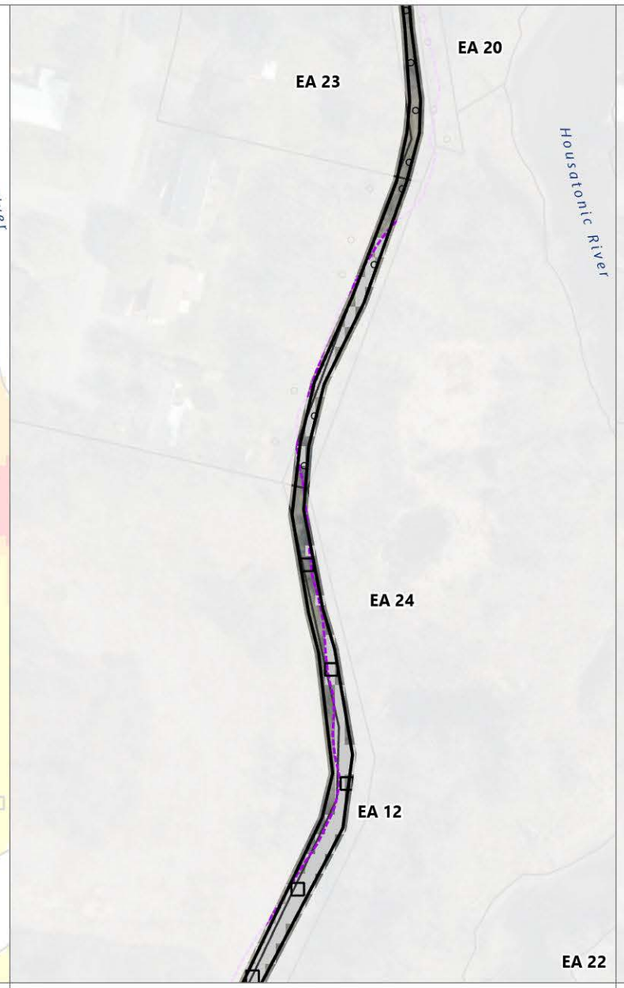
ANCHOR QEA

Figure 2-2f
Frequently Used Subarea (Exposure Area 12)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River



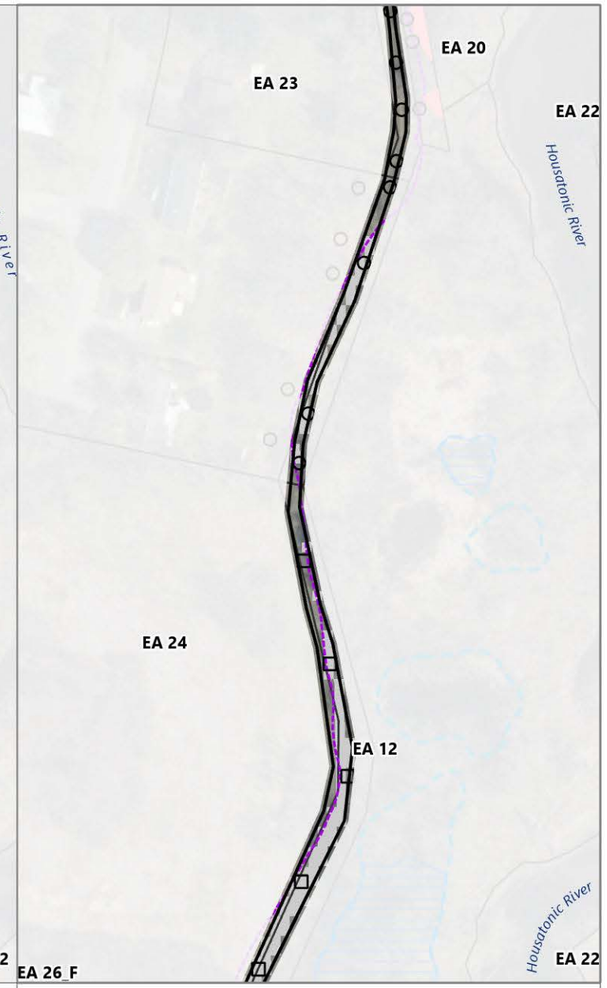
Total PCB (0 to 1 foot)[1]



Total PCB (1 to 2 feet)



Total PCB (2 to 3 feet)



Total PCB (0 to 3 feet)

LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- 1 mg/kg PCB Isopleth
- Vernal Pools (AECOM 2020)
- Core Area 1 Habitat
- Walking Trails
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTES:
1. PCB concentrations represent the average concentration in the top 0 to 1 foot of soil based on 0- to 0.5-foot and 0.5- to 1-foot layers.
2. Aerial imagery from MassGIS 2021.

0 160
Feet



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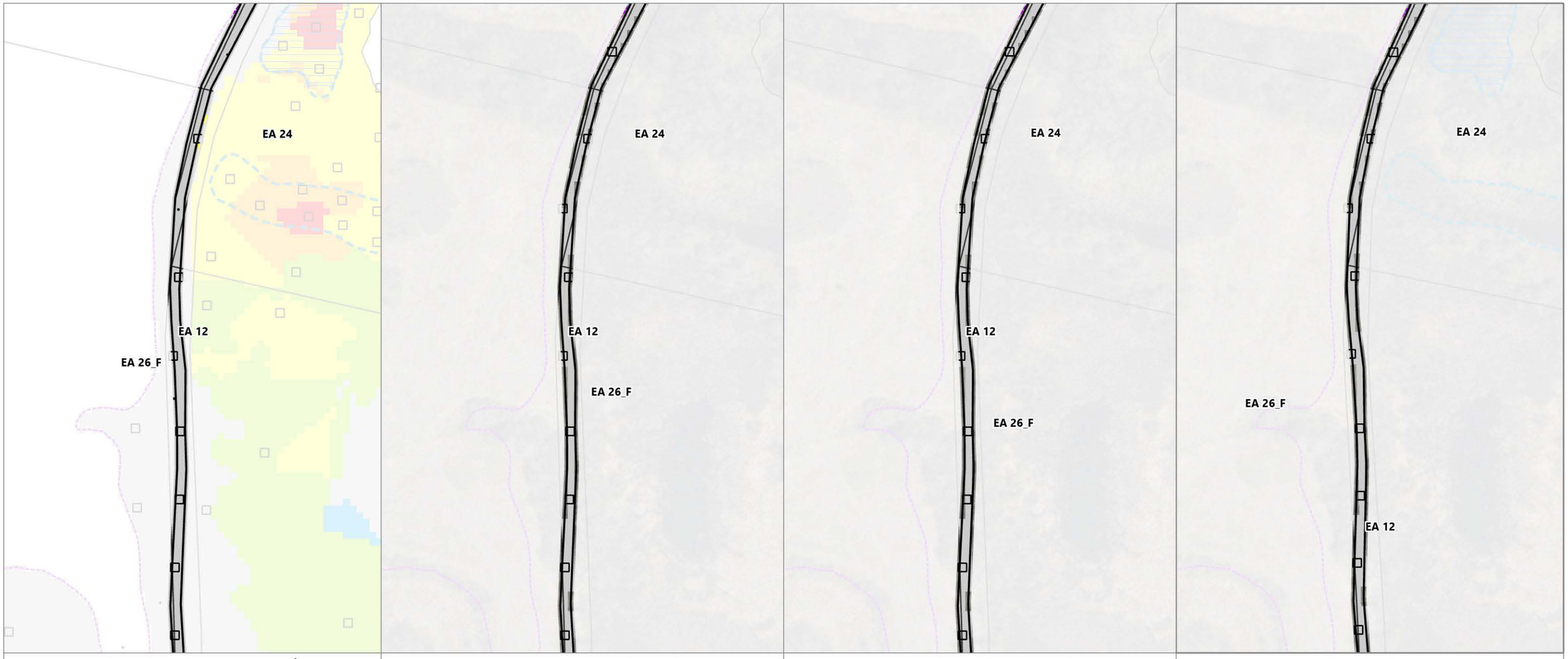
ANCHOR QEA

Figure 2-2g
Frequently Used Subarea (Exposure Area 12)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River



Total PCB (0 to 1 foot)[1] | **Total PCB (1 to 2 feet)** | **Total PCB (2 to 3 feet)** | **Total PCB (0 to 3 feet)**

LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- 1 mg/kg PCB Isopleth
- Vernal Pools (AECOM 2020)
- Core Area 1 Habitat
- Walking Trails
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTES:
1. PCB concentrations represent the average concentration in the top 0 to 1 foot of soil based on 0- to 0.5-foot and 0.5- to 1-foot layers.
2. Aerial imagery from MassGIS 2021.

0 160
Feet



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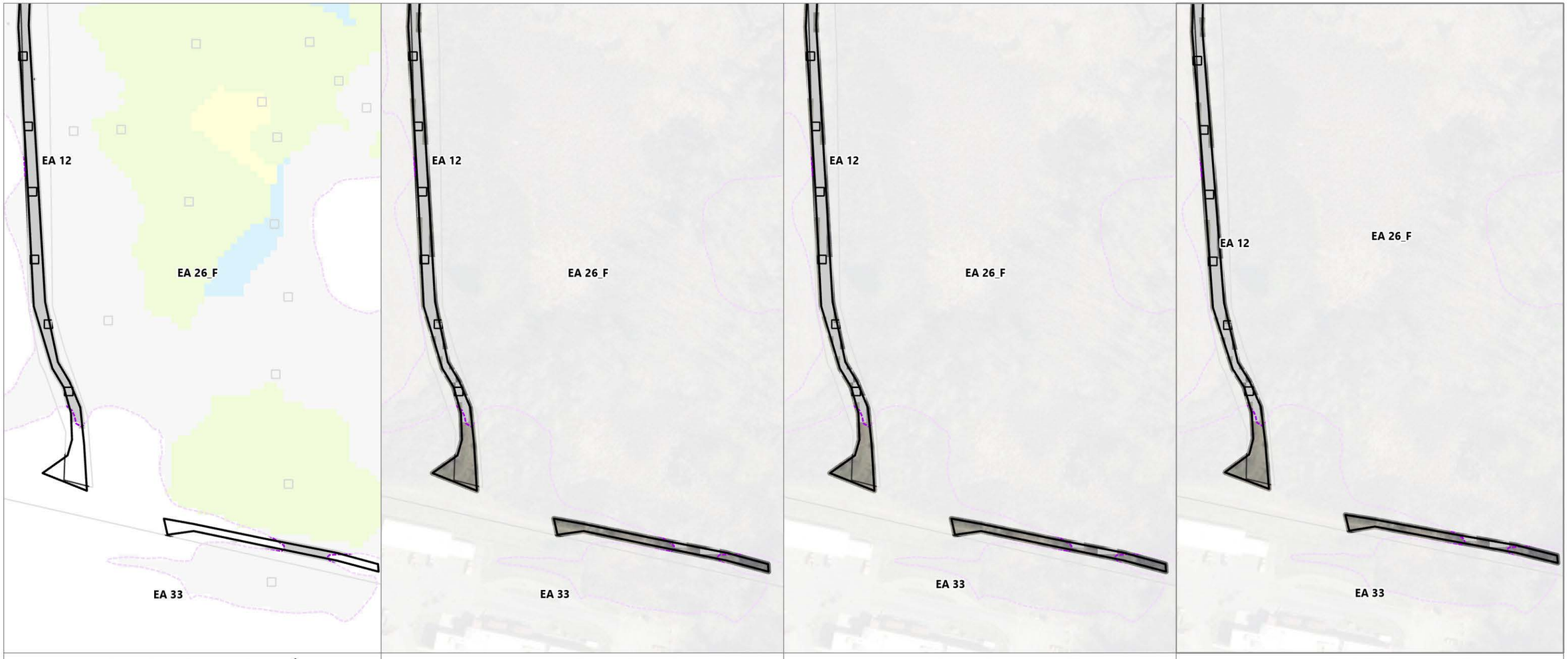
ANCHOR QEA

Figure 2-2h
Frequently Used Subarea (Exposure Area 12)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River



Total PCB (0 to 1 foot)[1] | **Total PCB (1 to 2 feet)** | **Total PCB (2 to 3 feet)** | **Total PCB (0 to 3 feet)**

LEGEND:

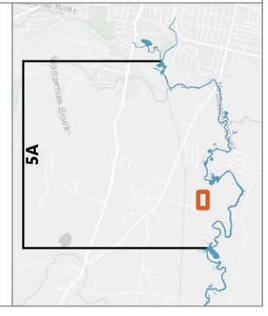
- Exposure Area Boundary
- Exposure Subarea Boundary
- 1 mg/kg PCB Isopleth
- Vernal Pools (AECOM 2020)
- Core Area 1 Habitat
- Walking Trails
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTES:
1. PCB concentrations represent the average concentration in the top 0 to 1 foot of soil based on 0- to 0.5-foot and 0.5- to 1-foot layers.
2. Aerial imagery from MassGIS 2021.

0 160
Feet



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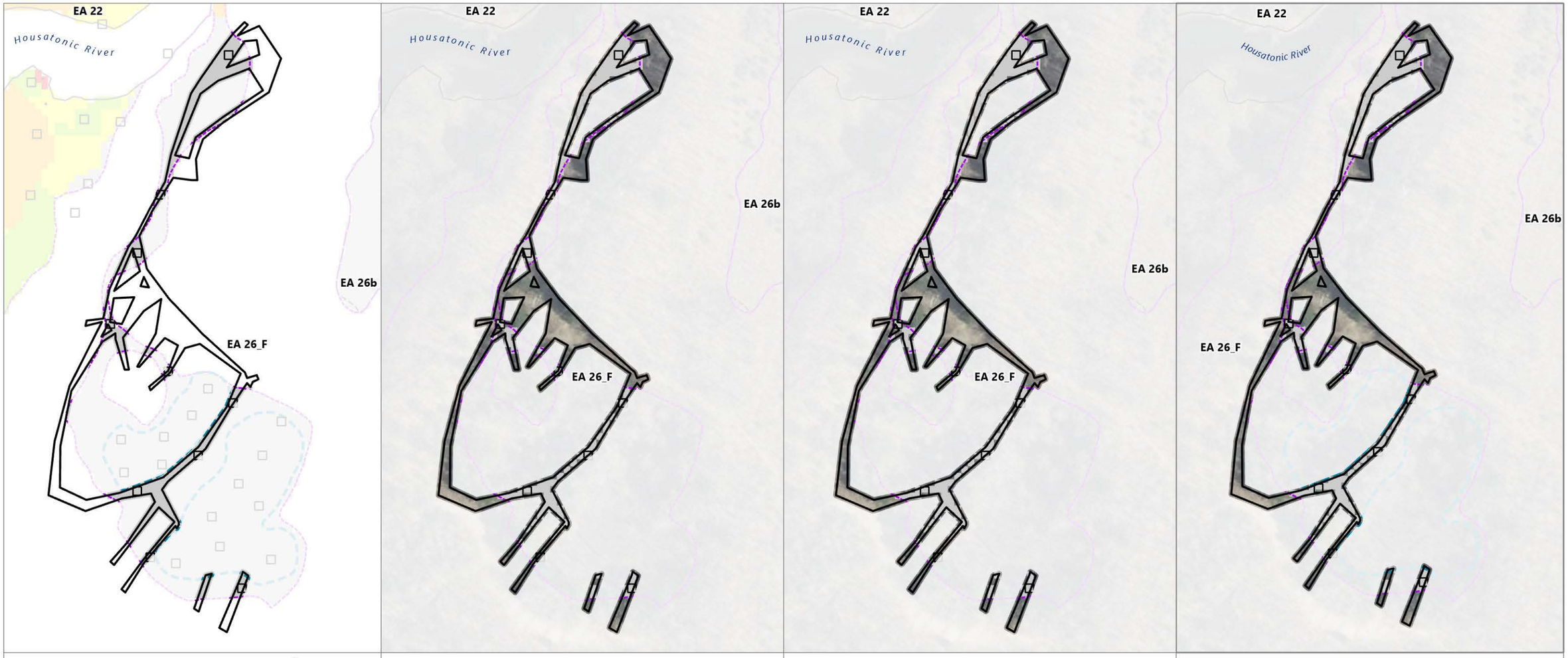
ANCHOR QEA

Figure 2-2i
Frequently Used Subarea (Exposure Area 12)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River



Total PCB (0 to 1 foot)[1]	Total PCB (1 to 2 feet)	Total PCB (2 to 3 feet)	Total PCB (0 to 3 feet)

LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- 1 mg/kg PCB Isopleth
- Vernal Pools (AECOM 2020)
- Core Area 1 Habitat
- Walking Trails
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

NOTES:
1. PCB concentrations represent the average concentration in the top 0 to 1 foot of soil based on 0- to 0.5-foot and 0.5- to 1-foot layers.
2. Aerial imagery from MassGIS 2021.

0 160
Feet

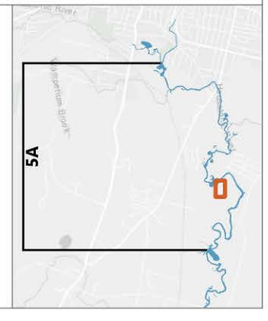


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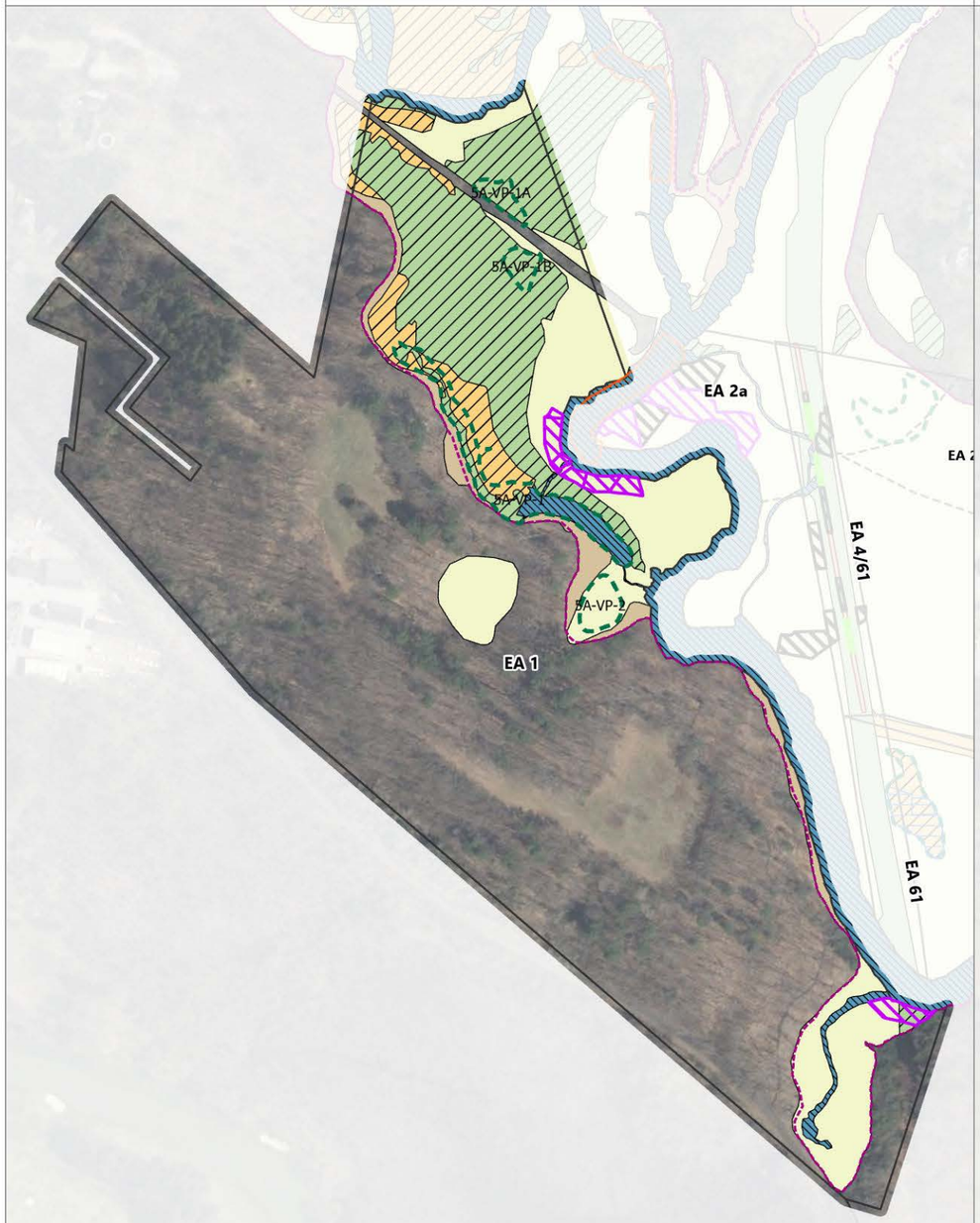
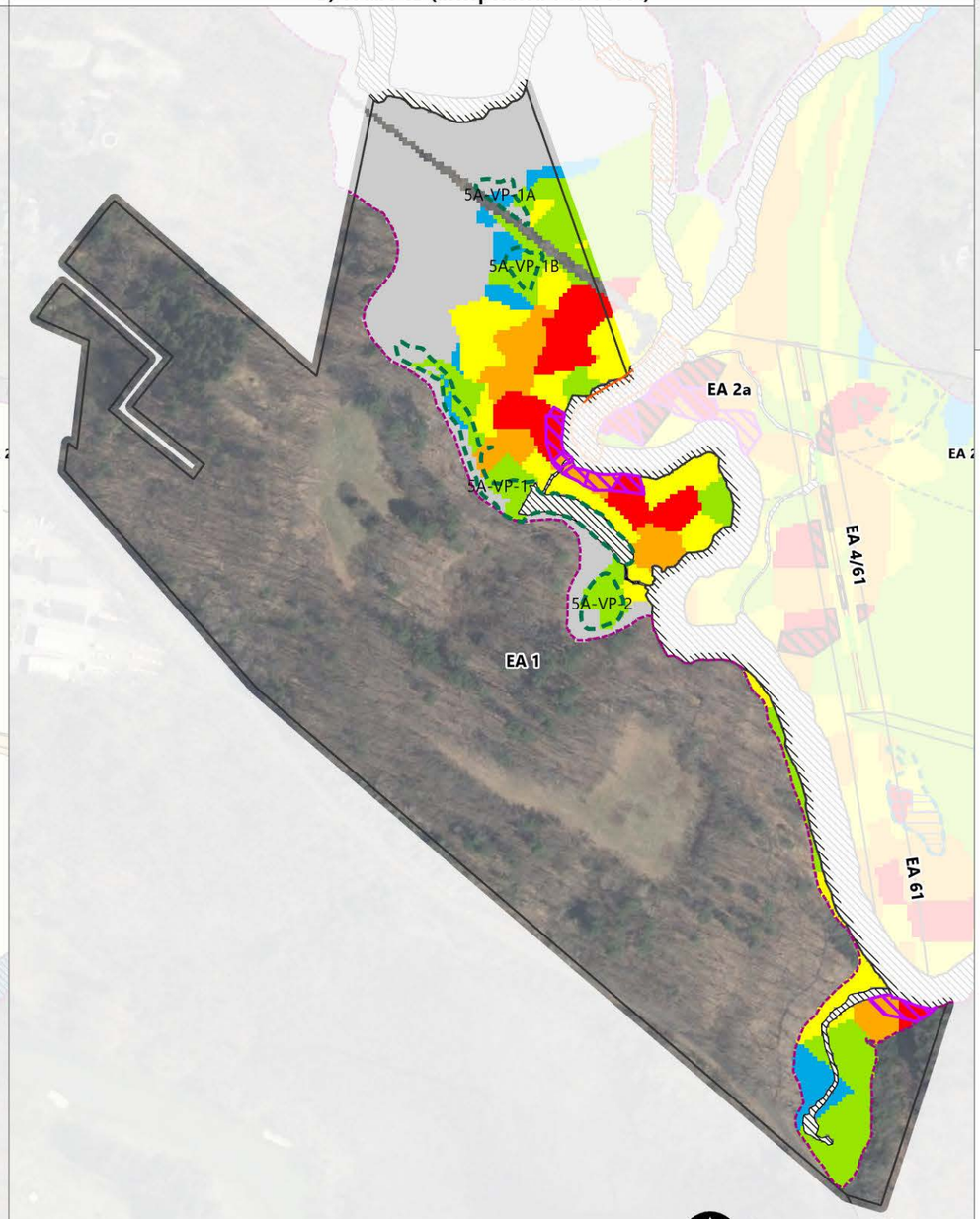
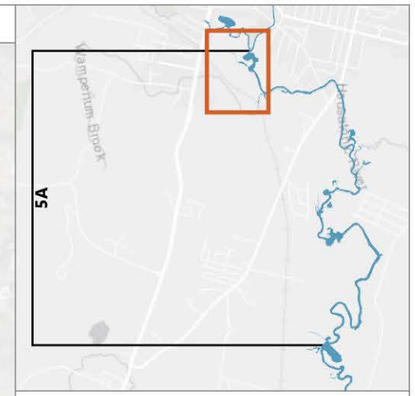
Figure 2-2j
Frequently Used Subarea (Exposure Area 26a)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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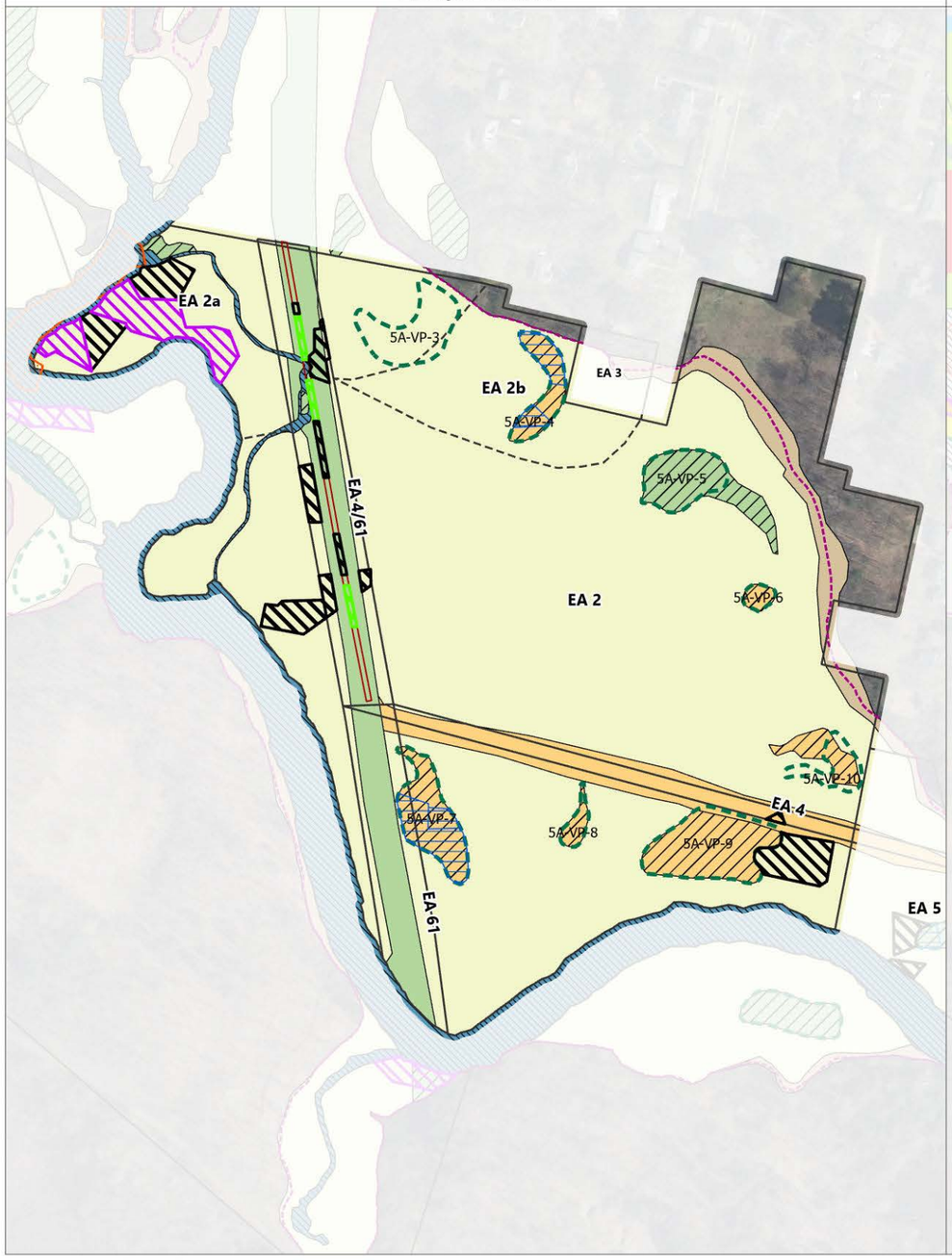
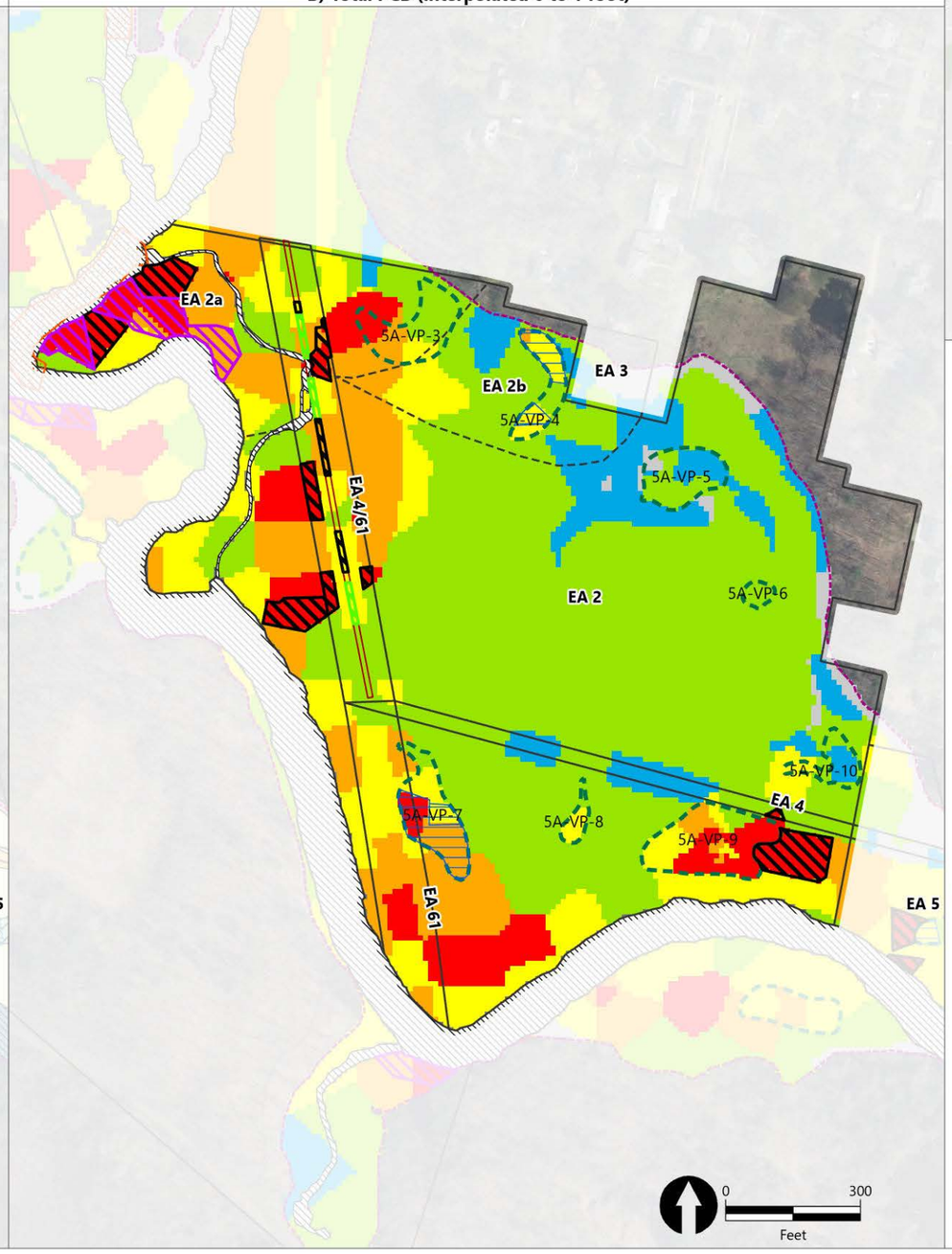
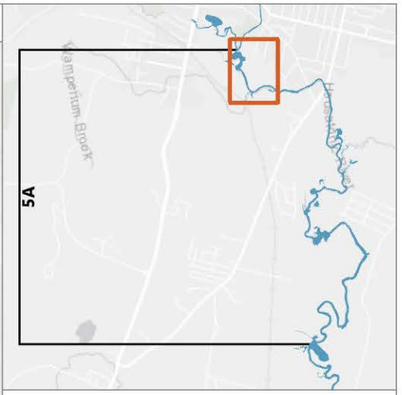
Figure 5-1a
Non-Residential Floodplain Remediation Areas (Exposure Area 1)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:
- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)
- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access
- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)
- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas
- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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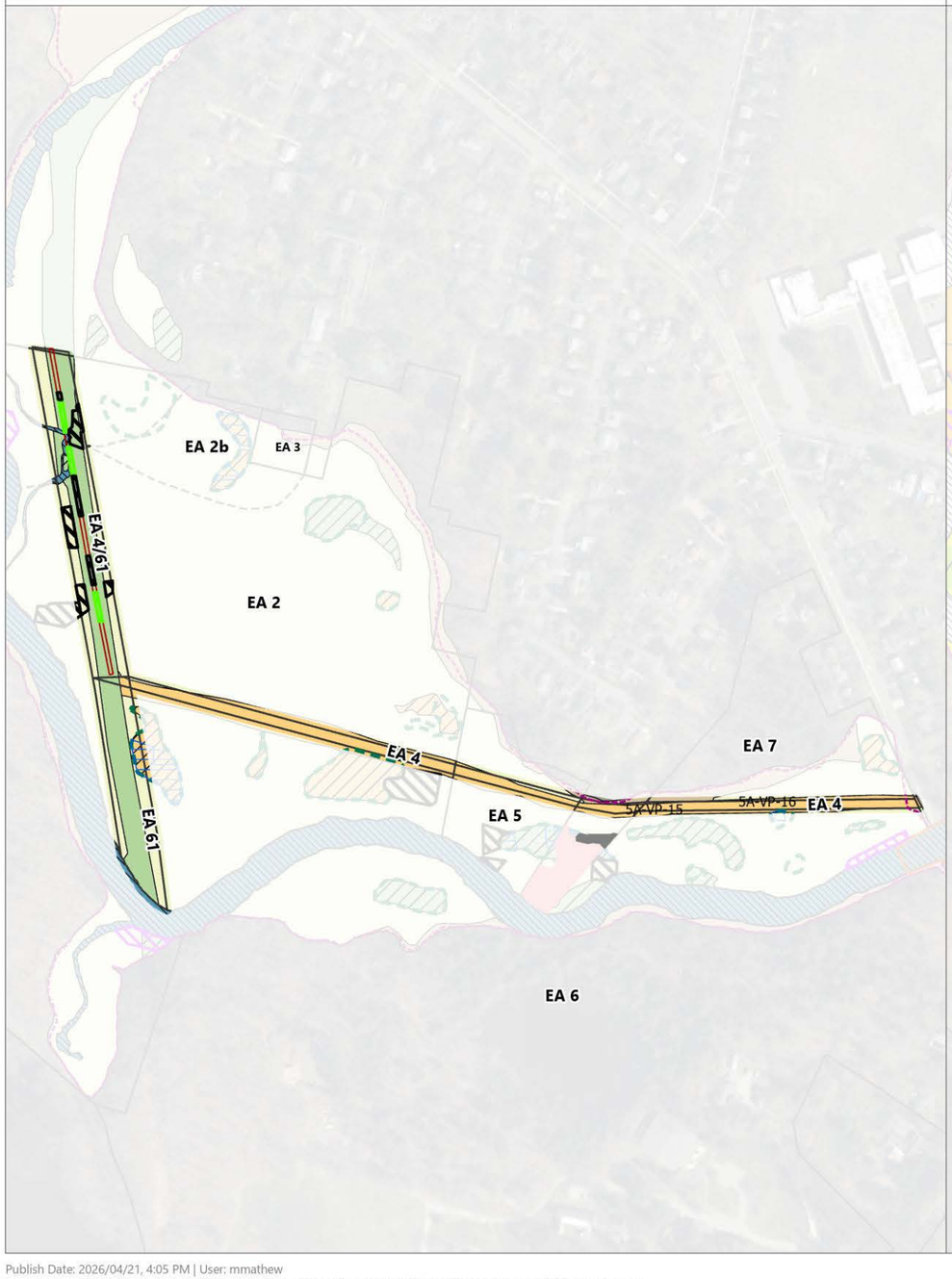
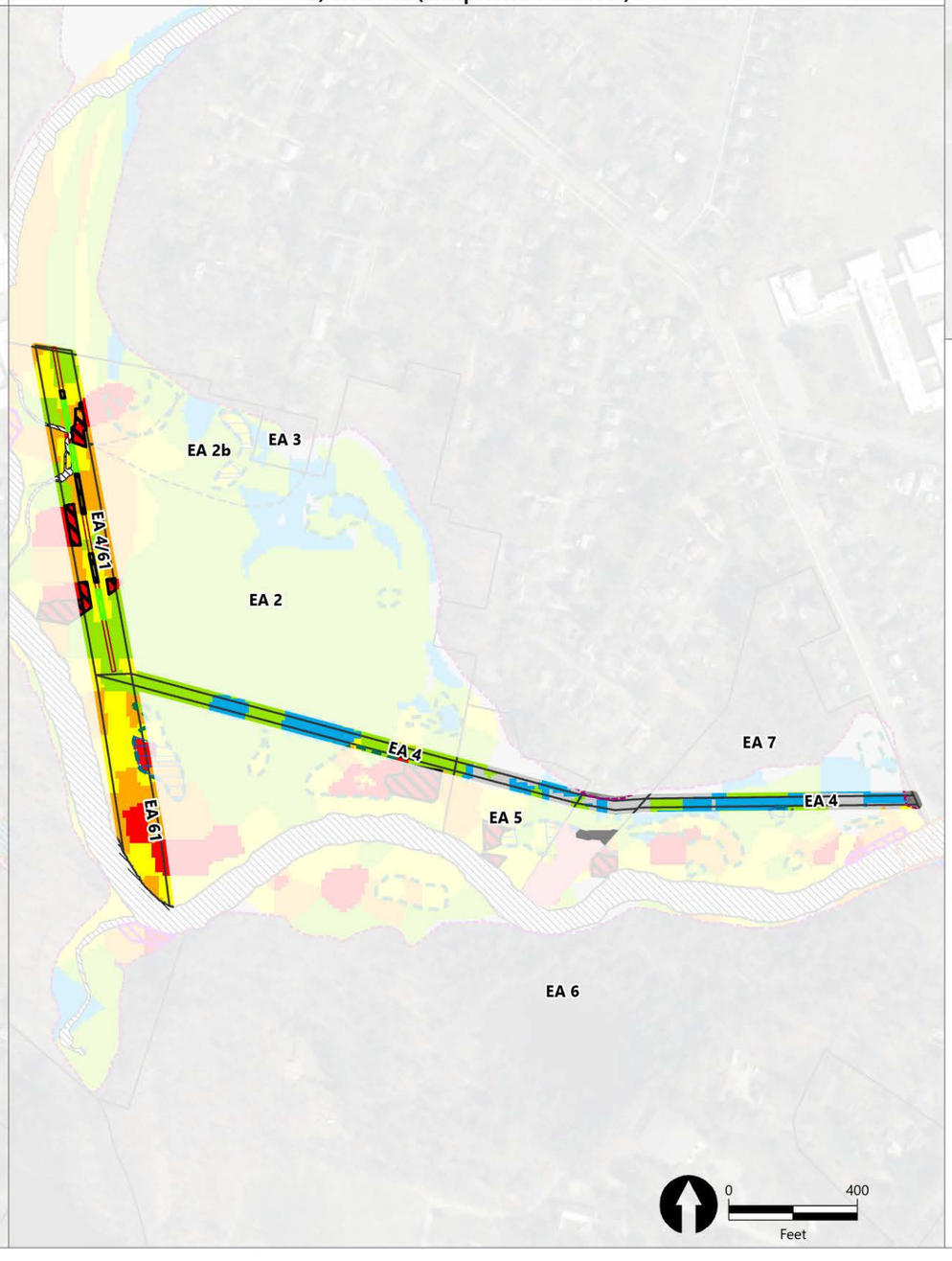
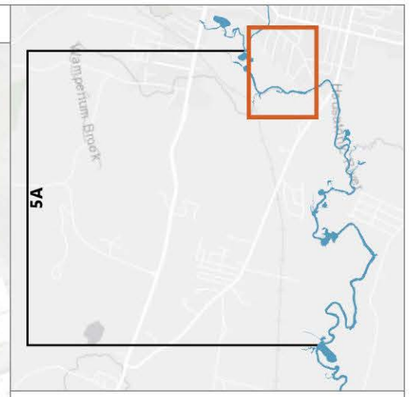
Figure 5-1b
Non-Residential Floodplain Remediation Areas (Exposure Area 2)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:
- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)
- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access
- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)
- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas
- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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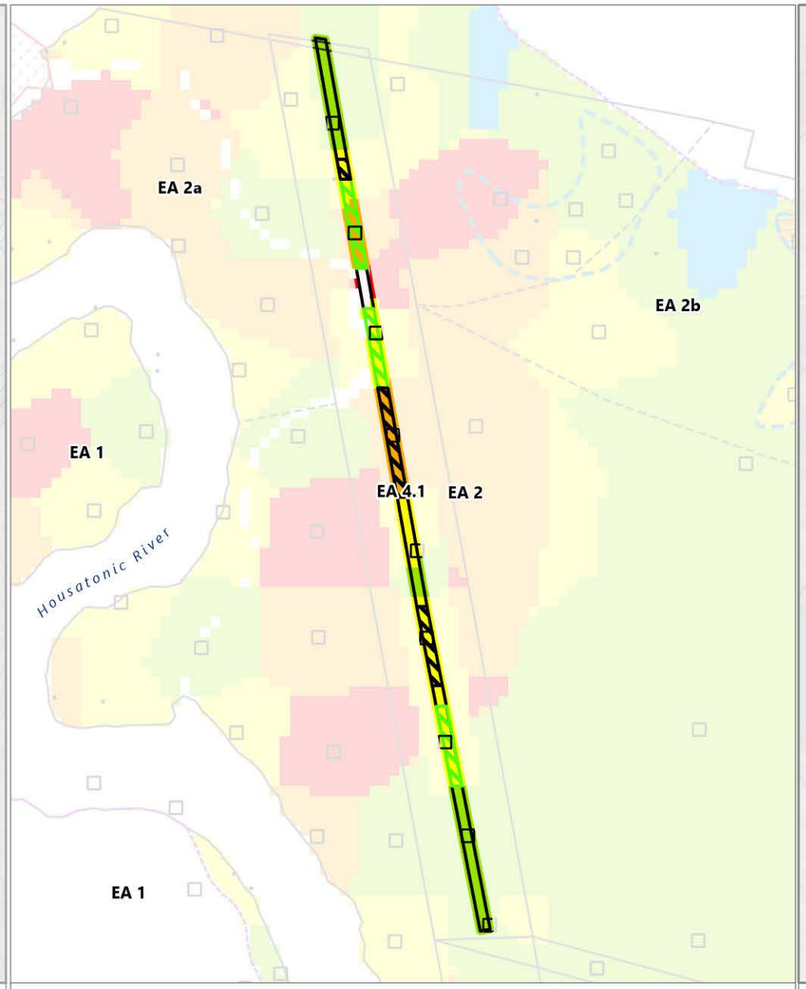
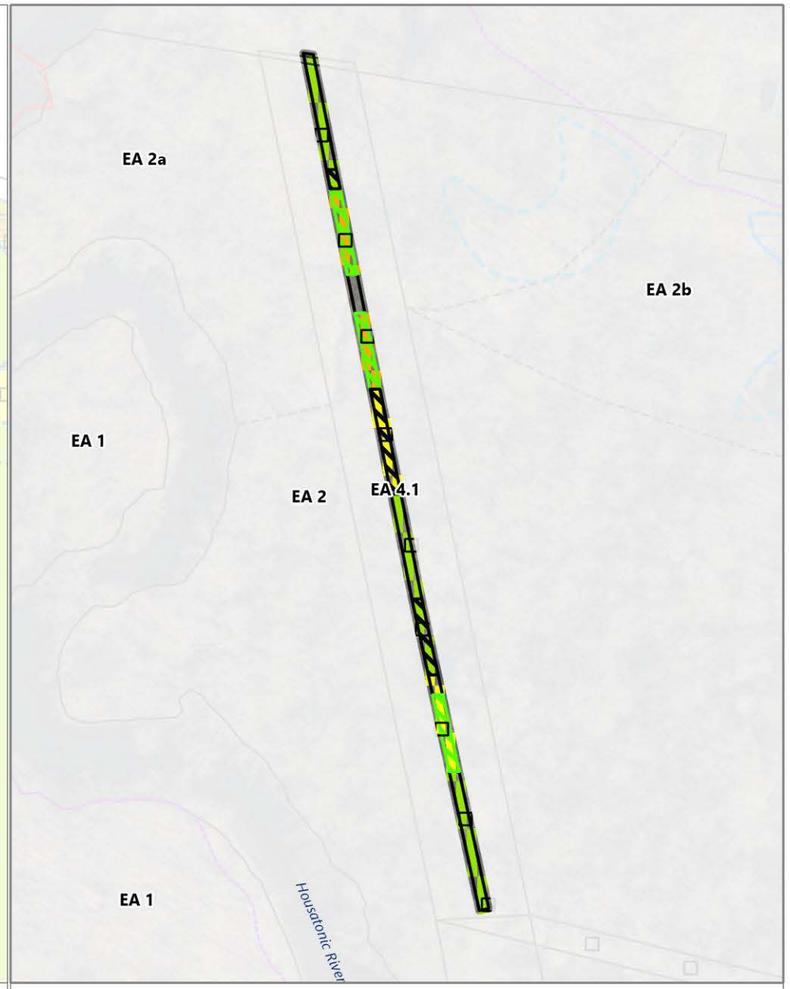
Figure 5-1c
Non-Residential Floodplain Remediation Areas (Exposure Areas 4 and 61)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River



Super Habitats



Total PCB (0 to 1 foot)[1]



Total PCB (0 to 3 feet)

LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- 1 mg/kg PCB Isopleth
- Frequently Used Subarea
- Non-Residential SDC Locations (2024-2025)
- Residential Sampling Locations (2024)
- Non-Residential PDI Sampling Locations (2022)
- Residential PDI Sampling Locations (2020-2021)
- Actual/Potential Lawn Sampling Locations
- Historical Sampling Locations

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

NOTES:
1. PCB concentrations represent the average concentration in the top 0 to 1 foot of soil based on 0- to 0.5-foot and 0.5- to 1-foot layers.
2. Aerial imagery from MassGIS 2021.

0 160
Feet



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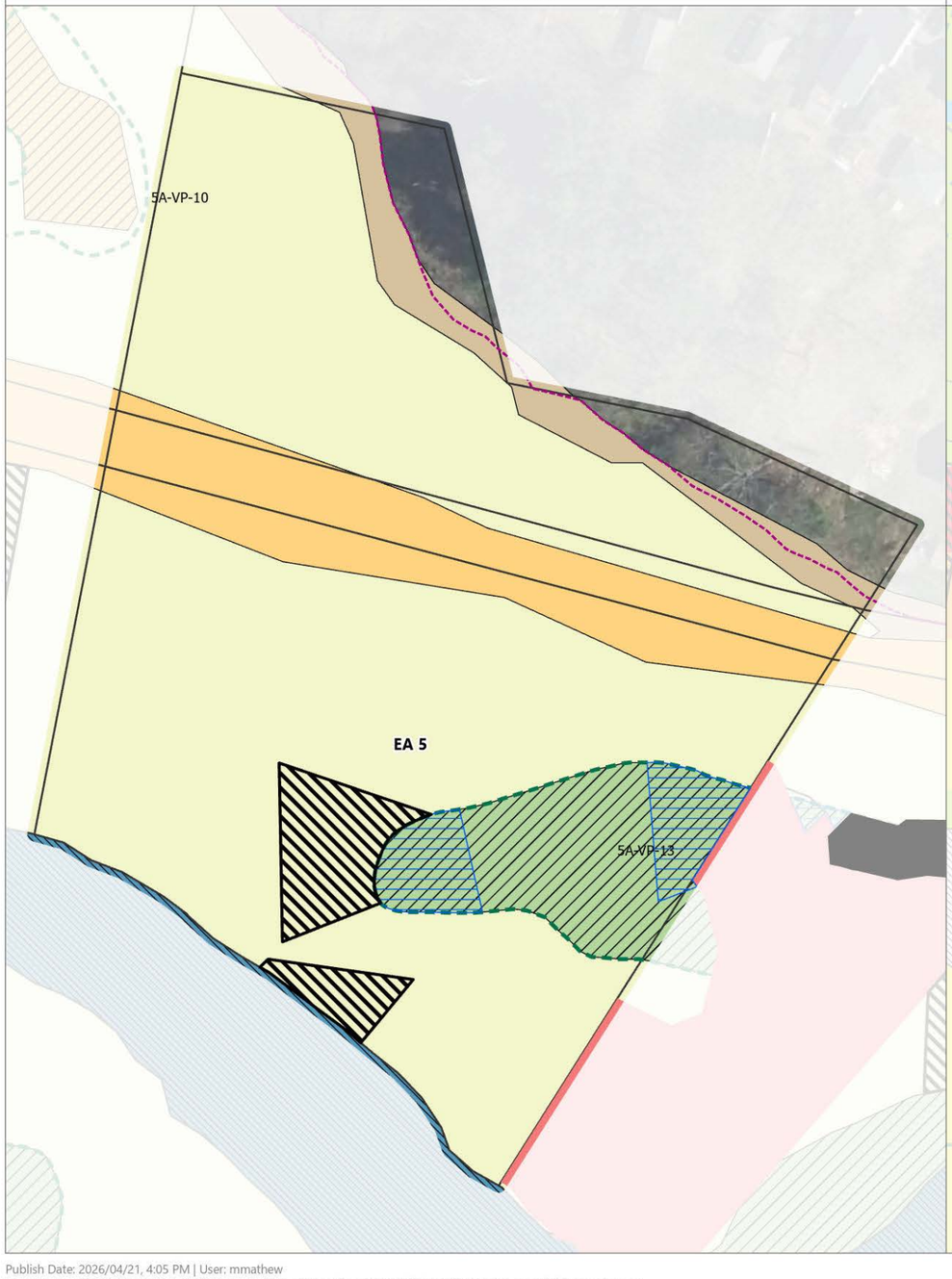
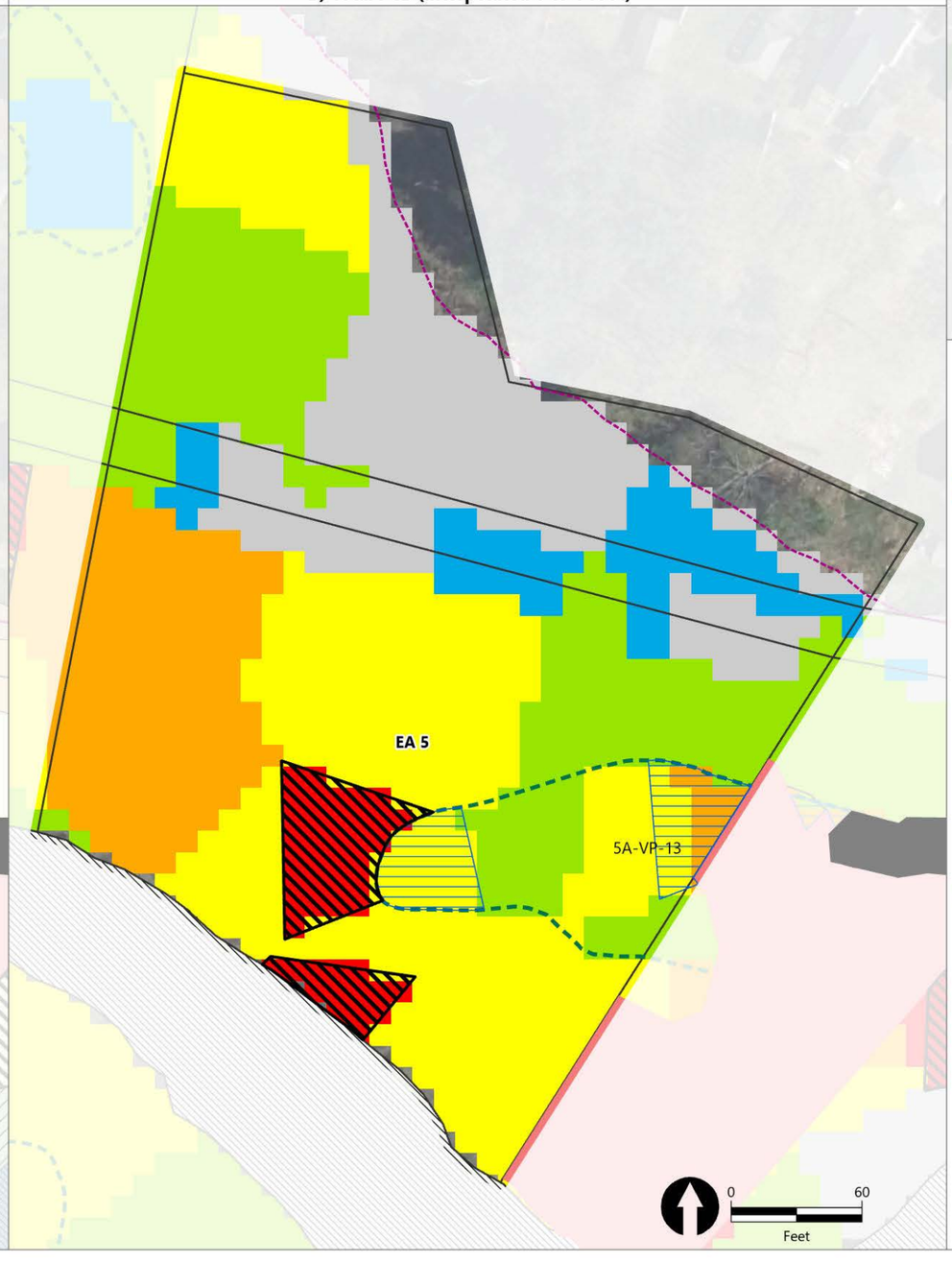
Figure 5-1d
Non-Residential Remediation in Frequently Used Subarea (Exposure Area 4/61)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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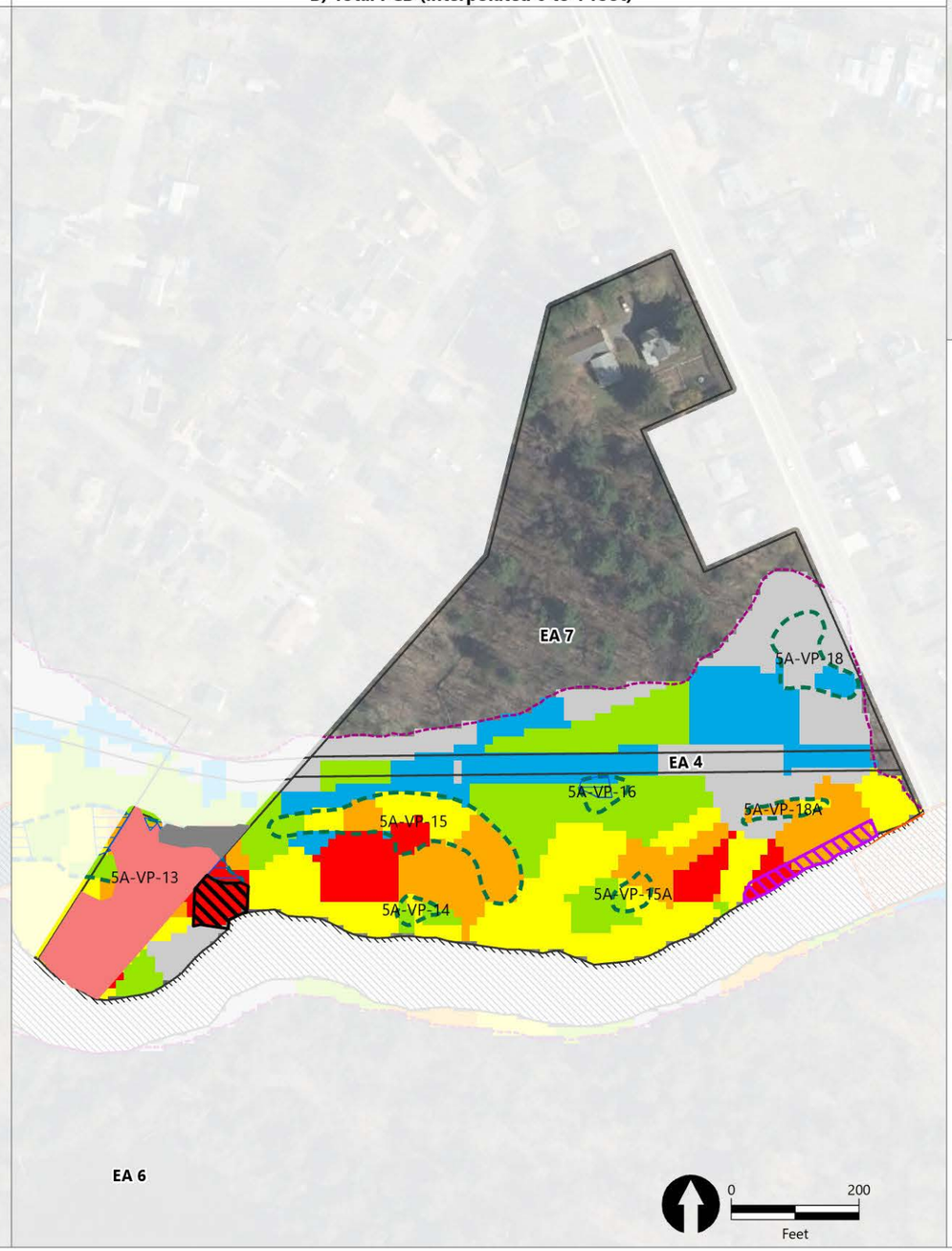
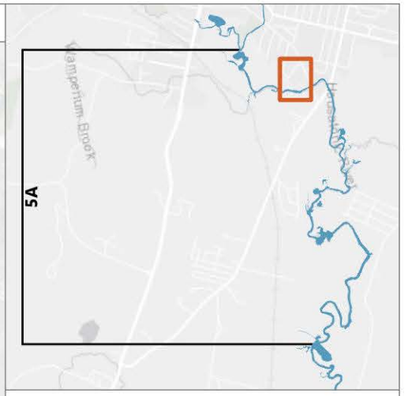
Figure 5-1e
Non-Residential Floodplain Remediation Areas (Exposure Area 5)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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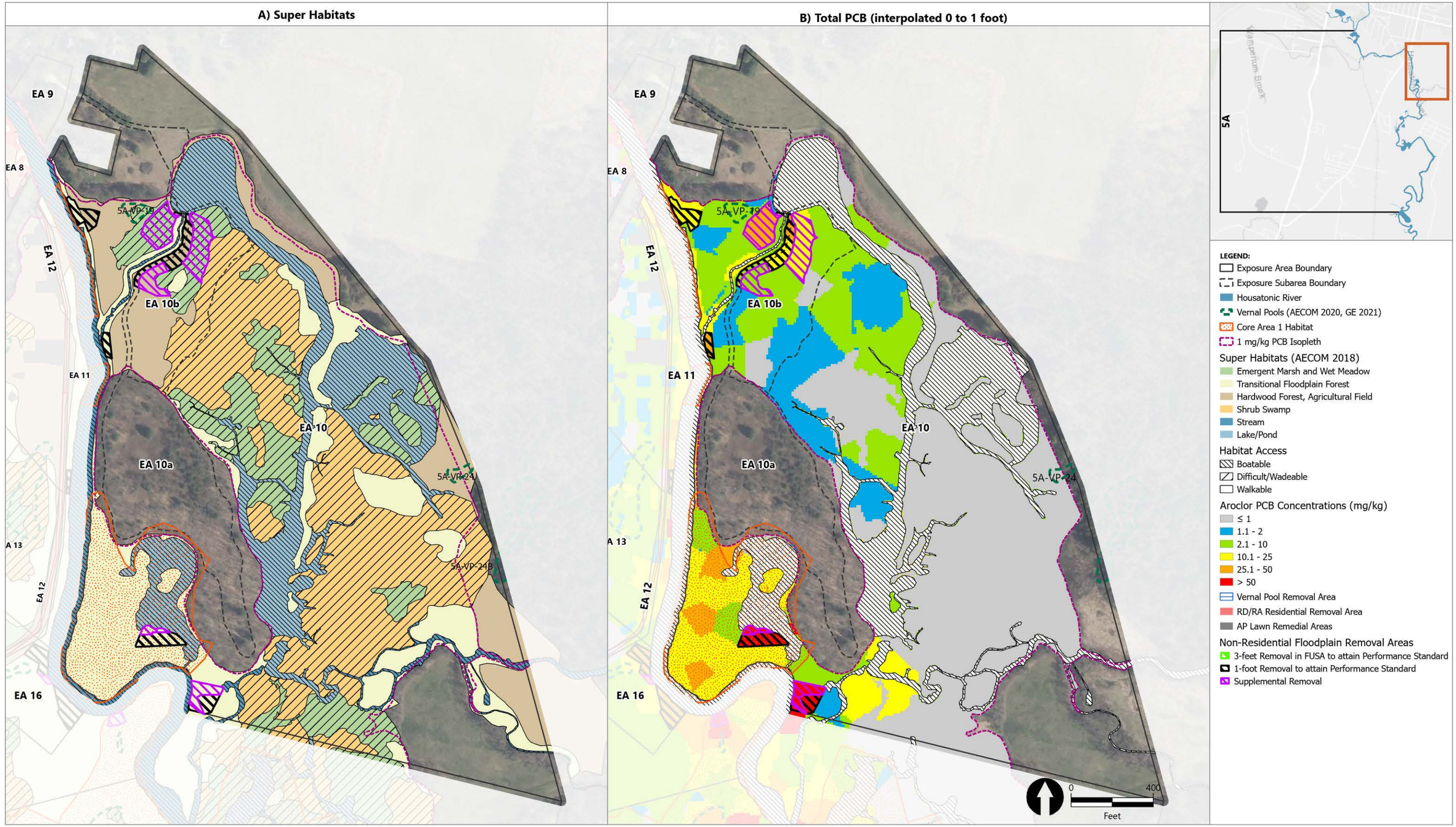
Figure 5-1f
Non-Residential Floodplain Remediation Areas (Exposure Area 7)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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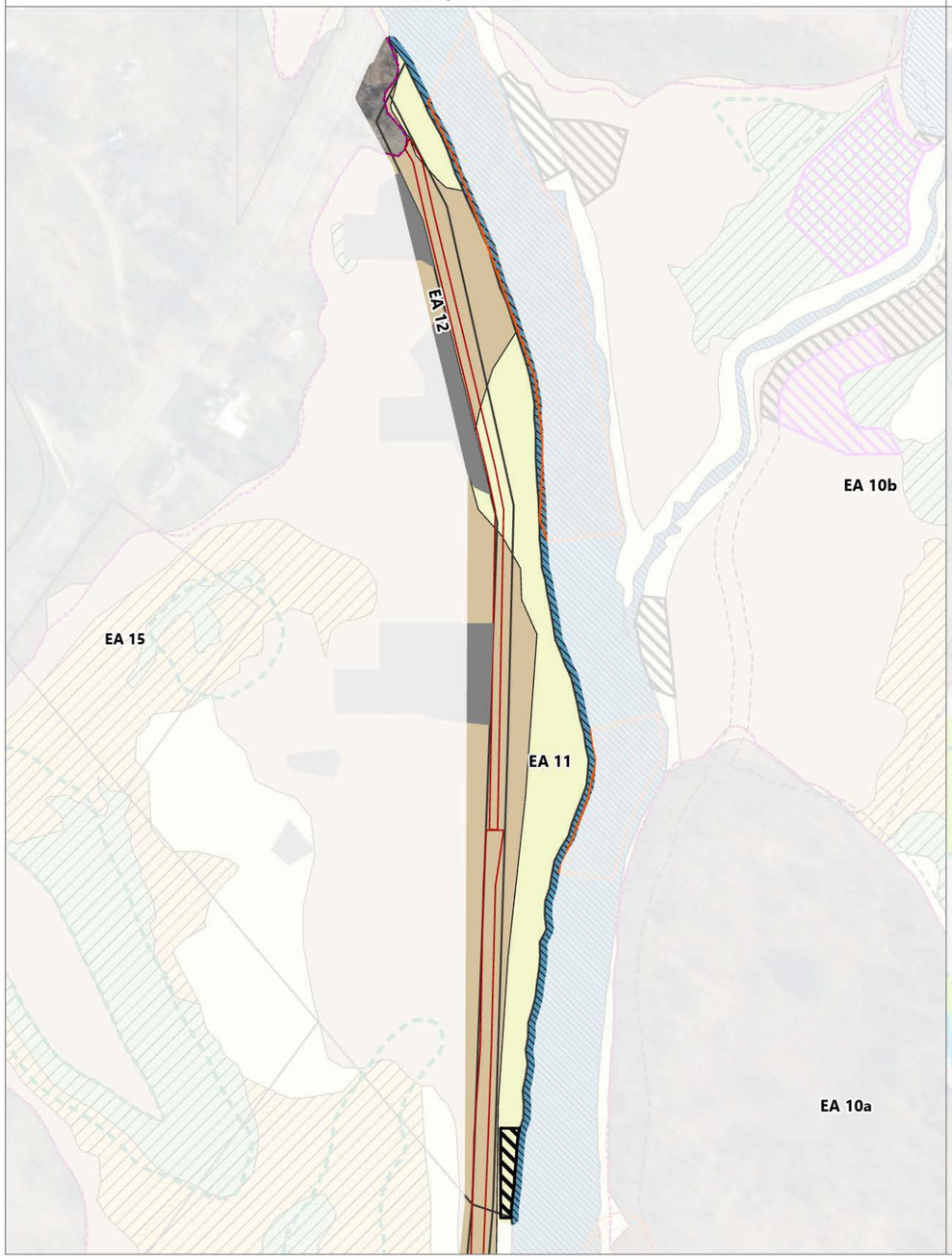
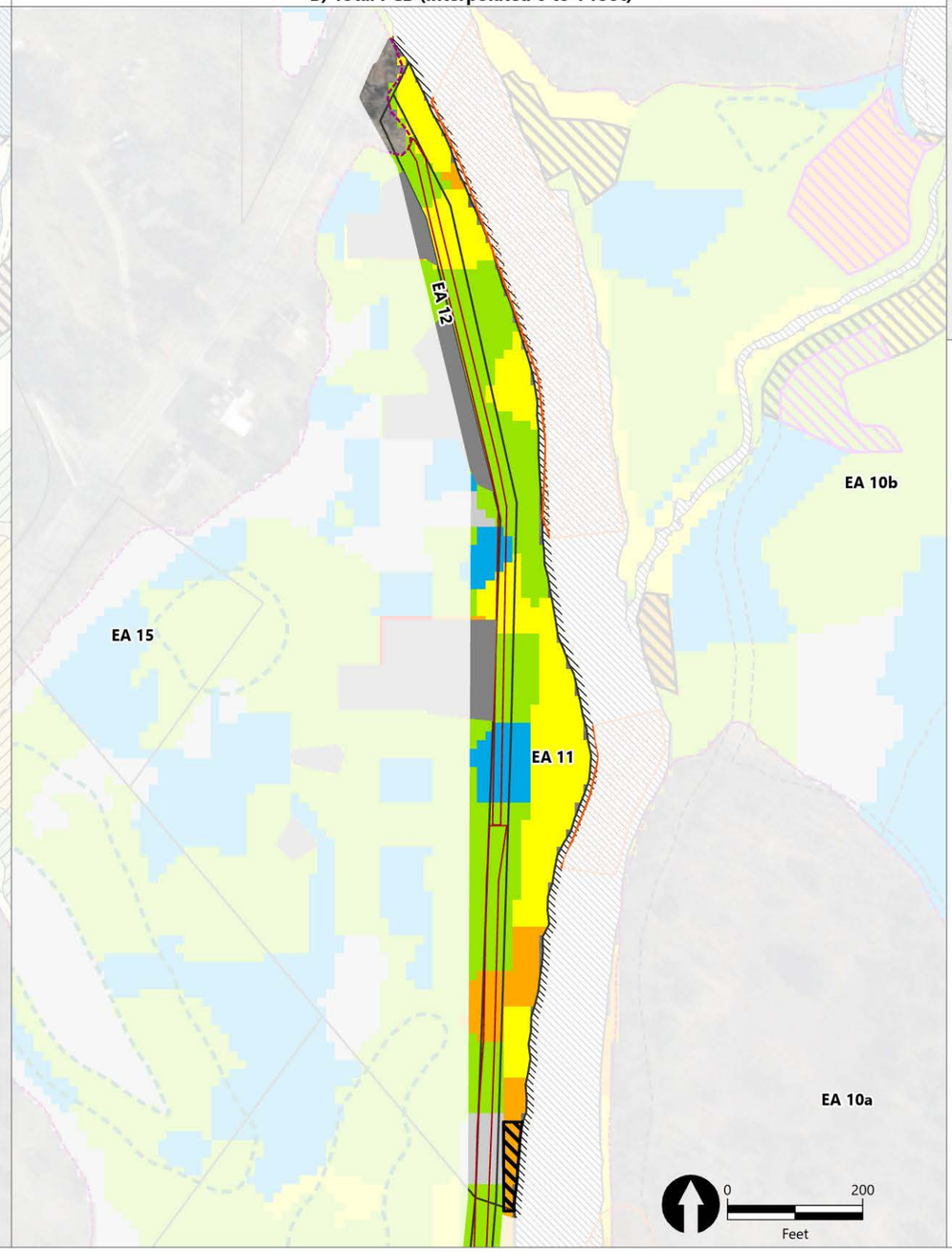
Figure 5-1g
Non-Residential Floodplain Remediation Areas (Exposure Area 10)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:
- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)
- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access
- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)
- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas
- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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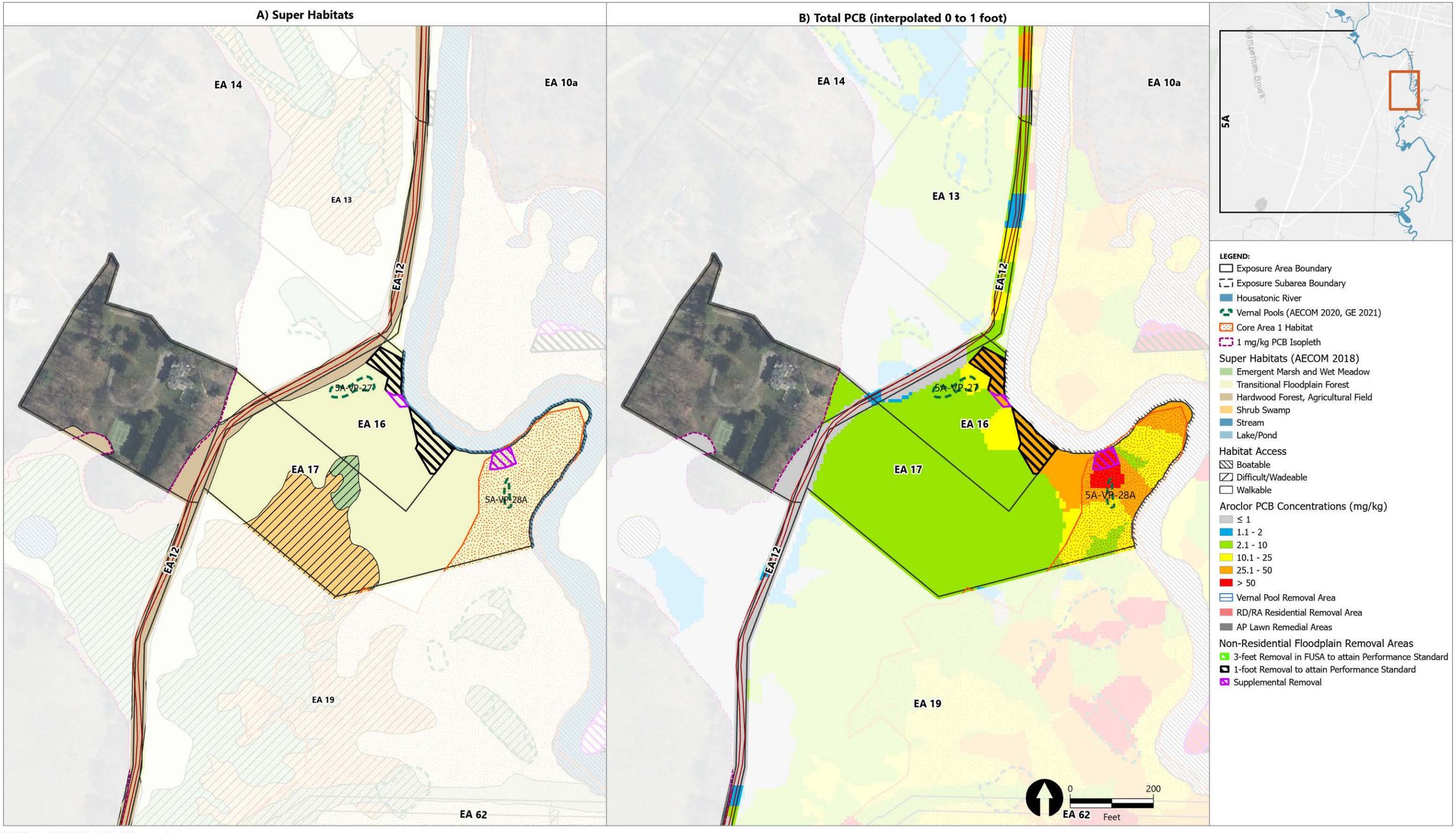
Figure 5-1h
Non-Residential Floodplain Remediation Areas (Exposure Area 11)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)



LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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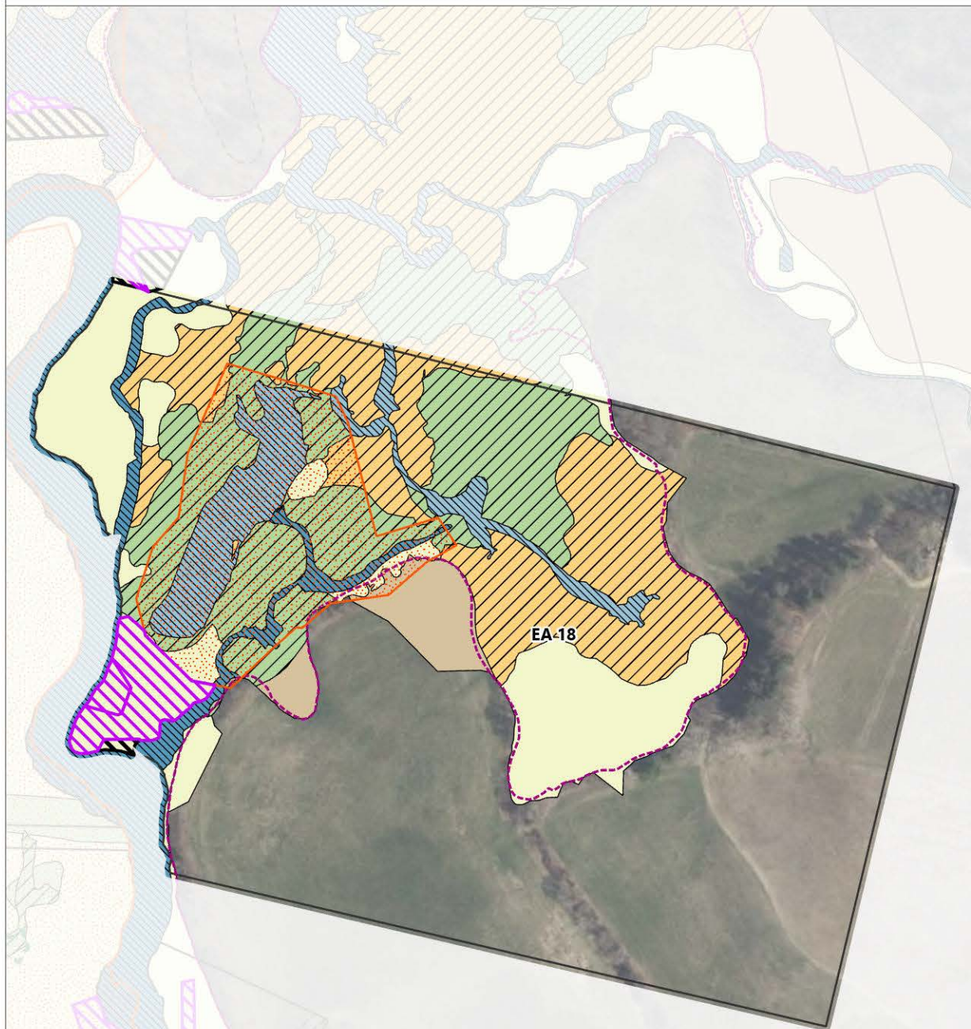
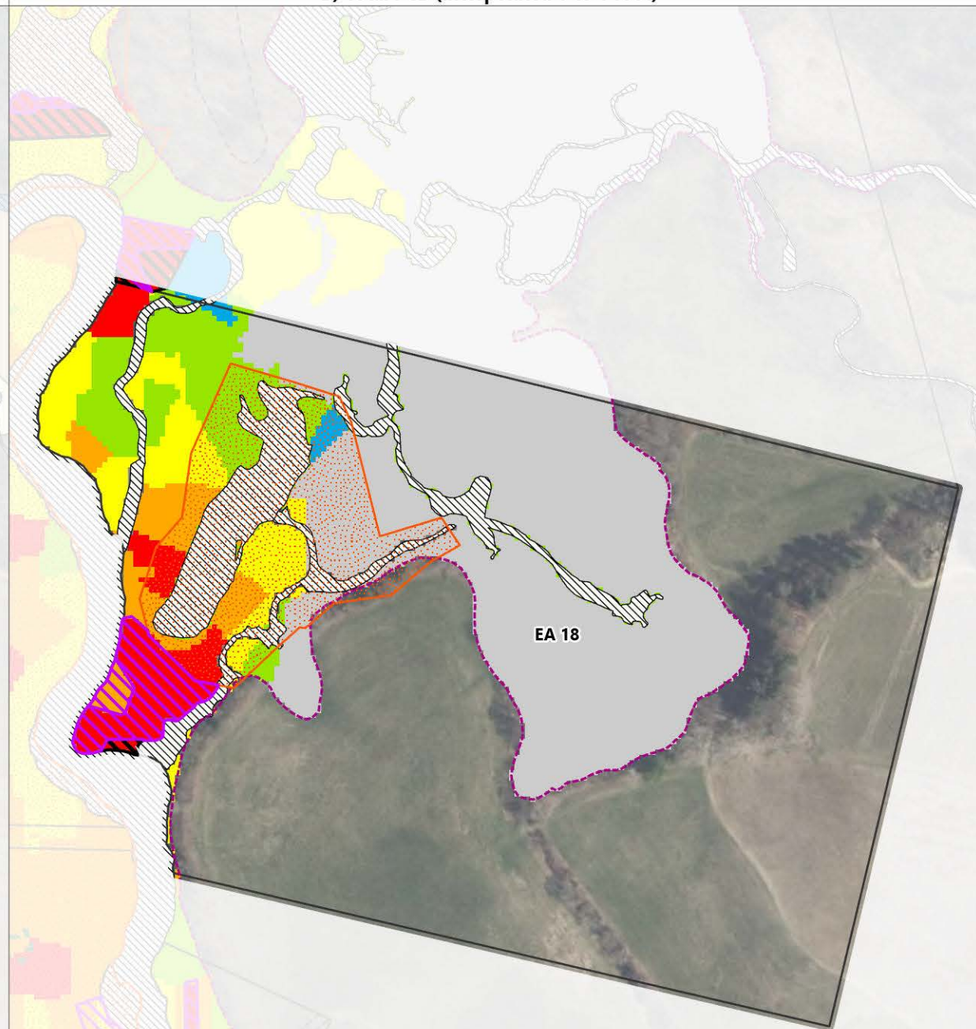
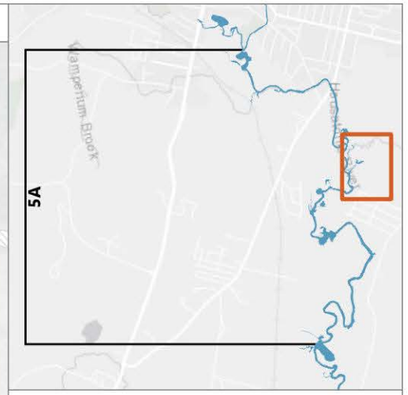
Figure 5-1i
Non-Residential Floodplain Remediation Areas (Exposure Areas 16 and 17)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:
- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)
- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access
- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)
- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50

- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas
- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

0 300
Feet

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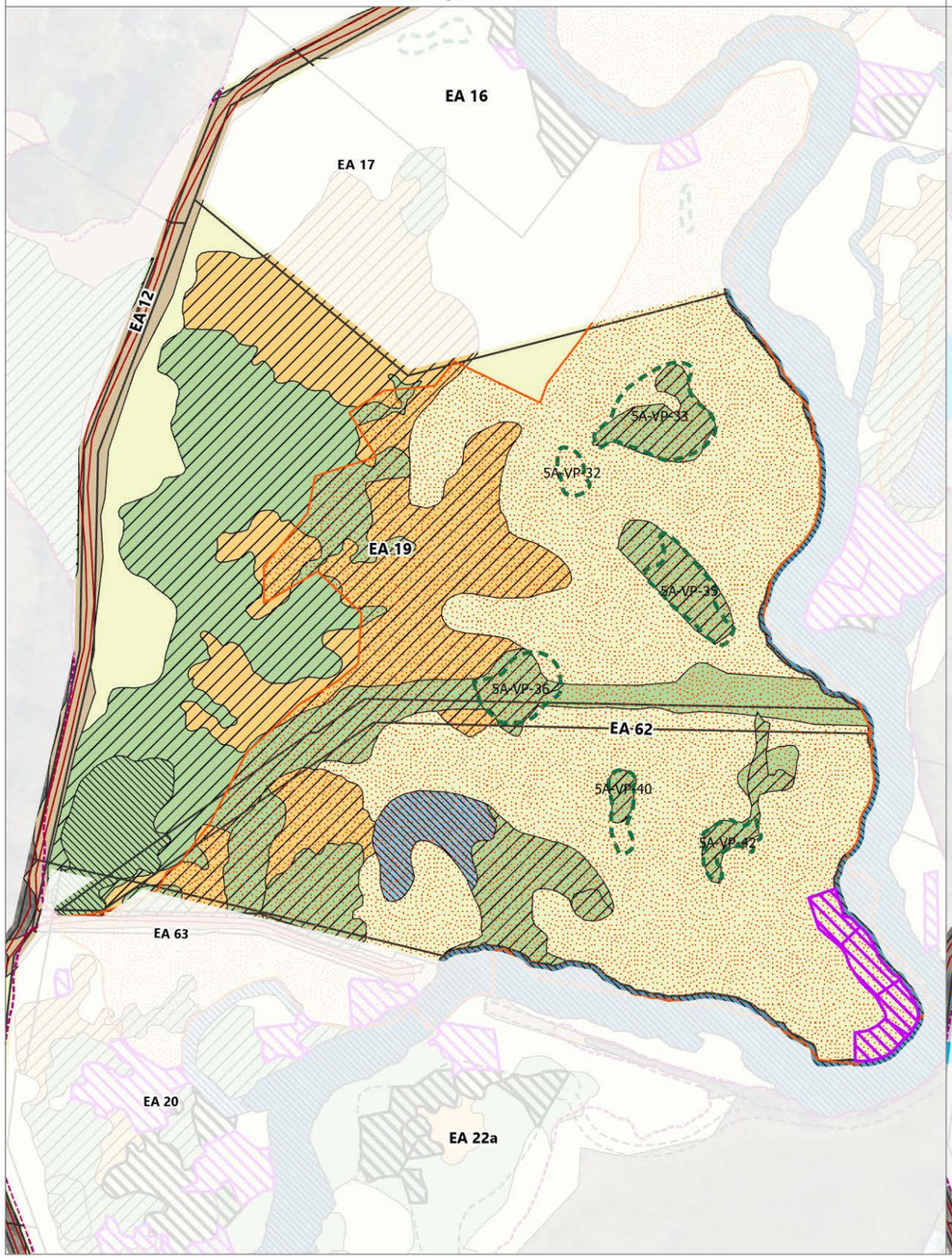
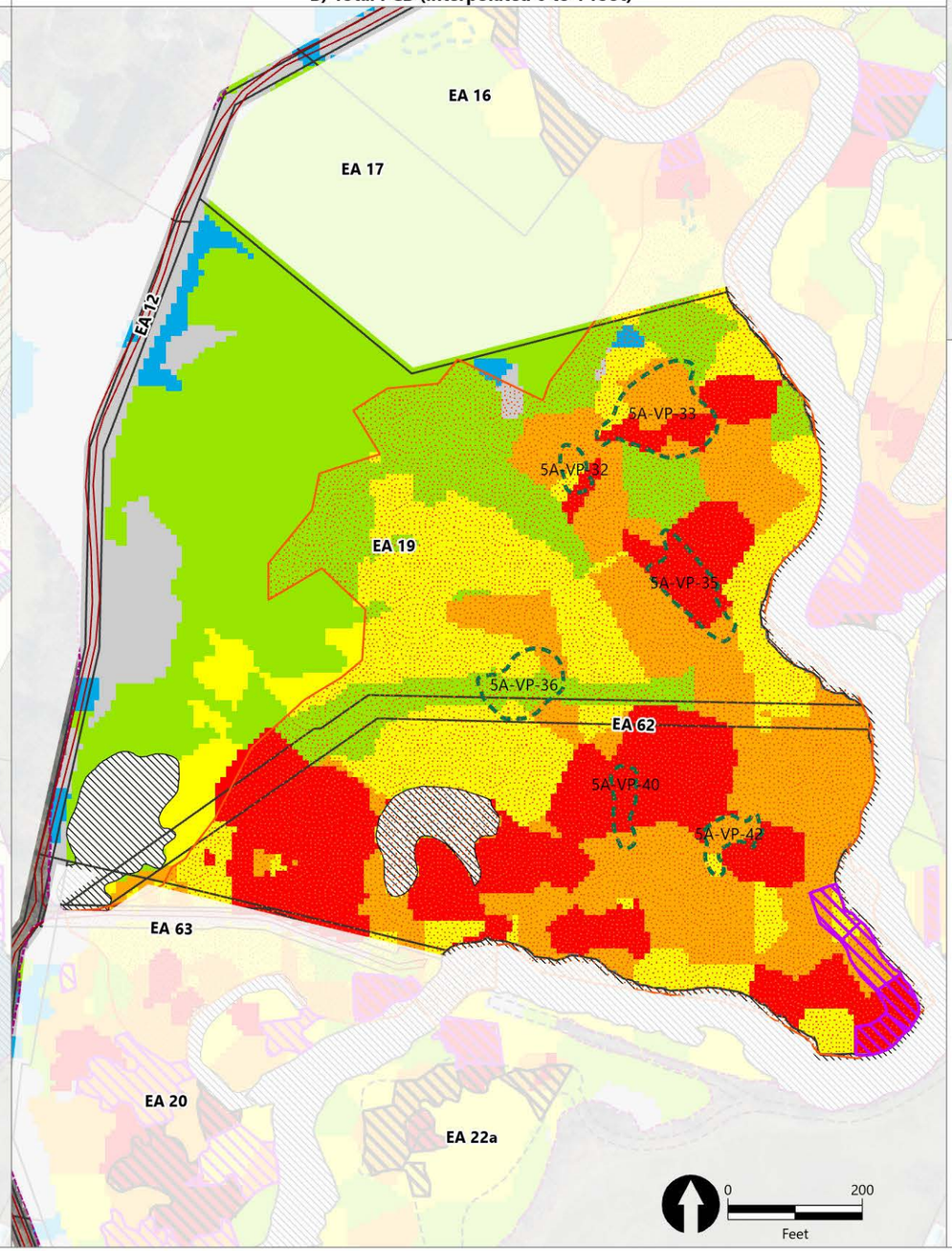
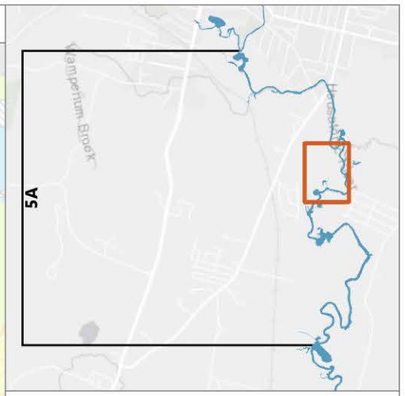
Figure 5-1j
Non-Residential Floodplain Remediation Areas (Exposure Area 18)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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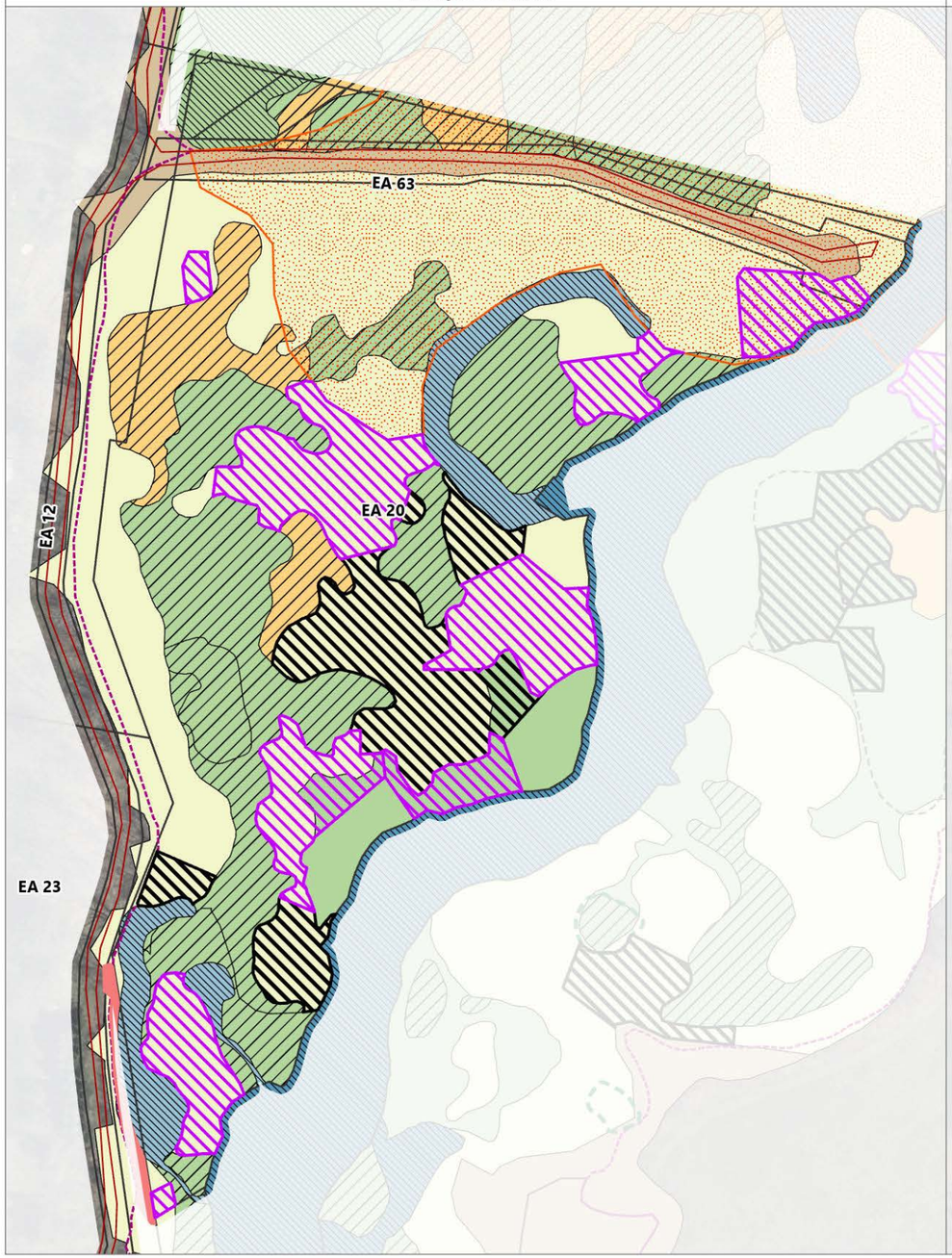
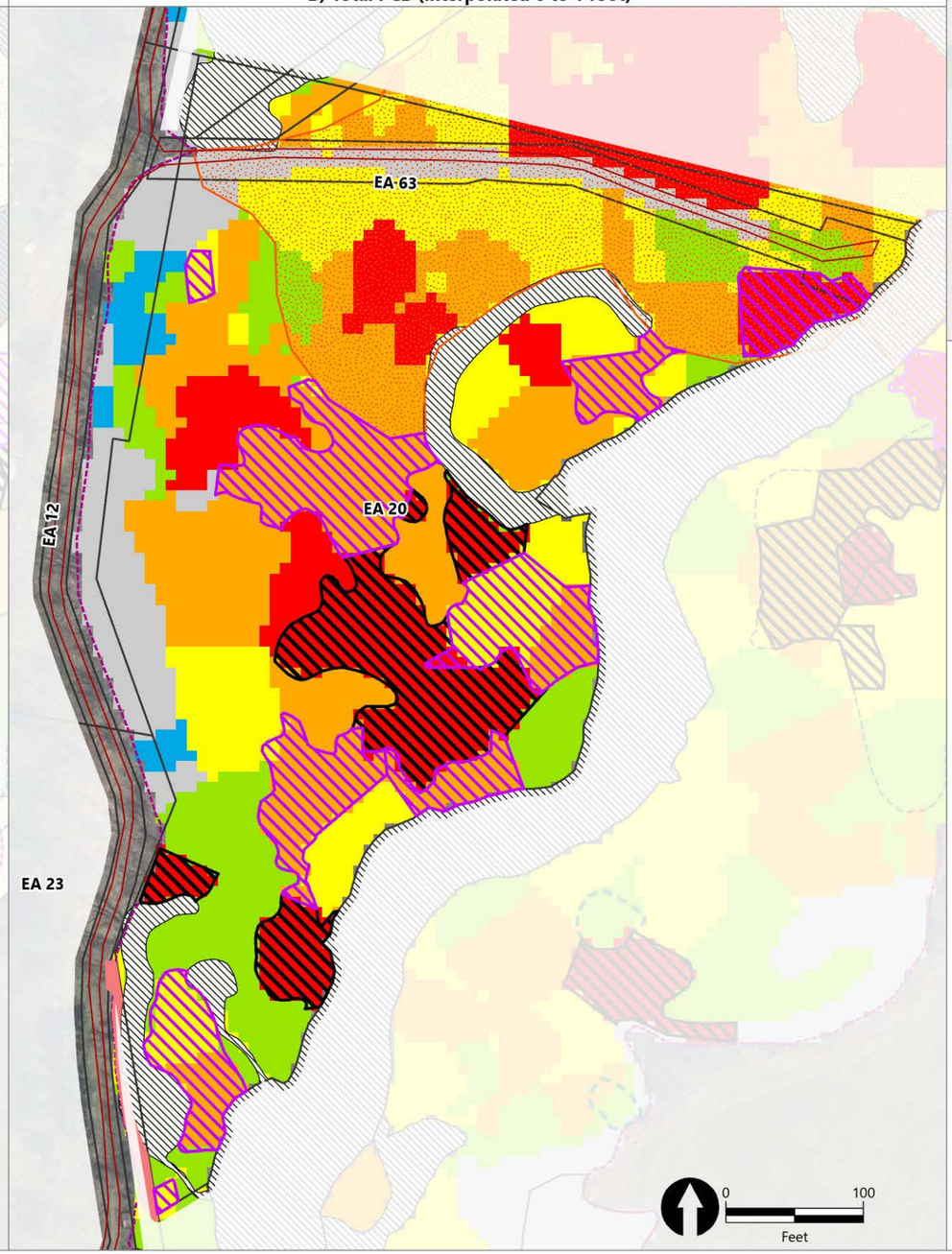
Figure 5-1k
Non-Residential Floodplain Remediation Areas (Exposure Area 19)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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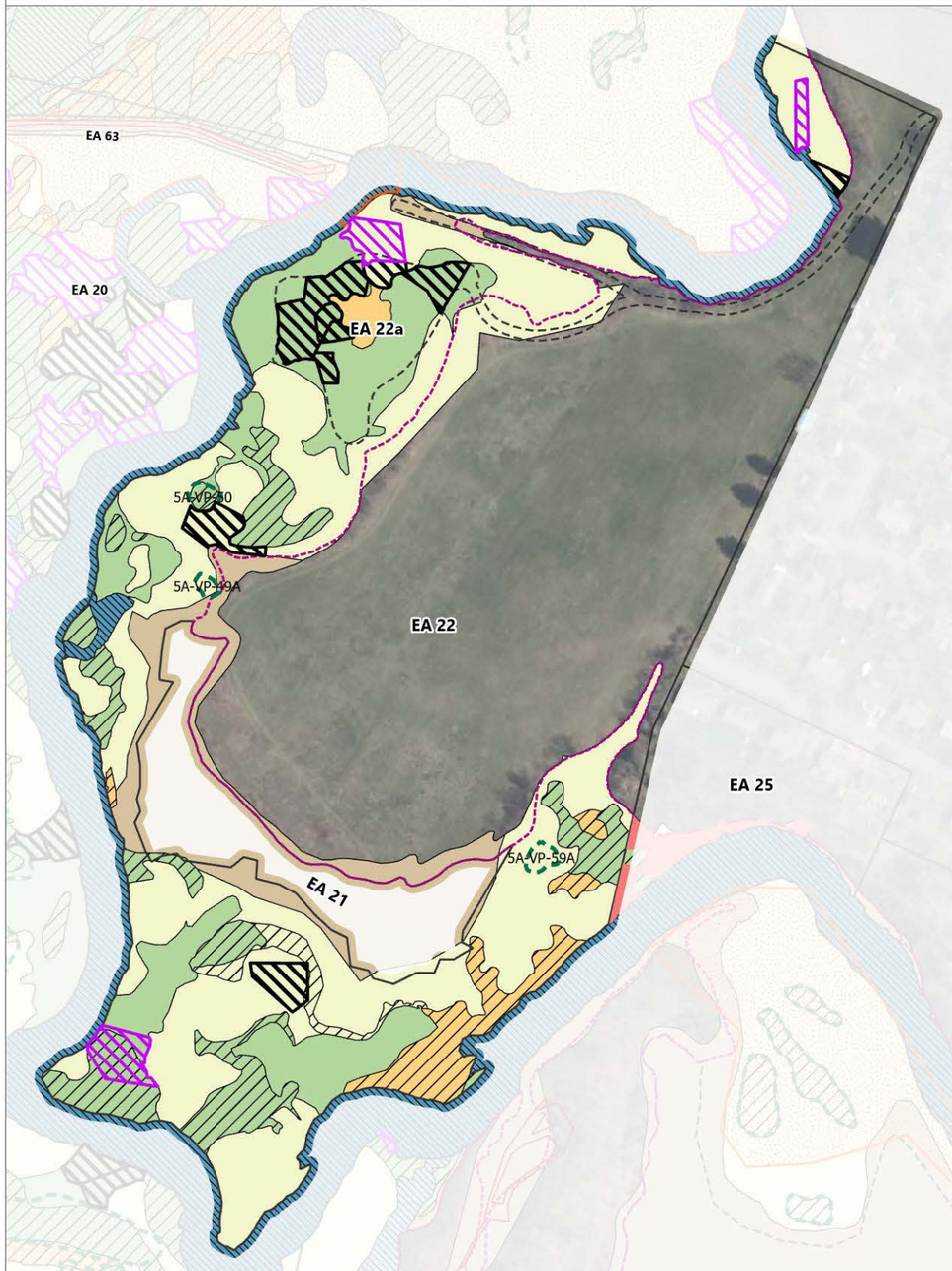
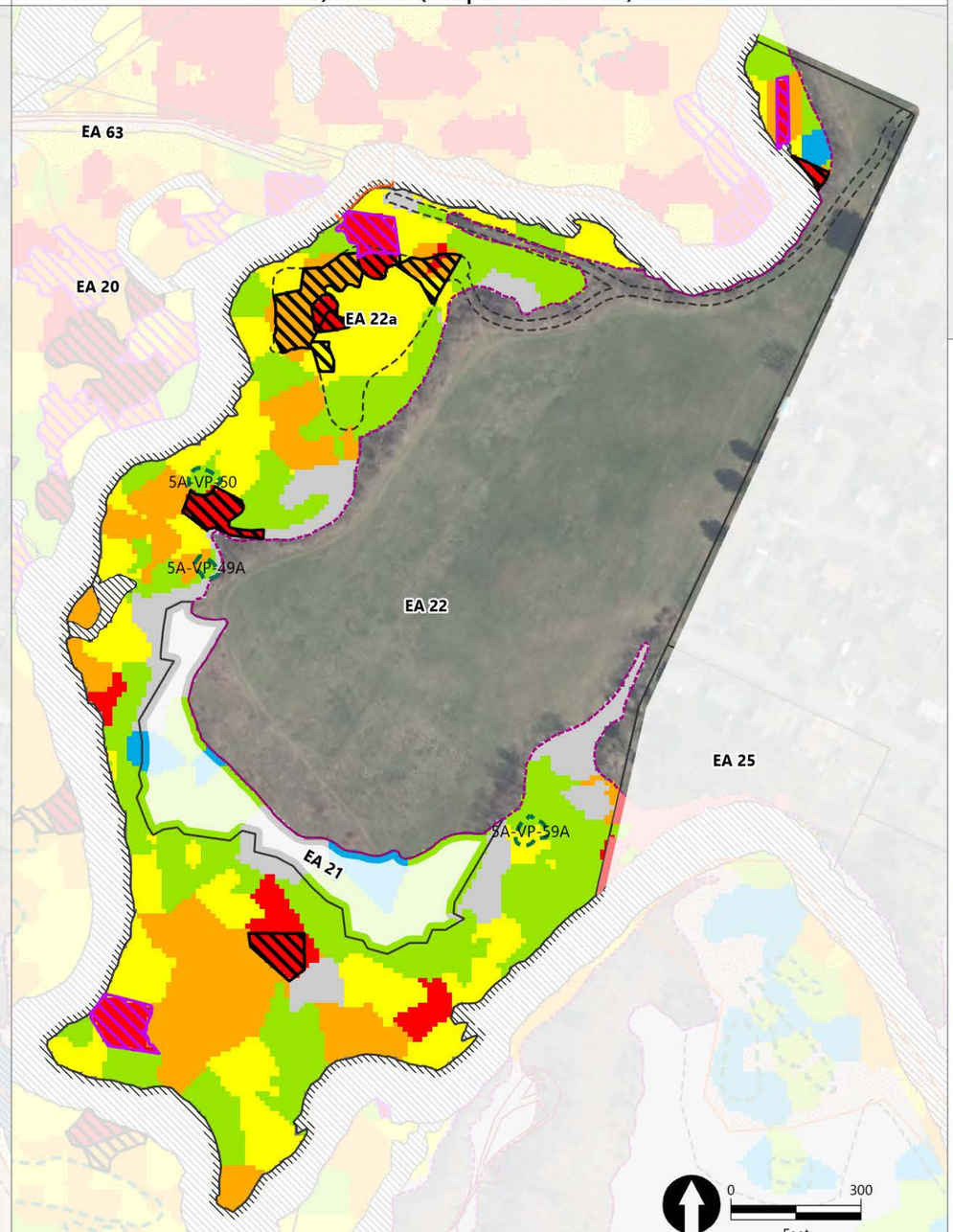
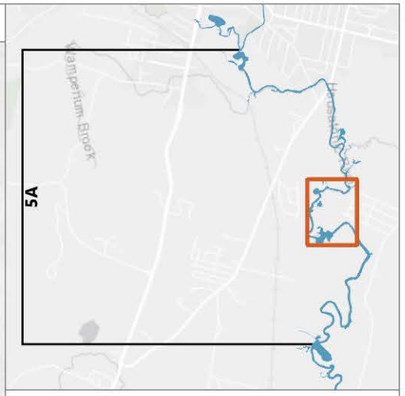
Figure 5-1l
Non-Residential Floodplain Remediation Areas (Exposure Area 20)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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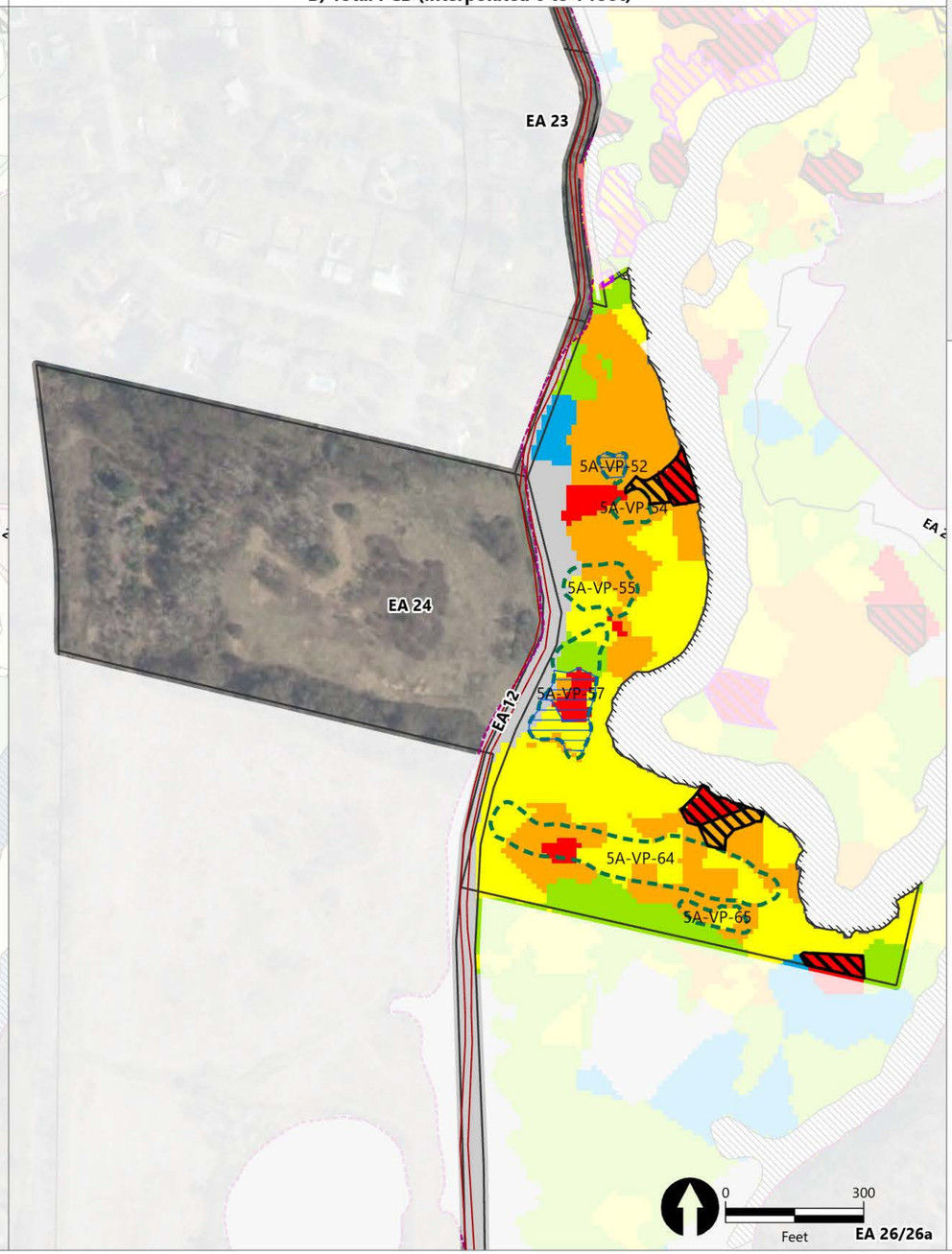
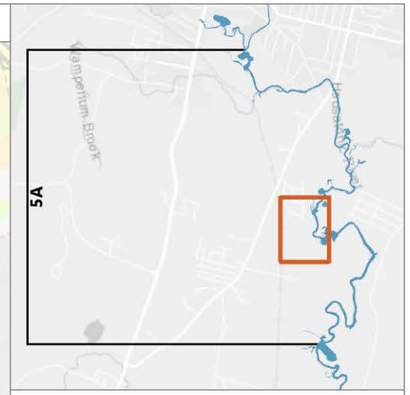
Figure 5-1m
Non-Residential Floodplain Remediation Areas (Exposure Area 22)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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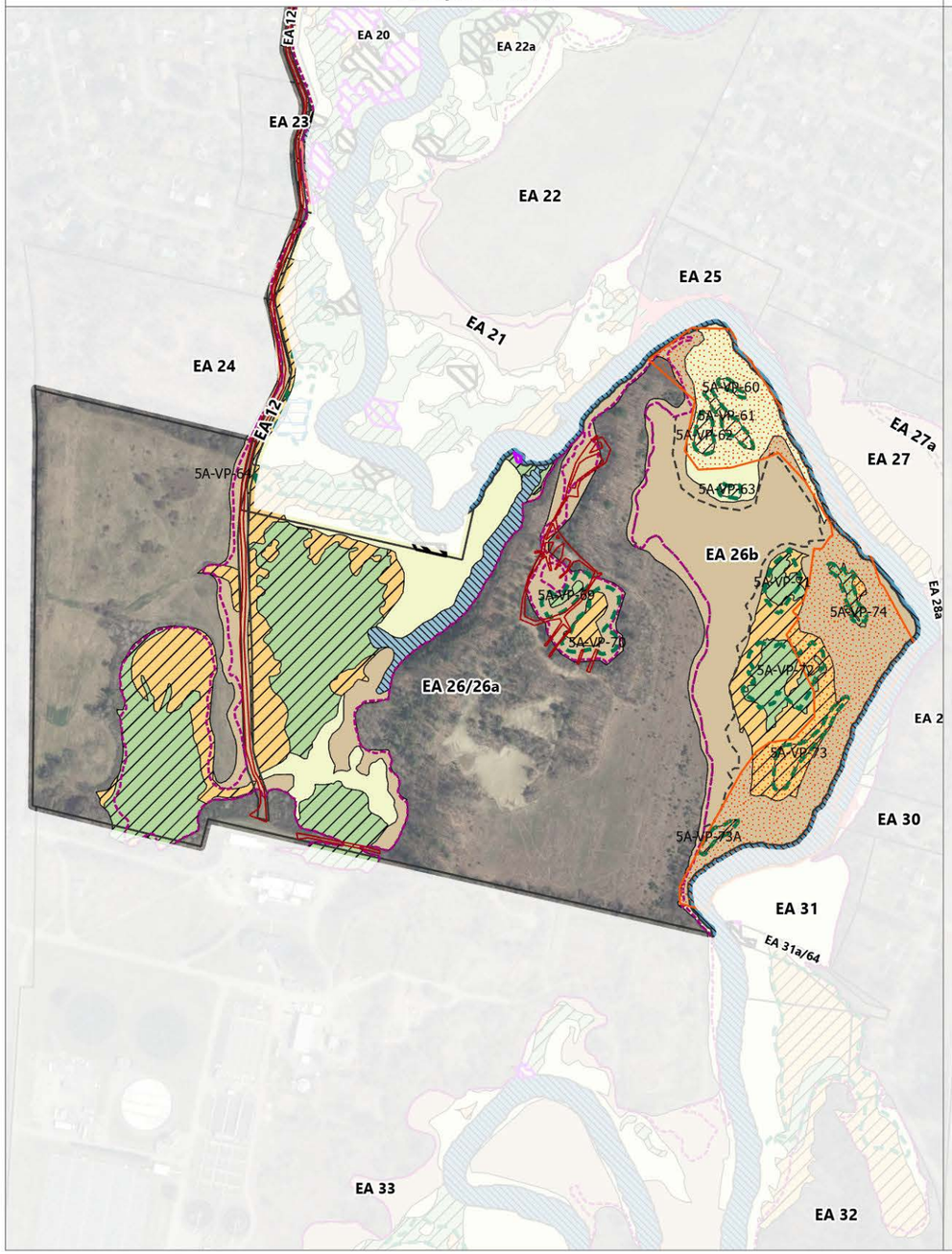
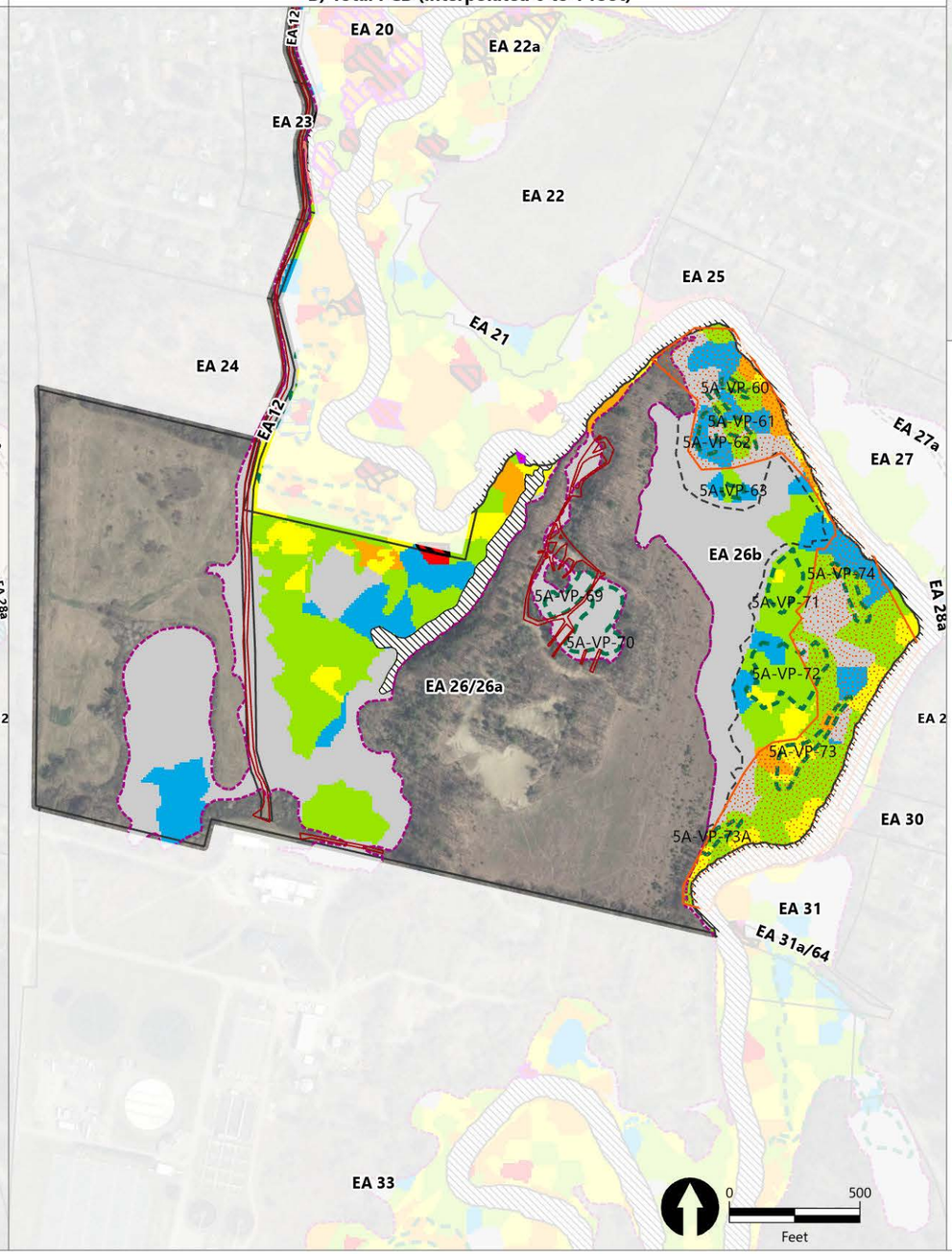
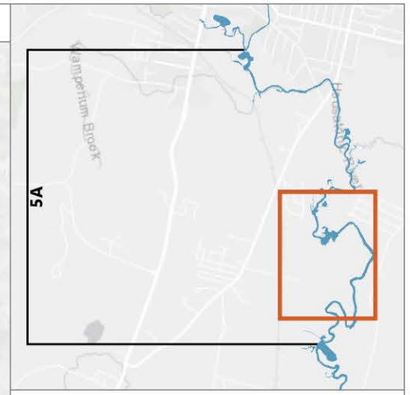
Figure 5-1n
Non-Residential Floodplain Remediation Areas (Exposure Area 24)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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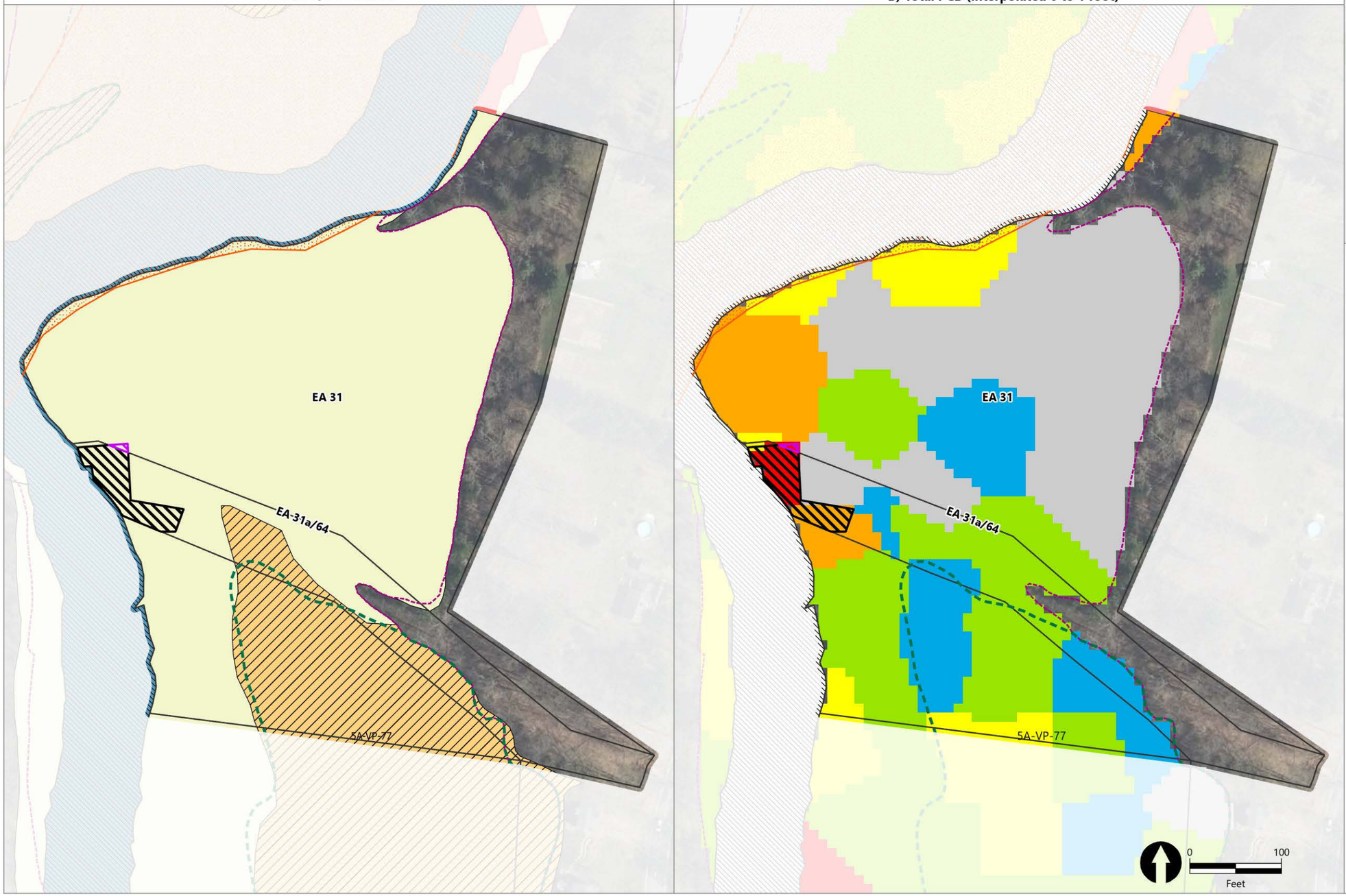
Figure 5-1o
Non-Residential Floodplain Remediation Areas (Exposure Area 26)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)





LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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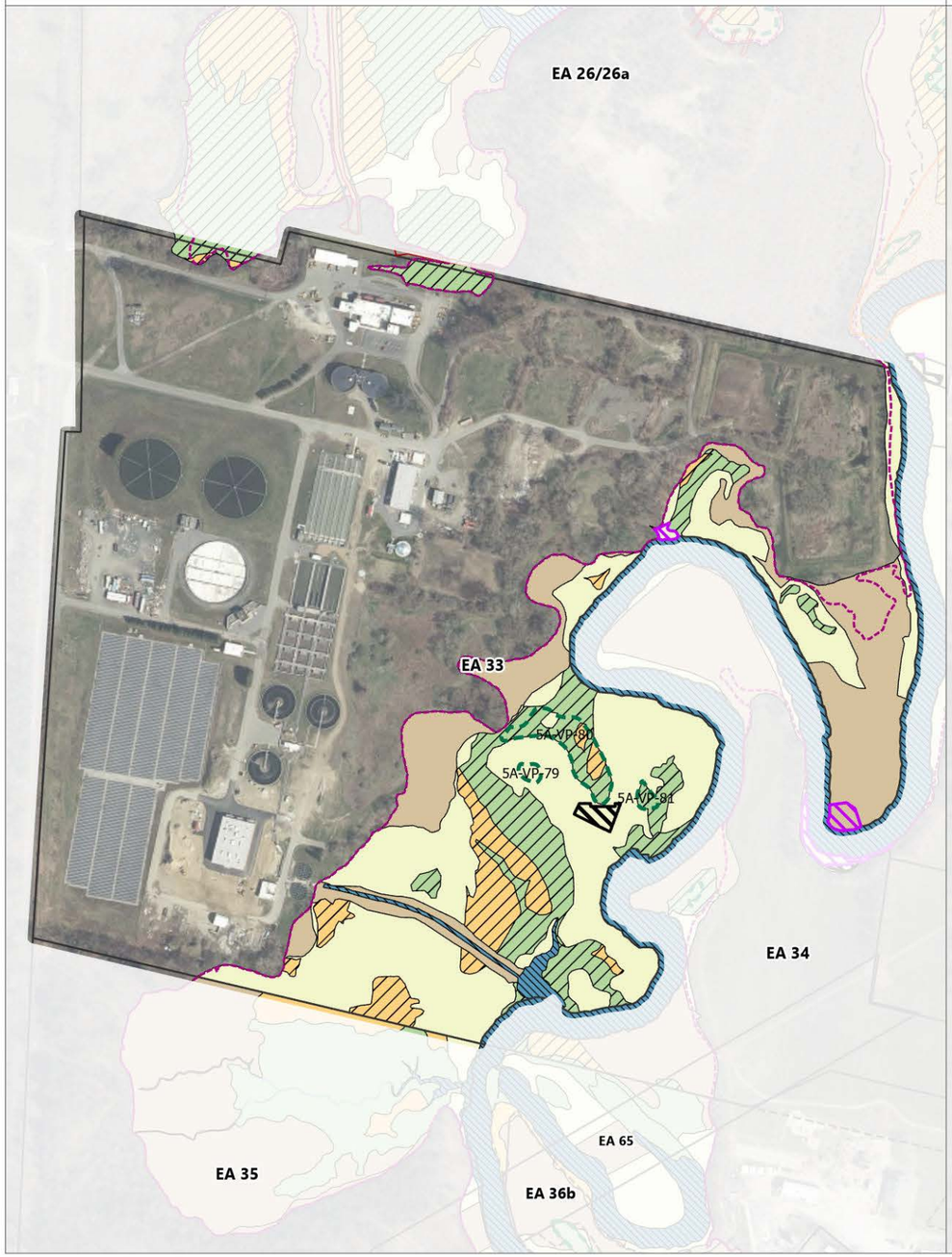
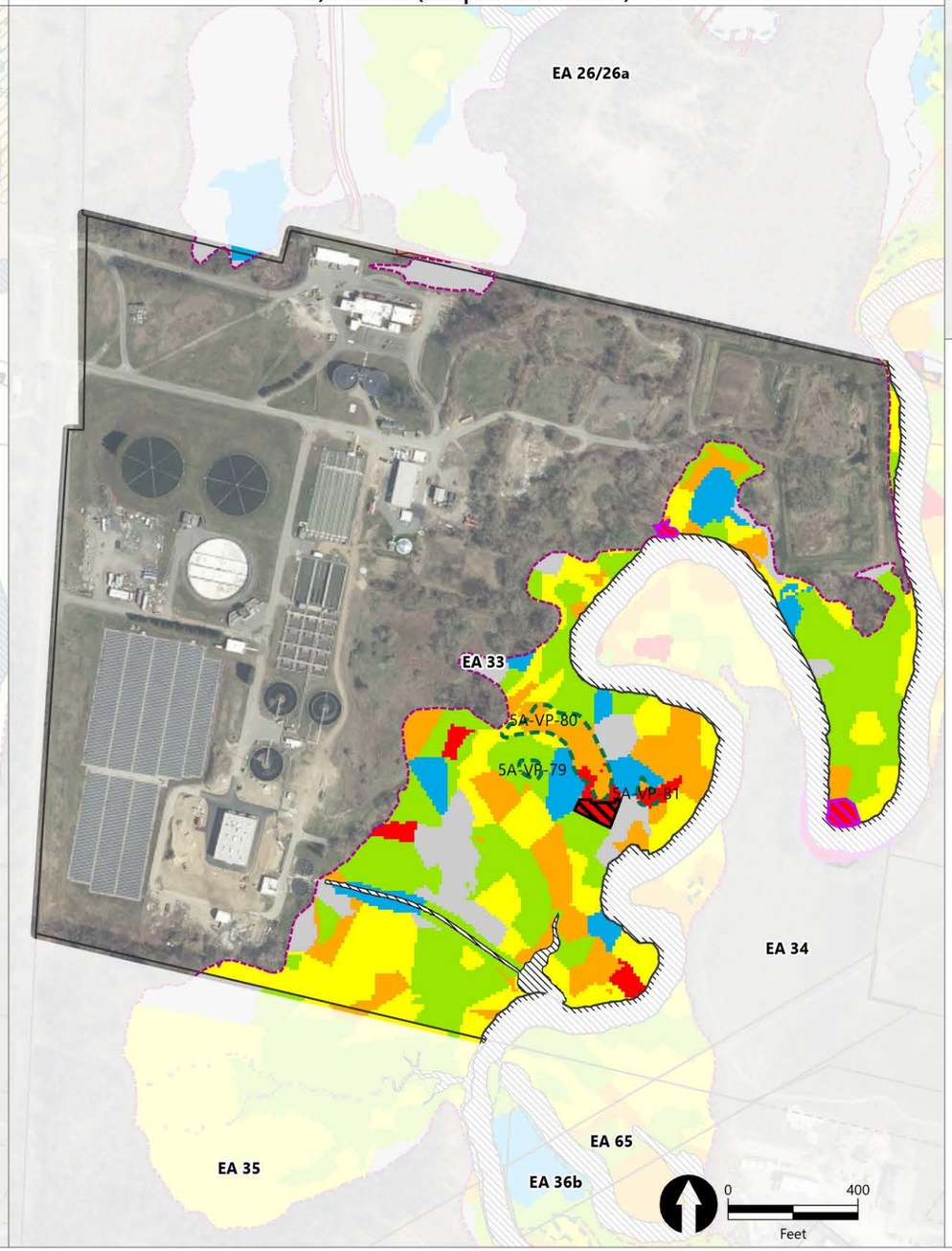
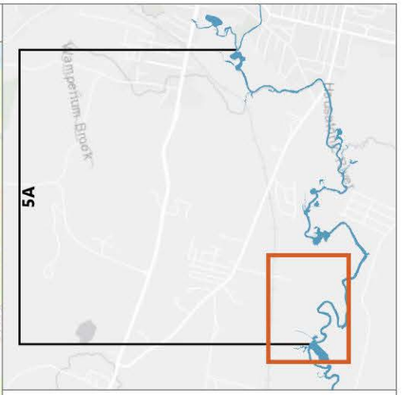
Figure 5-1p
Non-Residential Floodplain Remediation Areas (Exposure Area 31)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

0 400
Feet

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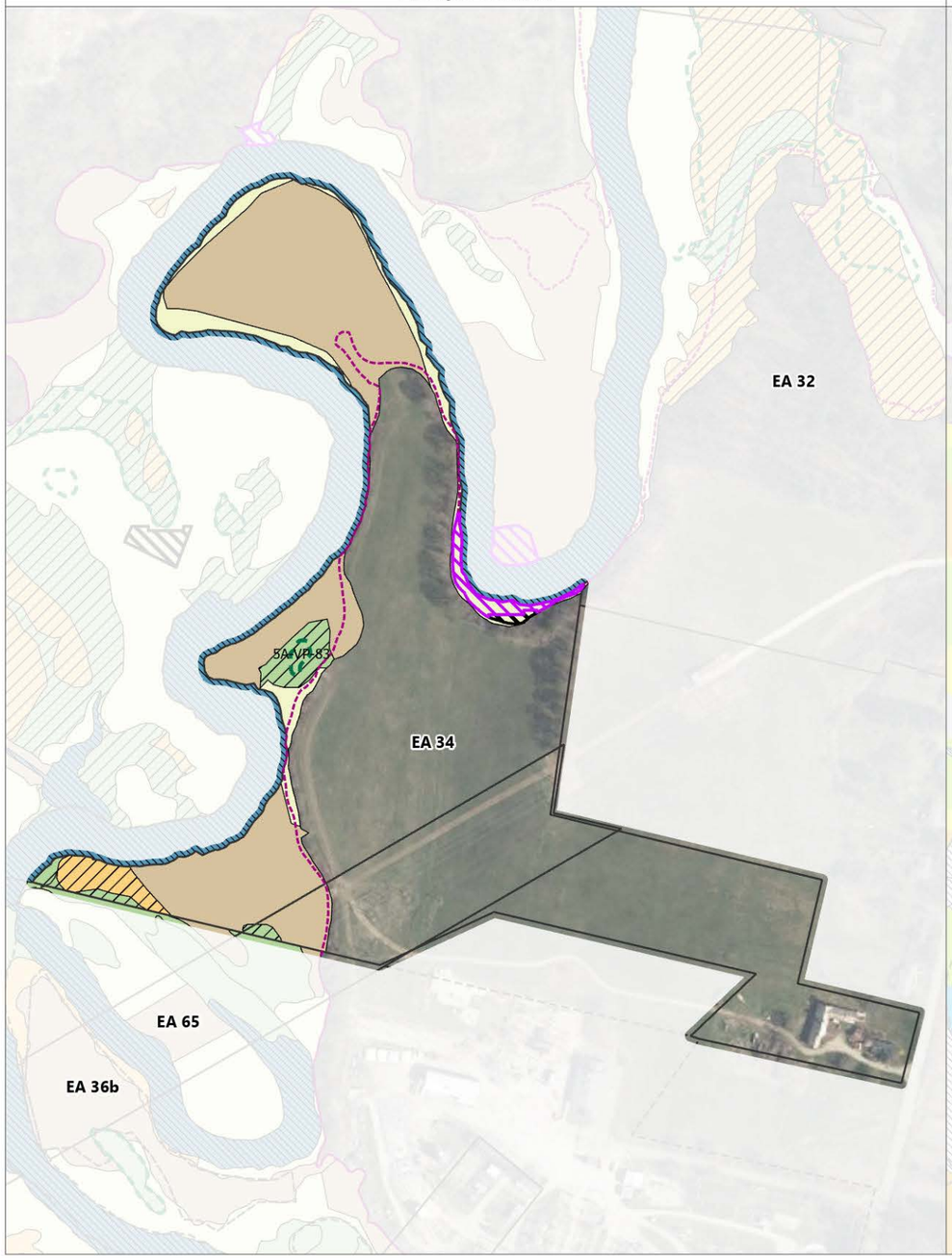
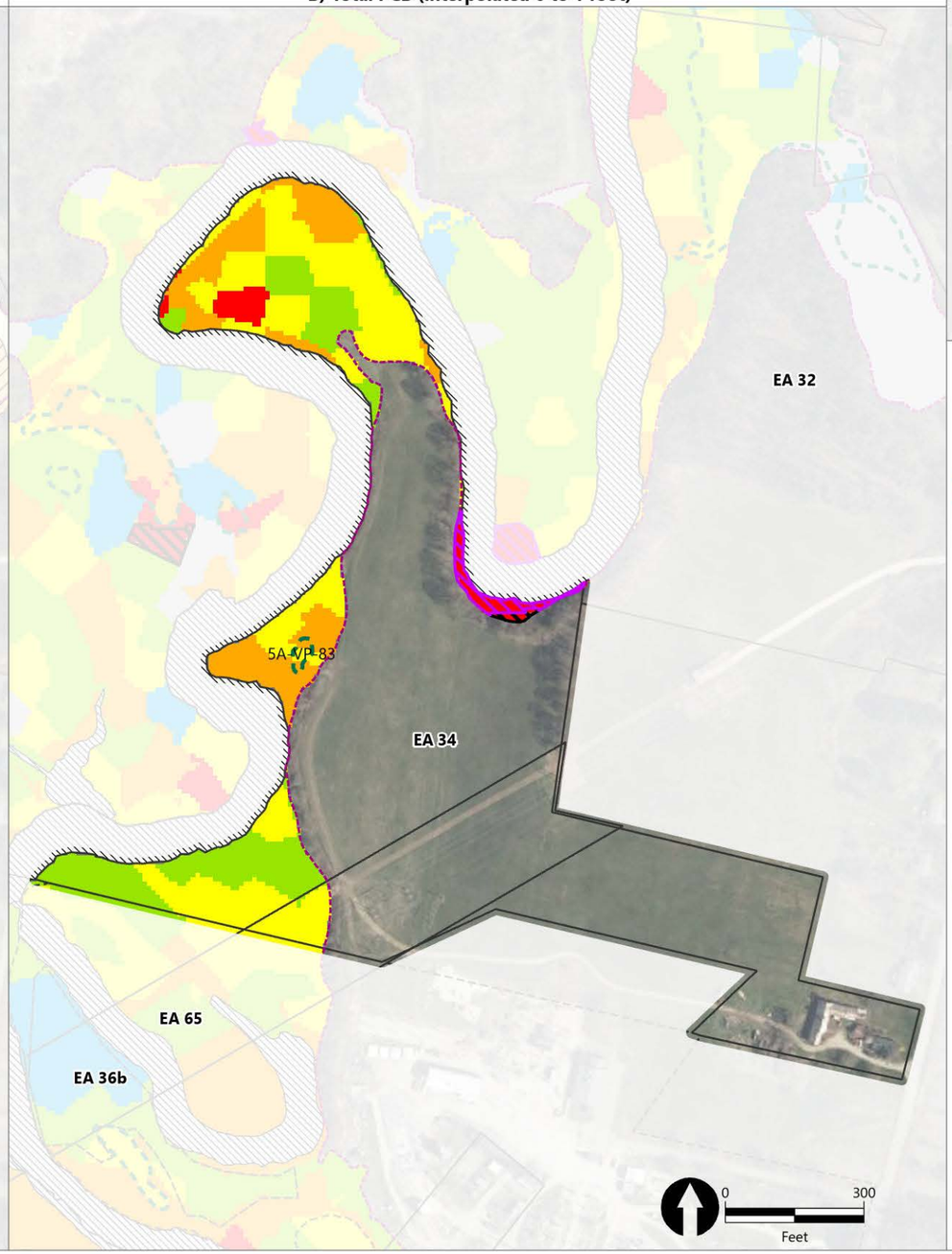
Figure 5-1q
Non-Residential Floodplain Remediation Areas (Exposure Area 33)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

A) Super Habitats

B) Total PCB (interpolated 0 to 1 foot)







LEGEND:

- Exposure Area Boundary
- Exposure Subarea Boundary
- Housatonic River
- Vernal Pools (AECOM 2020, GE 2021)
- Core Area 1 Habitat
- 1 mg/kg PCB Isopleth

Super Habitats (AECOM 2018)

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

Habitat Access

- Boatable
- Difficult/Wadeable
- Walkable

Aroclor PCB Concentrations (mg/kg)

- ≤ 1
- 1.1 - 2
- 2.1 - 10
- 10.1 - 25
- 25.1 - 50
- > 50
- Vernal Pool Removal Area
- RD/RA Residential Removal Area
- AP Lawn Remedial Areas

Non-Residential Floodplain Removal Areas

- 3-feet Removal in FUSA to attain Performance Standard
- 1-foot Removal to attain Performance Standard
- Supplemental Removal

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Figure 5-1r
Non-Residential Floodplain Remediation Areas (Exposure Area 34)
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

Attachment 1
Evaluation of 1 mg/kg PCB Isopleth

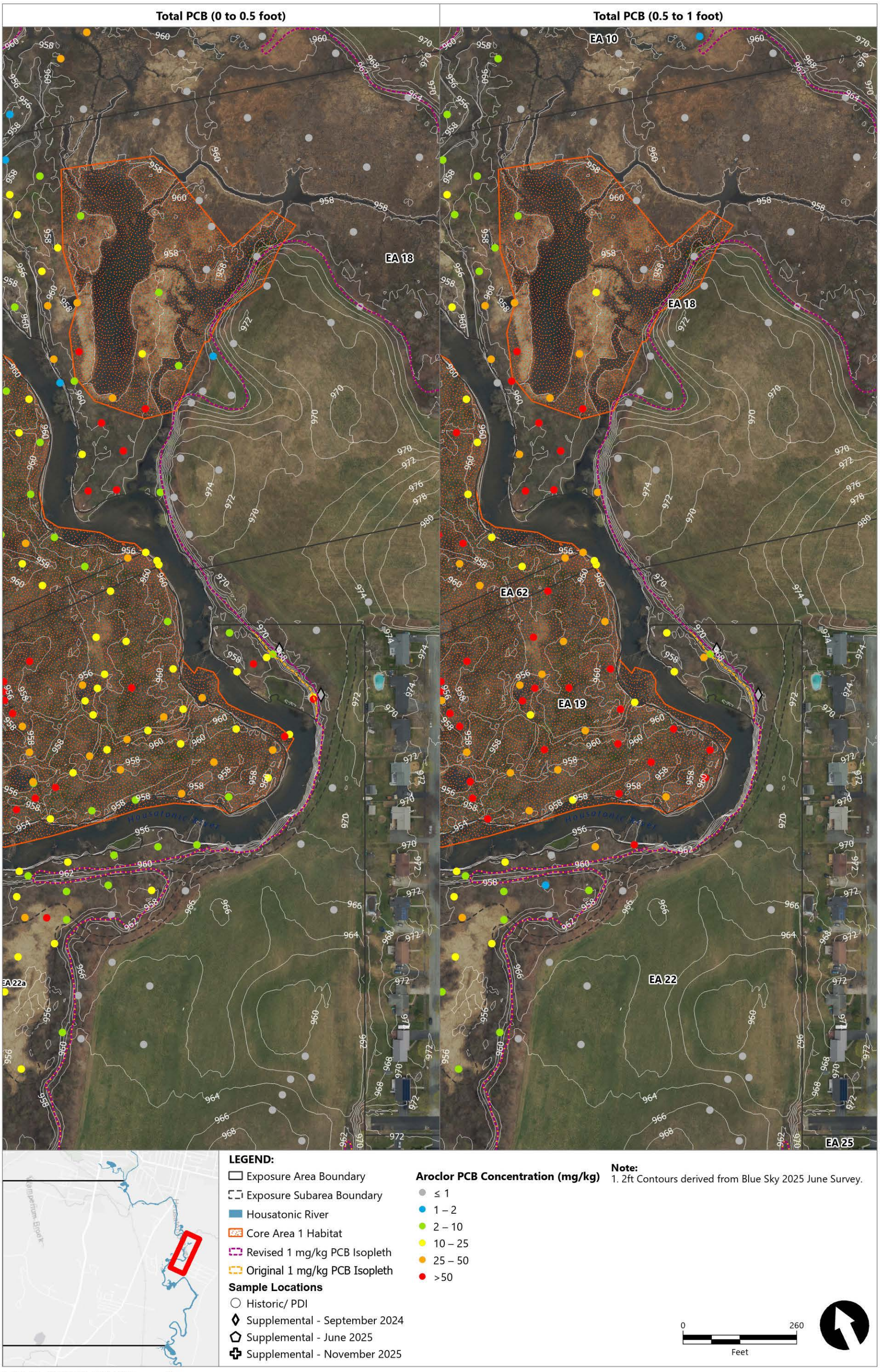

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Figure 1
Update to 1 mg/kg PCB Isopleth in Exposure Area 22
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

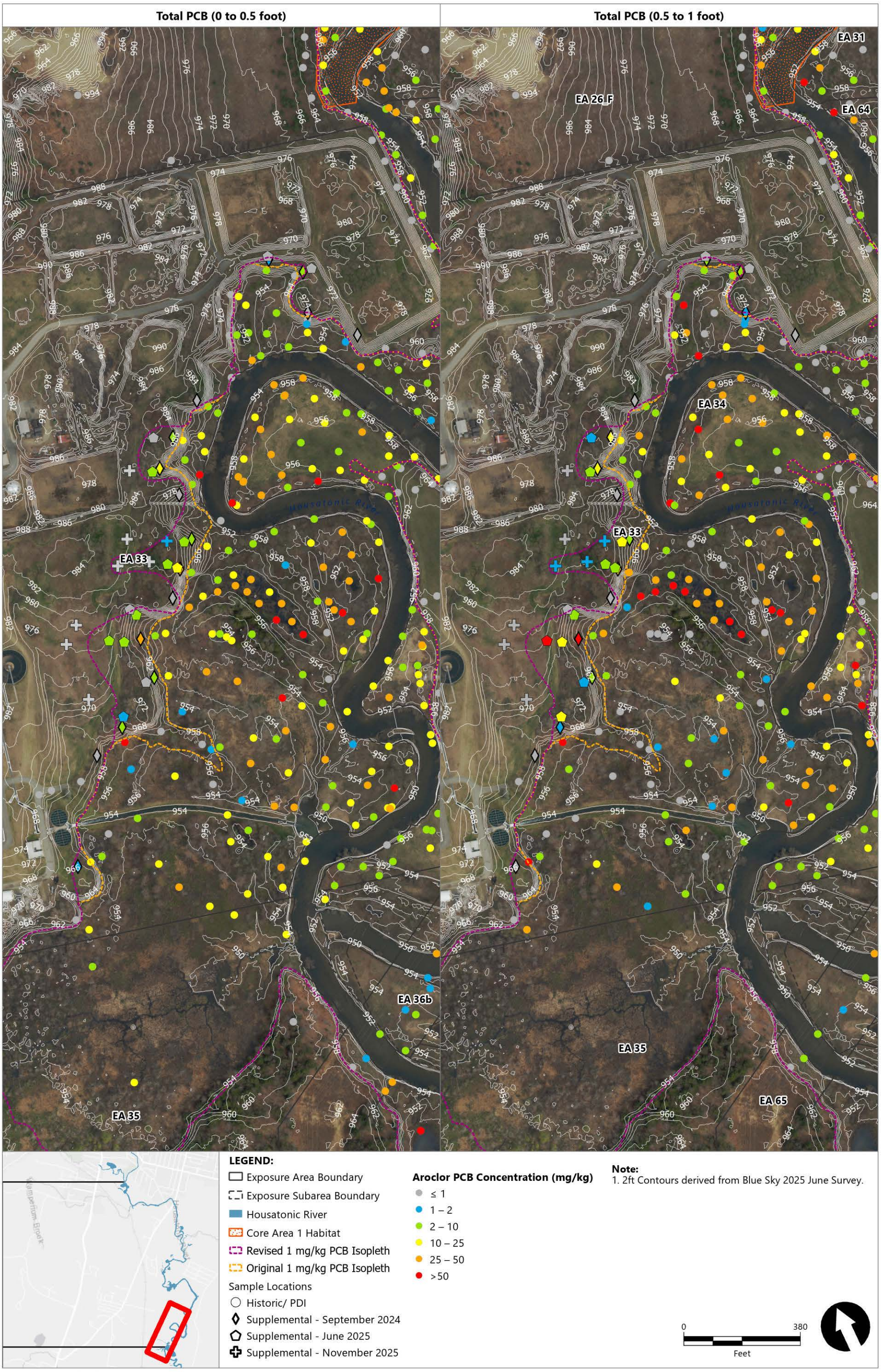

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Figure 2
Update to 1 mg/kg PCB Isopleth in Exposure Area 33
Revised Non-Residential Exposure Area PCB Evaluations
Housatonic River – Rest of River

Appendix K
Reach 5A Geotechnical Evaluations for Temporary Access Road Design



April 2026
Housatonic River – Rest of River

Reach 5A Geotechnical Evaluations for Temporary Access Road Design

Prepared for General Electric Company
Pittsfield, Massachusetts

April 2026
Housatonic River – Rest of River

Reach 5A Geotechnical Evaluations for Temporary Access Road Design

Prepared for
General Electric Company
1 Plastics Avenue
Pittsfield, Massachusetts 01201

Prepared by
Anchor QEA, Inc.
54 Genesee Street, Suite 100A
Camillus, New York 13031

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Attachment 2 Estimated Existing Ground Cover Depth Profiles and Plan View Figures

Attachment 3 Estimated Depth Existing Ground Cover Statistical Summary

Attachment 4 D-Load Calculations

Attachment 5 California Bearing Ratio Calculation Summary and Figures

ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ACPA	American Concrete Pipe Association
ASTM	ASTM International
Bluesky	Bluesky Geospatial Ltd.
C.T. Male	C.T. Male Associates of Latham, New York
CBR	California Bearing Ratio
City	City of Pittsfield
cm	centimeter
D-load	dead load
DCP	dynamic cone penetrometer
Final RD/RA Work Plan	*Final Remedial Design/Remedial Action Work Plan for Reach 5A*
GE	General Electric Company
GIS	geographic information system
lb/lf/ft	pound per linear foot per foot
LiDAR	Light Detection and Ranging
LRFD	Load and Resistance Factor Design
mm/blow	millimeter per blow
RCP	reinforced concrete pipe
WWTP	wastewater treatment plant

1 Introduction

This appendix to the *Final Remedial Design/Remedial Action Work Plan for Reach 5A* (Final RD/RA Work Plan) documents geotechnical evaluations performed in support of the Reach 5A temporary access road design.

As shown in the *Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A* (Anchor QEA et al. 2023), significant portions of the planned Reach 5A temporary access road layout are located along City of Pittsfield (City) sewer easements that traverse the area. Construction equipment and vehicles will traverse along the temporary access roads during the remediation, including trucks transporting excavated soils/sediment for disposal and trucks importing aggregate materials for backfill and cap construction. Use of the sewer easements in this manner capitalizes on the existing access paths and lack of vegetation in these areas since those areas are already disturbed.

Because some of the planned access roads follow existing sanitary sewer easements, the evaluations included the following: (1) review of existing sanitary sewer information provided by the City of Pittsfield; (2) estimation of the existing soil cover thicknesses on top of the sewer lines based on ground elevation data of the sewer easements and topographic survey data of the sewer structures; (3) assessment of the recommended cover thicknesses to maintain the stability of the sewer lines; and (4) identification of discrete areas where additional cover material (i.e., aggregate materials or mats) will be required for placement during construction of the temporary access roads.

In addition, a soil-bearing capacity evaluation was performed at representative locations to identify the suitability of various existing soils to support anticipated vehicle loads during construction. The findings of these evaluations were subsequently considered when designing the temporary access roads to support the Reach 5A remediation as described in the Final RD/RA Work Plan.

2 Sanitary Sewer Data

2.1 Sanitary Sewer Information

During the remedial design process, the General Electric Company (GE) discussed the proposed construction and use of temporary access roads with the City. This included temporary access roads on City property and specifically along segments of the sanitary sewer main easements that traverse the Reach 5A project area. The City subsequently provided geographic information system (GIS) files and Record Drawings for the constructed sanitary sewer pipeline to support the design evaluation. The City Record Drawings included *Main Intercepting Sewer – Record Drawings, Contract 1* (January 1960) and *Sackett Brook Intercepting Sewer – Record Drawings, Contract 24* (August 1967).

The City's Record Drawings indicate that the sanitary sewer lines beneath the proposed temporary access roads planned for west of Pomeroy Avenue and south of Holmes Road to the Pittsfield Wastewater Treatment Plant (WWTP) consist of a 72-inch Class IV reinforced concrete pipe (RCP). Sewer lines extending east and crossing the Housatonic River consist of 27-inch Class IV RCP. The City's GIS files and Record Drawings show the approximate location of the sanitary sewer pipelines and manholes along with pipe invert elevations at the manholes. The City confirmed that the sewer Record Drawings used a City-specific vertical datum, so the values were corrected to the project datum (North American Vertical Datum of 1988) based on field survey measurements.

Figure 1 shows the sanitary sewer easements and along with the proposed primary temporary access roads in Reach 5A. In general, the main intercepting sewer extends northwards from the Pittsfield WWTP to Holmes Road along the western side of the Housatonic River before it turns west and crosses the river on the east of the Pomeroy Avenue Bridge. After crossing the river, the sewer main extends westward beneath Pomeroy Avenue and passes through the Reach 5A floodplain before turning north. The sanitary sewer also crosses the river south of the confluence of the east and west branches of the river. The Sackett Brook intercepting sewer extends eastward from the main interceptor, crosses the river near Station 116+00, extends east to Eric Drive at a residential neighborhood, and turns north through Noble Farm before eventually crossing East New Lenox Road.

2.2 Survey Program

Field survey activities were performed to confirm the locations of the sanitary sewer manholes and lines within the project area and collect surveyed elevations of the sewer invert elevations. Data from the manhole survey and existing topographic survey data were used to support an evaluation of the amount of existing ground cover above the sewer main pipelines. A summary of these survey programs is provided in the following subsections.

2.2.1 Topographic Surveys

In April 2025, Bluesky Geospatial Ltd. (Bluesky) of North Adams, Massachusetts, gathered scaled high-resolution aerial photography and Light Detection and Ranging (LiDAR) survey data over more than 3,000 acres of the Housatonic River and the Reach 5A, 5B, 5C, and 6 floodplain corridors. Following the aerial survey and data processing, Bluesky delivered high-resolution orthoimagery, planimetric drawing files, and digital elevation model data (i.e., three-dimensional points, break lines, and one-foot contours). C.T. Male Associates of Latham, New York (C.T. Male), used the aerial imagery and elevation mapping to conduct field ground surveys to verify the topographic data in the Reach 5A project areas.

The data collected from the aerial and topographic surveys formed the basis of the ground elevations that were compared to the elevations estimated from the top of the sewer mains and structures. The estimation of elevations of the sewer main and structures is discussed in the following subsection.

2.2.2 Sanitary Sewer Survey

To estimate the elevations of the sewer main pipelines, C.T. Male was retained to perform a survey to document the location of sewer main manholes, aboveground structures, and easements. With assistance from City personnel, C.T. Male also opened over 40 sewer manholes and, where possible, surveyed and recorded the elevations of the ground surface at the manholes, sewer pipe inverts, and top of pipes and documented the size and type. The alignment of the sewer lines was estimated by drawing straight lines between the manhole locations surveyed by C.T. Male. A summary of C.T. Male's manhole survey data is included as Attachment 1.

2.3 Estimation of Ground Cover

Using the pipe elevation provided by C.T. Male data, Anchor QEA developed a three-dimensional model of the top of the sewer lines. The top-of-pipe elevations were based on the pipe invert elevations provided by C.T. Male, plus the inside diameter plus the concrete pipe wall thickness. That model was then compared to the ground elevation data to develop a series of profiles that were drawn along the alignment of the sewer mains. Figures 2 through 6 in Attachment 2 show the plan view alignments and stationing for the segments of the sewers where soil cover thicknesses were evaluated. The corresponding profiles are included as Figures 7 through 11 in Attachment 2.

The depth (or thickness) of ground cover was determined on the profiles every 50 feet by measuring the vertical distance from the ground surface to the top of the modeled pipe. Cover thicknesses were also measured at discrete locations where visual inspection identified low spots or depressions in the existing ground surface. Those measurements were summarized for each sewer segment. A statistical summary of the average, minimum, and maximum depths of ground cover for the sewer lines in

discrete project areas is included as Attachment 3. In general, average cover depths above the main interceptor (where access roads are currently proposed for construction) range from approximately 4.3 to 5.5 feet, with maximum cover depths above the main interceptor ranging from approximately 7.4 to 10 feet.

Measurements of ground cover above the sewer pipelines that are less than three feet were identified in two locations west of Pomeroy Avenue, in two locations south of Holmes Road, and in several locations where the sewer runs below the City WWTP property. These locations are depicted on Figures 2 through 6 in Attachment 2. Those figures depict plan views of the sewer pipeline alignments and manhole locations and use color coding to indicate the range of ground cover thickness above the pipelines, based on the measurements collected form the profiles.

Using this information, C.T. Male collected additional topographic survey data in the shallow depth areas that were identified to verify the ground elevation data. It was determined that, in most areas, three or more feet of ground cover exists above the sewer mains. However, as noted, ground cover thicknesses in certain discrete areas were estimated to be less than three feet. The minimum cover thickness that was identified (approximately 1.6 feet) is along the main intercepting sewer line located west of Pomeroy Avenue near Staging Area SA-1 (refer to Figure 2 in Attachment 2). This area of reduced pipe burial depth appears to be related to erosion caused by the Intermittent Side Channel that occurred since construction of the sewer line.

3 Minimum Cover Evaluation

3.1 Evaluation Approach

This section summarizes the findings of an evaluation of the existing 72-inch sanitary sewer RCP where temporary access roads are planned for the purpose of determining a minimum cover thickness to be provided above the sewer pipe in areas that will be used as temporary access roads. The City Record Drawings identified the main intercepting sewer as the 72-inch RCP. Based on the *Revised On-Site and Off-Site Transportation and Disposal Plan* (Arcadis 2024), it is assumed that the vehicles planned for hauling materials and equipment over the temporary access roads will include tandem axle intermodal container haul trucks and heavy tandem axle dump trucks. The axle loads and configurations of these vehicles are represented by the American Association of State Highway and Transportation Officials (AASHTO) HL-93 vehicular loading. HL-93 is the current standard live load model for highway bridges defined in the AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications and has replaced the HS-20 loading designation used in earlier AASHTO specifications.

The following information was reviewed for this evaluation:

- City Record Drawing *Main Intercepting Sewer – Record Drawings, Contract 1*, dated January 1960;
- ASTM International (ASTM) C76 Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe;
- American Concrete Pipe Association (ACPA) Concrete Design Manual; and
- Existing Depth of Cover Summary Statistics developed as described in Section 2.3 (Attachment 3).

The existing 72-inch RCP is indicated as "Class IV" per the City Record Drawings. The ACPA Concrete Pipe Design Manual provides a procedure for computing the pipe strength requirement based on burial depth, soil loads, fluid loads, and traffic loads. ASTM C76 specifies strength classes based on dead load (D-load) at 0.01-inch crack and ultimate load. The 0.01-inch crack D-load ($D_{0.01}$) is the maximum three edge bearing test load supported by a concrete pipe before a crack occurs having a width of 0.01 inch measured at close intervals, through a length of at least 1 foot. D-loads are expressed in pound per linear foot of inside pipe diameter (lb/lf/ft). Per ASTM C76, the $D_{0.01}$ rating for a Class IV pipe is 2,000 lb/lf/ft.

Based on review of plans and field survey data (Attachment 3), it is estimated that burial depth of the existing main interceptor sewer pipelines varies from approximately 1.6 to 10 feet as noted in Section 2.3.

Using the procedure detailed in Chapter 4 of the ACPA Design Guide, the required $D_{0.01}$ was computed ($D_{0.01}$-computed) for the 72-inch RCP with depth of cover from ground surface to top of pipe of three feet and one foot. Calculations are provided in Attachment 4. Results of these analyses indicate $D_{0.01\text{-computed}}$ of 655 lb/lf/ft and 898 lb/lf/ft for depths of cover of three feet and one foot, respectively. These values are based on a factor of safety of 1.0 following guidance in the above-mentioned ACPA Design Manual. These values are based on AASHTO HL-93 vehicular live loading.

The HL-93 live load model includes either a Design Truck with two 32,000-pound rear axles or a Design Tandem with two 25,000-pound axles, applied in combination with a uniform lane load, providing a conservative representation of heavy highway vehicles similar to or exceeding HS-20 loading effects. The actual factor of safety was computed as the ratio of the $D_{0.01\text{-Class IV-rated}}$ for the Class IV RCP to the computed $D_{0.01\text{-computed}}$. The computed factors of safety for three-foot and one-foot depths of cover were 3.1 and 2.2, respectively.

Additional research was conducted to correlate with and confirm the conclusions from the above analyses. The following references provide additional evidence regarding the minimum depth of cover above Class IV RCP for construction access roads:

- AASHTO LRFD Bridge Design Specifications, 2020 Edition, Section 12.6.6.3 "Minimum Cover" indicates minimum cover for RCP under unpaved areas or on top of flexible pavement as the greater of 1/8 of the pipe outside diameter, or 12 inches.
- Minnesota Department of Transportation Technical Memorandum, dated February 25, 2020, indicates minimum cover requirements for 72-inch Class IV round RCP of 1.75 feet for flexible paved roads and 1.5 feet for unpaved roads based on HL-93 loading.
- Oklahoma Department of Transportation, 2019 Roadway Design Standard Drawing, R-63, dated June 30, 2022, indicates that the "minimum height of cover from top of subgrade for [RCP] shall be 12 inches" based on HS-20 loading."

Finally, it was noted that the City Record Drawings for the main intercepting sewer (Contract 1, Sheet No 21, Miscellaneous Details, Detail No. 1) indicate a minimum three feet of cover from top of pipe to top of pavement or aggregate roadway surface for road construction.

3.2 Results and Recommendations

Based on the results of geotechnical evaluation, Anchor QEA recommends a minimum of three feet of cover above the 72-inch RCP sanitary sewer lines where temporary access roads are proposed to be constructed. This provides an adequate factor of safety based on the ACPA Design Manual and is consistent with the original design cover thickness for the sewer.

As discussed in Section 2.3, nearly all the length of sewer lines where temporary access roads are proposed have three or more feet of existing ground cover. In accordance with the Final RD/RA Work Plan, the temporary access roads that follow existing sewer lines are expected to be constructed with a nominal thickness of 12 inches of crush stone. Therefore, only sections with less than two feet of existing cover would potentially contain less than three feet of cover after the roads are constructed. As noted above, only one segment was identified as having less than two feet of existing cover. That area is identified on the Technical Drawings (Appendix A to the Final RD/RA Work Plan), which direct the contractor to install additional gravel access road thickness, as needed, to provide at least three feet of cover above the top of the sewer pipe.

4 Temporary Access Road Design

4.1 Evaluation Approach

As part of the supplemental data collection program, dynamic cone penetrometer (DCP) tests were performed between September 4 and October 4, 2024, at a total of 52 locations, consisting of 46 locations along proposed temporary access roads and six locations within proposed temporary staging areas located within the Reach 5A project area. The resulting data were used to identify the presence of soft or unstable conditions in these locations by measuring the tested soil's resistance to the penetration of a cone.

DCP tests were conducted using a hand-operated, multi-flight steel probe with a sacrificial steel conical tip and a 35-pound hammer weight. The steel probe and conical tip were advanced by manually raising the hammer 15 inches and dropping it in free fall to strike the top of the probe, transferring energy through the lower flights to the cone tip. Advancement of the probe was recorded in 10-centimeter (cm) increments until a practical refusal criterion was met (i.e., greater than 50 blows per 10 cm) or maximum depth of the available steel flights were reached (i.e., typically less than 15 feet). Blows to drive each 10 cm increment were recorded through the termination of the test. Measured blow counts were then correlated to standard penetration test N values to characterize soil stiffness and density.

Resulting blow counts from each test were used to calculate the California Bearing Ratio (CBR), a correlation relating rate of penetration to soil stiffness. Correlated CBR values were used to understand the subgrade support required, in this case for proposed construction access roads throughout Reach 5A.

4.2 Assumptions

CBR values were calculated for each location using Nazzal (2003) and White et al. (2018) correlations (USACE 2025). A modified averaging approach was applied for this evaluation because the Nazzal correlation is unreliable at low penetration rates (which were observed at certain testing locations), and the standard 12.5 millimeter/blow cutoff for averaging the two correlations was not appropriate for the observed conditions. Instead, an averaged curve between the two CBR correlation curves was used to develop a modified relationship that better represents the observed DCP data. The resulting CBR equation is presented as follows.

Equation 1
CBR Modified Averaging Correlation

$$CBR = \frac{300}{PR^{1.025}}$$

where:
PR = Penetration Rate (mm/blow)

4.3 Results and Recommendations

Calculated CBR values, together with roadway design assumptions, were used to determine the required subgrade support and corresponding gravel thickness at each DCP location. Lower CBR values indicate weaker soils requiring greater structural support, while higher values reflect more competent subgrade conditions. DCP locations were thus categorized as having high (Class A), medium (Class B), or low (Classes C and D) subgrade support based on their calculated CBR. Traffic loading was also incorporated into the analysis, assuming 10 to 25 heavy truck trips per day, as increased loading necessitates greater gravel thickness. These factors were used to calculate the minimum gravel section required to support construction traffic under existing subgrade conditions. A summary of roadway conditions and associated requirements is provided in Table 1.

Table 1
Summary of Roadway Conditions

Subgrade Support Condition	Correlated CBR Value	Minimum Gravel Layer Thickness (inches)
A	CBR >10 percent	7.0
B	3< CBR ≤10 percent	9.0
C	≤3%	11.5
D[1]	≤3% and visually marshy/unstable	—

Note:
1. Class D roadway conditions are not given an assigned gravel layer thickness and instead require a ground stabilization alternative.

In addition, a summary table compiling the DCP locations and their associated CBR values and subgrade conditions can be found in Table 1 of Attachment 5.

Conditions observed at each DCP location, together with their distribution along the project corridor, were used to develop a map illustrating subgrade conditions and corresponding typical aggregate sections along the proposed construction roadway alignment. This map is shown in Figures 1a through 1d of Attachment 5.

The proposed roadways are predominantly underlain by Class A subgrade conditions, with isolated segments classified as Class B or C. A limited number of segments were identified as Class D and are not recommended to support construction traffic without stabilization measures.

In these areas, potential ground improvement measures may include the following:

- Placement of geogrid reinforcement at the base of the aggregate section;
- Alternative construction materials to distribute applied loads (e.g., crane mats or composite mats); and
- Adaptive management, including periodic maintenance and repair to restore roadway performance.

These measures may be implemented individually or in combination, depending on site-specific conditions.

5 Conclusion

The findings of the geotechnical evaluations summarized herein should be considered when constructing the Reach 5A temporary access roads. Discrete areas requiring additional ground cover or soil support are identified on the Design Drawings (Appendix A to the Final RD/RA Work Plan) and requirements are included in the Technical Specifications (Appendix B to the Final RD/RA Work Plan) to direct the construction of the temporary access roads.

6 References

Anchor QEA, AECOM, and Arcadis, 2023. *Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A*. Housatonic River – Rest of River. Prepared for General Electric Company, Pittsfield, Massachusetts. September 2023.

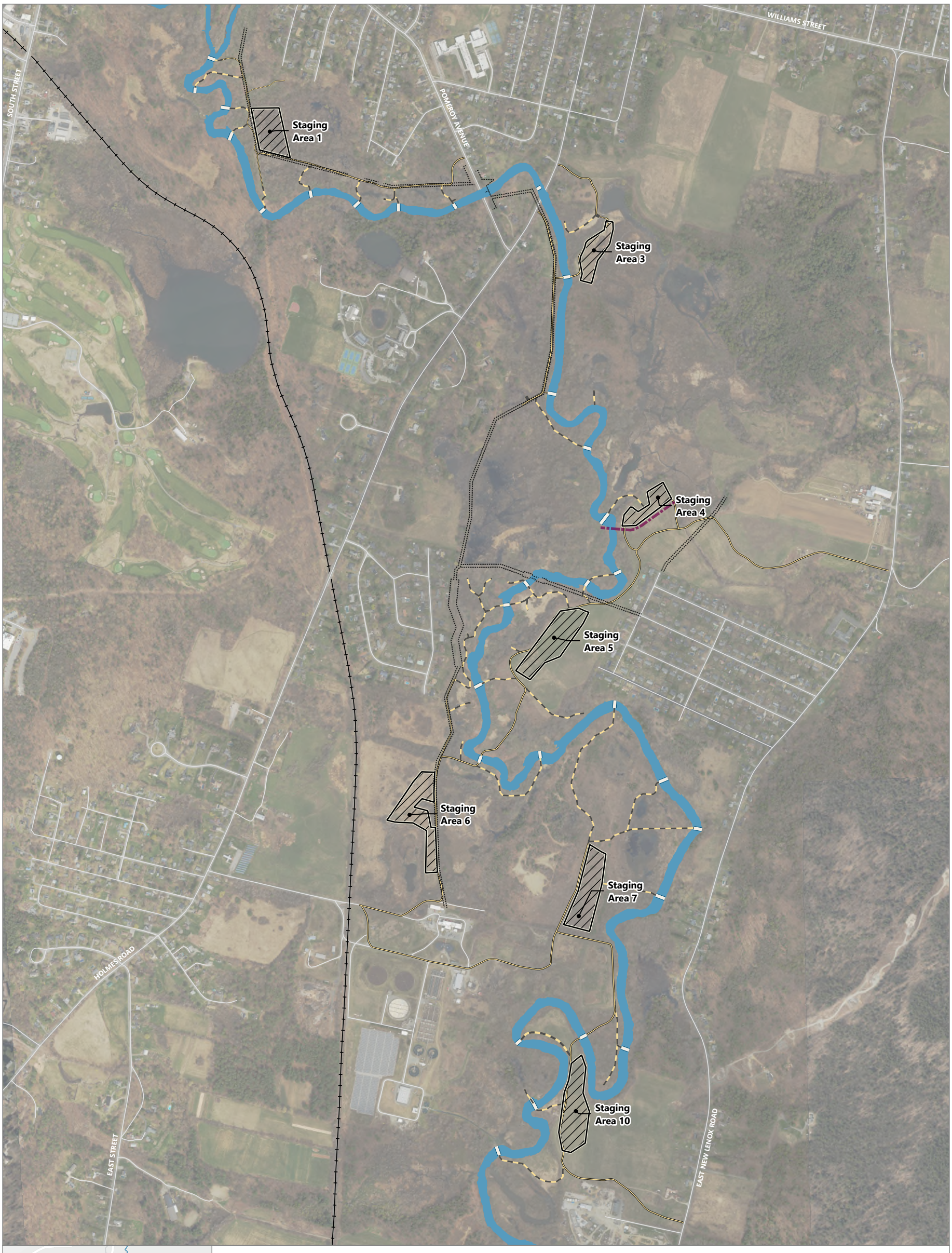
Arcadis, 2024. *Revised On-Site and Off-Site Transportation and Disposal Plan, Housatonic River – Rest of River, Pittsfield, Massachusetts*. Prepared for General Electric Company. October 2024.

Nazzal, M.D., 2003. *Field Evaluation of In-Situ Test Technology for QC/QA During Construction of Pavement Layers and Embankments*. Master's thesis. Baton Rouge, Louisiana. Louisiana State University; Civil and Environmental Engineering Department. https://repository.lsu.edu/gradschool_theses/1002.

USACE (U.S. Army Corps of Engineers), 2025. *Unified Facilities Criteria Soil Mechanics Design Manual 7.1*. Document UFC-3-220-10. March 2025.

White, D.J., P. Vennapusa, E. Tutumluer, W. Vavrik, M. Moaveni, and S. Gillen, 2018. "Spatial Verification of Modulus for Pavement Foundation System." *Transportation Research Record: Journal of the Transportation Research Board* 2672(52):333–346.

Figure



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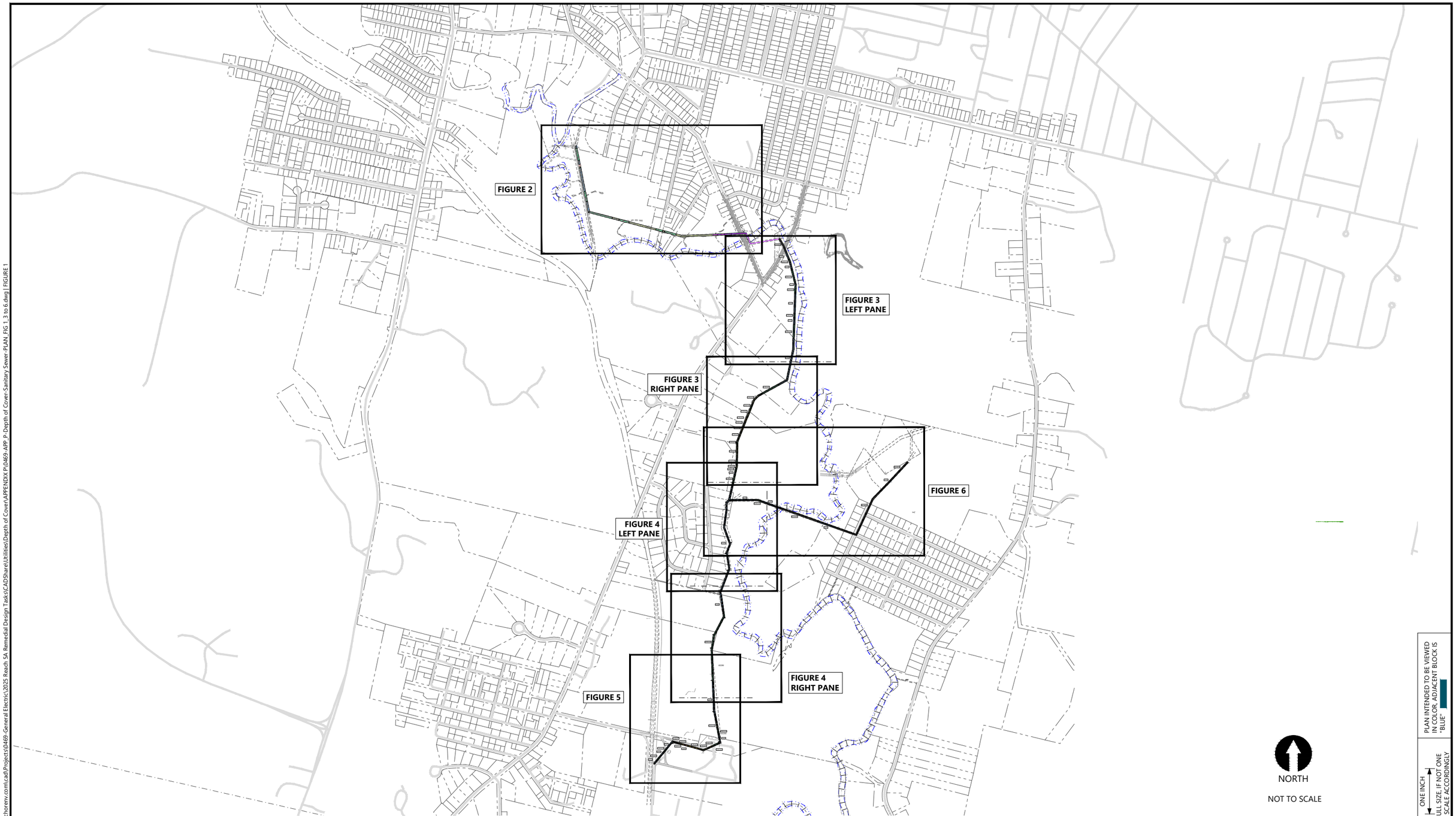
ANCHOR QEA

Figure 1
Reach 5A Temporary Access Roads and Sanitary Sewer Line Easements
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

Attachment 1
Summary of C.T. Male Sanitary Sewer Topographic Survey Data

C.T. MALE POINT ID	EASTING (MA83F, USFT)	NORTHING (MA83F, USFT)	RIM ELEVATION (NAVD88, USFT)	DESCRIPTION (CITY OF PITTSFIELD ID)	GROUND ELEVATION (NAVD88, USFT)	INVERT IN (NAVD88, USFT)	INVERT OUT (NAVD88, USFT)	TOP PIPE INSIDE (NAVD88, USFT)	REMARKS
6119	183410.9170	2987886.8310	968.63	SIPHON 6119	966.80				INVERT NOT NEEDED
6118	183585.0262	2987887.2756	967.14	SIPHON 6118	965.74	954.90		957.40	
							954.80	959.30	
2691	183806.7610	2988186.1950	964.18	SMH B0250					INVERT NOT NEEDED
190	183746.1180	2987883.3980	964.52	SMH B0190	964.10	954.52	953.12	961.02	CANT SEE PIPES
180	183834.5213	2987430.0928	964.05	SMH B0180	964.18	952.85	952.85	958.05	CANT SEE PIPES
170	183932.2402	2986935.5492	962.75	SMH B0170	962.87				UNABLE TO OPEN
160	184351.4677	2986825.9901	961.85	SMH B0160	962.04	952.45	952.45	958.25	
150	184779.1191	2986715.3536	961.75	SMH B0150	961.80	950.45	950.45	958.05	
140	185266.9296	2986588.3470	961.59	SMH B0140	961.91	952.29	952.29	958.19	
130	185720.0654	2986603.8312	961.62	SMH B0130	961.56	952.12	952.12	957.82	
				MH B0120					MH NOT FOUND, NOT SHOWN ON SEWER PLANS (MAY NOT EXIST)
2374	186151.3281	2986625.8226	941.26	SMH	971.67	927.58	927.56		10"PVC (NOT MH B0120)
6108	186199.6400	2986625.9150	969.07	SIPHON MH		951.10		N/A	LANDOWNER USES CONC PAD FOR CARPORT
6107	186257.4240	2986476.5440	968.96	SIPHON MH		950.90		954.90	4'X4' BRICK
10010	186676.1980	2986548.7560	962.42	SMH B0110	962.97				INVERT NOT NEEDED
				MH B0100					MH NOT FOUND, NOT SHOWN ON SEWER PLANS (MAY NOT EXIST)
90	186826.2320	2986221.3506	961.42	SMH B0090	961.65	950.72	950.72	957.02	
80	186909.3678	2985886.0907	961.42	SMH B0080	962.23	950.22	950.22	957.22	
70	186891.9717	2985413.2250	961.08	SMH B0070	961.37	950.53	950.53	956.28	
60	186874.8447	2984949.9665	961.83	SMH B0060	962.32	950.13	950.13	956.13	
50	186784.5733	2984514.0215	960.87	SMH B0050	961.25	949.87	949.87	955.67	
40	186378.1235	2984291.0832	960.20	SMH B0040	960.40	950.00	950.00	956.40	
2742	186313.2850	2984230.2540		SMH B0030+-	959.66				SOUNDING MH+- (2 FOOT BELOW GROUND IS A BURIED METAL PLATE)
2617	186068.6710	2983628.5020	958.97	SMH B0020	958.88	949.50	949.50	955.60	72" PIPE
2609	186061.0090	2983272.8480	958.93	SMH B0010	959.01	949.40	949.40	955.50	72" PIPE
2597	185951.5580	2982784.3240	961.89	SMH JUNCT 33	961.55	948.70	948.70	954.70	72" PIPE
						952.40			27" BRICK INVERT IN FROM EAST MH C0010
240	185915.6912	2982745.3835	961.85	SMH A0140	962.10	949.05	949.05	955.15	
				MH A0130					MH NOT FOUND, NOT SHOWN ON SEWER PLANS (MAY NOT EXIST)
				MH A1960					MH NOT FOUND
220	185878.7726	2982392.1806	963.69	SMH A0120	963.74	948.89	948.89	954.99	
110	185964.8135	2982152.7878	964.68	SMH A0110	965.21	948.78	948.73	955.18	72" PIPE
100	185917.4175	2982029.0494	964.95	SMH A0100	965.62	948.85	948.85	954.85	72" PIPE
	185954.1850	2981792.0020	967.00	SMH A0090	964.28				CENTER 16'X18' CONC STRUCTURE WITH LOCKED CHAIN LINK FENCE
				SMH A0080					MH NOT FOUND
				SMH A0070					MH NOT FOUND, NOT SHOWN ON SEWER PLANS (MAY NOT EXIST)
				SMH A1890					INVERT NOT NEEDED, MH NOT FOUND
260	185877.8707	2981109.7107	959.11	SMH A0060	959.22	948.41	948.41	954.51	72" PIPE
250	185732.5990	2980829.3179	959.07	SMH A0050	958.88	948.17	948.17	954.47	72" PIPE
340	185701.9212	2980626.5328	959.30	SMH A0040	959.22	948.20	948.20	954.60	
30	185719.1176	2980182.6410	958.10	SMH A0030	958.32	948.50	948.50	953.40	
20	185735.6391	2979759.4448	960.89	SMH A0020	960.86	947.69	947.69	954.24	72" PIPE
10	185824.2990	2979293.6641	965.29	SMH A0010	965.51			960.30	953.2 SUMP (CANT SEE TUNNEL OFFSET 8' WEST OF MH)
2636	185584.6180	2979184.9440	964.49	SMH A0150	964.58	955.84		957.29	VCP IN FROM WEST SMH A0160
						957.54		958.79	VCP IN FROM SOUTHWEST
						958.94		960.19	VCP IN FROM SOUTH
							955.84	957.09	VCP OUT TO SMH A0010
2643	185137.4390	2979308.5400	969.12	SMH A0160	969.12	962.77		964.12	VCP IN FROM SMH A0170
							962.47	964.02	VCP OUT TO SMH A0150
2628	184873.5209	2978990.9555	980.11	SMH A0170	979.96	972.86		973.90	VCP IN FROM WEST
							971.61	972.90	VCP OUT TO SMH A0160
2493	186363.2100	2982785.8600	960.29	SMH C0010	960.24	953.44	953.44	955.79	27" BRICK
2513	186631.2200	2982688.5500	963.03	SMH SIPHON 6104.1	958.75	954.23	954.13	953.23	14" BRICK IN, 27" BRICK OUT
2678	186763.7220	2982644.6310	965.29	SMH SIPHON 6104.2	960.55				INVERT NOT NEEDED
2684	187005.8570	2982559.3330	961.82	SMH C0020					INVERT NOT NEEDED
2711	187249.0420	2982472.0270	965.67	SMH C0030	965.67	956.90	956.90	959.60	
2720	187514.4860	2982378.6160	966.98	SMH C0040	966.98	957.50	957.50	959.90	
2651	187783.1300	2982284.5870	970.91	SMH C0050	970.91				INVERT NOT NEEDED
2654	187915.5180	2982573.5520	972.59	SMH C0060	972.59				INVERT NOT NEEDED
2657	188021.3050	2982801.5540	981.61	SMH C0070	981.61	958.90	958.90	961.30	
2667	188267.5630	2983055.9160	967.7*	SMH C0080	967.70	959.50	959.50	961.80	* TOP CONC NO RIM COVER
				SMH C0090					MH NOT FOUND

Attachment 2
Estimated Existing Ground Cover Depth Profiles and Plan View Figures



NORTH

NOT TO SCALE

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: --
DRAWN BY: D. BINKNEY
CHECKED BY: C. GUEST
APPROVED BY: --
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A FINAL DESIGN
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

SANITARY SEWER PLAN AND PROFILE
KEY MAP

FIG 1

SHEET # 1 OF 11

Apr 01, 2026 1:51pm dbinkney \\gala.anchorenv.com\cad\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\CADShare\Utilities\Depth of Cover\APPENDIX P\0469-APP_P-Depth of Cover-Sanitary Sewer-PLAN_FIG 1_3 to 6.dwg] FIGURE 1



NOTES:

1. SANITARY SEWER MANHOLE LOCATIONS AND TOP OF SEWER PIPE ELEVATIONS SURVEYED BY C.T. MALE (2025-2026).
2. ALIGNMENT OF SEWER LINES AND TOP OF PIPE DRAWN BY ANCHOR QEA CONNECTING THE MANHOLE LOCATIONS USING THE ELEVATIONS PROVIDED BY C.T. MALE.
3. GROUND SURFACE ELEVATIONS BASED ON BLUESKY LIDAR SURVEY (2025).
4. DEPTH OF COVER BASED ON GROUND SURFACE MINUS MODELED TOP OF PIPE, MEASURED EVERY 50-FEET ALONG THE DEPICTED ALIGNMENT.
5. PROPOSED LOCATIONS AND ALIGNMENTS OF ACCESS ROADS AND STAGING AREAS IS PRELIMINARY AND SUBJECT TO CHANGE.

APPROXIMATE DEPTH OF COVER LEGEND:

- LESS THAN 2-FT.
- 2 TO 3-FT.
- 3 TO 4-FT.
- 4 TO 5-FT.
- GREATER THAN 5-FT.

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

ONE INCH

AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

NOT FOR CONSTRUCTION

ANCHOR QEA

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: --
DRAWN BY: D. BINKNEY
CHECKED BY: C. GUEST
APPROVED BY: --
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A FINAL DESIGN
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

SANITARY SEWER SYSTEM
APPROXIMATE DEPTH OF COVER

FIG 2

SHEET # 2 OF 11

\\gala.anchorenv.com\cad\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\CADShare\Utilities\Depth of Cover\APPENDIX P\0469-APP_P-Depth of Cover-Sanitary Sewer-PLAN_FIG 2.dwg | FIGURE 2

Apr 01, 2026 3:00pm dbinkney

NOTES:

1. SANITARY SEWER MANHOLE LOCATIONS AND TOP OF SEWER PIPE ELEVATIONS SURVEYED BY C.T. MALE (2025-2026).
2. ALIGNMENT OF SEWER LINES AND TOP OF PIPE DRAWN BY ANCHOR QEA CONNECTING THE MANHOLE LOCATIONS USING THE ELEVATIONS PROVIDED BY C.T. MALE.
3. GROUND SURFACE ELEVATIONS BASED ON BLUESKY LIDAR SURVEY (2025).
4. DEPTH OF COVER BASED ON GROUND SURFACE MINUS MODELED TOP OF PIPE, MEASURED EVERY 50-FEET ALONG THE DEPICTED ALIGNMENT.
5. PROPOSED LOCATIONS AND ALIGNMENTS OF ACCESS ROADS AND STAGING AREAS IS PRELIMINARY AND SUBJECT TO CHANGE.

APPROXIMATE DEPTH OF COVER LEGEND:

- LESS THAN 2-FT.
- 2 TO 3-FT.
- 3 TO 4-FT.
- 4 TO 5-FT.
- GREATER THAN 5-FT.

NO DATA

>5-FT

4 TO 5-FT

>5-FT

4 TO 5-FT

>5-FT

4 TO 5-FT

>5-FT

4 TO 5-FT

>5-FT

4 TO 5-FT

>5-FT

PROPOSED ACCESS ROADS

ALIGNMENT OF SANITARY SEWER PIPELINE

SANITARY SEWER MANHOLE

EXISTING ROADS

HOUSATONIC RIVER

HOLMES ROAD

POMEROY AVENUE

HOUSATONIC RIVER

NORTH

0 100 200

SCALE IN FEET

MATCHLINE (FIGURE 3 - RIGHT PANE)

MATCHLINE (FIGURE 3 - LEFT PANE)

EXISTING ROADS

>5-FT

4 TO 5-FT

3 TO 4-FT

4 TO 5-FT

SANITARY SEWER MANHOLE

3 TO 4-FT

2 TO 3-FT

3 TO 4-FT

2 TO 3-FT

3 TO 4-FT

ALIGNMENT OF SANITARY SEWER PIPELINE

4 TO 5-FT

3 TO 4-FT

4 TO 5-FT

3 TO 4-FT

4 TO 5-FT

>5-FT

4 TO 5-FT

HOUSATONIC RIVER

PROPOSED ACCESS ROADS

HOUSATONIC RIVER

NORTH

0 100 200

SCALE IN FEET

MATCHLINE (FIGURE 4 - LEFT PANE)

NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: --
DRAWN BY: D. BINKNEY
CHECKED BY: C. GUEST
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HOUSATONIC RIVER REACH 5A FINAL DESIGN
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

SANITARY SEWER SYSTEM
APPROXIMATE DEPTH OF COVER

FIG 3

SHEET # 3 OF 11

\\galia.anchorenv.com\cad\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\CADShare\Utilities\Depth of Cover\APPENDIX P\0469-APP-P-Depth of Cover-Sanitary Sewer-PLAN_FIG 1_3 to 6.dwg] FIGURE 3

Apr 01, 2026 1:58pm dbinkley

NOTES:

1. SANITARY SEWER MANHOLE LOCATIONS AND TOP OF SEWER PIPE ELEVATIONS SURVEYED BY C.T. MALE (2025-2026).
2. ALIGNMENT OF SEWER LINES AND TOP OF PIPE DRAWN BY ANCHOR QEA CONNECTING THE MANHOLE LOCATIONS USING THE ELEVATIONS PROVIDED BY C.T. MALE.
3. GROUND SURFACE ELEVATIONS BASED ON BLUESKY LIDAR SURVEY (2025).
4. DEPTH OF COVER BASED ON GROUND SURFACE MINUS MODELED TOP OF PIPE, MEASURED EVERY 50-FEET ALONG THE DEPICTED ALIGNMENT.
5. PROPOSED LOCATIONS AND ALIGNMENTS OF ACCESS ROADS AND STAGING AREAS IS PRELIMINARY AND SUBJECT TO CHANGE.

APPROXIMATE DEPTH OF COVER LEGEND:

- LESS THAN 2-FT.
- 2 TO 3-FT.
- 3 TO 4-FT.
- 4 TO 5-FT.
- GREATER THAN 5-FT.

NORTH

0 100 200

SCALE IN FEET

3 TO 4-FT

4 TO 5-FT

>5-FT

4 TO 5-FT

MATCHLINE (FIGURE 3 - RIGHT PANE)

>5-FT

>5-FT

4 TO 5-FT

PROPOSED ACCESS ROADS

ALIGNMENT OF SANITARY SEWER PIPELINE

SANITARY SEWER MANHOLE

MATCHLINE (FIGURE 6)

>5-FT

HOUSATONIC RIVER

EXISTING ROADS

MATCHLINE (FIGURE 4 - RIGHT PANE)

SHETLAND DRIVE

PINTO DRIVE

PALOMINO DRIVE

CLYDESDALE DRIVE

MATCHLINE (FIGURE 4 - LEFT PANE)

EXISTING ROADS

>5-FT

HOUSATONIC RIVER

SANITARY SEWER MANHOLE

PROPOSED ACCESS ROADS

4 TO 5-FT

ALIGNMENT OF SANITARY SEWER PIPELINE

NORTH

0 100 200

SCALE IN FEET

MATCHLINE (FIGURE 5 - LEFT PANE)

>5-FT

NOT FOR CONSTRUCTION

PLAN INTENDED TO BE VIEWED IN COLOR. ADJACENT BLOCK IS "BLUE"

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

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Apr 01, 2026 1:59pm dbinkney

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: --
DRAWN BY: D. BINKNEY
CHECKED BY: C. GUEST
APPROVED BY: --
SCALE: AS NOTED
DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A FINAL DESIGN
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

SANITARY SEWER SYSTEM
APPROXIMATE DEPTH OF COVER

FIG 4

SHEET # 4 OF 11

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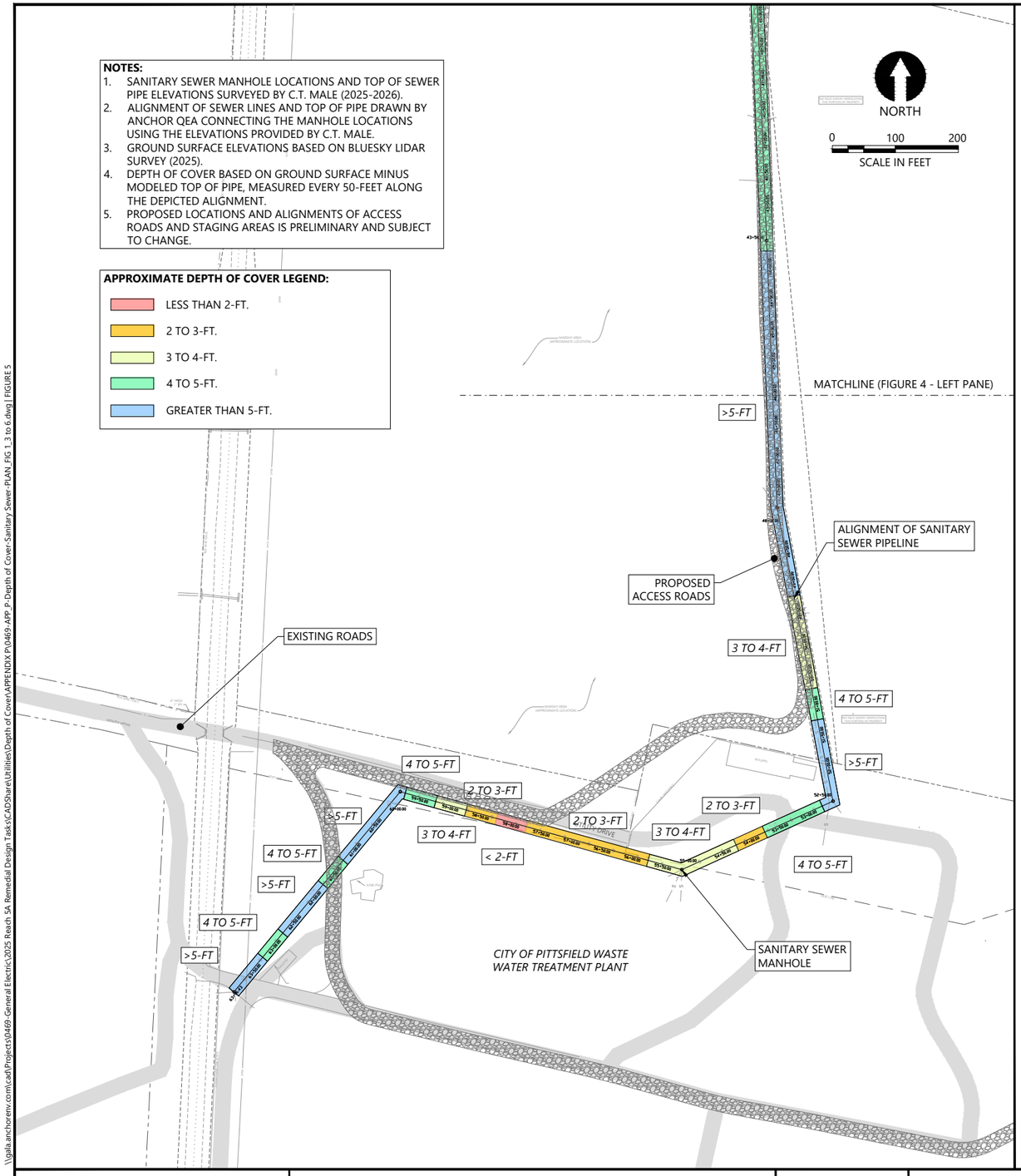
APPROXIMATE DEPTH OF COVER LEGEND:

- LESS THAN 2-FT.
- 2 TO 3-FT.
- 3 TO 4-FT.
- 4 TO 5-FT.
- GREATER THAN 5-FT.



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NOT FOR CONSTRUCTION

ANCHOR QEA

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PITTSFIELD, MASSACHUSETTS

SANITARY SEWER SYSTEM
APPROXIMATE DEPTH OF COVER

FIG 5

SHEET # 5 OF 11

Apr 01, 2026 2:00pm dbinkney \\galla.anchorenv.com\cad\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\CADShare\Utilities\Depth of Cover\APPENDIX P\0469-APP-P-Depth of Cover-Sanitary Sewer-PLAN_FIG 1_3 to 6.dwg] FIGURE 5

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- LESS THAN 2-FT.
- 2 TO 3-FT.
- 3 TO 4-FT.
- 4 TO 5-FT.
- GREATER THAN 5-FT.

NORTH

0 100 200

SCALE IN FEET

2 TO 3-FT
3 TO 4-FT
4 TO 5-FT
3 TO 4-FT
4 TO 5-FT
3 TO 4-FT
4 TO 5-FT
>5-FT
4 TO 5-FT
>5-FT
>5-FT
4 TO 5-FT
>5-FT
>5-FT
>5-FT
NO DATA
NO DATA
NO DATA
>5-FT
>5-FT

ALIGNMENT OF SANITARY SEWER PIPELINE

MATCHLINE (FIGURE 4 - LEFT PANE)

PROPOSED ACCESS ROADS

EXISTING ROADS

SANITARY SEWER MANHOLE

HOUSATONIC RIVER

HOUSATONIC RIVER

PALOMINO DRIVE

PINTO DRIVE

PALOMINO

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GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

SANITARY SEWER SYSTEM
APPROXIMATE DEPTH OF COVER

FIG 6

SHEET # 6 OF 11

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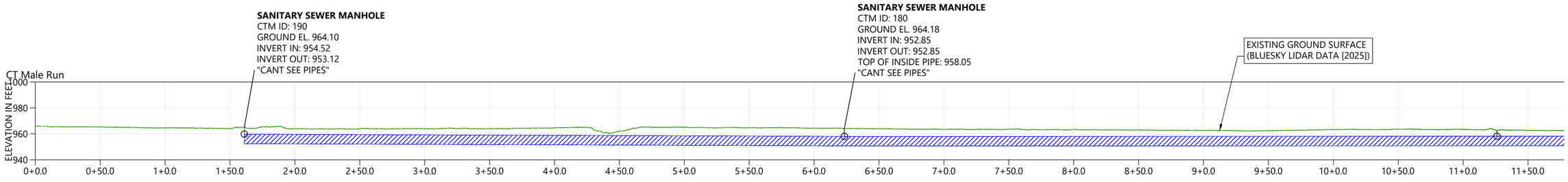
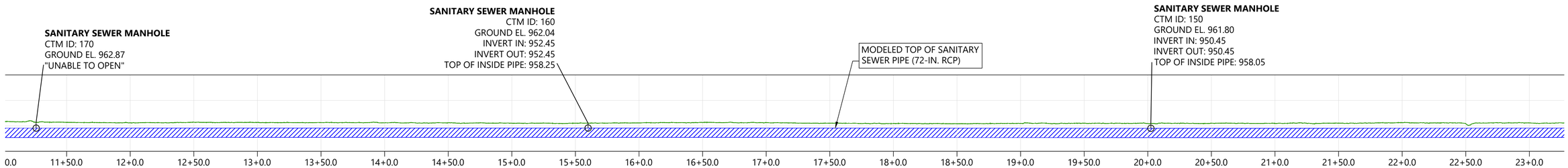
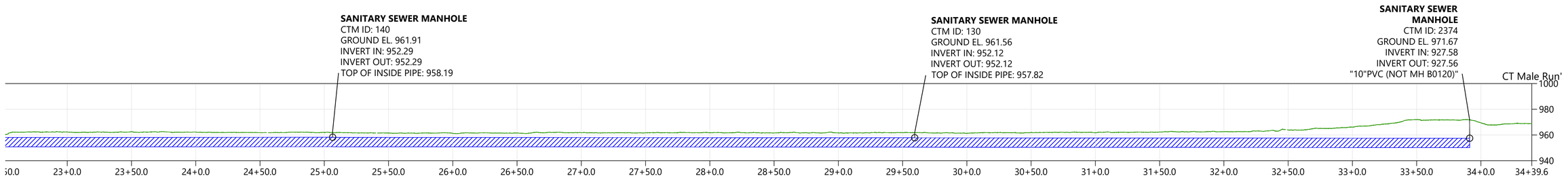
Apr 01, 2026 2:00pm dbinkney



EAST-WEST SANITARY SEWER PROFILE WEST OF POMEROY AVENUE
SEE FIGURE 2



EAST-WEST SANITARY SEWER PROFILE WEST OF POMEROY AVENUE
SEE FIGURE 2



EAST-WEST SANITARY SEWER PROFILE WEST OF POMEROY AVENUE
SEE FIGURE 2

0 40 80
SCALE IN FEET

NOTES:
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ANCHOR QEA

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HOUSATONIC RIVER REACH 5A FINAL DESIGN
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

SANITARY SEWER SYSTEM
APPROXIMATE DEPTH OF COVER

FIG 7

SHEET # 7 OF 11

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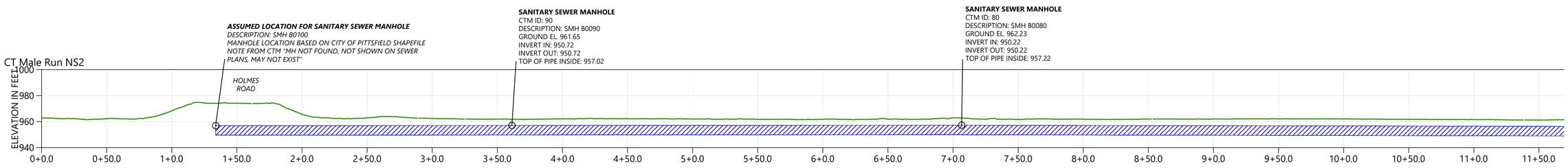
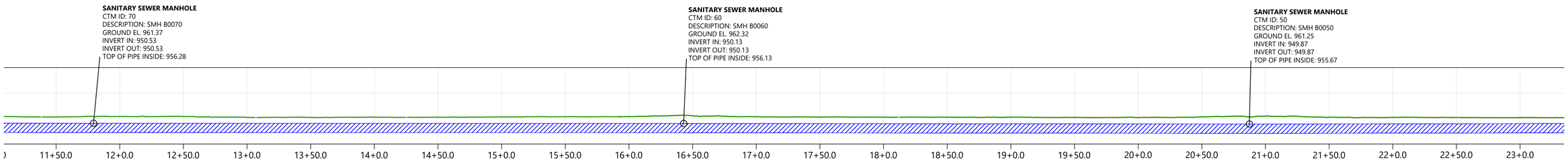


NORTH-SOUTH SANITARY SEWER PROFILE SOUTH OF HOLMES ROAD
SEE FIGURE 3



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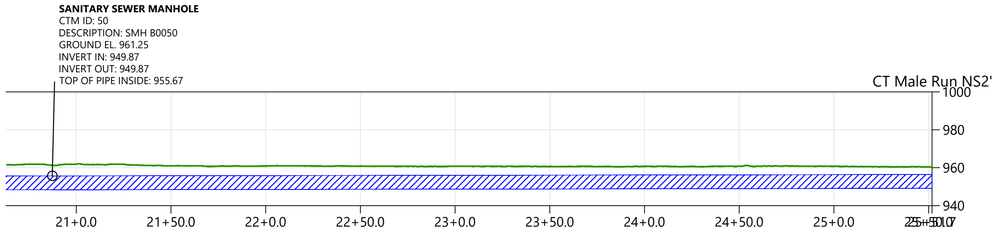

NORTH-SOUTH SANITARY SEWER PROFILE SOUTH OF HOLMES ROAD
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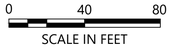

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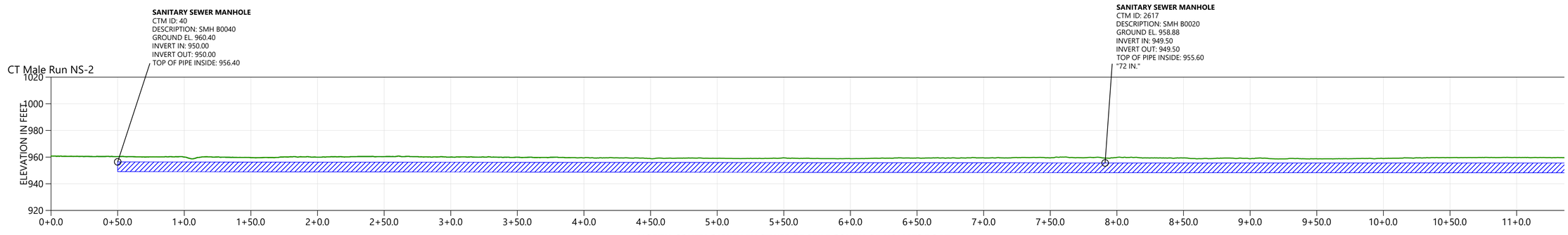
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

SANITARY SEWER SYSTEM
APPROXIMATE DEPTH OF COVER

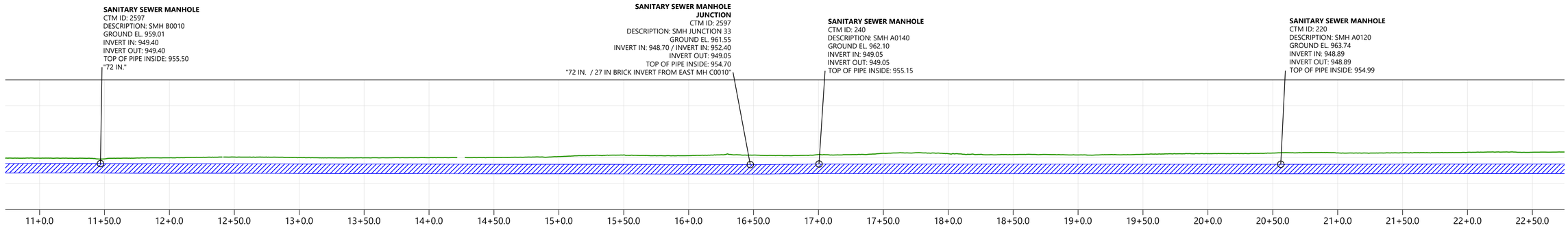
FIG 8

SHEET # 8 OF 11

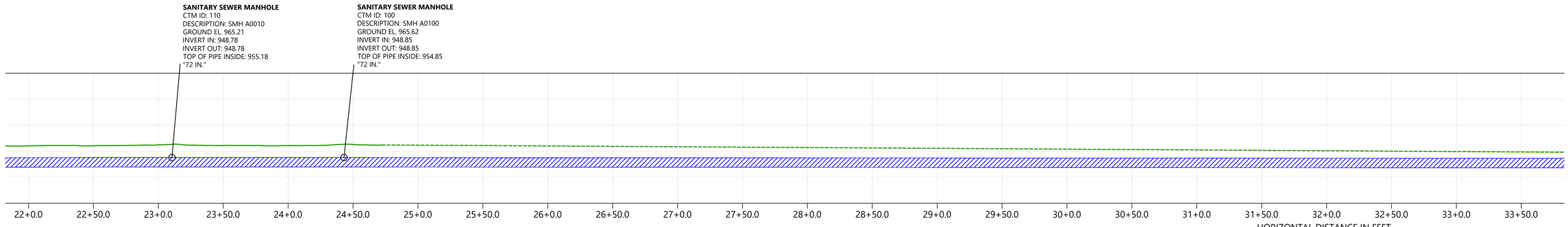
Mar 03, 2026 12:11pm dbinkney \\gala.anchorenv.com\cad\Projects\0469-General Electric\2025 Reach 5A Remedial Design Tasks\CADShare\Utilities\Depth of Cover\APPENDIX P\0469-APP_P-Depth of Cover-Sanitary Sewer-PROFILES_FIG 7 TO X.dwg | FIGURE 8



NORTH-SOUTH SANITARY SEWER PROFILE SOUTH OF HOLMES ROAD
SEE FIGURES 4 AND 5



NORTH-SOUTH SANITARY SEWER PROFILE SOUTH OF HOLMES ROAD
SEE FIGURES 4 AND 5



NORTH-SOUTH SANITARY SEWER PROFILE SOUTH OF HOLMES ROAD
SEE FIGURES 4 AND 5

0 40 80
SCALE IN FEET

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ANCHOR QEA

REVISIONS				
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HOUSATONIC RIVER REACH 5A FINAL DESIGN
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

SANITARY SEWER SYSTEM
APPROXIMATE DEPTH OF COVER

FIG 9

SHEET # 9 OF 11

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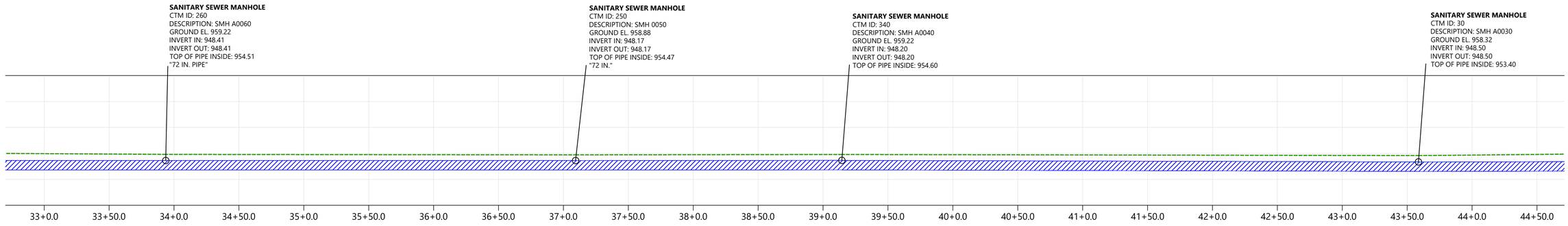
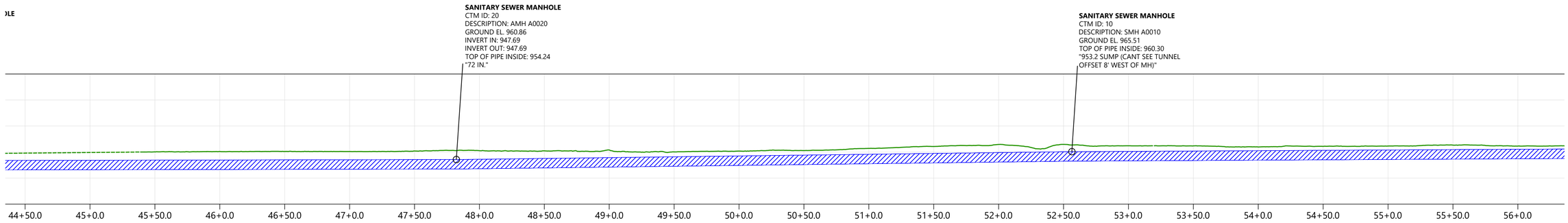
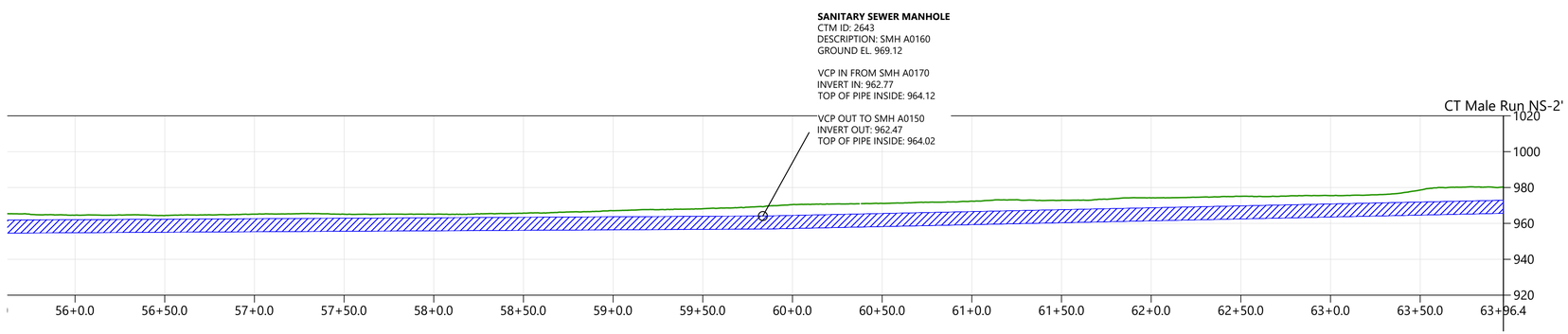
Mar 03, 2026 12:12pm dbinkney



NORTH-SOUTH SANITARY SEWER PROFILE SOUTH OF HOLMES ROAD
SEE FIGURE 4



NORTH-SOUTH SANITARY SEWER PROFILE SOUTH OF HOLMES ROAD
SEE FIGURE 5



NORTH-SOUTH SANITARY SEWER PROFILE SOUTH OF HOLMES ROAD
SEE FIGURE 5

0 40 80
SCALE IN FEET

NOTES:
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HOUSATONIC RIVER REACH 5A FINAL DESIGN
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

SANITARY SEWER SYSTEM
APPROXIMATE DEPTH OF COVER

FIG 10

SHEET # **10** OF **11**

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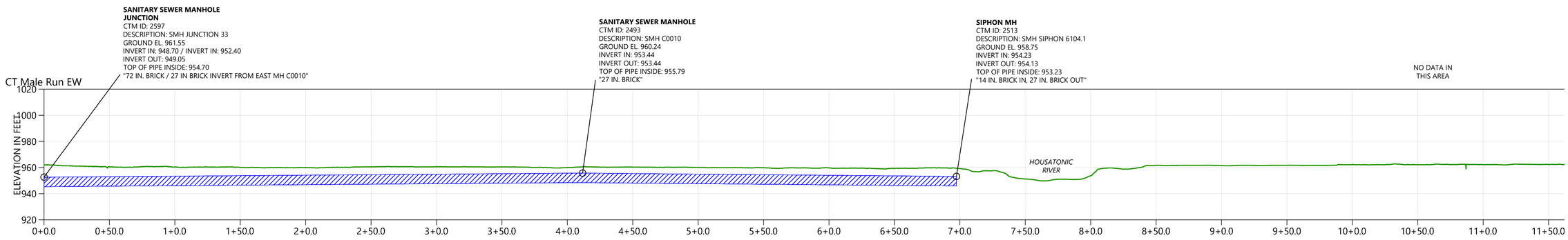
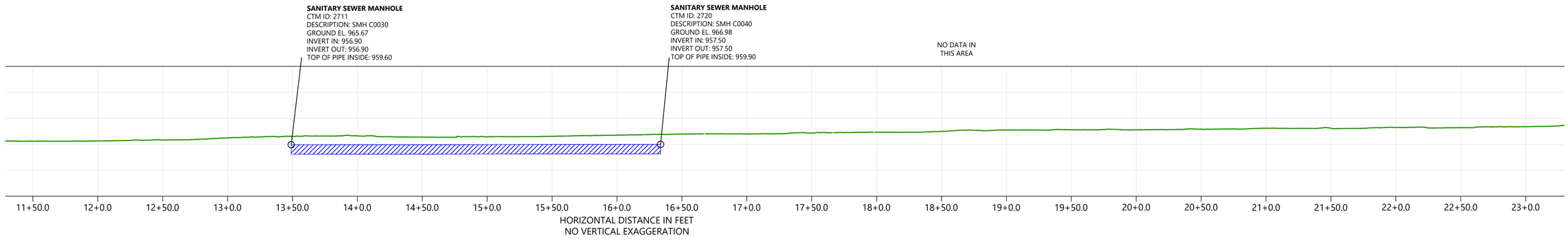
Mar 03, 2026 12:14pm dbinkney

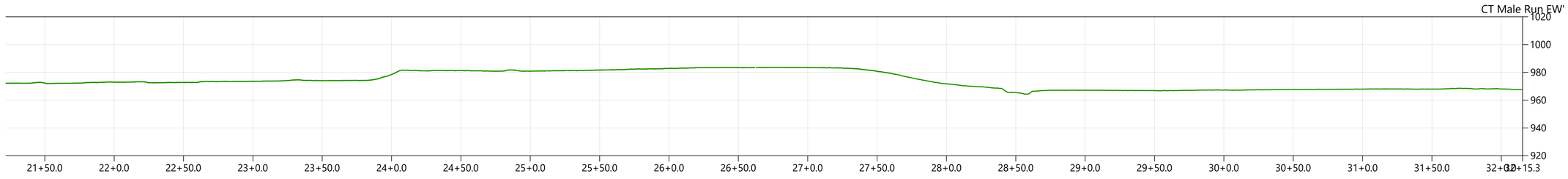


EAST-WEST SANITARY SEWER PROFILE WEST OF ERIC DRIVE NEIGHBORHOOD
SEE FIGURE 6



HORIZONTAL DISTANCE IN FEET
NO VERTICAL EXAGGERATION

EAST-WEST SANITARY SEWER PROFILE WEST OF ERIC DRIVE NEIGHBORHOOD
SEE FIGURE 6



EAST-WEST SANITARY SEWER PROFILE WEST OF ERIC DRIVE NEIGHBORHOOD
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0 40 80
SCALE IN FEET

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DATE: APRIL 2026

HOUSATONIC RIVER REACH 5A FINAL DESIGN
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

SANITARY SEWER SYSTEM
APPROXIMATE DEPTH OF COVER

FIG 11

SHEET # **11** OF **11**

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Mar 03, 2026 12:17pm dbinkney

Attachment 3
Estimated Depth Existing Ground Cover
Statistical Summary

Sanitary Sewer and Easement Location	Profile Station		Sanitary Sewer Description	Depth of Ground Cover Statistics		
	Start	End		Maximum (Ft.)	Average (Ft.)	Min (Ft.)
Main Interceptor West of Pomeroy Ave	1+61	33+00	72-in. RCP	8.60	4.40	1.60
Main Interceptor South of Holmes Road	2+00	76+00	72-in. RCP	10.02	5.52	2.90
Main Interceptor City WWTP Property	51+50	63+96	72-in. RCP	7.40	4.27	1.92
Sackett Brook Interceptor West of Housatonic River	0+00	7+00	27-in. RCP	9.33	5.99	4.30
Sackett Brook Interceptor East of Housatonic River to Eric Drive Neigborhood	8+50	17+25	27-in. RCP	7.19	6.50	6.00
Sackett Brook Interceptor East of Housatonic River (Noble Farm Area)	24+50	32+00	27-in. RCP	5.90	5.90	5.90

Notes:

1) Ground elevation data based on Bluesky LiDAR aerial survey data (2025).

2) Sanitary sewer pipelines elevations based on invert elevations collected by C.T. Male Associates (2025)

Attachment 4
D-Load Calculations

ANCHOR QEA

Project: Housatonic Reach 5A Job No.: 250469-12.01-03
Subject: Sewer Pipe Cover Depth Date: 12/9/25 Time:
Attendees: Page: 1 Of: 4
Made By: PJK
Route To:

☑ Calculations ☐ Telecon ☐ Meeting Notes

OBJECTIVE: Evaluate Class IV 72" RCP pipe strength requirement for construction access road crossings

REFERENCES: ① Record Drawings - City of Pittsfield, MA Main Intercepting Sewer - Contract 1 January, 1920

② ASTM C 76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

③ American Concrete Pipe Association (ACPA) Concrete Pipe Design Manual

④ DEPTH OF COVER DATA (MS Excel Spreadsheet) DATED 11-21-2025

Record Drawings① indicate the following:

- 72" RCP is Class IV - See Plan / Profile Sheets
- Sheet 21 - Miscellaneous Details
  - ↳ Typical Trench Section
    - 6" bedding
    - Trench and pipe backfill indicates "Select materials thoroughly compacted"
  - ↳ Access Roads Type A & B
    - ↳ Requires 3" min. cover from top of pipe to top of Gravel Surface

ASTM C 76② indicates:

D-Load to produce 0.01-in crack = 2,000 lb/LF/ft
For Class IV Pipe
72" RCP wall thickness = 7"

ANCHOR QEA

Project: Housatonic Reach 5A Job No.: 256469-12.01-03
Subject: Sewer Pipe Cover Depth Date: 12-9-25 Time:
Attendees: Page: 2 Of: 4
Made By: PJK
Route To:

☑ Calculations ☐ Telecon ☐ Meeting Notes

DEPTH OF COVER DATA (4) INDICATES VARIABLE DEPTHS

MIN	0.28"	- 1.77
MAX	4.90	- 6.3
AVG	2.30	- 2.43
	↑ PLANS	↑ CT MALE

SINCE RECORD DRAWINGS INDICATE 3' MIN. COVER FOR ROAD CROSSINGS, CONSIDER 3' DEPTH DEPTH OF COVER FOR ANALYSIS AND CONFIRM PIPE D-LOAD IS ADEQUATE FOR HS-20 LOADING → H = 3'

FOLLOWING ACPA (3), COMPUTE $D_{0.01}$-LOAD REQUIRED FOR 3' COVER

TRENCH WIDTH, B_d → ASSUME $B_d = D_{pipe} + 1.5' \times 2 + 2(\frac{7}{12}')$

$B_d = 10.17'$

$\frac{H}{B_d} = \frac{3}{10.17} = 0.29$ $K\mu'$ → USE 0.165 FOR GRANULAR SOIL

TRENCH LOAD COEFFICIENT → ACPA (2) FIGURE 214

$C_d = 0.2$

DETERMINE TRENCH TRANSITION WIDTH, B_{DT}

FROM ACPA (3) TABLE 27 → ASSUME TYPE 2 INSTALLATION

B_{DT} FOR H = 3 → 11.1

SINCE B_d IS LESS THAN B_{DT}, INSTALLATION WILL ACT AS A TRENCH. SOIL LOAD DETERMINED USING ACPA Eq. 4.3 AND 4.4

ANCHOR QEA

Project: Housatonic Reach 5A | Job No.: 256469-12-01-03
Subject: Sewer Pipe Cover Depth | Date: 12-9-25 | Time:
Attendees: | Page: 3 | Of: 4
Made By: PSK
Route To:

☑ Calculations ☐ Telecon ☐ Meeting Notes

D_o = OUTSIDE DIA. of Pipe = $\frac{72'' + (2)(7'')}{2}$ = 7.17'

TRENCH Soil Load, W_d

$$W_d = C_d \gamma_s B_d^2 + \frac{D_o^2 (4-\pi)}{8} \gamma_s \qquad \text{use } \gamma_d = 110 \text{ pcf}$$

$$W_d = 0.2(110)(10.2^2) + \frac{(7.17^2)(4-\pi)}{8}(110) \qquad 606.78$$

$$W_D = W_E = 2880.2 \text{ lb/LF} \qquad 2882$$

WEIGHT OF FLUID FOR 72" RCP

$$W_F = \gamma_w A = (62.4)\left(\frac{\pi(6^2)}{4}\right) = 1764.3 \text{ lb/LF}$$

LIVE LOAD, W_L → ACPA TABLE 42 FOR H = 3'

$$W_L = 4692.90 \text{ lb/LF}$$

BEDDING FACTOR, B_{fv} → ASSUME TYPE 2 INSTALLATION

$B_c = D_o = 7.17'$

$B_d = 10.2'$

$B_{dL} = 11.1'$

B_{fe} → ACPA Illustration 4.21, TYPE 2 → 2.8

B_{fo} → ACPA Illustration 4.22, TYPE 2 → 1.9

B_{fLL} → ACPA Illustration 4.24, H ≥ 2 → 2.2

ANCHOR QEA

Project: Housatonic Reach 5A Job No.: 256469-12-01-03
Subject: Sewer Pipe Cover Date: 12/9/25 Time:
Attendees: Page: 4 Of: 4
Made By: RJL
Route To:

☐ Calculations ☐ Telecon ☐ Meeting Notes

$$B_{fv} = B_f = \frac{[B_{fe} - B_{fo}][B_d - B_c]}{[B_{dt} - B_c]} + B_{fo}$$

$$= \frac{[2.8 - 1.9][10.2 - 7.17]}{[11.1 - 7.17]} + 1.9$$

$$= 2.59$$

$$D\text{-LOAD} = \left[\left(\frac{W_E + W_P}{B_f}\right) + \frac{W_L}{B_{fLL}}\right] \times \frac{F.S.}{D}$$ ← F.S. = 1.0 for D0.01 calc

$$= \left[\left(\frac{2880.2 + 1764.3}{2.59}\right) + \frac{4692.9}{2.2}\right] \frac{1}{6}$$

$$= 654.4 \text{ lb/LF/FT}$$

CLASS IV PIPE D-LOAD = 2000 lb/LF/FT

SINCE 2000 > 654.4 → 3' COVER IS ADEQUATE

CHECK 1' MIN COVER → SEE MSEXCEL SPREADSHEET

$D_{0.01}$-LOAD = 897.8 lb/LF/FT → O.K.

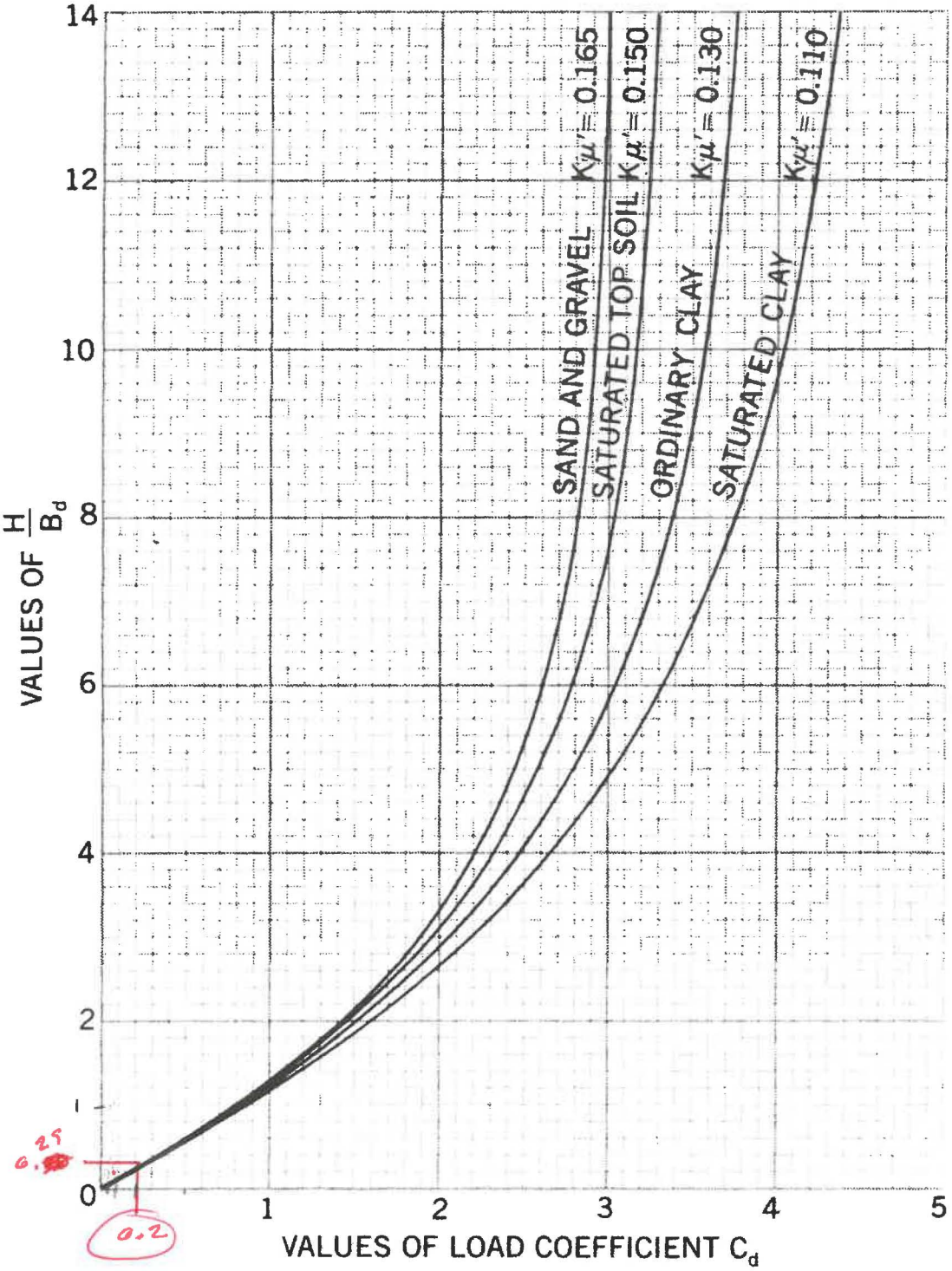
Depth of Cover Evaluation - 72" RCP *Sanitary* Sewer Line - Housaonic Reach 5A

Depth of Cover	H	3	ft	
Pipe ID	D	6	ft	72 in
Pipe Wall Thickness	twall	0.58	ft	7 in
Pipe OD	D_o	7.17	ft	86.0 in
Trench Width Beyond Pipe	w_1	1.5	ft	
Total Trench Width	B_d	10.17	ft	
H/B_d		0.30		
Trench Load Coefficient	C_d	0.20		Fig. 214
Trench Transition Width	B_{dt}	11.1	ft	
Unit Wt. of Soil	γ_s	110	pcf	
Trench Soil Load	$W_d = W_e$	2880.2	lb/lf	
Unit Wt. of Water	γ_w	62.4	pcf	
Pipe Flow Area	A	28.27		
Weight of Fluid	W_f	1764.3	lb/lf	
Live Load	W_L	4692.9	lb/lf	H=3
Outside Diameter of Pipe	$B_c = D_o$	7.17	ft	
Embankment Bedding Factor	B_{fe}	2.8		for Type 2
Minimum Bedding Factor	B_{fo}	1.9		for Type 2
Live Load Bedding Factor	B_{fLL}	2.2		H>/=2
Bedding Factor	B_{fv}	2.59		
Factor of Safety	F.S.	1.0		
D-Load	$D_{0.01}$	654.8		

Depth of Cover	H	1	ft	
Pipe ID	D	6	ft	72 in
Pipe Wall Thickness	twall	0.58	ft	7 in
Pipe OD	D_o	7.17	ft	86.0 in
Trench Width Beyond Pipe	w_1	1.5	ft	
Total Trench Width	B_d	10.17	ft	
H/B_d		0.10		
Trench Load Coefficient	C_d	0.10		Fig 214
Trench Transition Width	B_{dt}	11.1	ft	
Unit Wt. of Soil	γ_s	110	pcf	
Trench Soil Load	$W_d = W_e$	1743.2	lb/lf	
Unit Wt. of Water	γ_w	62.4	pcf	
Pipe Flow Area	A	28.27		
Weight of Fluid	W_f	1764.3	lb/lf	
Live Load	W_L	8867.55	lb/lf	H=1
Outside Diameter of Pipe	$B_c = D_o$	7.17	ft	
Embankment Bedding Factor	B_{fe}	2.8		for Type 2
Minimum Bedding Factor	B_{fo}	1.9		for Type 2
Live Load Bedding Factor	B_{fLL}	2.2		H</=2
Bedding Factor	B_{fv}	2.59		
Factor of Safety	F.S.	1.0		
D-Load	$D_{0.01}$	897.8		

Figure 214

LOAD COEFFICIENT DIAGRAM FOR TRENCH INSTALLATIONS



Pipe Size = 72"

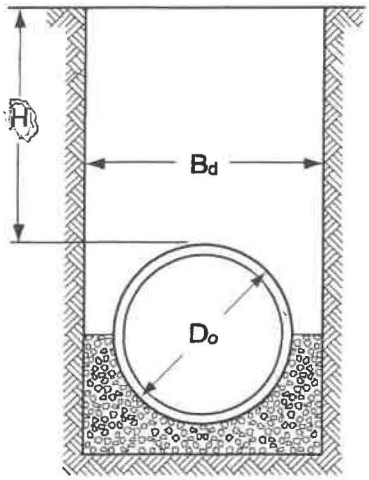
Height of Backfill H Above Top of Pipe, Feet	Transition Widths (FT)															
	Ku' = 0.165				Ku' = 0.150				Ku' = 0.130				Ku' = 0.110			
	Type 1	Type 2	Type 3	Type 4	Type 1	Type 2	Type 3	Type 4	Type 1	Type 2	Type 3	Type 4	Type 1	Type 2	Type 3	Type 4
5	10.9	11.3	11.3	11.8	10.9	11.3	11.3	11.7	10.8	11.2	11.2	11.6	10.7	11.1	11.1	11.5
6	11.0	11.4	11.4	11.8	10.9	11.3	11.3	11.7	10.8	11.2	11.2	11.6	10.7	11.1	11.1	11.5
7	11.1	11.5	11.5	11.9	11.0	11.4	11.4	11.8	10.9	11.3	11.3	11.7	10.8	11.2	11.2	11.6
8	11.2	11.6	11.6	12.0	11.1	11.5	11.5	11.9	11.0	11.4	11.4	11.8	10.8	11.2	11.2	11.6
9	11.3	11.7	11.7	12.1	11.2	11.6	11.6	12.0	11.1	11.5	11.5	11.8	10.9	11.3	11.3	11.7
10	11.5	11.8	11.8	12.2	11.3	11.7	11.7	12.1	11.2	11.5	11.5	11.9	11.0	11.4	11.4	11.8
11	11.6	12.0	12.0	12.3	11.4	11.8	11.8	12.2	11.2	11.6	11.6	12.0	11.1	11.4	11.4	11.8
12	11.7	12.1	12.1	12.5	11.5	11.9	11.9	12.3	11.3	11.7	11.7	12.1	11.1	11.5	11.5	11.9
13	11.8	12.2	12.2	12.6	11.7	12.0	12.0	12.4	11.4	11.8	11.8	12.2	11.2	11.6	11.6	12.0
14	11.9	12.3	12.3	12.7	11.8	12.2	12.2	12.5	11.5	11.9	11.9	12.3	11.3	11.7	11.7	12.1
15	12.1	12.4	12.4	12.8	11.9	12.3	12.3	12.6	11.6	12.0	12.0	12.4	11.4	11.8	11.8	12.1
16	12.2	12.6	12.6	12.9	12.0	12.4	12.4	12.8	11.7	12.1	12.1	12.5	11.5	11.9	11.9	12.2
17	12.3	12.7	12.7	13.1	12.1	12.5	12.5	12.9	11.8	12.2	12.2	12.6	11.6	11.9	11.9	12.3
18	12.4	12.8	12.8	13.2	12.2	12.6	12.6	13.0	11.9	12.3	12.3	12.7	11.6	12.0	12.0	12.4
19	12.5	12.9	12.9	13.3	12.3	12.7	12.7	13.1	12.0	12.4	12.4	12.8	11.7	12.1	12.1	12.5
20	12.6	13.0	13.0	13.4	12.4	12.8	12.8	13.2	12.1	12.5	12.5	12.9	11.8	12.2	12.2	12.6
21	12.8	13.1	13.1	13.5	12.5	12.9	12.9	13.3	12.2	12.6	12.6	13.0	11.9	12.3	12.3	12.6
22	12.9	13.3	13.3	13.6	12.6	13.0	13.0	13.4	12.3	12.7	12.7	13.1	12.0	12.3	12.3	12.7
23	13.0	13.4	13.4	13.8	12.7	13.1	13.1	13.5	12.4	12.8	12.8	13.2	12.1	12.4	12.4	12.8
24	13.1	13.5	13.5	13.9	12.8	13.2	13.2	13.6	12.5	12.9	12.9	13.3	12.1	12.5	12.5	12.9
25	13.2	13.6	13.6	14.0	13.0	13.3	13.3	13.7	12.6	13.0	13.0	13.4	12.2	12.6	12.6	13.0
26	13.3	13.7	13.7	14.1	13.1	13.4	13.4	13.8	12.7	13.1	13.1	13.4	12.3	12.7	12.7	13.1
27	13.4	13.8	13.8	14.2	13.2	13.5	13.5	13.9	12.8	13.2	13.2	13.5	12.4	12.8	12.8	13.1
28	13.5	13.9	13.9	14.3	13.3	13.6	13.6	14.0	12.9	13.2	13.2	13.6	12.5	12.8	12.8	13.2
29	13.7	14.0	14.0	14.4	13.4	13.7	13.7	14.1	13.0	13.3	13.3	13.7	12.5	12.9	12.9	13.3
30	13.7	14.0	14.0	14.4	13.4	13.7	13.7	14.1	13.0	13.3	13.3	13.7	12.5	12.9	12.9	13.3

Table 42

AASHTO HL-93 HIGHWAY LOADS ON CIRCULAR PIPE - POUNDS PER LINEAR FOOT

PIPE SIZE D IN INCHES	Bc (ft)	HEIGHT OF FILL H ABOVE TOP OF PIPE IN FEET													PIPE SIZE D IN INCHES
		0.5	1	1.5	2	2.5	3	3.5	4	5	6	7	8	9	
12	1.46	6192.12	4481.31	3418.51	2768.51	2013.10	1523.22	1188.02	974.10	709.30	551.91	456.20	385.15	341.48	12
15	1.75	6169.33	5357.78	4087.11	3309.88	2407.87	1822.59	1421.92	1167.50	850.21	661.61	546.80	461.69	409.37	15
18	2.04	7030.82	6049.88	4750.81	3847.25	2800.08	2120.22	1654.60	**1360.42**	990.81	771.09	637.20	538.06	477.13	18
21	2.33	7684.16	6265.30	5409.66	4380.66	3189.76	2416.15	1886.08	**1552.89**	1131.10	880.35	727.38	614.28	544.75	21
24	2.63	7649.09	7016.30	5909.71	4910.16	3576.93	2710.39	2116.36	1744.88	1271.08	989.38	817.36	690.33	612.25	24
27	2.92	7614.34	7494.40	6272.32	5285.96	3844.58	2909.71	2269.88	1886.21	1371.81	1073.38	889.05	749.97	664.43	27
30	3.21	7579.90	7460.50	6794.05	5636.40	4093.15	3094.25	2415.01	2019.42	1466.37	1153.19	957.60	806.85	714.08	30
33	3.50	7545.77	7426.91	7299.36	5905.48	4324.05	3265.14	2567.63	2145.03	1555.18	1229.03	1023.16	861.09	761.31	33
36	3.79	7511.95	7393.63	7275.30	6203.89	4538.55	3423.40	2711.94	2263.50	1638.62	1303.34	1085.88	912.84	806.25	36
42	4.38	7445.21	7327.94	7210.66	6574.20	4882.18	3705.72	2977.49	2480.74	1810.44	1447.96	1203.34	1009.36	889.78	42
48	4.96	**7575.35**	7263.41	7147.16	6347.70	5207.94	3920.84	3215.21	2674.26	1969.19	1581.28	1310.96	1097.31	965.52	48
54	5.54	**9199.36**	7652.36	7084.77	6693.96	5155.93	4125.14	3428.15	2846.75	2113.98	1704.28	1409.63	1177.52	1034.24	54
60	6.13	9135.17	8679.54	7548.46	7076.53	5438.86	4305.72	3525.20	3000.56	2246.06	1817.82	1500.16	1250.69	1096.63	60
66	6.71	9071.88	8928.98	8251.80	7421.85	5692.35	4509.61	3686.88	3137.72	2366.56	1922.69	1583.25	1317.48	1153.28	66
72	7.29	9009.46	8867.55	8725.63	7733.72	5919.54	4692.90	3831.44	3247.09	2490.76	2019.57	1659.54	1378.46	1204.74	72
78	7.88	8947.89	8806.95	8666.00	8015.51	6123.17	4857.71	3960.69	3389.62	2607.41	2109.12	1729.61	1434.14	1251.48	78
84	8.46	8887.16	8747.17	8607.18	8270.18	6305.66	5005.92	4091.86	3521.00	2716.03	2191.90	1793.96	1484.98	1293.93	84
90	9.04	8827.25	8688.20	8549.16	8500.34	6469.14	5139.16	4240.36	3642.08	2817.19	2268.44	1853.08	1531.40	1332.47	90
96	9.63	8768.14	8630.02	8491.91	8293.63	6620.04	5258.89	4378.04	3753.65	2911.42	2339.21	1907.37	1573.77	1367.45	96
102	10.21	8709.81	8572.62	8435.42	8242.26	6984.42	5552.24	4633.64	3973.27	3081.29	2476.29	2019.52	1666.56	1448.26	102
108	10.79	8652.26	8515.97	8379.68	8352.77	7345.00	5842.92	4888.17	4192.03	3250.45	2612.84	2131.29	1759.06	1528.84	108
114	11.38	8595.46	8460.07	8324.67	8750.40	7701.83	6130.98	5089.40	4409.93	3418.88	2748.88	2242.68	1851.28	1609.20	114
120	11.96	8539.40	8404.89	8270.38	9143.20	8054.97	6416.46	5336.51	4583.83	3586.61	2884.41	2353.68	1943.22	1689.33	120
126	12.54	8484.07	8350.43	8216.80	9531.25	8069.43	6699.39	5582.34	4795.86	3753.63	3019.42	2464.32	2034.87	1769.23	126
132	13.13	8429.45	8296.67	8163.90	9914.64	8028.17	6869.01	5826.90	5006.87	3919.94	3153.94	2574.58	2126.23	1848.90	132
138	13.71	8375.53	8243.60	8111.67	10293.44	8279.25	6838.58	6070.20	5216.88	4085.55	3287.94	2684.46	2217.32	1928.35	138
144	14.29	8322.30	8191.21	8060.12	10667.75	8587.88	7076.64	6098.52	**5425.87**	4250.47	3421.45	2793.98	2308.13	2007.58	144

EXAMPLE 4-1
Trench Installation



Given: A 48 inch circular pipe is to be installed in a 7 foot wide trench with 10 feet of cover over the top of the pipe. The pipe will be backfilled with sand and gravel weighing 110 pounds per cubic foot. Assume a Type 4 Installation.

Find: The required pipe strength in terms of 0.01 inch crack D-load.

1. Determination of Earth Load (W_E)
   To determine the earth load, we must first determine if the installation is behaving as a trench installation or an embankment installation. Since we are not told what the existing in-situ material is, conservatively assume a Kμ' value between the existing soil and backfill of 0.150.

   From Table 23, the transition width for a 48 inch diameter pipe with a Kμ' value of 0.150 under 10 feet of fill is:

   B_{dt} = 8.5 feet

   Transition width is greater than the actual trench width, therefore the installation will act as a trench. Use Equations 4.3 and 4.4 to determine the soil load.

   w = 110 pounds per cubic foot
   H = 10 feet
   B_d = 7 feet
   Kμ' = 0.150

   $$D_o = \frac{48+2*5}{12} = 4.83\ feet$$

   Note: Wall thickness for a 48 inch inside diameter pipe with a B wall is 5-inches per ASTM C 76

The value of C_d can be obtained from Figure 214, or calculated using Equation 4.4.

$$C_d = \frac{1-e^{-2(0.150)\left(\frac{10}{7}\right)}}{(2)(0.150)} = 1.16$$ Equation 4.4

$$W_d = (1.16)(110)(7^2) + \frac{4.83^2(4-\pi)}{8}(110)$$ Equation 4.3

$W_d = 6{,}538$ *pounds per linear foot*

$W_E = W_d = 6{,}538$ earth load in pounds per linear foot

Weight of Fluid, W_F, for a 48" pipe

$$W_F = \gamma_w * A$$

$$W_F = 62.4 * \frac{\pi(D_i)^2}{4} = 62.4 * \frac{\pi(4)^2}{4} = 784.1 \text{ pounds per linear foot}$$

2. Determination of Live Load (W_L)
   From Table 42, live load is negligible at a depth of 10 feet.
3. Selection of Bedding
   Because of the narrow trench, good compaction of the soil on the sides of the pipe would be difficult, although not impossible. Therefore a Type 4 Installation was assumed.

4. Determination of Bedding Factor, (B_{fv})
   The pipe is installed in a trench that is less than transition width. Therefore, Equation 4.32 must be used to determine the variable bedding factor.

   $B_c = D_o$ $B_c = 4.83$ outside diameter of pipe in feet
   $B_d = 7$ width of trench in feet
   $B_{dt} = 8.5$ transition width in feet
   $B_{fe} = 1.7$ embankment bedding factor
   $B_{fo} = 1.5$ minimum bedding factor

$$B_{fv} = \frac{(1.7 - 1.5)(7 - 4.83)}{8.5 - 4.83} + 1.5$$ Equation 4.32

$B_{fv} = 1.62$

5. Application of Factor of Safety (F.S.)
   A factor of safety of 1.0 based on the 0.01 inch crack will be applied.

6. Selection of Pipe Strength

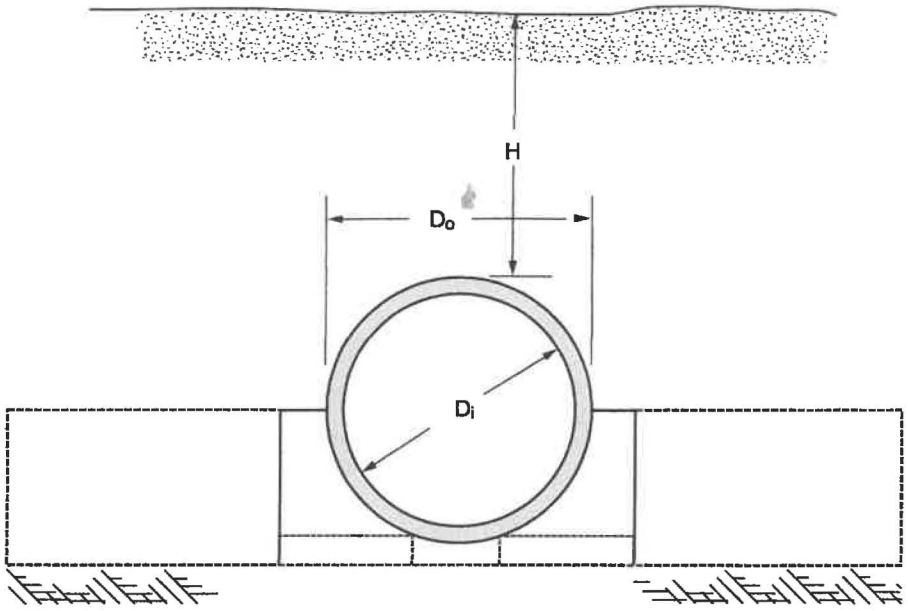
WE	=	6,538 earth load in pounds per linear foot
WF	=	784.1 fluid load in pounds per linear foot
WL	=	0 live load is negligible
Bf	=	Bfv = 1.62 earth load bedding factor
BfLL	=	N/A live load bedding factor is not applicable
D	=	4 inside diameter of pipe in feet

$$D_{0.01} = \left(\frac{6{,}358+784.1}{1.62}\right)\left(\frac{1}{4}\right)$$ Equation 4.34

$D_{0.01} = 1{,}130$ pounds per linear foot per foot of diameter

Answer: A pipe which would withstand a minimum three-edge bearing test load for the 0.01 inch crack of 1,130 pounds per linear foot per foot of inside diameter would be required.

EXAMPLE 4-2
Positive Projection Embankment Installation



Given: A 48 inch circular pipe is to be installed in a positive projecting embankment condition using a Type 1 installation. The pipe will be covered with 35 feet of 120 pounds per cubic foot overfill.

Find: The required pipe strength in terms of 0.01 inch D-load

1. Determination of Earth Load (W_E)
   Per the given information, the installation behaves as a positive projecting embankment. Therefore, use Equation 4.2 to determine the soil prism load and multiply it by the appropriate vertical arching factor.

$$D_0 = \frac{48+2*5}{12}$$ Note: The wall thickness for a 48-inch pipe with a B wall is 5-inches per ASTM C76.

D_o = 4.83 outside diameter of pipe in feet

w = 120 unit weight of soil in pounds per cubic foot

H = 35 height of cover in feet

$$PL = 120\left[35 + \frac{4.83*(4-\pi)}{8}\right]4.83$$ Equation 4.2

PL = 20,586 pounds per linear foot

Shown in Illustration 4.7 are the vertical arching factors (VAFs) for the

Attachment 5
California Bearing Ratio Calculation Summary and Figures

Table 1: Calculated DCP CBR Values

DCP ID	CBR Value (Modified Averaging)	Subgrade Support Condition
AR-DCP-1	41	A
AR-DCP-2	13	A
AR-DCP-3	23	A
AR-DCP-4	2.7	C
AR-DCP-5	2.8	C
AR-DCP-6	73	A
AR-DCP-7	14	A
AR-DCP-8	2.9	C
AR-DCP-9	5.1	B
AR-DCP-10	14	A
AR-DCP-11	11	A
AR-DCP-12	107	A
AR-DCP-13	38	A
AR-DCP-14	5.1	B
AR-DCP-15	4.2	B
AR-DCP-16	11	A
AR-DCP-17	37	A
AR-DCP-18	17	A
AR-DCP-19	34	A
AR-DCP-20	36	A
AR-DCP-21	27	A
AR-DCP-22	7.6	B
AR-DCP-23	5.1	B
AR-DCP-24	8.5	B
AR-DCP-25	30	A
AR-DCP-26	26	A
AR-DCP-27	5.3	B
AR-DCP-28	19	A
AR-DCP-29	66	A
AR-DCP-30	64	A
AR-DCP-31	25	A
AR-DCP-32	26	A
AR-DCP-33	4.4	B
AR-DCP-34	23	A
AR-DCP-35	46	A
AR-DCP-36	59	A
AR-DCP-37	43	A
AR-DCP-38	15	A
AR-DCP-39	18	A
AR-DCP-40	25	A
AR-DCP-41	40	A
AR-DCP-42	42	A
AR-DCP-43	30	A

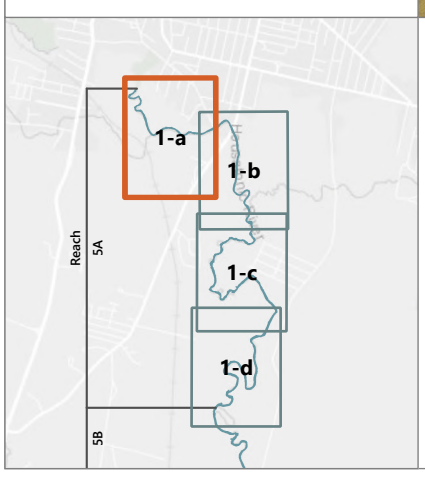
AR-DCP-44	23	A
AR-DCP-45	3.8	B
AR-DCP-46	3.5	B
SA-DCP-1	3.5	B
SA-DCP-4	22	A
SA-DCP-5	11	A
SA-SCP-6	25	A

Subgrade Support Condition	Correlated CBR Value	Minimum Gravel Layer Thickness, in.
A	CBR > 10 percent	7.0
B	3 < CBR ≤ 10 percent	9.0
C	CBR ≤ 3 percent	11.5
D[1]	≤ 3 percent AND visually marshy/unstable	--

[1] Class D roadway conditions are not given an assigned gravel layer thickeness and instead require a ground stabilization alternative

Geotechnical Investigation Locations

- Boring
- DCP
- Piezometer



LEGEND:

- Roads
- River Centerline
- Final Design Access Road - Primary
- Final Design Access Road - Secondary
- Final Design River Access Point
- In-River Sediment Remediation Area
- Floodplain Remediation
- Riverbank Remediation

Vernal Pools

- Activated Carbon
- Excavate and Restore
- Remediation Needed-Not Selected for PS
- No Remediation Needed

Surficial Geology Overlay

- Floodplain alluvium
- Glacial stratified deposits, coarse
- Thick till
- Thin till

NOTE:
1. Aerial Imagery from Bluesky 2025.
2. The remediation areas are preliminary and may be subject to revision as part of final design.

0 320
Feet

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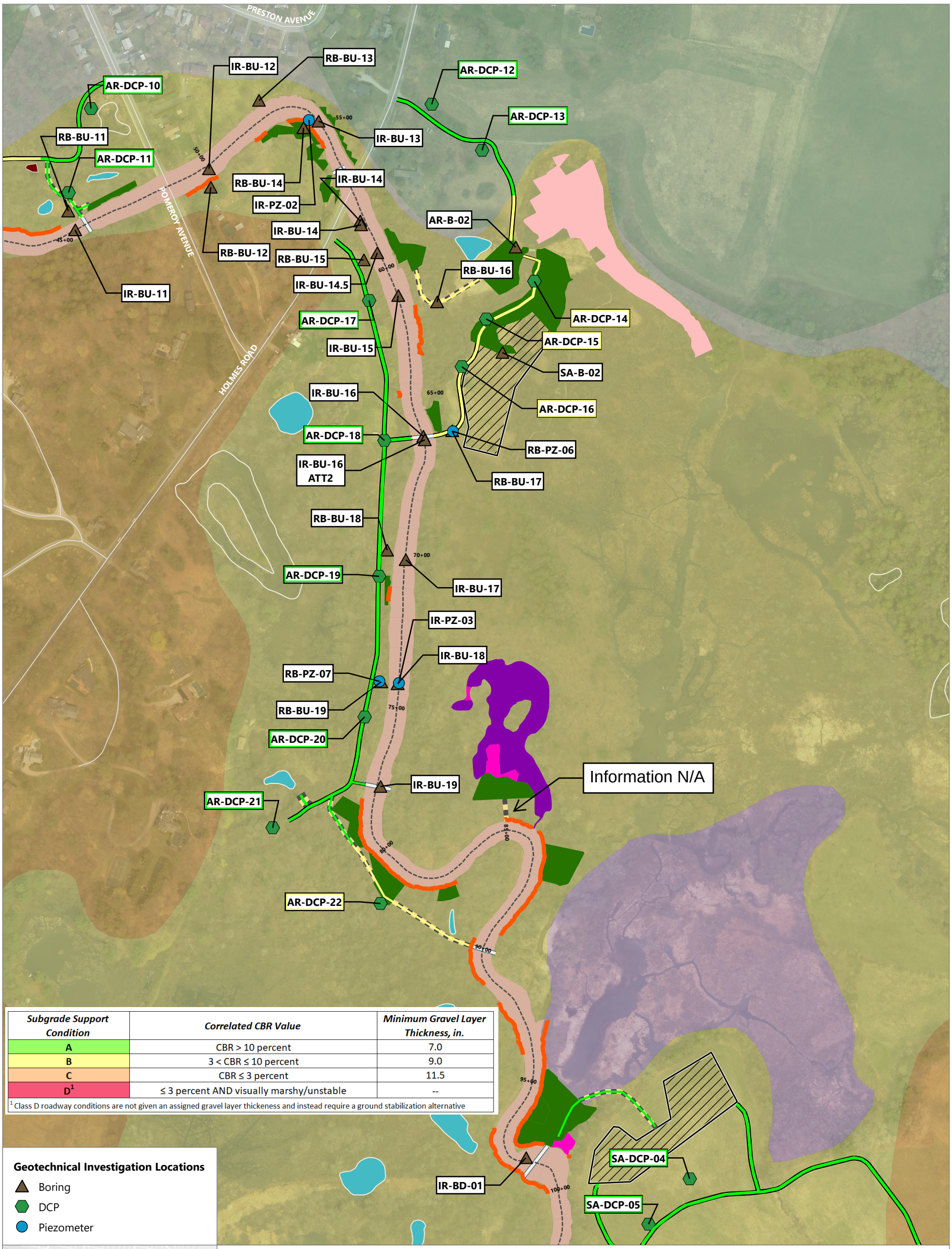
ANCHOR QEA

Figure 1a
Reach 5A Geotechnical Slope Stability Analysis
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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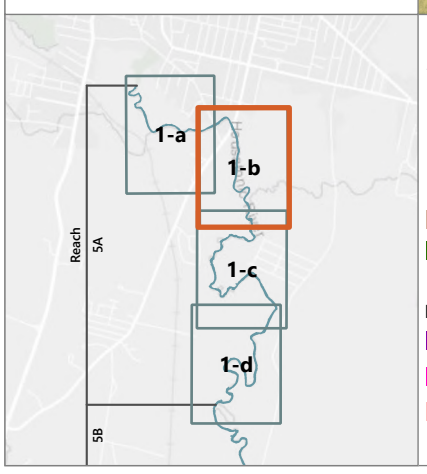
[1] Class D roadway conditions are not given an assigned gravel layer thickeness and instead require a ground stabilization alternative

Geotechnical Investigation Locations

- Boring
- DCP
- Piezometer



LEGEND:

- Roads
- River Centerline
- Final Design Access Road - Primary
- Final Design Access Road - Secondary
- Final Design River Access Point
- In-River Sediment Remediation Area
- Floodplain Remediation
- Riverbank Remediation

BWOWB Remediation

- Amendment required
- Dredge and cap
- Dredge and backfill

Vernal Pools

- Activated Carbon
- Excavate and Restore
- Remediation Needed-Not Selected for PS
- No Remediation Needed

Surficial Geology Overlay

- Swamp deposits
- Floodplain alluvium
- Glacial stratified deposits, coarse
- Thick till
- Thin till

NOTE:
1. Aerial Imagery from Bluesky 2025.
2. The remediation areas are preliminary and may be subject to revision as part of final design.

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Feet

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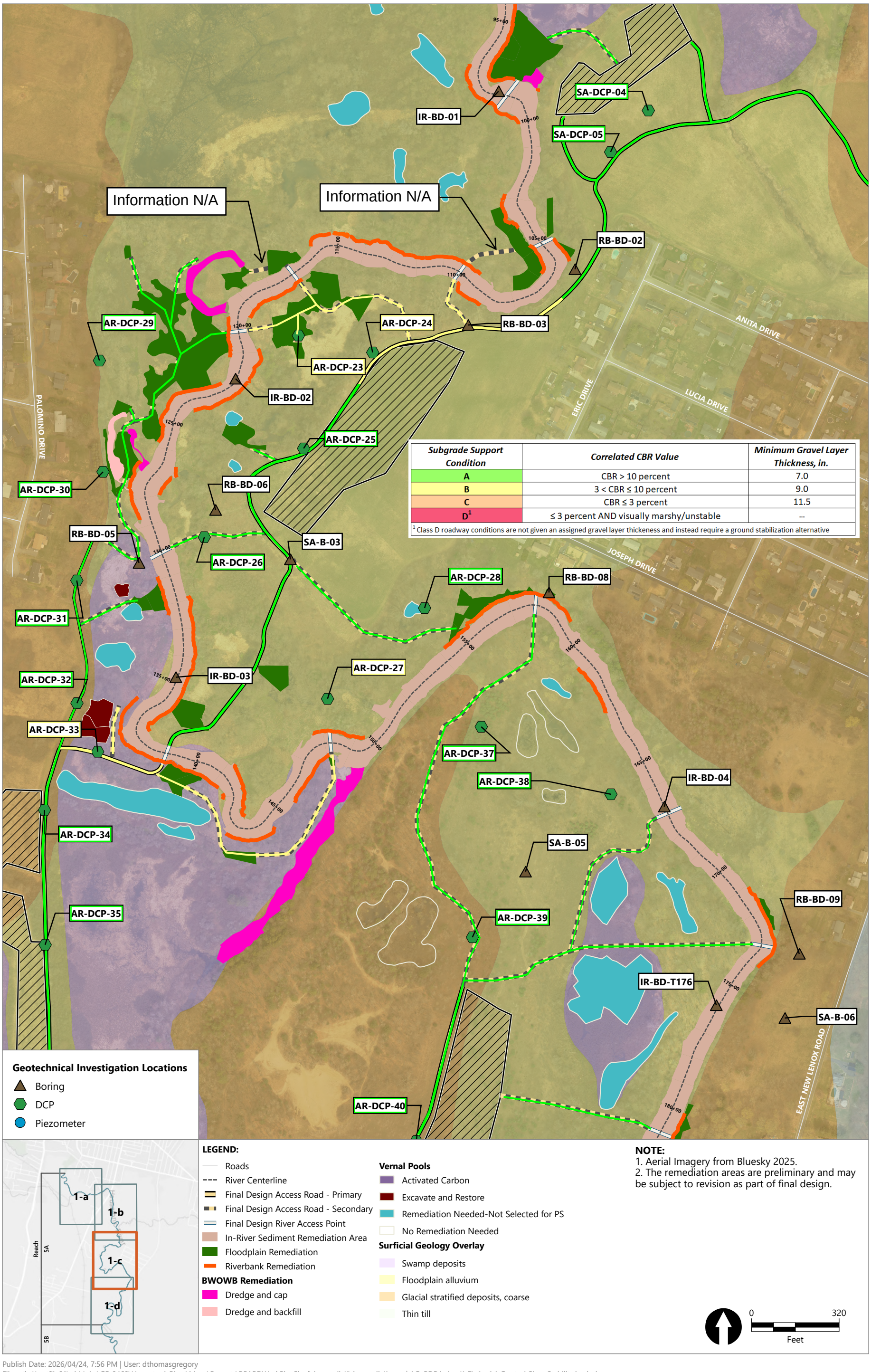
ANCHOR QEA

Figure 1b
Reach 5A Geotechnical Slope Stability Analysis
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



Subgrade Support Condition	*Correlated CBR Value*	*Minimum Gravel Layer Thickness, in.*
A	CBR > 10 percent	7.0
B	3 < CBR ≤ 10 percent	9.0
C	CBR ≤ 3 percent	11.5
D[1]	≤ 3 percent AND visually marshy/unstable	--

[1] Class D roadway conditions are not given an assigned gravel layer thickeness and instead require a ground stabilization alternative

Geotechnical Investigation Locations
- Boring
- DCP
- Piezometer

LEGEND:
- Roads
- River Centerline
- Final Design Access Road - Primary
- Final Design Access Road - Secondary
- Final Design River Access Point
- In-River Sediment Remediation Area
- Floodplain Remediation
- Riverbank Remediation

BWOWB Remediation
- Dredge and cap
- Dredge and backfill

Vernal Pools
- Activated Carbon
- Excavate and Restore
- Remediation Needed-Not Selected for PS
- No Remediation Needed

Surficial Geology Overlay
- Swamp deposits
- Floodplain alluvium
- Glacial stratified deposits, coarse
- Thin till

NOTE:
1. Aerial Imagery from Bluesky 2025.
2. The remediation areas are preliminary and may be subject to revision as part of final design.

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Feet

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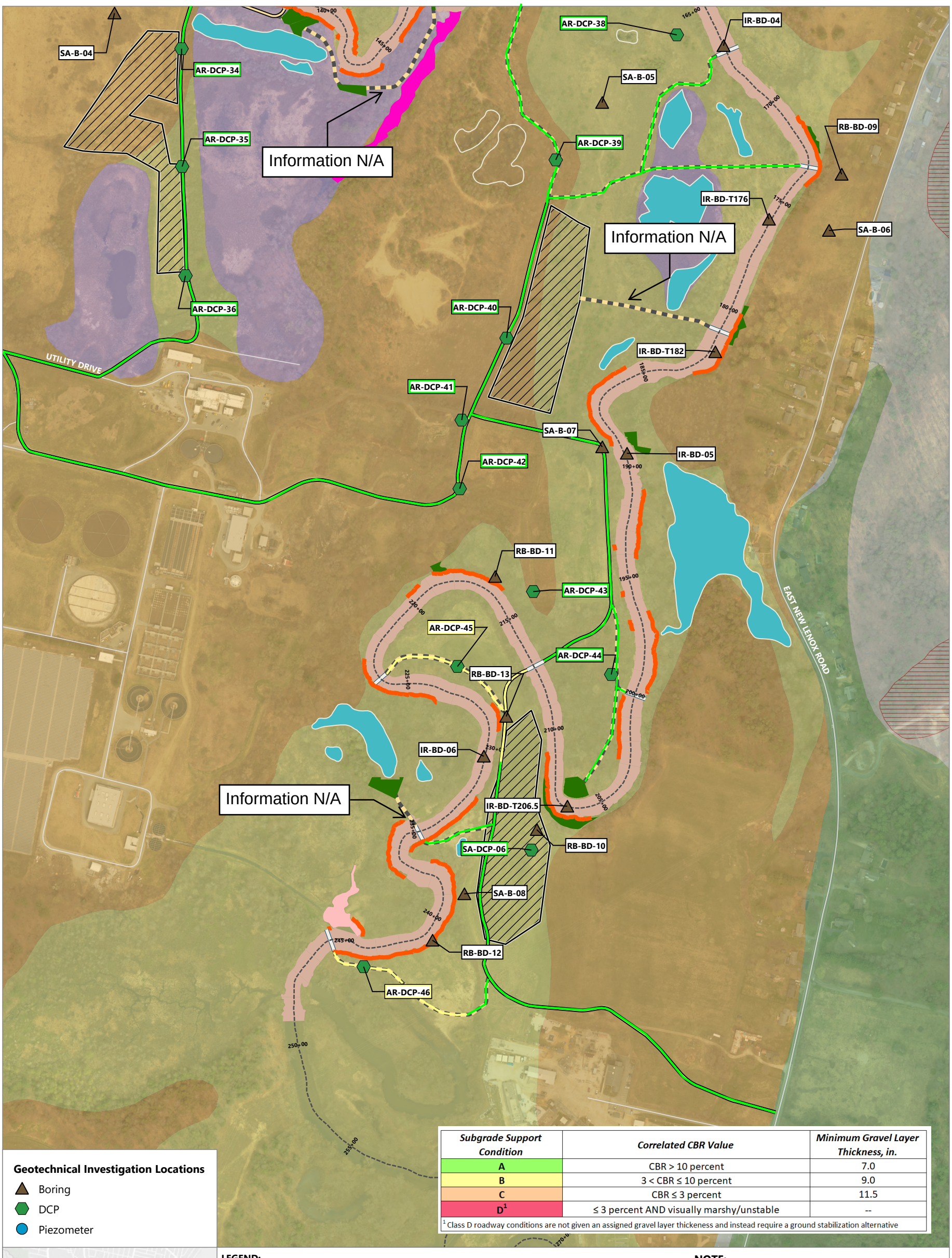
ANCHOR QEA

Figure 1c
Reach 5A Geotechnical Slope Stability Analysis
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River



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ANCHOR QEA

Figure 1d
Reach 5A Geotechnical Slope Stability Analysis
Final Remedial Design/Remedial Action Work Plan for Reach 5A
Housatonic River – Rest of River

Appendix L
Existing Road Improvement Evaluation and Design

CITY: DIV/GROUP: DB: LD: PIC: PM: TM: LYR:ON=*;OFF=*REF*
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CONCEPTUAL DESIGN DRAWINGS

GE-PITTSFIELD/HOUSATONIC RIVER SITE
REST OF RIVER - GRAVEL ROAD IMPROVEMENTS (GR)
CONTRACT TO BE DETERMINED



NOT FOR CONSTRUCTION

DATE ISSUED / DATE REVISED

APRIL 2026

TOWN OF LEE, MASSACHUSETTS
BERKSHIRE COUNTY

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

INDEX TO DRAWINGS

	CIVIL
GR-00	COVER SHEET
GR-01	GENERAL NOTES
GR-02	KEYPLAN
GR-03	PLAN AND PROFILE (STA: 00+00 - STA: 05+00)
GR-04	PLAN AND PROFILE (STA: 05+00 - STA: 10+00)
GR-05	PLAN AND PROFILE (STA: 10+00 - STA: 15+00)
GR-06	PLAN AND PROFILE (STA: 15+00 - STA: 20+00)
GR-07	PLAN AND PROFILE (STA: 20+00 - STA: 23+00)
GR-08	CROSS SECTIONS
GR-09	DETAILS

LOCATION MAP

0 2000' 4000'

GRAPHIC SCALE



ARCADIS

GENERAL NOTES:

1. THESE GRAVEL ROAD IMPROVEMENTS ARE DESIGNED FOR USE BY DRIVERS AND VEHICLES THAT WILL BE UTILIZED FOR THE REMEDIAL ACTION AT THE GE-PITTSFIELD/HOUSATONIC RIVER SITE. THE GRAVEL ROAD IMPROVEMENTS HAVE NOT BEEN DESIGNED TO SERVE AS MASSACHUSETTS DEPARTMENT OF TRANSPORTATION-CERTIFIED ROAD IMPROVEMENTS. THE MAXIMUM VEHICLE SIZE OPERATED ON THE IMPROVED GRAVEL ROAD SHOULD BE LIMITED TO TRACTOR TRAILER TRUCKS THAT CARRY INTERMODAL CONTAINERS. USE OF THE IMPROVED GRAVEL ROAD BY MOTOR VEHICLES NOT ASSOCIATED WITH THE GE-PITTSFIELD/HOUSATONIC RIVER SITE REMEDIAL ACTION WILL BE AT THE VEHICLE DRIVER'S OWN RISK.

2. THE TERM "SITE" REFERS TO THE CONSTRUCTION LIMITS OF THE ACCESS ROAD RESTORATION ADJACENT TO THE HOUSATONIC RIVER IN LEE, MA.

3. THE TERM "OWNER" SHALL REFER TO GENERAL ELECTRIC (GE) AND/OR A DESIGNATED REPRESENTATIVE. THE TERM "ENGINEER" SHALL REFER TO ARCADIS U.S., INC. (ARCADIS). THE TERM "CONTRACTOR" SHALL REFER TO THE COMPANY OR COMPANIES CONTRACTED TO IMPLEMENT THE DESIGN.

4. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH US DEPARTMENT OF LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS AS WELL AS OWNER AND SITE-SPECIFIC HEALTH AND SAFETY POLICIES, PROCEDURES, AND REQUIREMENTS. ALL ON-SITE CONTRACTOR PERSONNEL SHALL COMPLETE REQUIRED SITE-SPECIFIC TRAINING PRIOR TO SITE ENTRY IF DIRECTED BY THE OWNER AND/OR ENGINEER.

5. IF MATERIALS, QUANTITIES, STRENGTHS, OR SIZES INDICATED ON OTHER DRAWINGS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED, OR NOTED SHALL BE PROVIDED BY THE CONTRACTOR.

6. IT IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE PROCEDURES TO ENSURE THE SAFETY OF STRUCTURES AND COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS, OR TIE-DOWNS MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER COMPLETION OF THE PROJECT.

7. ALL DIMENSIONS AND ELEVATIONS NOTED (+/-) SHALL BE VERIFIED BY THE CONTRACTOR IN THE FIELD. THE CONTRACTOR SHALL CONFIRM COMPATIBILITY WITH OTHER DRAWINGS AND AS-BUILT PORTIONS OF THE WORK.

8. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION AND SHALL NOTIFY THE ENGINEER OF ANY CONDITIONS WHICH DO NOT COMPLY WITH THE DESIGN DRAWINGS AND THESE SPECIFICATIONS.

9. UNLESS OTHERWISE NOTED, DETAILS ARE NOT DRAWN TO SCALE. DO NOT SCALE DRAWINGS OF STRUCTURES OR STRUCTURAL COMPONENTS.

BASEMAP:

1. UNLESS OTHERWISE NOTED, EXISTING CONDITIONS TOPOGRAPHIC INFORMATION BASED ON SUPPLEMENTED WITH AERIAL LIGHT DETECTION AND RANGING (LiDAR) SURVEY FOR AREAS BEYOND 50 FEET FROM THE ROAD CENTERLINE CONDUCTED BY C.T. MALE BETWEEN SEPTEMBER AND DECEMBER, 2025.

2. HORIZONTAL DATUM IS NORTH AMERICAN DATUM OF 1983 (NAD83), MASSACHUSETTS STATE PLANE, MAINLAND ZONE; US FOOT. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SURVEY:

1. THE CONTRACTOR SHALL PROVIDE SURVEY SERVICES SUFFICIENT TO SUPPORT THE OVERALL PROJECT AND TO DOCUMENT THE PERFORMANCE OF THE WORK.

2. THE CONTRACTOR SHALL ESTABLISH AND MAINTAIN SITE SURVEY CONTROL. SURVEY DATA SHALL MATCH BASEMAP DATA.

UTILITIES:

1. THE LOCATIONS AND ALIGNMENTS OF EXISTING UTILITIES SHOWN ON THE DESIGN DRAWINGS ARE APPROXIMATE AND BASED ON INFORMATION READILY AVAILABLE TO THE ENGINEER. THE CONTRACTOR SHALL VERIFY THE PRESENCE AND LOCATION OF ALL OVERHEAD/UNDERGROUND SITE FEATURES AND UTILITIES RELEVANT TO THE WORK. ADDITIONAL SITE FEATURES AND UTILITIES THAT ARE NOT SHOWN ON THE DESIGN DRAWINGS MAY BE PRESENT.

2. EXCEPT WHERE NOTED OR AS OTHERWISE INDICATED IN THE DESIGN, THE CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE AND PROTECTION OF ALL OVERHEAD/UNDERGROUND SITE FEATURES AND UTILITIES THAT MAY BE AFFECTED BY THE WORK. ALL UTILITIES, UNLESS STATED OTHERWISE, SHALL REMAIN IN OPERATION FOR THE DURATION OF THE WORK. IF THE CONTRACTOR DAMAGES EXISTING UTILITY EQUIPMENT OR STRUCTURES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE UTILITY OWNER AND FULLY REPAIRING DAMAGES IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTILITY OWNER. IN THE EVENT OF A UTILITY STRIKE THAT CAUSES DAMAGE TO AN EXISTING UTILITY, THE CONTRACTOR MUST IMMEDIATELY STOP WORK UNTIL A FULL SOLUTION IS AGREED ON BY THE CONTRACTOR, ENGINEER, AND UTILITY OWNER.

3. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING/COORDINATING WITH THE APPROPRIATE UTILITY COMPANIES FOR THE TEMPORARY BRACING, REMOVAL, RELOCATION, AND/OR REPLACEMENT OF ANY UTILITIES, UTILITY POLES, OR GUY WIRES AS REQUIRED TO FACILITATE CONSTRUCTION.

GEOTECHNICAL ANALYSIS:

1. THE LOCATIONS AND NUMBER OF PROPOSED GEOTECHNICAL BORING LOCATIONS SHOWN ON THE DESIGN DRAWINGS ARE APPROXIMATE. ACTUAL GEOTECHNICAL BORING LOCATIONS TO BE DETERMINED IN THE FIELD AT TIME OF INVESTIGATION AT DIRECTION OF ONSITE ENGINEER REPRESENTATIVE.

2. RESULTS OF GEOTECHNICAL INVESTIGATIONS WILL BE USED TO FINALIZE TYPICAL ROAD SECTION DESIGN.

ABBREVIATIONS:

AASHTO	AMERICAN ASSOCIATION OF HIGHWAY AND TRANSPORTATION OFFICIALS
APPROX.	APPROXIMATE/APPROXIMATELY
ARCADIS	ARCADIS U.S., INC.
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS
BLDG.	BUILDING
CID	CONTAINED-IN DETERMINATION
CMP	CORRUGATED METAL PIPE
CPP	CORRUGATED PLASTIC PIPE
DR.	DRIVE
D_{50}	MEDIAN STONE SIZE
E.	EAST
EA.	EACH
E.G.	FOR EXAMPLE
ETC.	ET CETERA
ELEV./EL.	ELEVATION
FEMA	FEDERAL EMERGENCY MANAGEMENT AGENCY
FG	FINAL GRADE
FT	FOOT
FT/S	FEET PER SECOND
H	HORIZONTAL
HDPE	HIGH DENSITY POLYETHYLENE
HP	HIGH POINT
IN	INCH
INV.	INVERT
LBS	POUNDS
LF	LINEAR FOOT
MH	MANHOLE
MAX.	MAXIMUM
MIL	THOUSANDTH OF AN INCH
MIN.	MINIMUM
MW	MONITORING WELL
N.	NORTH
NW.	NORTHWEST
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
MASSDOT	COMMONWEALTH OF MASSACHUSETTS
MASSDEP	MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
MASS	MASSACHUSETTS
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
PG	PAGE
PSF	POUNDS PER SQUARE FOOT
QTY	QUANTITY
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
RFI	REQUEST FOR INFORMATION
S.	SOUTH
SE.	SOUTHEAST
STW	SHALLOW TEMPORARY WELL WITHOUT CONCRETE BASE
TBD	TO BE DETERMINED
TYP.	TYPICAL
OZ.	OUNCE
V	VERTICAL
VCP	VITRIFIED CLAY PIPE
W.	WEST
Ø	DIAMETER

LEGEND - EXISTING SITE FEATURES:

- MAJOR CONTOURS (5-FT INTERVAL)
- MINOR CONTOURS (1-FT INTERVAL)
- APPROX. LOC. OVERHEAD ELECTRIC
- APPROX. LOC. STORM PIPE
- FENCE LINE
- APPROX. LOC. RIGHT OF WAY
- UTILITY POLE
- TRANSMISSION TOWER
- RETAINING WALL
- GRAVEL ROAD
- FLOOD PLAIN
- BUILDING
- PAVED ROAD
- WATER STREAM
- EDGE OF MARSH
- WATER DITCH
- EDGE OF WATER
- OUTER BOUNDARY
- PARCEL BOUNDARY
- RIGHT OF WAY UTILITY
- MUNICIPALITY BOUNDARY
- APPROX. FLOODPLAIN LIMITS (AS DEFINED BY FEMA)

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No.	Date	Revisions	By	Ckd

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Professional Engineer's Name: **MARK O. GRAVELDING**
Professional Engineer's No.: MA
State: MA | Date Signed | Project Mgr.
Designed by | Drawn by: RKC | Checked by: PHB

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ARCADIS

GE-PITTSFIELD/HOUSATONIC RIVER SITE - TOWN OF LEE, MASSACHUSETTS
REST OF RIVER - GRAVEL ROAD IMPROVEMENTS

GENERAL NOTES AND LEGEND

CIVIL

ARCADIS Project No.: 30299972
Date: APRIL 2026

ARCADIS U.S., INC.
ONE LINCOLON CENTER 110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202 TEL. 315.446.9120

GR-01

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Professional Engineer's Name
MARK O. GRAVELDING

Professional Engineer's No.
MA

State	Date Signed	Project Mgr.
MA		
Designed by	Drawn by	Checked by
	RKC	PHB

NOT FOR CONSTRUCTION

ARCADIS

GE-PITTSFIELD/HOUSATONIC RIVER SITE - TOWN OF LEE, MASSACHUSETTS
REST OF RIVER - GRAVEL ROAD IMPROVEMENTS

KEYPLAN

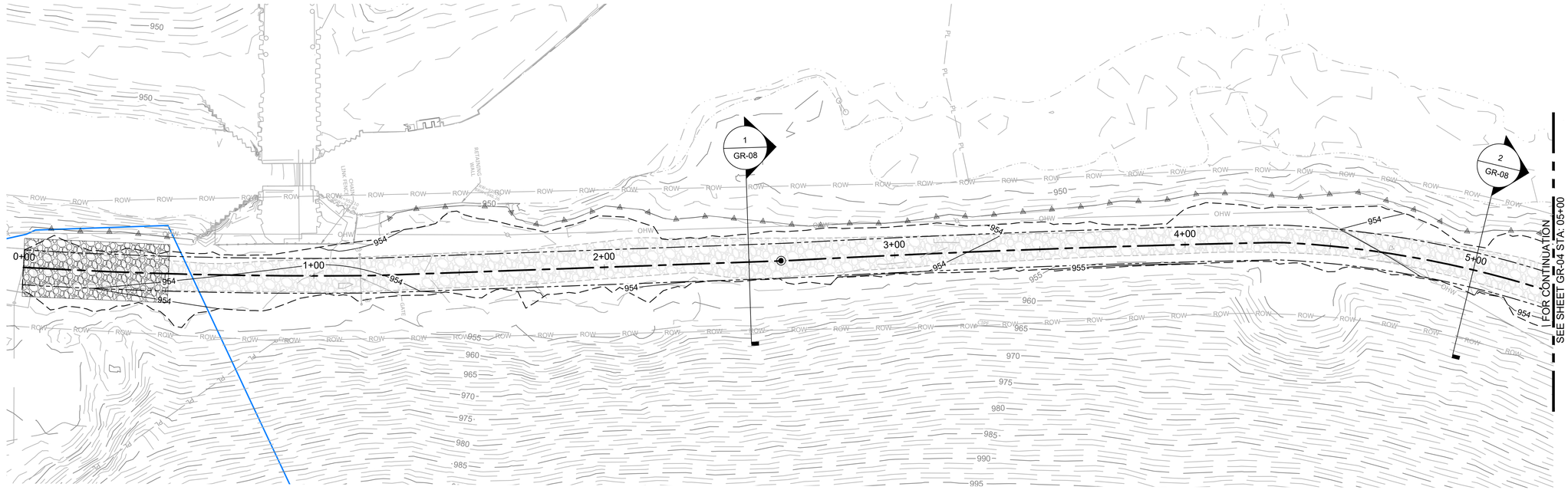
CIVIL

ARCADIS Project No.
30299972

Date
APRIL 2026

ARCADIS U.S., INC.
ONE LINCOLN CENTER 110 WEST FAYETTE STREET
SYRACUSE, NEW YORK
13202 TEL. 315.446.9120

GR-02

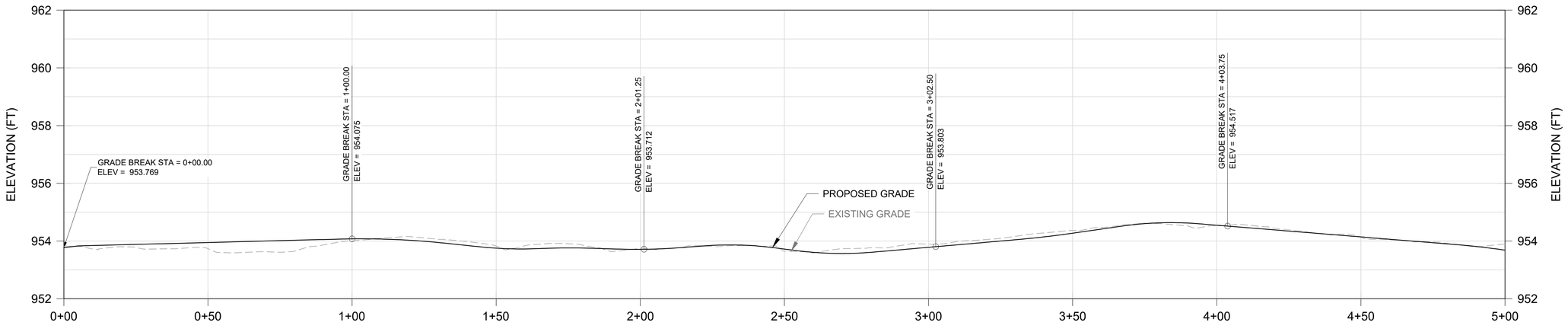


PLAN

0 10' 20' 40'

LEGEND

- 955 — PROP. MAJOR CONTOUR (5-FT INTERVAL)
- 954 — PROP. MINOR CONTOUR (1-FT INTERVAL)
- ROAD CENTERLINE
- PROPOSED LIMIT OF GRADING
- PROPOSED EDGE OF ROAD
- SILT FENCE
- PROPOSED GEOTECHNICAL BORING
- CONSTRUCTION ENTRANCE



PROFILE

SCALE: HORIZ. 0 10' 20' 40'

VERT. 0 2' 4'

SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING:

USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

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Professional Engineer's Name: **MARK O. GRAVELDING**

Professional Engineer's No.: MA

State	Date Signed	Project Mgr.
MA		
Designed by	Drawn by	Checked by
	RKC	PHB

NOT FOR CONSTRUCTION

ARCADIS

GE-PITTSFIELD/HOUSATONIC RIVER SITE - TOWN OF LEE, MASSACHUSETTS
REST OF RIVER - GRAVEL ROAD IMPROVEMENTS

PLAN AND PROFILE (STA: 0+00 - STA: 05+00)

CIVIL

ARCADIS Project No.
30299972

Date
APRIL 2026

ARCADIS U.S., INC.
ONE LINCOLN CENTER 110
WEST FAYETTE STREET
SYRACUSE, NEW YORK
13202 TEL. 315.446.9120

GR-03

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BY: GRIFFITH, KEVIN

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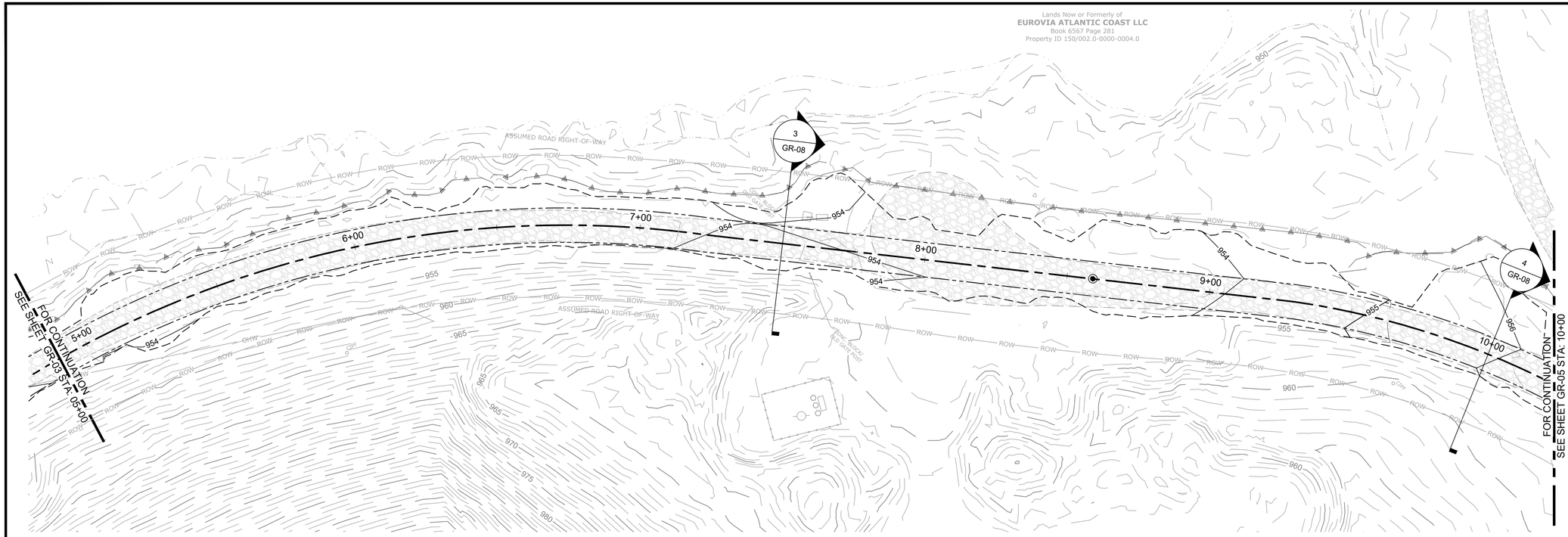
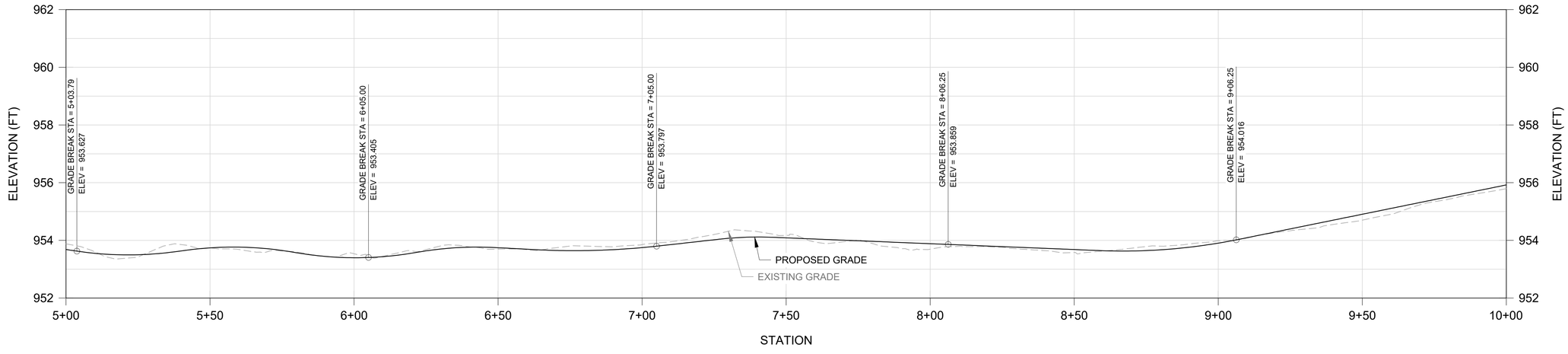
BY: GRIFFITH, KEVIN



LEGEND

- 955 — PROP. MAJOR CONTOUR (5-FT INTERVAL)
- 954 — PROP. MINOR CONTOUR (1-FT INTERVAL)
- ROAD CENTERLINE
- PROPOSED LIMIT OF GRADING
- PROPOSED EDGE OF ROAD
- SILT FENCE
- PROPOSED GEOTECHNICAL BORING



PROFILE

SCALE: HORIZ. 0 10' 20' 40'
VERT. 0 2' 4'

SCALE(S) AS INDICATED

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Professional Engineer's Name
MARK O. GRAVELDING
Professional Engineer's No.
MA
State: MA
Date Signed:
Project Mgr.:
Designed by:
Drawn by: RKC
Checked by: PHB

NOT FOR CONSTRUCTION

ARCADIS

GE-PITTSFIELD/HOUSATONIC RIVER SITE - TOWN OF LEE, MASSACHUSETTS
REST OF RIVER - GRAVEL ROAD IMPROVEMENTS

PLAN AND PROFILE (STA: 05+00 - STA: 10+00)

CIVIL

ARCADIS Project No.
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GR-04

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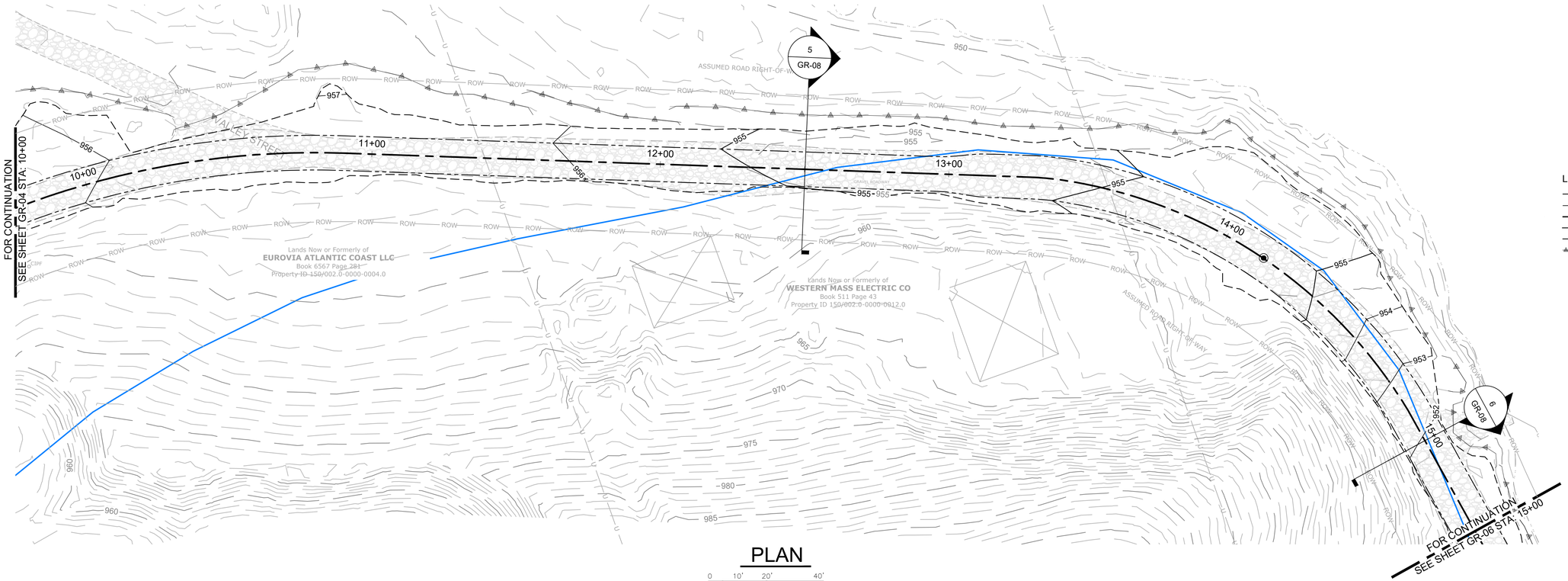
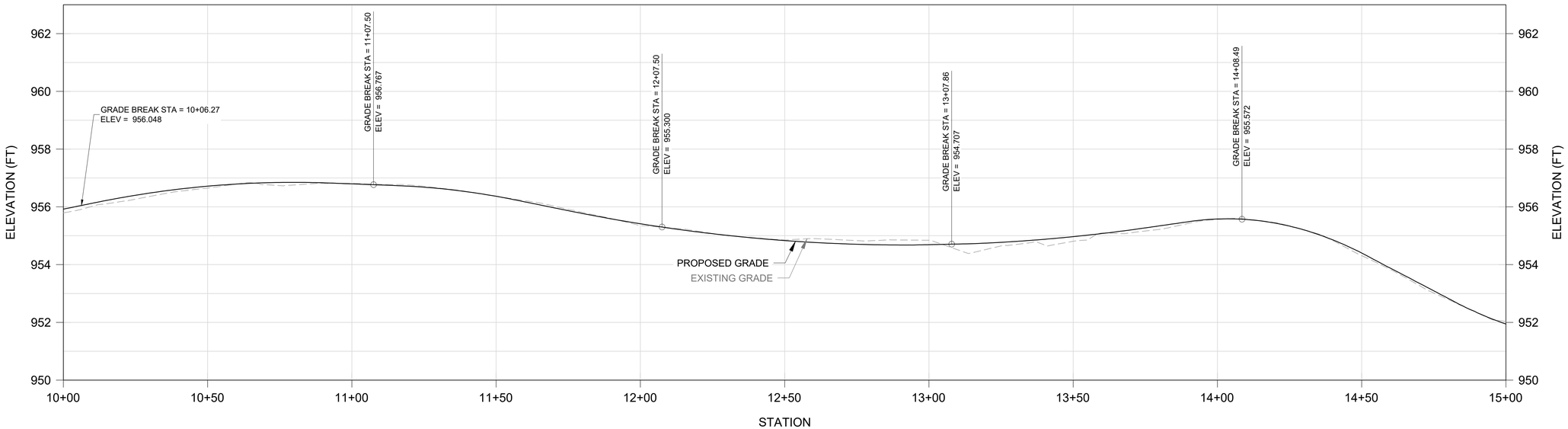


PLAN

0 10' 20' 40'



PROFILE

SCALE: HORIZ. 0 10' 20' 40'
VERT. 0 2' 4'

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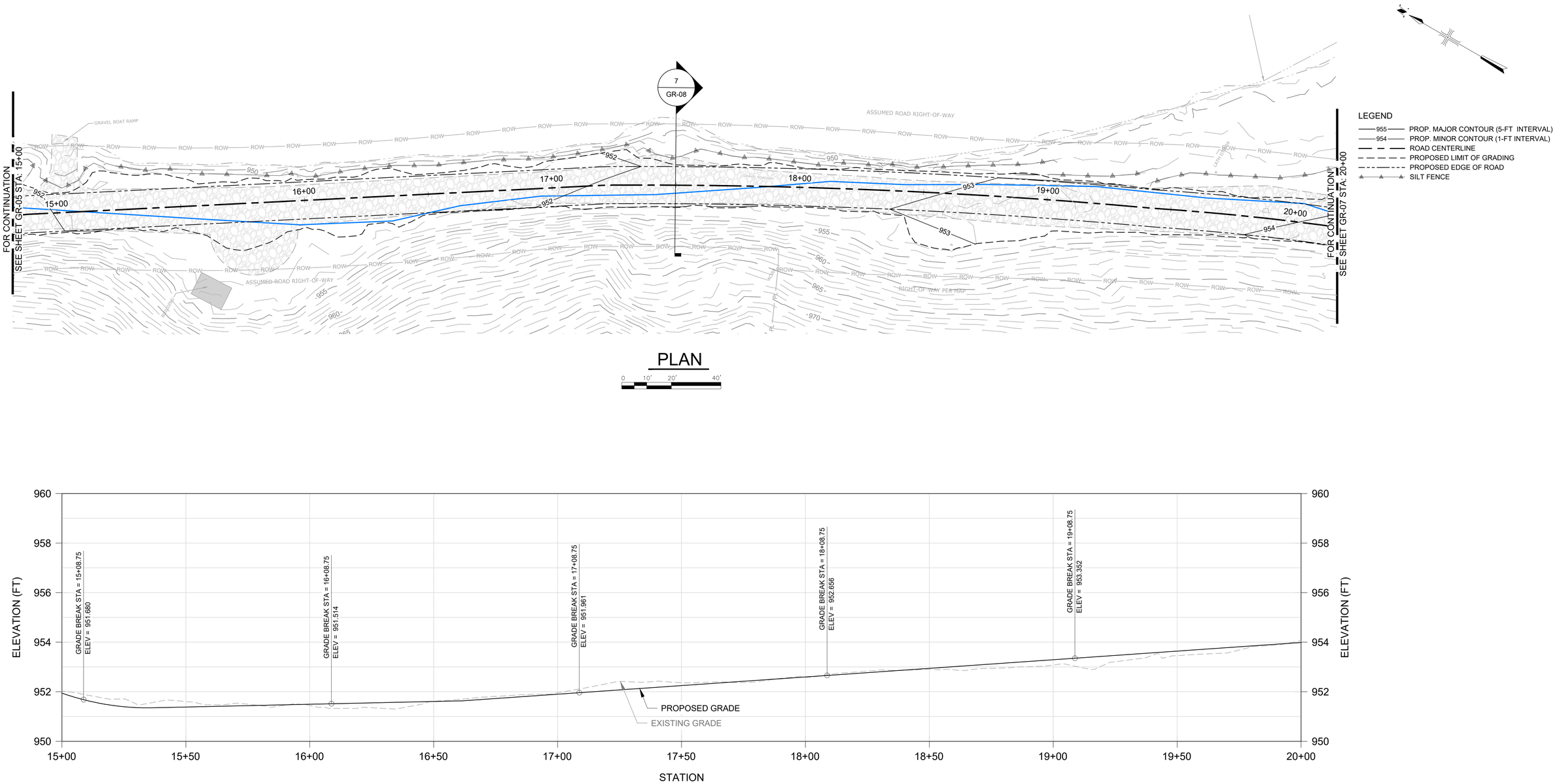
GR-05



PLAN

0 10' 20' 40'

PROFILE

SCALE: HORIZ. 0 10' 20' 40'
VERT. 0 2' 4'

SCALE(S) AS INDICATED

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Professional Engineer's No.: MA
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Drawn by: RKC
Checked by: PHB

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ARCADIS

GE-PITTSFIELD/HOUSATONIC RIVER SITE - TOWN OF LEE, MASSACHUSETTS
REST OF RIVER - GRAVEL ROAD IMPROVEMENTS

PLAN AND PROFILE (STA: 15+00 - STA: 20+00)

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GR-06

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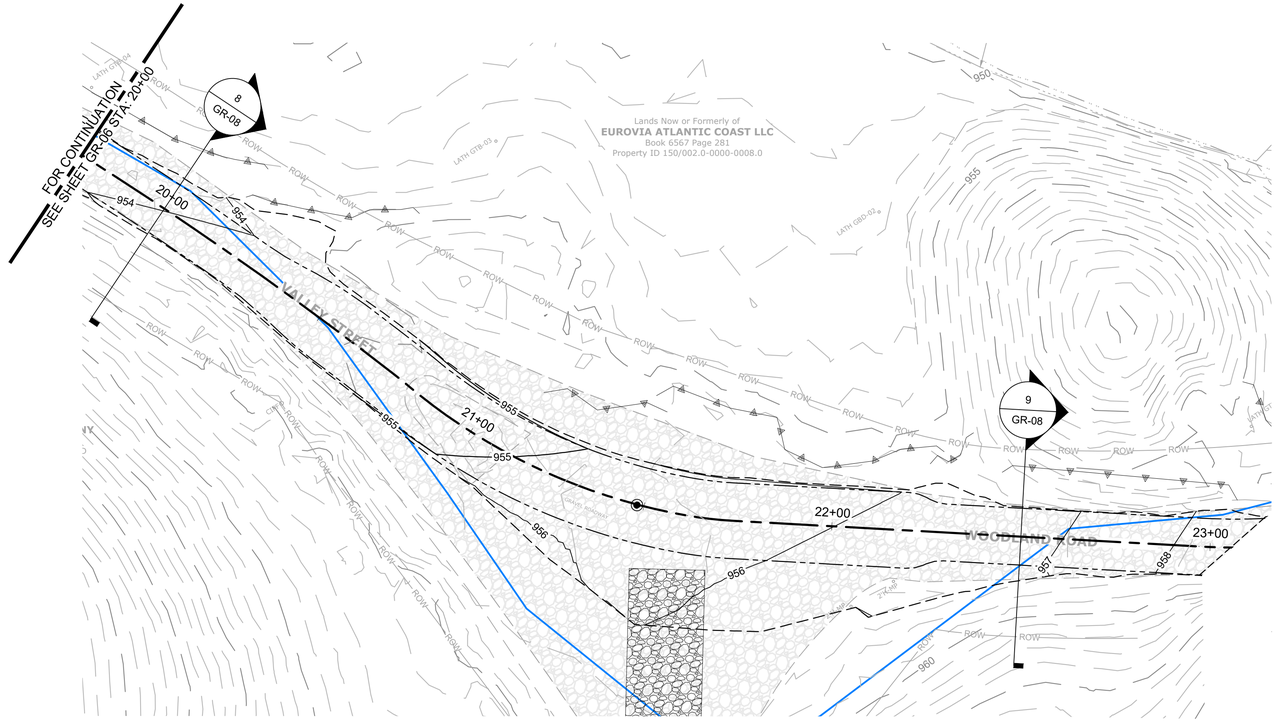
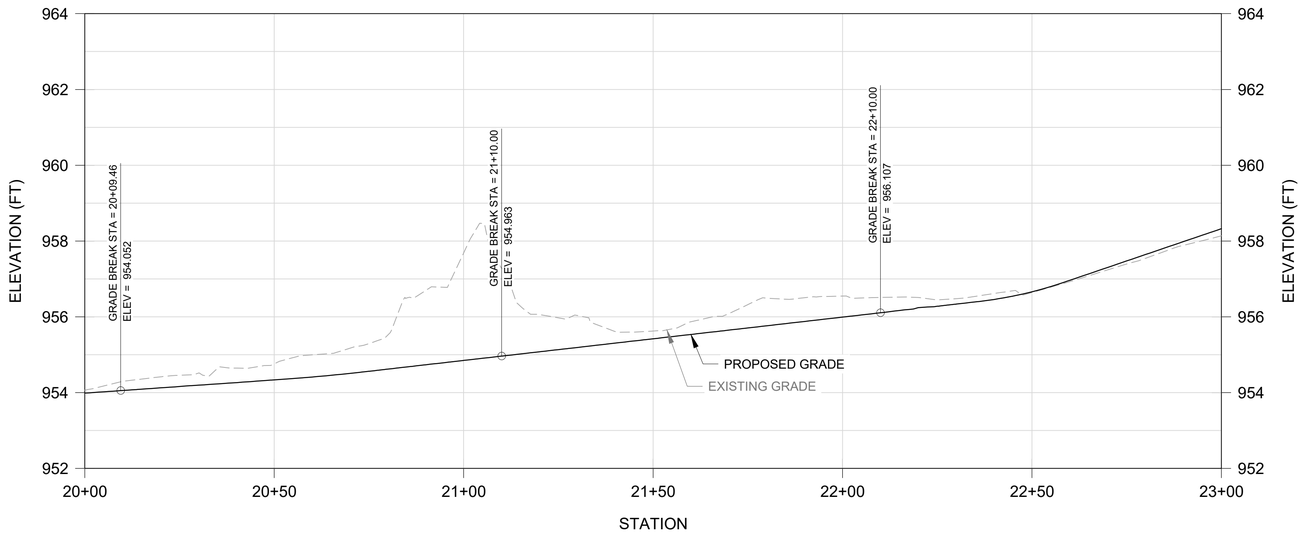


PLAN

0 10' 20' 40'



PROFILE

SCALE: HORIZ. 0 10' 20' 40'

VERT. 0 2' 4'

LEGEND

- 955 PROP. MAJOR CONTOUR (5-FT INTERVAL)
- 954 PROP. MINOR CONTOUR (1-FT INTERVAL)
- ROAD CENTERLINE
- PROPOSED LIMIT OF GRADING
- PROPOSED EDGE OF ROAD
- SILT FENCE
- PROPOSED GEOTECHNICAL BORING
- CONSTRUCTION ENTRANCE

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Professional Engineer's No.
MA

State	Date Signed	Project Mgr.
MA		
Designed by	Drawn by	Checked by
	RKC	PHB

NOT FOR CONSTRUCTION

ARCADIS

GE-PITTSFIELD/HOUSATONIC RIVER SITE - TOWN OF LEE, MASSACHUSETTS
REST OF RIVER - GRAVEL ROAD IMPROVEMENTS

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GR-07

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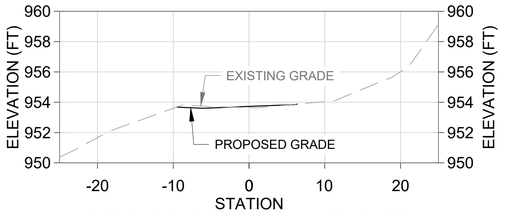
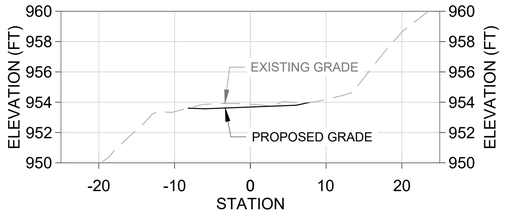


CROSS SECTION AT 2+50

SECTION 1 GR-03



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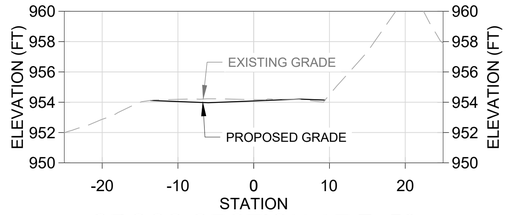

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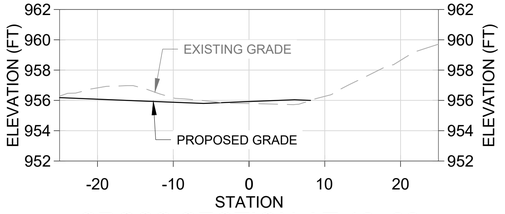

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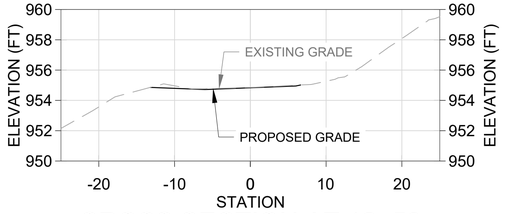

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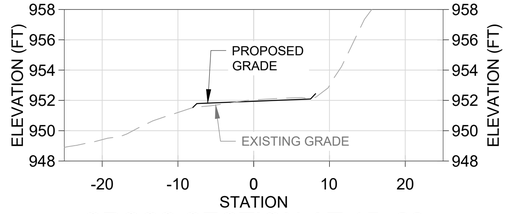
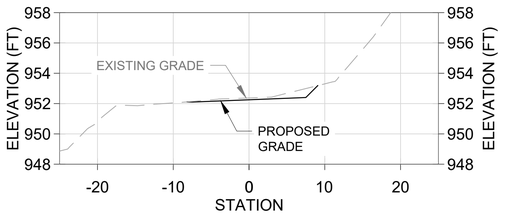


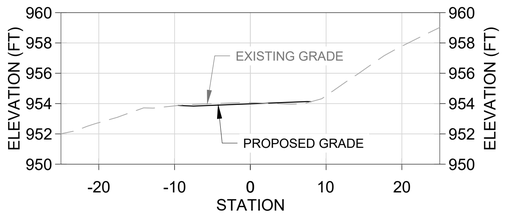
CROSS SECTION AT 15+00

SECTION 6 GR-05



CROSS SECTION AT 17+50

SECTION 7 GR-06



CROSS SECTION AT 20+00

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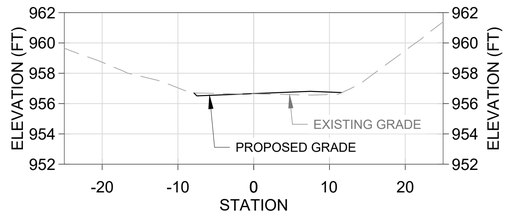

CROSS SECTION AT 22+50

SECTION 9 GR-07

SCALE: HORIZ. 0 10' 20'

VERT. 0 5' 10'

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Professional Engineer's No.: MA

State	Date Signed	Project Mgr.
MA		
Designed by	Drawn by	Checked by
	RKC	PHB

NOT FOR CONSTRUCTION

ARCADIS

GE-PITTSFIELD/HOUSATONIC RIVER SITE - TOWN OF LEE, MASSACHUSETTS
REST OF RIVER - GRAVEL ROAD IMPROVEMENTS

CROSS SECTIONS

CIVIL

ARCADIS Project No. 30299972

Date APRIL 2026

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GR-08

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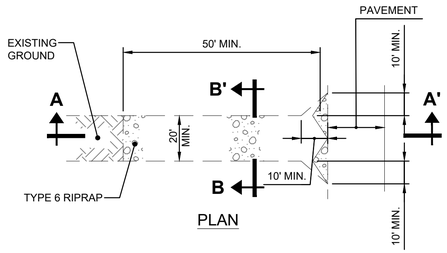
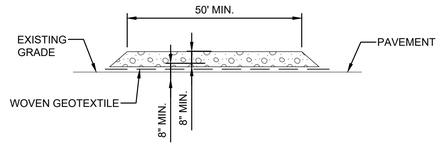
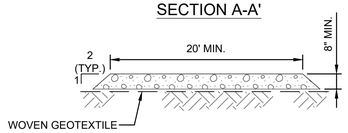


PLAN



SECTION A-A'

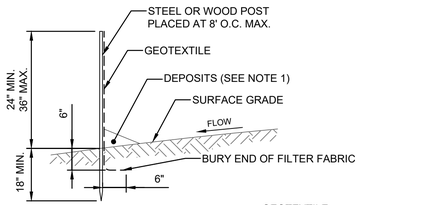


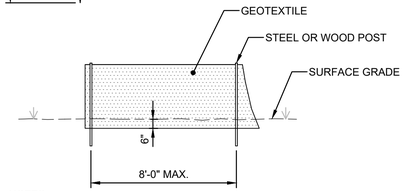
SECTION B-B'

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE FOR MAIN SITE ACCESS

NOT TO SCALE

1





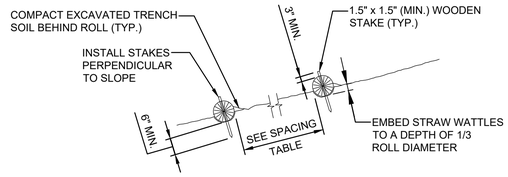
NOTES:

1. DEPOSITS SHALL BE REMOVED WHEN THEY REACH APPROXIMATELY 6 INCHES ABOVE GRADE ELEVATION.
2. THE SILT FENCE WILL REMAIN IN PLACE UNTIL A VEGETATIVE STAND IS ESTABLISHED.
3. THE SILT FENCE WILL BE USED FOR TEMPORARY EROSION AND SEDIMENTATION CONTROL ONLY.

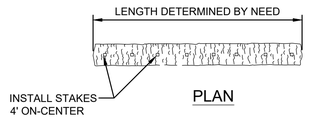
TEMPORARY SILT FENCE

NOT TO SCALE

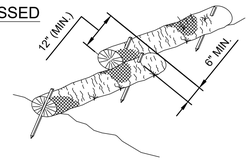
2



SECTION VIEW - GRASSED AREAS



PLAN



OVERLAPPING DETAIL

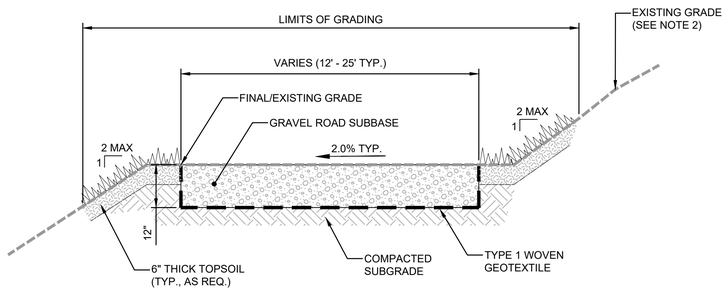
NOTES:

1. PLACE WATTLES PARALLEL TO TOE OF SLOPE OR ALONG SLOPE CONTOUR. TURN THE ENDS OF EACH WATTLE UPSLOPE TO INHIBIT FLOW AROUND THE ROLL.
2. WHEN MULTIPLE WATTLES ARE REQUIRED ALONG AN ALIGNMENT, OVERLAP ADJOINING SEGMENTS BY A MINIMUM OF 12 INCHES.
3. REMOVE SEDIMENT FROM THE UPSLOPE SIDE OF WATTLES WHEN ACCUMULATION HAS REACHED 1/2 OF THE EFFECTIVE HEIGHT OF THE BARRIER..
4. WATTLES TO BE STAKED NO MORE THAN 6" DEEP ON FINAL COVER AREA.

TEMPORARY STRAW WATTLE

NOT TO SCALE

3



NOTES:

1. REFER TO THE TECHNICAL SPECIFICATIONS FOR MATERIAL AND COMPACTION REQUIREMENTS.
2. ACCESS ROAD IMPROVEMENTS WITHIN FLOODPLAINS AREAS SHALL BE CONSTRUCTED WITH NO NET FILL. REFER TO PLANS FOR FLOODPLAN LOCATIONS.
3. ADDITIONAL GRADING MAY BE NECESSARY BEYOND THE STANDARD DETAILS FOR DRAINAGE FEATURES SUCH AS ROADSIDE DITCHES OR CULVERTS.
4. TYPICAL ROAD SECTION DEPICTED IS APPROXIMATE. ACTUAL ROAD SECTION DESIGN MAY BE MODIFIED RESULTING FROM FUTURE GEOTECHNICAL INVESTIGATION RESULTS.

TYPICAL ACCESS ROAD SECTIONS

NOT TO SCALE

4

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Professional Engineer's No.: MA

State	Date Signed	Project Mgr.
MA		
Designed by	Drawn by	Checked by
	RKC	PHB

NOT FOR CONSTRUCTION

ARCADIS

GE-PITTSFIELD/HOUSATONIC RIVER SITE - TOWN OF LEE, MASSACHUSETTS
REST OF RIVER - GRAVEL ROAD IMPROVEMENTS

DETAILS

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SYRACUSE, NEW YORK
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GR-09

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SECTION 02 21 00 – SURVEYS

PART 1 – GENERAL

1.01 DESCRIPTION

A. The Contractor shall provide survey control sufficient to support the overall Project and document the performance of the work.

B. The Contractor will employ a licensed Surveyor to provide the surveying functions necessary for the proper construction and documentation of the work. All survey related work products will be sealed and signed by a registered Massachusetts Professional Engineer or Licensed Surveyor.

C. Survey control for construction and documentation purposes will be the responsibility of the Contractor. The Contractor will safeguard all survey points and benchmarks. Should any of these points be destroyed, the replacement cost will be borne by the Contractor. The Contractor will be responsible for rectifying work improperly constructed due to failure to maintain and protect such established survey points and benchmarks.

D. Contractor shall furnish and/or provide all supervision, labor, tools, materials, equipment, services, and appurtenances necessary for, or incidental to, completing all work necessary for performing the surveying activities described herein and preparing required as-built survey data and drawings of pre-construction, interim, and post-construction grades.

1. The Contractor will perform topographic surveys to verify the design grades (i.e., subgrades and final grades) are met. The Contractor will prepare topographic drawings to document the constructed design conditions (i.e., alignments, elevations slopes).
2. All contingency surveying will be conducted at the Contractor.

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS (NOT USED)

1.03 SUBMITTALS

A. Survey Plan: The Contractor will submit a Survey Plan for review and approval by the CM 3 weeks prior to the start of any survey related field work. The Plan will include the following:

1. Survey Schedules and Crew:
   a. The Plan will include all milestone and other field survey activities for the project.
   b. The Plan will include name, address, telephone number, and qualifications, including licensure and/or certification, of the surveyor, crew chief, superintendent, and all other persons who are proposed to perform surveys or survey related duties to the CM for review and approval.

B. Survey Data Records:

1. The Contractor will furnish the CM with copies of project field notes, computations, any records relating to the layout of the work and information on any computer software required to interpret the finished data and records for review and approval prior to the final progress payment. The CM will use them as necessary to verify completion of the project work prior to submittal of the final payment. The Contractor will retain copies of all such material furnished to the CM.
2. Survey data will be provided in x, y, z, d (easting, northing, elevation, description) format. Each data file must include a descriptive header including, but not limited to: software and equipment information, project name and client, horizontal and vertical datum, units, survey type, alignment, and stations surveyed.
3. The Contractor will maintain a complete, accurate log of survey work as it progresses at the Site.
4. The accuracy of the Contractor's survey and other furnishing of data to the Engineer do not constitute a transfer of responsibility for verifying accuracy.

C. As-Built Drawings. Upon completion of major phases of Work, Contractor shall submit a copy of the associated survey drawing with relevant as-built data in a format compatible with AutoCAD Civil 3D 2023 and in PDF. At a minimum, the as-built drawings shall include the following information:

1. Surveyed surface elevation contours (1 foot resolution), spot elevations, alignments and limits of surveyed conditions, and survey points for constructed features with descriptors where applicable.
2. General site work conditions including access roads, drainage features (culverts, stormwater conveyance features), berms, fences and gates, , etc.

1.04 PERFORMANCE CRITERIA/QUALITY ASSURANCE

A. The Contractor must have a minimum of 5 years' experience completing the type of work specified herein.

B. All survey data acquisition, layout, and related work will be performed and signed by a licensed Surveyor.

C. The Contractor will conduct and document the quality control procedures recommended by the survey equipment manufacturer for the equipment used.

D. Survey will be conducted to meet the requirements specified herein; including, but not limited to, documenting the completed construction work with accuracy sufficient to allow for evaluation and confirmation the project work is being completed in conformance with the Contract Documents.

E. When applicable, the Contractor will regularly resurvey benchmarks for comparison with original elevations and positions. Where the Contractor uses the laser for control, he will periodically check the grade and alignment during each day's operation. The Contractor will promptly notify the Engineer if changes in elevations or positions occur to be reviewed for consistency with Design Drawings.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

A. The Contractor will exercise care during the execution of the work activities specified herein to minimize any disturbance to existing property and to the landscape and waters in the areas surrounding the work areas. Survey crews will not traverse into controlled areas or private property without first obtaining approval by the CM.

B. The Contractor will reference survey points to the provided survey control points and record all survey locations, with horizontal and vertical data, on project record documents.

C. Unless otherwise approved by the Engineer, topographic survey data shall be collected on a 10-foot by 10-foot grid or wherever the elevation changes more than 1 foot. Survey shall document location of grade breaks and edges of construction areas as appropriate. Structures and features existing within the survey limits shall be surveyed and identified on the survey drawings.

3.02 PRE-CONSTRUCTION SURVEY

A. Contractor shall perform pre-construction surveys of Site construction areas, as needed, to document existing site conditions.

B. Pre-construction survey data and drawings shall be submitted to the Engineer at least one week prior to the start of earthwork activities in the surveyed areas, unless otherwise allowed by the Engineer.

3.03 POST-CONSTRUCTION SURVEY

A. The Contractor shall perform post-construction topographic and feature surveys to document the completed work and to confirm restoration to pre-construction conditions or other elevations as required. At a minimum, these surveys shall obtain the following information:

1. Location and identification of structures and features (e.g., building walls and structures, hydrants and shutoff valves, roads, fences, poles, equipment, etc.). For building walls and structures, include top and bottom elevations.
2. Surface topography and slope break lines for prominent grade changes.
3. Location and identification of drainage features (e.g., culvert pipes, subsurface pipes, manholes, catch basins, ditches, swales, pipe inlets/outlets, riprap protection, check dams, berms, etc.). Include descriptions of material types, pipes and sizes, manholes, catch basins, etc.).
4. Elevation of drainage systems (i.e., pipe and channel inverts, manhole and catch basin rim and sump, check dams and berm toes and crests).

3.04 CONTROL OF WORK

A. Reference Points:

1. Established reference points damaged or destroyed by Contractor will be re-established by Contractor.
2. From established reference points, establish lines, grades, and elevations necessary to control the Work. Obtain measurements required for executing the Work to tolerances specified.
3. Establish, place, and replace as required, such additional stakes, markers, and other reference points necessary for control, intermediate checks, and guidance of construction operations.

B. Procedures:

1. Accuracy:
   a. For topographic land surveys:
      1) Horizontal accuracy shall be plus or minus 0.1 feet.
      2) Vertical accuracy shall be plus or minus 0.05 feet for general site grading and 0.02 feet for structural features (e.g. pipes, manholes) unless otherwise specified or approved by the Engineer.
   b. Survey calculations shall include an error analysis sufficient to demonstrate required accuracy.

- END OF SECTION -

SECTION 31 05 16 – AGGREGATES FOR EARTHWORK

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Providing all labor, materials, tools, equipment, and services as shown, specified, and required to install aggregate materials from on-site or off-site sources for the filling and backfilling, restoration of surfaces, and other purposes required by the Contract Documents.

2. Aggregate materials consist of:
   a. Sand Bedding;
   b. Crushed Stone;
   c. Graded Aggregate;
   d. Gravel Road Subbase

B. Related Sections:

1. Section 31 05 16.10 – Materials for Earthwork.
2. Section 31 05 19.13 – Geotextiles for Earthwork.
3. Section 31 22 00 – Grading.
4. Section 31 37 00 – Riprap.
5. Section 32 91 19.13 – Topsoil Placement and Grading.

1.02 SUBMITTALS

A. Informational Submittals:

1. Delivery Tickets: Submit copy of delivery ticket for each load of material delivered to the Site. Each delivery ticket shall indicate Supplier name and source address, project name, contract number, date, material type, MassDOT item number when applicable, and quantity delivered.

1.03 DELIVERY

A. Notify the CM no less than one (1) week in advance of delivery of all aggregate materials unless otherwise approved by the CM.

PART 2 – PRODUCTS

PART 3 – MATERIALS

Refer to Section 31 05 16.10 – Materials for Earthwork for material product description.

PART 4 – EXECUTION

4.01 INSPECTION

A. Prior to placement of aggregate materials, verify that the geotextiles (if required), are free of tears, holes, wrinkles, and foreign objects, and are securely anchored.

B. Verify that subgrades, aggregate base grades, and final grades, slopes and elevations conform to specified requirements. Notify the CM immediately if a specified grade, slope, or elevation appears inconsistent with the others specified.

C. At the beginning of each day's Work, the CM will inspect the previously placed aggregate materials, and the Contractor shall institute whatever corrective action, if any, that the CM deems appropriate. This may include but is not limited to the removal and replacement of unsuitable aggregate materials.

4.02 PLACEMENT OF AGGREGATE MATERIAL

A. Do not allow heavy equipment to operate directly on exposed or thinly covered geotextile. Construct a platform of the aggregate material from which additional material can be spread.

B. Materials shall be placed, not dumped, to the limits and grades shown on Drawings.

C. Do not operate equipment in a manner that will cause equipment to dig into the geotextiles. If this occurs, even inadvertently, clear the area to demonstrate to the satisfaction of the CM that the geotextiles have not been damaged. In the event of any damage, the Contractor will immediately repair such damage.

D. Spread and grade aggregate material in single lifts to the final thickness and grades shown on the Drawings.

E. Place aggregate materials to the densities and lift thicknesses specified in Section 31 22 00 – Grading

F. Furnish and use equipment capable of adding measured amounts of water to the fill materials to bring fill materials to a condition within required moisture content range.

G. Furnish and use equipment capable of discing, aerating, and mixing the fill materials to ensure reasonable uniformity of moisture content throughout the fill materials, and to reduce moisture content of borrow materials by air drying, when necessary. When subgrade or lift of fill materials requires moisture-conditioning before compaction, fill material shall be sufficiently mixed or worked on the subgrade to ensure uniform moisture content throughout the lift of material to be compacted. Materials at moisture content more than specified limit shall be dried by aeration or stockpiled for drying.

H. Perform compaction with equipment suitable for the type of fill material being placed. Select and use equipment capable of achieving the minimum densities required in the Contract Documents.

I. Furnish and use equipment capable of compacting in restricted areas next to structures and around piping and Underground Facilities. Effectiveness of the equipment selected by Contractor shall be tested at start of compacted fill work by constructing a small section of fill within or adjacent to the area where fill will be placed. Record total number of coverages with selected compaction equipment and perform field moisture content and density tests to ensure that specified compaction of fill has been obtained. If test section results indicate that the required compaction has not been obtained, do one or more of the following:

    1. Increase the number of coverages.

2. Decrease the lift thicknesses.

3. Use different compaction equipment.

J. Place fill materials in horizontal, loose lifts, not exceeding the specified lift thicknesses following compaction. Place fill in a manner ensuring uniform lift thickness after placing. Mechanically compact each lift, by not less than two complete coverages of the compactor. One coverage is defined as the conditions reached when all portions of the fill lift have been subjected to the direct contact of compactor's compacting surface. Compaction of fill materials by inundation with water is unacceptable.

K. Do not place fill materials when standing water is present on the surface of the area where fill will be placed. Do not compact fill when standing water is present on the fill to be compacted.

L. Do not place or compact fill in a frozen condition or on top of frozen material.

M. Fill containing organic materials or other unacceptable materials previously described shall be removed and replaced prior to compaction.

N. If required densities are not obtained because of improper control of placement or compaction procedures, or because of inadequate or improperly functioning compaction equipment, the Contractor shall perform all work required to achieve the required densities. Such work shall include complete removal of unacceptable fill areas and replacement and re-compaction until acceptable fill conditions are achieved.

O. Repair observed or measured settlement. Make repairs and replacements, as required, within five days after being so advised by CM.

4.03 FIELD QUALITY CONTROL

A. Contractor shall perform thickness measurements in the field as directed by the CM, to determine compliance with the Contract Documents.

B. Contractor shall subcontract with an independent third-party firm to test the in-place density and moisture of compacted lifts in accordance with specification Section 31 22 00 – Grading.

C. Contractor shall record all test results and document their locations. The CM may require the Contractor to make additional tests or to re-test compacted material if the compaction procedures or the density of the material are in question.

4.04 CRITERIA AND TOLERANCES

A. Fill materials shall be constructed to the lines and grades shown on the contract drawings unless otherwise requested by the CM. Acceptance of final grades will be based on site observations by the CM and review of a final as-built survey information. Any settlements that occur prior to final acceptance of the work shall be restored to design and/or intended grades by the Contractor.

- END OF SECTION -

SECTION 31 05 16.10 – MATERIALS FOR EARTHWORK

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Providing all labor, materials, tools, equipment, and services as shown, specified, and required to furnish and install earthwork materials from on-site or off-site sources for the filling and backfilling, restoration of surfaces, and other purposes required by the Contract Documents.
2. Materials covered in this Section include:
   a. Aggregates;
   b. Riprap; and
   c. Topsoil.

B. Related Sections:

1. Section 31 05 16 – Aggregates for Earthwork.
2. Section 31 37 00 – Riprap.
3. Section 32 91 19.13 – Topsoil Placement and Grading.

1.02 REFERENCES

A. Reference Standards:

1. Association of Official Analytic Chemists (AOAC), Official Methods of Analysis of AOAC International.
2. ASTM C127, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
3. ASTM D1140, Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75 µm) Sieve.
4. ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort of 56,000 ft-lbf/ft3, also known as “Modified Proctor”.
5. ASTM D2216 Standard Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.
6. ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
7. ASTM D2434, Standard Test Method for Permeability of Granular Soils.
8. ASTM D3980, Standard Test Method for Direct Shear Test of Soils Under Consolidated Drained Conditions.
9. ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
10. ASTM D5084, Standard Test Method for Measurement of Hydraulic Conductivity of soils.
11. ASTM D5268, Standard Specification for Topsoil Used for Landscaping Purposes.

12. ASTM D6913, Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis.
13. ASTM D6938, Density of Soil and Soil-Aggregate in Place by Nuclear Method (Shallow Depth).

1.03 QUALITY ASSURANCE

A. Materials, procedures, operations, and methods shall be in strict conformance with the Contract Documents. Materials shall be subjected to strict quality control monitoring as detailed herein. The placed granular materials shall conform exactly to the Contract Documents, except as otherwise authorized in writing by the CM.

B. Comply with relevant, applicable requirements of the MassDOT Standard Specifications.

1.04 SUBMITTALS

A. Submit background information for each proposed borrow pit to the CM for review as part of the borrow pit's initial screening for acceptance. At a minimum, background information shall include the following:
   1. The location of the borrow pit(s) including state, county, municipality, and address.
   2. The names, contact information, and relationship of persons involved with the borrow pit preparation and transport of the fill from the borrow site to the receiving site.
   3. A description of the borrow pit including use history and quantity of material available from each borrow site.
   4. A copy of current MassDOT mining permit, and proof of MassDOT approval for proposed source of riprap.
   5. A description of sampling methodology to be used to obtain geotechnical and analytical samples.
   6. Identification of specific areas within the borrow pit on a scaled site plan where material will be obtained for use at the project site.
   7. Identification of specific areas within the borrow pit on a scaled site plan where samples for analytical and geotechnical testing will be obtained.
   8. The results of geotechnical testing previously performed at each borrow pit and description of the geotechnical properties of the material and indication that the material meets the projects' geotechnical specifications.

B. Submit names and qualifications of analytical and geotechnical laboratories proposed by the Contractor for Project use to the CM for review and approval in advance of their use.

C. Submit results of laboratory chemical analysis of each material type from each borrow pit at the frequencies specified in Part 2.02 of this specification.

D. Submit results of laboratory geotechnical testing of each material type from each borrow pit at the frequencies specified in Part 2.02 of this specification.

E. Submit laboratory compaction characteristic data (using Modified Proctor) for each borrow pit and for each material type having a minimum specified compaction objective. In the event of a change in the gradation of the material (as determined by the Contractor and/or the CM based on review of the particle-size analyses performed during production), additional laboratory

compaction testing may be necessary to ensure applicable compaction criteria are being referenced for field compaction assessment.

F. Submit qualifications for the firm proposed for conducting field nuclear density testing of fill materials.

G. Submit plan acceptable to the CM that details how imported and on-Site soil and aggregate materials will be managed at the Site. This plan shall include descriptions of how materials will be delivered to the Site (for both imported and on-Site borrow materials), where materials will be staged, and how staged materials will be managed (e.g., protected against erosion, sloped, loaded, etc.).

1.05 DELIVERY

A. Notify the CM no less than one (1) week in advance of delivery of all granular materials.

PART 2 – PRODUCTS

2.01 MATERIALS

a. Gravel Road Subbase:
   1) Material shall be MASSDOT M1.03.1. The Gravel material, whether delivered to the site or selected from the spoils, shall be naturally- or artificially graded mixture of natural or crushed gravel, crushed stone, or natural or crushed sand, complying with the gradation requirements below.

Sieve Sizes (Square Openings)	Percentage by Weight Passing Sieve
3-inch	100
1½-inch	70-100
¾-inch	58-85
No. 4	30-60
No. 200	0-10

B. Topsoil:

1. Material:
   a. Topsoil shall be fertile, friable, natural-loam surface soil, capable of sustaining vigorous plant growth; free of any admixture of subsoil, clods of hard earth, plants or roots, sticks, stones larger than one inch in diameter, pests and pest larvae, or other extraneous material harmful to plant growth, in compliance with ASTM D5268.
   b. Gradation shall be as specified in Table 1.

GRADATION REQUIREMENTS FOR TOPSOIL

U.S. Sieve Size	Percentage by Weight Passing Sieve
1-inch	100
No. 10	90-100
No. 200	35-70

   c. Clay content of material passing the No. 200 sieve shall not exceed 20 percent.

d. Material shall have a pH range of 5.0 to 7.0.
e. Organic content of material passing the No. 10 sieve shall be not less than five percent and shall not exceed 20 percent.
f. Material shall be free of foreign chemical contaminants and shall comply with the soil cleanup objectives for residential use.
g. Provide imported topsoil from a permitted mine, pit, or quarry, or a commercial processing facility specializing in the manufacture of topsoil.
h. Contractor shall collect samples for geotechnical (gradation only) and chemical analyses in accordance with relevant specifications in Part 2.02.

C. Riprap:

1. Material:
   a. Stone for riprap shall be hard, angular field or quarry stone that is sound, durable, free of shale seams and coatings, and of such characteristics that stone will not disintegrate when subjected to action of water.
   b. Stones shall have a minimum specific gravity of 2.5, as determined according to ASTM C127.
   c. Stones shall be free of dirt, debris, and deleterious material.
   d. Provide riprap from a MassDOT-permitted mine, pit, or quarry. Source shall be approved by MassDOT for furnishing aggregates for MassDOT projects.
2. Size:
   a. Each load of riprap shall be well-graded, from smallest to largest size.
   b. Proportions: Width and thickness of each stone shall not be less than one-third the length of the stone.
   c. Gradations shall be as specified below:

TYPE 6 RIPRAP

Size (inches)	Percentage Passing Through Square Openings
4	100
1	0-10

D. Do not ship material to the Site until proposed material, source, and Supplier are accepted by CM.

2.02 SOURCE QUALITY CONTROL

A. Off-Site Materials: Contractor shall coordinate, collect, and submit the sample for laboratory testing of each material, to verify compliance with the Contract Documents.

1. Initial Borrow Source Assessment: Contractor shall conduct an initial assessment in coordination with the CM (if not previously conducted for the proposed material and burrow source) to evaluate whether the materials at the borrow source are potentially suitable for use subject to further evaluation through sampling and analysis. This assessment will likely include some or all of the following: a field visit to evaluate the materials and the location of the materials and discussions with the owner of the materials or the property owner regarding the origin of the materials, the historical use of the borrow source area, and any chemical/physical characterization data that may already exist for the material at the source. The level of detail involved in this initial assessment will depend on the candidate materials and will be limited if the potential materials are undisturbed in-place materials. If the initial assessment indicates that the materials at the borrow source are potentially usable and thus warrant further evaluation, the Contractor shall coordinate with the CM for

sampling and testing of the potential materials as described in Part 2.02(A)(2) and Part 2.02(A)(3) of this specification. The initial assessment shall also meet the requirements described in the Soil Cover/Backfill Characterization Plan that is part of the 2024 Project Operations Plan.

2. Geotechnical Testing: If the results of the initial assessment indicate that the candidate borrow source and materials may be suitable for use, the Contractor shall obtain representative samples in coordination with the CM of each of each material types for laboratory geotechnical testing to verify conformance with the Contract Documents. Contractor will obtain representative samples of each material and perform geotechnical testing for the following:
    a. Aggregates:
        1) Tests:
            a) Gradation in accordance with ASTM D6913 and ASTM D1140;
            b) Moisture/density relationship in accordance with ASTM D1557 (graded aggregate only);
        2) Geotechnical testing shall be completed prior to placement of the material and at a frequency of one per 5,000 CY of imported material.
    b. Riprap:
        1) Tests:
            a) Gradation in accordance with ASTM D5519-07.
        2) Geotechnical testing shall be completed prior to placement of the material and at a frequency of one per 2,500 CY of imported material.
    c. Topsoil:
        1) Tests:
            a) Gradation in accordance with ASTM D6913 and ASTM D1140.
        2) Geotechnical testing shall be completed prior to placement of the material and at a frequency of one per 5,000 CY of imported material.
    d. Geotechnical testing shall be completed prior to shipment of fill. Fill material may not be accepted for import until results of chemical analysis are approved by the CM.
    e. All sample test results shall be provided to the CM to verify acceptability of the soil materials for use.
    f. Geotechnical sample testing results shall be provided to the CM to verify acceptability of the soil materials for on-site use at least 15 days before material delivery to the Site.
    g. Contractor shall collect at least two representative samples of each material type for testing.

3. Chemical Testing: If the results of the initial assessment indicate that the candidate borrow source and materials may be suitable for use, the Contractor shall obtain representative samples of each material, in coordination with the CM, for chemical testing of the fill materials (e.g., topsoil, and gravel). Chemical testing of stone materials (e.g., riprap) are not required, provided that those materials are from a source found to be acceptable from the initial borrow source assessment. Chemical testing shall be performed as follows:
    a. The frequency of sampling/analysis for chemical contaminants is dependent on the source/location of the proposed off-site soil fill material:
        1) If the candidate material is from an undisturbed in-place source (e.g., an active gravel/borrow pit), the source will provide a letter certifying that the material is virgin, and one representative sample of the material will be collected and analyzed. The analytical data from this chemical characterization will be submitted to the CM, who will compare the data to the following criteria:

Constituent	Criterion (mg/kg)	Basis
PCBs	1	MCP Method 1 Standard for S-1/GW-3 Soil
Appendix IX+3 VOCs/SVOCs	ND	MCP Method 1 Standard for S-1/GW-3 Soil
Antimony	20	MCP Method 1 Standard for S-1/GW-3 Soil
Arsenic	20	MCP Method 1 Standard for S-1/GW-3 Soil
Barium	1,000	MCP Method 1 Standard for S-1/GW-3 Soil
Beryllium	90	MCP Method 1 Standard for S-1/GW-3 Soil
Cadmium	5	MassDEP Freshwater Sediment Screening Value
Chromium (total)	100	MCP Method 1 Standard for S-1/GW-3 Soil
Copper	150	MassDEP Freshwater Sediment Screening Value
Cyanide (total)	30	MCP Method 1 Standard for S-1/GW-3 Soil
Lead	130	MassDEP Freshwater Sediment Screening Value
Mercury	0.3 (for soil backfill)	MassDEP Soil Background Value
Nickel	49	MassDEP Freshwater Sediment Screening Value
Selenium	400	MCP Method 1 Standard for S-1/GW-3 Soil
Silver	100	MCP Method 1 Standard for S-1/GW-3 Soil
Thallium	8	MCP Method 1 Standard for S-1/GW-3 Soil
Vanadium	400	MCP Method 1 Standard for S-1/GW-3 Soil
Zinc	460	MassDEP Freshwater Sediment Screening Value

If the data are acceptable, the CM will submit sample test results to EPA for approval. The results of this sample will be considered to represent the materials that originate from this virgin source up to 20,000 cubic yards of material from the borrow source, until such time as the physical characteristics of the source location significantly change.

2) If more than 20,000 cubic yards are anticipated to be used as aggregate material, additional periodic sampling of the imported material will be conducted following the initial characterization. Specifically, if more than 20,000 cubic yards are obtained from an approved undisturbed in-place backfill source, then, following the initial chemical characterization sampling, additional periodic chemical characterization sampling will continue to be performed at a frequency of one representative sample per 20,000 cubic yards (or less if the additional material is less than that amount). The analytical data from this chemical characterization will be submitted to the CM, who will compare the data with the criteria described in Section 3.1 of the Soil Cover/Backfill Characterization Plan. If the analytical results for this additional sampling are acceptable, the imported material will be approved for use and separate EPA approval will not be required.
3) For off-site materials that have not been certified as a virgin source, the frequency of initial borrow source characterization testing will involve the collection of one composite sample for each 2,000 cubic yards from the borrow source and for each distinct material type specified in the technical design documents. If the volume of material to be characterized is less than 2,000 cubic yards, one composite sample

will still be collected from that material. Each composite sample will be composed of 10 discrete "grab" subsamples that will be collected at spatially distributed locations within the source material and composited into a single sample to be submitted to a laboratory for the appropriate chemical analyses identified in Part 2.02(A)(3)(b)(1) of this specification. A PID headspace screening will be performed for all 10 subsample locations used to form the composite sample. However, for analysis of volatile organic compounds (VOCs), each sample will be a single discrete grab sample collected at one of the 10 subsample locations used to form the composite sample. The analytical data from this chemical characterization will be submitted to the CM, who will compare the data with the criteria described in Section 3.1 of the Soil Cover/Backfill Characterization Plan. If the analytical results from this sampling are acceptable, the CM will submit sample test results to EPA for approval. This initial sampling frequency will be used to characterize up to 20.000 cubic yards of material from the borrow source.

4) If more than 20,000 cubic yards are anticipated to be used as aggregate material, additional periodic sampling of off-site materials not certified as a virgin source will be conducted following the initial characterization. Specifically, if more than 20,000 cubic yards are obtained from an approved backfill source that is not certified as a virgin source, then, following the initial chemical characterization sampling, additional periodic chemical characterization sampling will be performed at a frequency of one sample (either composite or grab, based on intended analysis, as described above) per 7,500 cubic yards (or less if the additional material is less than that amount) from each distinct borrow source and for each distinct material type specified in the technical design documents. Based on the results from this sampling, the CM may request approval from EPA to reduce this volume-based characterization sampling frequency to a rate of up to one sample per 20,000 cubic yards. For this additional sampling, each composite sample, as required for the majority of analyses, will be composed of 10 grab subsamples that are collected at spatially distributed locations within the source material and composited into a single sample for analysis. The PID headspace screening will be performed for all 10 subsample locations used to form the composite sample; and for analysis of VOCs, each sample will be a single discrete grab sample collected at one of the 10 subsample locations used to form the composite sample. The analytical data from this chemical characterization will be submitted to the CM, who will compare the data with the criteria described in Section 3.1 Soil Cover/Backfill Characterization Plan. If the analytical results for this additional sampling indicate that those criteria are met, the imported material will be approved for use and separate EPA approval will not be required.

5) If more than one off-site source is proposed for the soil fill material, samples shall be collected and analyzed from each source at the appropriate frequency provided above.

b. Each material type shall be collected and sampled in accordance with the Soil Cover/Backfill Characterization Plan) and, in particular, shall be tested as follows:

1) Each borrow source material sample will be analyzed for PCBs (as Aroclors) and the VOCs, semi-volatile organic compounds (SVOCs), cyanide, and metals listed in Appendix IX of 40 Code of Federal Regulation 264, plus benzidine, 2-chloroethyl vinyl ether, and 1,2-diphenylhydrazine.

2) Each borrow source material sample collected for chemical characterization testing will also be screened using a photoionization detector (PID) as described in Appendix A2 (Standard Operating Procedure for Photoionization Detector Field Screening) of GE's revised (2023) FSP/QAPP to verify that the materials do not contain elevated levels of volatile organic vapors. All samples will be collected, analyzed, and validated in accordance with that revised FSP/QAPP or any EPA-approved revision or addenda of that document.

c. Chemical testing shall be completed prior to shipment of material to the Site. Material may not be accepted for import to the Site until results of chemical analysis are approved by the CM.
d. All sample test results shall be provided to the CM to verify acceptability of the soil materials for use.

PART 3– EXECUTION

Refer to material Sections referenced in Part 1.01 (B) of this Section for material installation specifications.

- END OF SECTION -

SECTION 31 05 19.13 – GEOTEXTILES FOR EARTHWORK

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Providing all labor, materials, tools, equipment, and services as shown, specified, and required to furnish and install geotextiles.

B. Related Sections:

1. Section 31 23 00 – Excavation and Fill.
2. Section 31 37 00 – Riprap.

1.02 REFERENCE STANDARDS

A. The following Geosynthetics Research Institute (GRI) test methods are referenced in this Section:

1. GRI GT13 – Test Methods and Properties for Geotextiles Used as Separation Between Subgrade Soil and Aggregate.

B. The following American Association of State Highway and Transportation Officials (AASHTO) standards are referenced in this section:

1. AASHTO M 288 – Standard Specification for Geotextile Specification for Highway Applications.

C. Where reference is made to one of the above codes, standards, specifications, or publications, the revisions in effect at the time of bid shall apply.

1.03 QUALITY ASSURANCE

A. Geotextile manufacturer shall be a specialist in the manufacture of geotextile separation and stabilization fabrics and shall have produced and successfully installed a minimum of five million square feet of geotextile material.

1.04 SUBMITTALS

A. Prior to shipment of any geotextile materials, submit the following information on the geotextile product to the CM:

1. Lot and roll identification numbers for materials.
2. Quality control certificates that provide reference to the lot and roll identification numbers, sampling procedures, test methods and test results and other items such as:
   a. Name of Manufacturer;
   b. Chemical Composition;
   c. Product Identification; and
   d. Statement of Compliance.
3. All certificates shall be signed by a representative of the manufacturer.
4. Geotextile quality assurance tests from the manufacturer including:

Test	Procedure
Unit Weight	ASTM D-5261
Flow Rate	ASTM D-4491
Permittivity	ASTM D-4491
Trapezoidal Tear Strength	ASTM D-4533
Grab Elongation	ASTM D-4632
Apparent Opening Size	ASTM D-4751
CBR Puncture	ASTM D-6241

5. Unless otherwise specified or approved by the CM, the quality assurance tests by the manufacturer shall be conducted at the frequency of one per lot or one per each 50,000 square feet. One lot is defined as a group of consecutively numbered rolls or panels from the same manufacturing line and using raw materials from the same resin batch.
6. The geotextile manufacturer shall replace any rolls that are rejected for non-compliance with these Specifications.
7. If a sample fails to meet the quality control requirements, the manufacturer shall test each roll manufactured from the same resin batch or at the same time as the failing roll.
8. Testing shall continue until a pattern of acceptable test results is established.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Each roll of geotextile delivered to the Site shall be labeled by the manufacturer identifying the manufacturer's name, product identification, lot number, roll number, and roll dimensions.

B. Inspect all rolls and packages upon delivery to the Site to confirm that the materials have not been damaged due to improper transportation, handling, or storage. If the protective wrapping is damaged, or if damage to the roll is suspected, separate the roll from the lot for more detailed inspection.

C. Notify CM if any loss or damage exists to geotextile. Replace loss and repair damage to new condition, in accordance with manufacturer’s instructions.

D. Protect geotextile from ultraviolet light exposure, precipitation or other inundation, mud, dirt, dust, puncture, cutting, or any other damaging or deleterious conditions. Ship and store geotextile rolls in relatively opaque and watertight wrappings.

E. Place geotextile only after the required submittals have been received and reviewed by the CM and the placement surface has been fully prepared and deemed acceptable for geotextile deployment.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. GSE Environmental.

B. TenCate Miarfi.

C. Skaps Industries.

D. Approved Equal.

2.02 MATERIALS

A. Woven Geotextile:

1. Woven geotextile shall be composed of high-tenacity polypropylene yarns woven into a stable network such that the yarns retain their relative position. The woven geotextile shall be chemically inert to naturally encountered chemicals, acids, and bases and resist biological degradation.

2. Woven geotextile shall be used as a separation layer.

3. The woven geotextile shall meet AASHTO M 288-05 requirements for a Class 2 separation geotextile, consist of 95% weight polyethylene or polyester, and have the following MARVs:

TABLE 2
REQUIREMENTS FOR WOVEN GEOTEXTILE

Property	ASTM Test Method	Units	Value (MARV, Except AOS)*
Grab Tensile Strength	D4632	lb	250
Grab Tensile Elongation	D4632	%	15
Trapezoidal Tear Strength	D4533	lb	90
CBR Puncture	D6241	lb	700
Permittivity	D4491	sec^{-1}	0.05
Flow Rate	D4491	$gal/min/ft^2$	4
AOS	D4751	mm	0.425
UV Resistance (at 500 hours)	D4355	% strength retained	70

* Minimum Average Roll Value

PART 3 – EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which the Work will be performed and notify CM in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected in a manner acceptable to CM.

3.02 PREPARATION

A. Excavate or fill subgrade, as required, to bring subgrade to elevations shown or indicated. Maintain all angles of repose. Confirm that subgrade is at proper elevations and that no further earthwork is required to bring the subgrade to proper elevations. Provide subgrade elevations that slope parallel to finished grade and, in the direction, shown on the Design Drawings.

B. Remove all stones greater than two inches in any dimension, construction debris, trash, rubble, and all other extraneous materials from the subgrade.

C. Notify CM that subgrade has been prepared and obtain CM's approval before installing geotextile.

3.03 INSTALLATION

A. Place (roll out) geotextiles in the direction of most frequent vehicular travel.

B. Overlap adjoining edges of geotextiles a minimum of 12 inches, unless otherwise specified or approved by the CM.

C. Weight geotextiles with sandbags or equivalent when required. Install sandbags (or equivalent) during placement and maintain until replaced with cover materials.

D. During placement of geotextiles, take care not to entrap excessive dust, mud, or moisture in the geotextile stone, that could damage or cause clogging of the geotextile, or hamper subsequent seaming.

E. Use proper tools to cut and size geotextiles; exercise care while cutting geotextiles.

F. Do not expose geotextiles to precipitation prior to being installed, and do not expose geotextiles to direct sunlight for more than 15 days.

3.04 GEOTEXTILE REPAIR

A. Any holes or tears in the fabric shall be repaired as follows:

1. On Slopes: Sew a fabric patch into place using a double sewn lock stitch (1/4 inch to 3/4 inch apart and no closer than one inch from any edge). Should any tear exceed 10 percent of the width of the roll, that roll shall be removed from the slope and replaced.
2. Non-Slopes: Spot-seam a fabric patch in place with a minimum of 18 inches of overlap in all directions.

3.05 PLACEMENT OF COVER MATERIALS

A. Place all granular materials located on top of the geotextile in such a manner as to ensure:

1. No damage of the geotextile or underlying layers.
2. Minimal slippage between the geotextile and the underlying layers.
3. No excess tensile stresses in the geotextile.

B. Do not drive equipment directly on the geotextile.

C. Utilize equipment exerting the lowest ground pressure practicable to place the granular materials to minimize the potential for damage to the geotextile. Under no circumstances shall the placement equipment exert more than 5 psi ground pressure.

- END OF SECTION -

SECTION 31 11 00 – CLEARING AND GRUBBING

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Providing all labor, materials, equipment, and incidentals required to perform clearing and grubbing as specified in the Contract Documents (excludes Work to be performed under Contract 11 associated with clearing and removal of pond-related vegetation).
2. Removing and disposing of trees, shrubs, brush, logs, stumps, vegetation, rubbish, and other objectionable material.
3. Paying all fees associated with transport and disposal of debris resulting from clearing and grubbing.
4. Clearing and grubbing, as necessary, to facilitate remedial activities at the site.

B. Related Sections:

1. Section 31 25 00 – Erosion and Sediment Controls.

1.02 SUBMITTALS

A. Submit a plan acceptable to the CM within 15 days from award of contract, that details vegetation clearing and removal Work, including:

1. Description of Contractors means and methods for bush and tree clearing, stump removal, chipping, on-site transport of logs and cleared vegetation, and on-site staging of materials prior to offsite disposition.
2. Contractors plan for offsite disposition of cleared vegetation materials.

PART 2– PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 PREPARATION

A. Protection:

1. Protect existing site improvements, including streets, drives, underground facilities to remain (if any), and adjacent property and structures throughout the Work. Repair damage caused by The Contractor to original condition or replace in kind, to satisfaction of CM.
2. Protect trees, shrubs, vegetation, and grassed areas to remain by providing temporary fencing, barricades, wrapping, or other methods shown, specified, or accepted by Engineer. Correct damage caused by The Contractor outside the limits of clearing and grubbing Work.
3. Do not remove trees without the approval of Engineer, unless shown or indicated for removal on the Design Drawings.
4. Do not locate construction equipment, stored materials, or stockpiles within the drip line of trees and vegetation to remain following completed construction.

B. Site Preparation:

1. Delineation of Clearing and Grubbing Limits:
   a. Locate and clearly flag trees, vegetation, and other items to remain within the limits of clearing and grubbing.
   b. Provide flagging to delineate limits of areas to be cleared or grubbed. Following delineation of clearing limits, review at Site with CM and obtain CM written approval before initiating clearing and grubbing Work.
   c. Replace flagging that is lost, removed, or destroyed until clearing and grubbing Work is complete, and Engineer allows removal of flagging.

2. Erosion and Sediment Controls:
   a. Install applicable erosion and sediment controls before initiating clearing and grubbing Work.
   b. Comply with erosion and sediment control requirements of Section 31 25 00 – Erosion and Sediment Controls.
   c. Adjust, relocate, or install additional erosion and sediment controls as clearing and grubbing Work progresses to previously uncleared, ungrubbed areas of the Site.

3.02 CLEARING AND GRUBBING

A. Remove all trees, shrubs, brush, logs, stumps, vegetation, rubbish, and other objectionable material within the work areas as indicated in the Contract Documents. Blanket tree removal is prohibited. Where possible and if practicable, trees shall be cut flush with the ground and roots left in place. Except for areas shown on the Drawings, stumps and roots shall be removed by the contractor from within soil excavation areas and within areas designated for filling.

B. Trees and shrubs to remain that have been damaged or require trimming shall be treated and repaired under the direction of a qualified arborist, or other professional with qualifications acceptable to Engineer. Replace trees and shrubs that are damaged beyond repair or that are removed but were intended to remain.

3.03 DISPOSITION OF CLEARED AND GRUBBED MATERIALS

A. Proper management, transportation, and disposition of cleared and grubbed materials at appropriate, CM-approved facilities in accordance with applicable Laws and Regulations. May include on-site use of certain cleared and grubbed materials as approved by CM.

1. Above-ground and below-ground vegetation that is cleared and grubbed to facilitate construction activities shall be managed for off-site disposition or for on-site use as approved by CM. Vegetation approved for on-site use by the CM shall be ground and/or chipped to allow for reuse as erosion control materials. Designation of site areas for reuse of vegetation material shall be coordinated with the CM.

- END OF SECTION -

SECTION 31 22 00 – GRADING

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Providing all labor, materials, services, and equipment necessary to complete the grading depicted on the Design Drawings.

B. Related Sections:

1. Section 31 11 00 – Clearing and Grubbing.
2. Section 31 05 16 – Aggregates for Earthwork.
3. Section 31 23 00 – Excavation and Fill.

1.02 REFERENCE STANDARDS

A. The following American Society for Testing and Materials (ASTM) standards are referenced in this section:

1. D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 [2,700 kN-m/m^3]).
2. D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.03 QUALITY ASSURANCE

A. Use materials, procedures, operations, and methods in strict conformance with the Contract Documents. Materials will be subjected to strict quality control monitoring as detailed herein.

1.04 SUBMITTALS

A. Proposed equipment and compaction method(s) provided prior to earthwork activities.

B. Results of moisture/density tests performed on fill materials (determined by ASTM D1557).

C. Results of in-place density tests performed on fill materials (determined by ASTM D6938).

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 BACKFILL MATERIALS

A. Backfill Material shall conform to Section 31 23 00 – Excavation and Fill.

3.02 GENERAL BACKFILLING REQUIREMENTS

A. Backfill shall be started at the lowest section of the area to be backfilled.

B. Drainage of the areas being backfilled shall be maintained at all times.

C. Areas to be backfilled shall be inspected and approved by the CM prior to backfilling operations. All unsuitable materials and debris shall be removed.

D. Backfill material shall not be placed when moisture content is too high to allow proper compaction.

E. When material is too dry for adequate compaction, water shall be added to the extent necessary.

F. Backfill material shall not be placed on frozen ground, nor shall the material itself be frozen or contain frozen soil fragments when placed.

G. No calcium chloride or other chemicals shall be added to prevent freezing.

H. Material incorporated in the backfilling operation that is not in satisfactory condition shall be subject to rejection and removal by the Contractor.

I. The maximum lift thickness is 12 inches (measured prior to compaction), unless otherwise noted in this Section or on the Design Drawings.

J. For backfill placed directly over geosynthetics, the minimum installed first lift thickness above the geosynthetics is 12 inches and shall be comprised of selected soils or sediments that are free of objects greater than three inches in any dimension, any sharp objects, or any other deleterious materials that could potentially damage geosynthetics within the underlying baseliner system. During placement of the initial lift, a spotter will be stationed on top of the baseliner system and to the side of the spreading equipment to observe the placement of the material. If objects are spotted that could possibly damage the baseliner system, the spotter will signal the equipment operator to stop operation to allow the objectionable material to be removed from the material being spread. Unless otherwise specified by the CM, all equipment operating on backfilled materials shall comply with the following:

Allowable Equipment Ground Pressure (psi)	**Thickness of Overlying Compacted Fill (ft)**
<5	1.0
<15	1.5
<20	2.0
>20	3.0

K. The Contractor shall use appropriately sized equipment and methods when placing and compacting backfill so as not to damage underlying geosynthetic materials. In heavily trafficked areas, the thickness of overlying compacted fill shall be at least 3 feet. Areas where geosynthetics may have been damaged during backfill installation as determined by the Contractor CM, shall be inspected, and repaired, if necessary, in accordance with the Technical Specifications. Equipment operating on backfilled materials shall comply with the criteria in the above table for Allowable Equipment Ground Pressure.

3.03 METHOD OF COMPACTION

A. General:

1. The Contractor shall adopt compaction methods that produce the degree of compaction specified herein, prevent subsequent settlement, and provide adequate support.
2. Compaction methods used shall avoid disturbance to underlying fine-grained soils, subsurface utilities, and any underling geosynthetics.
3. Hydraulic compaction by ponding or jetting shall not be permitted.
4. Backfill material shall not be left in an uncompacted state at the close of a day's construction.
5. Prior to terminating work, ridges of soil left on the final layer of compacted fill, by tractors, trucks, or other equipment used for compaction, shall be eliminated using low-pressure equipment. However, soil surfaces may be left in a "tracked" condition (i.e., with parallel indentations from the tracks of tracked equipment running horizontally along the slope) for purposes of erosion and sediment control.
6. As backfill progresses, the surface shall be graded such that no ponding of water shall occur on the surface of the fill.

B. Equipment:

1. Unless otherwise specified, equipment for compaction shall be consistent with space limitations of the work areas and the need to protect adjacent facilities.
2. Compaction of fill material in confined areas shall be accomplished by means of a drum-type, power-driven, hand-guided vibratory compactor, or by hand-guided vibratory plate tampers.
3. If the proposed method does not produce the degree of compaction required, an alternate method shall be adopted until the required compaction is achieved.
4. The moisture content of backfill or fill material shall be adjusted, if necessary, to achieve the required degree of compaction.

C. Minimum Compaction Requirements:

1. Unless otherwise specified on the Design Drawings, the degree of compaction specified for the various items listed below in Table 1 shall be the minimum allowable.
2. Unless the Contractor can successfully demonstrate that its methods will produce the required degree of compaction, materials to be compacted shall be placed in layers not exceeding the uncompacted thicknesses listed in Table 1.
3. Degree of compaction to be verified using in-place density tests (using ASTM D6938) and shall be performed by a certified geotechnical testing.
4. The CM may order additional in-place density tests to ascertain conformance with the compaction requirements shown in Table 1.
5. The Contractor shall dig test holes when requested by the CM for the purpose of taking an in-place density test below the current fill level.
6. The Contractor shall provide free access to fill areas for the purpose of making such tests. Payment for all compaction tests shall be made by the Contractor.
7. The Contractor shall anticipate time needed due to testing procedures and shall not have claims for extra compensation occasioned by such time.

TABLE 1

Material	Maximum Uncompacted Lift Thickness (inches)	Minimum Compaction
Excavated Subgrade – Existing Undisturbed Soils (fill areas)	Not Applicable	Proof-rolling
Aggregate Fill – Access Road	12	95% (ASTM D1557) 1 Test per 500 LF of Roadway
Topsoil	6	Compact by placing/tracking only

8. When proof-rolling existing (or native) soils, the layer shall be acceptable when deformations caused by substantial earthwork equipment (e.g., roller, fully loaded dump truck) are no deeper than 1 inch. All soft or wet materials that continue to deform more than 1 inch shall be removed and replaced with suitable material and retested by the Contractor.

3.04 GRADING

A. After the completion of all backfill operations, the Contractor shall grade the site to the lines, grades, and elevations shown on the Design Drawings, taking into account any subsequent construction and site restoration requirements.

3.05 EXISTING FACILITIES

A. General:

1. Existing subsurface facilities may be encountered during construction of the work or located in close proximity to the work.
2. These facilities may include, but are not necessarily limited to, sewers, drains, water mains, gas mains, electrical conduits, and their appurtenances. These facilities may or may not be shown on the Design Drawings. However, the sizes, locations, heights, and depths, if indicated, are only approximate and the Contractor shall conduct its operations with caution and satisfy itself as to the accuracy of the information given. The Contractor shall not claim, nor shall it be entitled to receive compensation for damages sustained by reason of the inaccuracy of the information given or by reason of its failure to properly maintain and support such structures.
3. There may be other subsurface facilities, the existence and/or location of which are not known, such as individual water and gas services, electrical conduits, sanitary and storm sewer drains, etc. The Contractor shall consult with the CM of such facilities and, if possible, shall determine, prior to construction, the location and depth of any such facilities that may exist in the area to be excavated.
4. If underground facilities are known to exist in an area but their location is uncertain, the Contractor shall exercise reasonable care in its excavation technique to avoid damage to them.
5. The Contractor shall notify Massachusetts Dig Safe at least 72 hours prior to any site work.

B. Notification and Protection Procedures:

1. Except where superseded by state or local regulations, or in the absence of any applicable regulations, the Contractor shall, at a minimum, include the following procedures in its operations:
    a. Prior to Excavating:
        1) Determine correct field location of all nearby underground facilities or arrange for Representatives of the utilities to locate them.
        2) Notify owners of nearby underground facilities when excavation is to take place, allowing them reasonable time to institute precautionary procedures or preventive measures which they deem necessary for protection of their facilities.
        3) In cooperation with owners of nearby facilities, provide temporary support and protection of those underground facilities that may be especially vulnerable to damage by virtue of their physical condition or location, or those that could create hazardous conditions if damaged.
    b. Immediately notify any utility owner of any damage to its underground facilities resulting from the Contractor's operations and arrange for repairs to be made as soon as possible.
    c. In case of any emergency the Contractor shall follow the approved Contingency and Emergency Procedures Plan.

3.06 OTHER REQUIREMENTS

A. Unfinished Work:

1. When, for any reason, the work is to be left unfinished, all trenches and excavations shall be filled, and all roadways and watercourses left unobstructed with their surfaces in a safe and satisfactory condition.

B. Hauling Material on Street:

1. When hauling material over the streets or pavement, the Contractor shall provide suitably tight-sealing vehicles so as to prevent deposits on the streets or pavements. In all cases where any materials are dropped from the vehicles, the Contractor shall clean up the same as often as required to keep the crosswalks, streets, and pavements clean and free from dirt, mud, stone, and other hauled material.

C. Field Quality Control:

1. In-Place Density Testing of Fill Materials:
    a. Perform field density tests in accordance with Section 3.03 C.
    b. Submit test results, certified by testing laboratory, to CM within 24 hours after completion of test.
    c. If testing laboratory reports or inspections indicate subgrade, bedding, or fill compaction below specified density, Contractor shall remove unacceptable materials as necessary and replace with specified materials, and provide additional compaction until subgrades, bedding, and fills are acceptable. Contractor shall retest subgrade, bedding, or fills that did not originally comply with specified density.

3.07 CRITERIA AND TOLERANCES

A. Fill materials shall be constructed to the lines and grades shown on the contract drawings unless otherwise requested by the CM. Acceptance of final grades will be based on site observations by the CM and review of a final as-built survey information by the CM. Any settlements that occur prior to final acceptance of the work shall be restored to design and/or intended grades by the contractor.

- END OF SECTION -

SECTION 31 23 00 – EXCAVATION AND FILL

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment, and incidentals required to perform all excavating, filling, and grading, and disposing of earth materials as shown, specified, and required to complete the Work.
2. Design and provide temporary excavation support and protection systems in accordance with Laws and Regulations to prevent injury to persons and property, including surface structures and Underground Facilities, during excavation and fill Work.
3. Perform excavation and fill Work within the areas shown or indicated on the Design Drawings.
4. Preparation of subgrade for pavements and crushed stone surfacing is included under this Section.
5. No classification of excavated materials will be made. Excavation includes all materials regardless of type, character, composition, moisture, or condition thereof, except rock requiring drilling, blasting, or special equipment for removal.

B. Coordination:

1. Review procedures under this and other Sections and coordinate Work that must be performed with or before excavation and fill Work.

C. Related Sections:

1. Section 31 05 16 – Aggregates for Earthwork.
2. Section 31 05 16.10 – Materials for Earthwork
3. Section 31 11 00 – Clearing and Grubbing.

1.02 REFERENCE STANDARDS

A. Terminology:

1. The following words or terms are not defined but, when used in this Section, have the following meaning:
   a. "Debris" means man-placed buried or piled material including, but not limited to, brick, concrete, asphalt, metal, and wood.
   b. "Subgrade" means the uppermost surface of native soil material unmoved from the bottom of excavations.

B. The following standards are referenced in this Section:

1. ASTM D6913, Standard Test Methods for Particle-Size Distribution (Gradation) of Soils using Sieve Analysis.
2. ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 [600 kN-m/m3]).

3. ASTM D1140, Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75 µm) Sieve.
4. ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
5. ASTM D6938, Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
6. ASTM E329, Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
7. USEPA SW-846 Method 6010, Inductively Coupled Plasma-Atomic Emission Spectrometry.

1.03 QUALITY ASSURANCE

A. Qualifications:

1. Professional Engineer: Retain the services of a professional engineer licensed and registered in the State of Massachusetts and experienced in providing engineering services of the kind indicated. Responsibilities include, but are not necessarily limited to, the following:
   a. Reviewing temporary excavation support and protection system performance that may be required to perform the work indicated in the Contract Documents.
   b. Preparing or supervising the preparation of design calculations and related submittals verifying compliance with the temporary excavation support and protection system(s) with the requirements of the Contract Documents.
   c. Signing and sealing all calculations, drawings, and submittals prepared by professional engineer.
   d. Certifying that:
      1) It has performed the design of the temporary excavation support and protection system(s) in accordance with the performance requirements stated in the Contract Documents; and
      2) Said design conforms to Laws and Regulations, and to the prevailing standards of practice.
2. Testing Laboratory: Retain the services of an independent testing laboratory to perform field quality control testing required in this Section. Testing laboratory shall comply with ASTM E329 and shall be experienced in the types of testing required.

B. Regulatory Requirements:

1. Laws and Regulations applying to the Work under this Section include, but are not limited to, the following:
   a. 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response;
   b. 29 CFR 1926.65, Hazardous Waste Operations and Emergency Response; and
   c. 29 CFR 1926.650 through 29 CFR 1926.652, Subpart P – Excavations.
2. Comply with applicable provisions and recommendations of the following:
   a. Code of Massachusetts Regulations (CMR); and
   b. MassDOT Standard Specifications and Standard Sheets.
3. Obtain required permits and approvals for excavation and fill Work, including work permits from right-of-way owners.

1.04 SUBMITTALS

A. Informational Submittals:

1. Excavation and Backfilling Plan: Submit acceptable plan for excavation, backfilling, and related Work not less than 21 days prior to starting excavation Work. Include the following:
   a. Name of Contractor's "competent person" in responsible charge of excavation and fill Work.
   b. Plan for coordinating shut-offs, locating, capping, abandoning, temporary services, and continuing utility services.
   c. Copies of "manufacturer's data" or other tabulated data if protective system(s) are designed on the basis of such data.
   d. Design drawings, design calculations, and assumptions for construction surcharges, including magnitude and location relative to excavations, prepared by Contractor's professional engineer. CM's review and acceptance of submittal does not imply approval by CM of the associated Work. Contractor shall be solely responsible for designing, installing, operating, and maintaining the system(s) required to satisfactorily perform all necessary shoring, bracing, and protection. This includes all excavation stabilization designs completed by the Contractor for excavation and backfilling work in the vicinity of the Eversource towers.
   e. Proposed excavation, dewatering, backfilling, and compaction procedures. Where different procedures or equipment will be used for different types of material or at different locations at the Site, indicate where each procedure and equipment item will be used. This includes procedures for excavation and backfilling work planned in the vicinity of the Eversource Power Line Towers.
   f. List of proposed equipment for excavation, dewatering, backfilling, and compaction Work.
   g. Planned sequence of excavation and backfilling operations, including coordination with temporary pumping, selective demolition, and piping installation Work.
   h. Detailed schedule of excavation and backfilling Work in accordance with the accepted Progress Schedule.
2. Qualifications Statements:
   a. Professional Engineer: Submit name, address of firm, and qualifications of professional engineer.
   b. Testing Laboratory: Submit name and qualifications of testing laboratory to be employed, and qualifications of testing laboratory's personnel that will perform field quality control testing required in this Section. If more than one laboratory will be employed, submit qualifications statement for each laboratory.
3. Source Quality Control Submittals: Submit Supplier name, source address, and proof of MassDOT approval, as required, for each proposed source of fill material.
4. Delivery Tickets: Submit copy of delivery ticket for each load of general fill material, subbase material, and pipe bedding material delivered to the Site. Each delivery ticket shall indicate Supplier name and source address, project name, contract number, date, material type, MassDOT item number when applicable, and quantity delivered.
5. Field Quality Control Submittals:
   a. Laboratory Test Reports: Submit in accordance with Paragraph 3.11.A of this Section.
   b. Daily Inspection Logs: Submit in accordance with Paragraph 3.11.B of this Section.

1.05 SITE CONDITIONS

A. Subsurface Information:

1. The Design Drawings indicate information available relative to subsurface conditions at the Site. Such information and data are not intended as a representation or warranty of continuity of conditions between soil borings or test pits, nor of groundwater levels at dates and times other than date and time when measured, nor that purpose of obtaining the

information and data were appropriate for use by Contractor. The CM will not be responsible for interpretations or conclusions drawn therefrom by Contractor.

2. Soil borings and other exploratory operations may be made by Contractor. Coordinate Contractor-performed test borings and other exploratory operations with the Owner and utility owners as appropriate. Perform such explorations without disrupting or otherwise adversely affecting operations of Owner or utility owners. Comply with Laws and Regulations relative to required notifications.

B. Existing Structures:

1. The Contract Documents show or indicate certain structures and Underground Facilities adjacent to or within the limits of the Work. Such information was obtained from existing records and is not guaranteed to be correct or complete. Contractor shall explore ahead of selective demolition, trenching, excavation, or other subsurface Work to determine the exact location of all existing structures and Underground Facilities. Existing structures and Underground Facilities shall be supported and protected from damage by Contractor. Immediately repair and restore existing structures and Underground Facilities damaged by Contractor.

2. Movement or operation of construction equipment over Underground Facilities shall be at Contractor's sole risk and only after Contractor has prepared and submitted to CM and utility owners (as applicable), and received acceptance therefrom, a plan describing Contractor's analysis of the loads to be imparted and Contractor's proposed measures to protect structures and Underground Facilities during the Project.

3. Coordinate with utility owners for shut off of services in active piping and conduits, and for testing, shut off of services, and draining, purging, or de-energizing where specified or required of piping and conduits of unknown status. When required by utility Owner, CM will assist Contractor with utility owner notifications. Completely remove buried piping and conduits indicated for removal and not otherwise indicated as being abandoned or to remain in place.

4. In general, service lines and laterals to individual houses and businesses are not shown; however, Contractor shall assume that a service exists for each utility owner to each house, business, and property.

5. Do not interrupt existing utilities serving facilities occupied and used by Owner, City, or others, except when such interruption is indicated in the Contract Documents or when allowed in writing by CM after acceptable temporary utility services are provided by Contractor for the affected structure or property.

PART 2 – PRODUCTS

2.01 MATERIALS

1. None – See Section 31 05 16 – Aggregates for Earthwork and Section 31 05 16.10 – Materials for Earthwork for specifications related to fill materials.

PART 3 – EXECUTION

3.01 INSPECTION

A. Provide CM with sufficient notice and with means to examine areas and conditions under which excavating, filling, and grading Work will be performed. CM will advise Contractor in writing when CM is aware of conditions that may be detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Erosion and Sediment Control: Provide temporary erosion and sediment controls in accordance with 31 25 00 – Erosion and Sediment Control.

B. Odor and Dust Control: Provide odor and dust controls in accordance with Local, State and Federal requirements.

C. Site Preparation:

1. Clearing and Grubbing: Comply with Section 31 11 00 – Clearing and Grubbing.

D. Temporary Barriers:

1. Provide temporary barrier surrounding excavations and excavation work areas to provide temporary protection to persons and property. Barrier shall have openings only at vehicular, equipment, and worker access points.

2. During non-working hours, completely enclose all sides of excavation with temporary barriers.

3. Minimum Material Requirements for Temporary Barriers:
   a. Temporary barrier shall be not less than snow fence-type fencing, four feet high.
   b. Fence shall be constructed of vertical hardwood slats measuring not less than 1.5 inches by 1/4 inch interwoven with strands of horizontal wire or shall be of equivalent plastic construction.
   c. Posts:
      1) Posts shall be steel, either "U"-, "Y"-, or "T"-shaped, or channel section.
      2) Posts shall have a nominal weight of not less than 1/3-pound per linear foot, exclusive of the anchor.
      3) Posts shall have tapered anchors weighing not less than 0.67 pound, each firmly attached by means of welding, riveting, or clamping.
      4) Posts shall have corrugations, knobs, notches, or studs placed and constructed to engage a substantial number of fence line wire in the proper position.
   d. Provide each post with sufficient quantity of galvanized wire fasteners or clamps, of not less than 0.120 inch in diameter, for attaching fence wire to post.

E. Maintenance and Protection of Traffic: Provide traffic controls in accordance with Local, State and Federal requirements. Work shall not impact utility owners, public access to streets and drives, or access to private property, unless approved by authorities having jurisdiction.

3.03 TEST PITS

A. General: In advance of the construction, excavate, make observations and measurements, and fill test pits to determine conditions or location of existing structures and Underground Facilities. Perform all Work required in connection with excavating, stockpiling, maintaining, sheeting, shoring, and filling test pits. Contractor shall be responsible for the definite location of each existing structure and Underground Facility involved within the areas of excavation for the Work. Exercise care during such location work to avoid damaging and disrupting the affected structure or Underground Facility. Contractor shall be responsible for repairing damage caused during the Work to existing structures or Underground Facilities to remain.

B. Payment for Test Pits: There shall be no separate payment for test pits.

3.04 DEWATERING

A. General:

1. Provide and maintain adequate drainage and dewatering equipment to remove and dispose of all surface water and groundwater entering excavation and fill areas, or other parts of the Work and work areas. To the extent practicable, keep each excavation and fill areas dry during excavation, subgrade preparation, and continually thereafter until backfilling operations are completed and acceptable to CM.

2. Keep all working areas at the Site free of surface water at all times. Provide temporary drainage ditches and temporary dikes and provide required temporary pumping and other work necessary for diverting or removing rainfall and all other accumulations of surface water from excavation and fill areas. Perform diversion and removal of surface water in a manner that prevents accumulation of water behind permanent or temporary structures and at any other locations in the work area where such accumulations may be detrimental.

3. Contractor shall be responsible for the condition of piping, conduits, and channels used for drainage, and such piping, conduits, and channels shall be clean and free of sediment. Piping, conduits, and channels used for drainage shall not be located in environmentally-sensitive areas such as wetlands.

B. Temporary Dewatering System:

1. Contractor shall design, provide, operate, and maintain dewatering system to include sufficient trenches, sumps, pumps, hose, piping, well points, and similar facilities, necessary to depress and maintain groundwater level two feet below the base of each excavation until backfilling operations are completed and acceptable to the CM.

2. Design and operate dewatering system to avoid settlement and damage to existing structures and Underground Facilities, and to minimize the turbidity of the collected water.

3. To the extent practicable, groundwater table shall be lowered in advance of excavation for a sufficient period of time to allow dewatering of fine grain soils.

4. Operate dewatering system continuously during active excavation and backfilling Work. Provide standby pumping facilities and personnel to maintain the continued effectiveness of the system. Do not discontinue dewatering operations without first obtaining CM's acceptance for such discontinuation.

5. If, in the CM's opinion, groundwater levels are not being lowered or maintained as required, provide additional or alternate temporary dewatering devices, as necessary.

6. Locate elements of temporary dewatering system to allow continuous dewatering operation without interfering with the Work to the extent practicable. Location of temporary dewatering system shall not impact utility owners, adjacent wetlands, public access to streets and drives, or access to private property, unless approved by authorities having jurisdiction.

C. Disposal of Water Removed by Dewatering System:

1. Water resulting from excavation and fill area dewatering shall be discharged in a manner that does not cause excessive erosion or sedimentation and at an on-site location approved by the CM.

3.05 EXCAVATION

A. Perform all excavation required to complete the Work as shown, specified, and required in the Design Drawings. Excavation shall include removing and handling of earth, sand, clay, gravel, hardpan, soft, weathered, or decomposed rock, pavements, rubbish, debris, and other materials within the excavation limits.

B. Extent of open excavations shall be minimized to the greatest extent practical.

C. Excavation Protection: Provide excavation protection systems in accordance with Laws and Regulations to prevent injury to persons and property, including surface structures and Underground Facilities.

1. Excavation Less Than Five Feet Deep: Excavations in stable rock or in soil conditions where there is no potential for a cave-in may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded, or shored and braced.

2. Excavations Greater Than Five Feet Deep: Excavations in stable rock may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded, or shored and braced.

3. Provide and maintain excavation support and protection systems in accordance with submittal accepted by CM and required under Paragraph 1.04.A.1 of this Section.

D. Maintain excavations in dry condition in accordance with Article 3.04 of this Section.

E. Extend excavations sufficiently on each side of structures, footings, and similar construction to allow setting of forms, installation of shoring and bracing, and the safe sloping of banks, as necessary.

F. Subgrades:

1. General:
   a. Subgrades shall be firm and intact, dense, and thoroughly compacted and consolidated; shall be free of standing water and mud, muck, and other soft or unsuitable materials; and shall remain firm and intact under all construction operations. Subgrades that are otherwise solid but become soft or mucky on top due to construction operations shall be reinforced with general fill material. Finished elevation of stabilized subgrades shall not be above subgrade elevations shown or indicated.
   b. If, in the CM's opinion, subgrade becomes softened or mucky because of construction delays, failure to dewater properly, or other cause within Contractor's control, the subgrade shall be excavated to firm material, trimmed, and backfilled with compacted general fill material.

G. Pipe Trench Preparation:

1. Not more than 150 feet of trench shall be opened in advance of installing pipe in trench.
2. Trench width shall be minimized to the greatest extent practical, and shall comply with the following:
   a. Trench width shall be sufficient to provide space for installing, jointing, and inspecting piping. Refer to the Drawings for trench requirements. In no case shall trench be wider at top of pipe than pipe barrel OD plus two feet, unless otherwise shown or indicated.
   b. Enlargement of trench width at pipe joints may be made when required and approved by CM.
   c. Trench width shall be sufficient for shoring and bracing or shielding and dewatering.
   d. Trench width shall be sufficient to allow thorough compaction of fill adjacent to bottom half of pipe.
   e. Do not use excavating equipment that requires the trench to be excavated to excessive width.
3. Depth of trench shall be as shown or indicated on the Drawings. If required and approved by CM in writing, depths may be revised.
4. Where bedrock or other unyielding material is encountered at the bottom of the trench, remove such material to a minimum depth of six inches below the bottom of the pipe and replace with pipe bedding material.
5. Where CM considers existing material beneath bedding material unsuitable, remove and replace such unsuitable material with pipe bedding material.

H. Unauthorized Excavation: All excavations outside the lines and grades shown or indicated and that are not approved by CM, together with removing and disposing of the excavated material and backfilling with suitable material, shall be completed by the Contractor. Fill unauthorized excavations with properly compacted general fill material.

3.06 TEMPORARY SHEETING, SHORING, AND BRACING

A. General:

1. If this method is used, design and provide temporary sheeting, shoring, bracing, and similar excavation supports as shown, specified, and required for the Work. Temporary excavation support and protection systems shall be capable of supporting excavation sidewalls and resisting soil and hydrostatic pressures and superimposed and construction loads.
2. Clearances and types of temporary sheeting, shoring, bracing, and similar excavation supports, insofar as they may affect the finished character of the Work, will be subject to CM's acceptance, but Contractor is responsible for adequacy of all sheeting, shoring, bracing, and similar excavation supports.
3. Materials:
   a. Previously-used materials shall be in good condition, and shall not be damaged or excessively pitted. New or used sheeting may be used for temporary sheeting, shoring, and bracing.
   b. All steel work for sheeting, shoring, bracing, and other excavation supports shall be in accordance with ANSI/AISC 360, except that field welding will be allowed.
4. Install sheeting, shoring, bracing, and similar excavation supports without damaging existing buildings, structures, Underground Facilities, and site improvements adjacent to excavation.
5. As excavation progresses, carry down shoring, bracing, and similar excavation supports to required elevation at bottom of excavation.

6. Comply with Laws and Regulations regarding sheeting, shoring, bracing, and similar excavation supports.

7. Maintain sheeting, shoring, bracing, and other excavation supports in excavations regardless of time period excavations will be open.

8. Unless otherwise shown, specified, or directed, remove materials used for temporary construction when the Work is completed. Perform such removal in manner not injurious to the structures and Underground Facility, their appearance, and adjacent construction.

B. Monitoring:

1. Monitor excavation support and protection systems and surrounding conditions daily during excavation progress and for as long as excavation remains open.

2. Immediately notify CM of any movement, cracking, or settlement of the ground surface surrounding the excavation, or of any visual damage to or movement of adjacent structures, utility poles, or other facilities.

3. Promptly correct bulges, breakage, leaks, or other evidence of movement to ensure that excavation support and protection systems remain stable.

C. Removal of Sheeting and Bracing:

1. Remove sheeting and bracing from excavations, unless otherwise directed by CM in writing, when construction has progressed sufficiently to support excavations and bear soil and hydrostatic pressures and superimposed and construction loads. Perform removal to avoid damaging the Work, adjacent construction, existing structures, and Underground Facilities to remain. Removal shall be equal on both sides of excavation to ensure no unequal loads on structures and Underground Facilities. Contractor shall repair any damage.

2. Backfill voids resulting from the removal of sheeting and bracing with approved general fill material.

3.07 CLEAN SHEETING AND BRACING OF VISIBLE SOIL UPON REMOVAL. TRENCH SHIELDS

A. Excavation of earth material below bottom of trench shield shall not exceed the limits established in Laws and Regulations or manufacturer’s specifications.

B. When using a shield for installing piping:

1. Portions of trench shield extending below the mid-diameter of an installed, rigid pipe, such as pre-stressed concrete pipe and other types of rigid pipe, shall be raised above the pipe's mid-diameter elevation prior to moving the shield along the trench for further construction.

2. Bottom of shield shall not at any time extend below mid-diameter of installed pipe that is flexible or has flexing capability, such as steel, ductile iron, PVC, CPVC, polyethylene, and other pipe that has flexing capability.

C. When using a shield for installing structures, bottom of the shield shall not extend below the top of the bedding for the structures.

D. When removing the shield or moving the shield ahead, exercise extreme care to prevent moving piping, structures, and other Underground Facilities, and to prevent disturbance of bedding material for piping, structures, and other Underground Facilities. When piping, structures, or Underground Facilities are disturbed, remove and reinstall the disturbed items in accordance with the Contract Documents.

3.08 FILL AND COMPACTION

A. Provide and compact all fill required for the finished grades as shown on the Design Drawings.

B. Construction fill material that includes organic materials or other unacceptable materials shall be removed and replaced with approved fill material in accordance with the Contract Documents.

C. Placement – General:

1. Place fill to the grades shown on the Design Drawings or indicated. Bring up evenly on all sides fill around structures and Underground Facilities.

2. Place fill materials to the density specified for each material type. Furnish and use equipment capable of adding measured amounts of water to the fill materials to bring fill materials to a condition within required moisture content range, if required. Furnish and use equipment capable of discing, aerating, and mixing the fill materials to ensure reasonable uniformity of moisture content throughout the fill materials, and to reduce moisture content of borrow materials by air drying, when necessary. When subgrade or lift of fill materials requires moisture-conditioning before compaction, fill material shall be sufficiently mixed or worked on the subgrade to ensure uniform moisture content throughout the lift of material to be compacted. Materials at moisture content in excess of specified limit shall be dried by aeration or stockpiled for drying.

3. Perform compaction with equipment suitable for the type of fill material placed. Select and use equipment capable of providing the minimum density required in the Contract Documents. Furnish and use equipment capable of compacting in restricted areas next to structures and around piping and Underground Facilities. Effectiveness of the equipment selected by Contractor shall be tested at start of compacted fill Work by constructing a small section of fill within or adjacent to the area where fill will be placed. Record total number of coverages with selected compaction equipment and perform field moisture content and density tests to ensure that specified compaction of fill has been obtained. If tests on the test section of fill indicate that required compaction has not obtained, do one or more of the following:
   a. Increase the amount of coverages.
   b. Decrease the lift thicknesses.
   c. Use different compaction equipment.

4. Place fill materials in horizontal, loose lifts, not exceeding specified uncompacted thickness. Place fill in a manner ensuring uniform lift thickness after placing. Mechanically compact each lift, by not less than three complete coverages of the compactor. One coverage is defined as the conditions reached when all portions of the fill lift have been subjected to the direct contact of compactor's compacting surface. Compaction of fill materials by inundation with water is unacceptable.

5. Do not place fill materials when standing water is present on surface of the area where fill will be placed unless otherwise approved by the CM. Do not compact fill when standing water is present on the fill to be compacted. Do not place or compact fill in a frozen condition or on top of frozen material. Fill containing organic materials or other unacceptable materials previously described shall be removed and replaced prior to compaction.

6. If required densities are not obtained because of improper control of placement or compaction procedures, or because of inadequate or improperly functioning compaction equipment, Contractor shall perform all work required to provide the required densities.

Such work shall include complete removal of unacceptable fill areas and replacement and re-compaction until acceptable fill is provided.

7. Contractor shall repair observed or measured settlement. Make repairs and replacements, as required, within five days after being so advised by CM.

D. Fill in Pipe Trenches:

1. Where shown or indicated, provide geotextile separation fabric between pipe embedment and native material in accordance with Section 31 05 19.13 – Geotextiles for Earthwork.
2. Place pipe bedding material in pipe trenches in horizontal layers, and thoroughly compact each layer before the next layer is placed.
3. Pipe trenches may be backfilled prior to testing of piping unless the nature of the test requires observation of piping during testing.
4. Pipe Bedding: Install piping on not less than four-inch layer of pipe bedding material. Pipe bedding material shall extend 12 inches above the top of the pipe.
5. Placing and Compacting Pipe Trench Fill: Unless otherwise shown, placement and compaction of pipe trench fill material shall comply with the following:
   a. Pipe bedding material shall be spread and the surface graded to provide a uniform and continuous support beneath piping at all points between bell holes or pipe joints. Slight disturbance of installed pipe bedding material surface during withdrawal of pipe slings or other lifting tackle is acceptable.
   b. After each pipe's bedding material has been graded and the piping has been aligned, joined in accordance with the Contract Documents, and placed in final position on bedding material, provide and compact sufficient pipe trench fill material under and around each side of the pipe and back of the bell or end thereof to hold piping in proper position and maintain alignment during subsequent pipe jointing and embedment operations. Deposit and compact pipe trench fill material uniformly and simultaneously on each side of piping to prevent lateral displacement of piping. Place and compact pipe trench fill material to an elevation 12 inches above top of pipe, unless otherwise shown or specified.
   c. Each layer of pipe trench fill material shall be compacted by at least two complete coverages of all portions of surface of each lift using appropriate compaction equipment.
   d. Method of compaction and compaction equipment used shall be appropriate for material to be compacted and shall not transmit damaging shocks to the piping.

E. Subbase Placement:

1. Provide subbase material where indicated in the Contract Documents and to the limits required.
2. Place subbase material in compacted lifts not exceeding the specified thicknesses for each lift.

F. Compaction Density Requirements:

1. All soils and aggregates used for fill shall be compacted to the density specified for each material type.
2. Fill shall be wetted and thoroughly mixed to achieve optimum moisture content plus-or-minus three percent.
3. Replace natural, undisturbed soils or compacted soil subsequently disturbed or removed by construction operations with materials compacted as specified for their material type.

4. Field quality control testing for density, to verify that specified density was obtained, shall be performed in accordance with Paragraph 3.11.A of this Section.

5. When field quality control testing indicates unsatisfactory compaction, provide additional compaction necessary to obtain the specified compaction. Perform additional compaction Work until specified compaction is obtained. Such work includes complete removal of unacceptable (as determined by CM) fill areas and replacement and re-compaction until acceptable fill is provided in accordance with the Contract Documents.

G. Replacement of Unacceptable Excavated Materials: In cases where over-excavation to replace unacceptable soil materials is required, backfill the excavation to required subgrade with general fill material and thoroughly compact in accordance with Paragraph 3.08.G of this Section.

3.09 GRADING

A. General:

1. Uniformly grade areas within limits of grading under this Section, including adjacent transition areas.

2. Smooth subgrade surfaces within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

3. Blend grading over trench or excavation to elevations shown or indicated. Where elevations are not shown or indicated, blend finished grade with existing grade on each side of trench or excavation.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free of irregular surface changes, and comply with the following:

1. Grassed Areas or Areas Covered with Gravel, Stone, Wood Chips, or Other Special Cover: Finish areas to receive topsoil or special cover to within not more than one inch above or below the required subgrade elevations.

2. Pavements: Shape surface of areas under pavements to line, grade, and cross section, with finish surface not more than 1/2 inch above or below the required subgrade elevation.

C. Compaction: After grading, compact subgrade surfaces to achieve required subgrade elevations and percentage of maximum density for each material classification.

3.10 SUBBASE COURSE FOR PAVEMENT AND CRUSHED STONE SURFACING

A. General:

1. Place subbase material, in layers of specified thickness, over ground surface to support pavement base course or crushed stone surfacing.

2. After completing filling and grading, shape and compact subgrade to an even, firm foundation in accordance with this Section. Remove unsuitable subgrade materials, including soft materials, boulders, vegetation, and loose stones, and replace with compacted fill material as directed by CM.

B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.

C. Subbase Course Placement:

1. Place subbase course material on prepared subgrade in layers of uniform thickness, in accordance with indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placing operations.

2. Provide geotextile separation fabric over the prepared subgrade in accordance with Section 31 05 19.13.

3. Compaction and Grade Control: Comply with compaction requirements for excavation and fill in this Section, and the following requirements:
   a. Compaction with roller shall begin at the sides of the area to be paved or receive crushed stone surfacing and shall continue toward the center. Continue compaction until there is no movement of the course ahead of the roller.
   b. After rolling, check for grade with a line not less than 40 feet in length. Depressions over 1/2 inch deep shall be filled to satisfaction of CM.

4. After completing compaction, other than that necessary for bringing material for the next course, do not haul or drive over the compacted subbase.

5. Do not install subbase in excess of 500 feet in length without compacting to prevent softening of the subgrade.

6. If subgrade material becomes churned up into or mixed with the subbase material, remove the mixed material and replace it with clean, compacted subbase material.

D. Shoulders:

1. Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each lift of subbase material.

2. Compact and roll not less than 12-inch width of shoulder simultaneously with compacting and rolling of each lift of subbase material.

3.11 FIELD QUALITY CONTROL

1. Perform field density tests in accordance with specification Section 31 22 00 – Grading.

2. Submit test results, certified by testing laboratory, to CM within 24 hours after completion of test.

3. If testing laboratory reports or inspections indicate subgrade, bedding, or fill compaction below specified density, Contractor shall remove unacceptable materials as necessary and replace with specified materials, and provide additional compaction until subgrades, bedding, and fills are acceptable. Retesting of subgrade, bedding, or fills that did not originally comply with specified density shall be performed by Contractor.

A. Earthwork Inspections:

1. Perform daily or more frequent inspections of all excavations, adjacent areas, and protective systems as required by Laws and Regulations and this Section to ensure their continued effectiveness and integrity, and the safety of exposed employees.

2. Inspections shall be performed by Contractor's competent person, together with CM:
   a. Prior to the start of Work and as needed throughout the day; and
   b. After every rainstorm or other hazard-increasing occurrence.

3. Where Contractor's competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or

other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions or corrective actions have been taken to ensure their safety.

4. Document the date, time, and outcome of each inspection in a dedicated log. Submit copy of inspection log to CM with daily construction report.

- END OF SECTION -

SECTION 31 25 00 – EROSION AND SEDIMENT CONTROLS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Providing and maintaining methods, equipment, materials, and temporary construction as required to control erosion and sediment transport at the Site and adjacent areas as specified in the Project design drawings. This also includes the requirements specified in the Contractor's Site-specific Stormwater Pollution Prevention Plan (SWPPP).
2. Maintain erosion and sediment controls until no longer required.

B. Related Sections:

1. Section 31 11 00 – Clearing and Grubbing.
2. Section 31 23 00 – Excavation and Fill.
3. Section 31 91 19.13 – Topsoil Placement and Grading

1.02 REFERENCES

A. The following standards are referenced in this Section:

1. MassDEP Stormwater Handbook and Stormwater Standards.

B. The following is provided to assist Contractor with development of Contractor's Site-specific SWPPP:

1. Preliminary UDF Construction Stormwater Pollution Prevention (Arcadis, May 2025).

1.03 QUALITY ASSURANCE

A. Requirements:

1. Comply with applicable provisions and recommendations of the Project SWPPP (includes the applicable substantive requirements specified for the National Pollutant Discharge Elimination System Construction General Permit).

1.04 SUBMITTALS

A. Action Submittals:

1. Product Data: Submit manufacturer's product data, specifications, and installation instructions for the following:
   a. Reinforced silt fencing;
   b. Straw wattles; and
   c. Erosion control mats and associated anchoring materials.

B. SWPPP Submittal:

1. Contractor to prepare a Site-specific SWPPP that includes the applicable substantive requirements specified for the National Pollutant Discharge Elimination System Construction General Permit.

PART 2 – PRODUCTS

2.01 EROSION AND SEDIMENT CONTROLS

A. General:

1. Materials used for erosion and sediment controls shall be in accordance with the applicable regulatory requirements indicated in Article 1.03 of this Section, unless otherwise shown or indicated in the Contract Documents and or the SWPPP.

B. Reinforced Silt Fencing:

1. Filter Fabric:
   a. Material: Geotextile shall comply with MassDEP guidelines for Soil Erosion and Sediment Control standard and specifications for silt fence.
   b. Height: Three feet, minimum.
2. Fence Support Posts:
   a. Material: Hardwood or steel posts may be used.
      1) Hardwood posts shall be at least 1.25 inches by 1.25 inches in cross section.
      2) Steel posts shall be "T" or "U" shape in cross section with a minimum weight of 1.0 pound per linear foot.
   b. Length: Four feet, minimum.
3. Wire Reinforcing: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening or as approved.
4. Fabric fasteners shall be heavy-duty staples, wire ties, or other fastener compatible with support post material.

C. Stabilized Construction Access:

1. Crushed stone shall be a clean, durable, matrix of sharp-angled fragments ranging in size from 1 to 3 inches.
2. Geotextile shall comply with MassDEP guidelines for Soil Erosion and Sediment Control standard and specifications for stabilized construction access use.

D. Temporary Erosion Control Blankets: Type 3.B, in accordance with FHWA FP-03, Section 713.17.

1. Product and Manufacturer: Provide one of the following:
   a. ECSC-2B, by East Coast Erosion Blankets, LLC;
   b. Curlex II FibreNet, by American Excelsior Company;
   c. Or equal.
2. Erosion control blankets shall be 100 percent natural and biodegradable and shall not incorporate plastic netting of any kind. Acceptable materials include jute, excelsior, straw or coconut fiber, and cotton.
3. Staples or anchoring stakes shall be 100 percent biodegradable.

E. Permanent Turf Reinforcement Mat (TRM): Type 5.A, in accordance with FHWA FP-03, Section 713.18.

1. Product and Manufacturer: Provide one of the following:
   a. C350 Turf Reinforcement Mat, by North American Green;
   b. Or equal.
2. Permanent TRM shall be non-degradable with sufficient thickness, strength, and void space for permanent erosion protection, per TRM manufacturers requirements.
3. Staples or anchoring stakes shall be per TRM manufacturers requirements and specifications.

F. Straw Wattles:

1. 12-inch diameter, bio-degradable straw wattle, 100% weed free.
2. Up to 24-month life expectancy.
3. 1/8-inch mesh opening.
4. Minimum 180 psi strength per ASTM 5035.

PART 3 – EXECUTION

3.01 EROSION AND SEDIMENT CONTROL

A. Installation and Maintenance – General:

1. General:
   a. Provide erosion and sediment controls as shown and indicated on the Design Drawings and elsewhere in the Contract Documents, and as suggested in the Stormwater Prevention Control Plan. Provide erosion and sediment controls as the Work progresses into previously undisturbed areas.
   b. Install erosion and sediment controls shall be in accordance with the applicable regulatory requirements indicated in Article 1.03 of this Section, unless otherwise shown or indicated in the Contract Documents.
   c. Use necessary methods to successfully control erosion and sedimentation, including ecology-oriented construction practices, vegetative measures, and mechanical controls. Use best management practices in accordance with Laws and Regulations, and regulatory requirements indicated in Article 1.03 of this Section, to control erosion and sedimentation during the Project.
   d. Plan and execute construction, disturbances of soils and soil cover, and earthwork by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation. Provide temporary measures for controlling erosion and sedimentation, as indicated in the Contract Documents and as required for the Project.
   e. Regulate drainage and control erosion and sedimentation in areas that are cleared for storage of materials or equipment, or for temporary facilities.
   f. Provide erosion and sediment controls, including stabilization of soils, at the end of each work day.

2. Coordination:
   a. Coordinate erosion and sediment controls with this Section's requirements on water control.
   b. Coordinate temporary erosion and sediment controls with construction of permanent drainage facilities and other Work to the extent necessary for economical, effective, and continuous erosion and sediment control.

3. Provide all erosion and sediment control measures required by the Contract Documents for the areas where soil or soil cover will be disturbed before commencing activities that will disturb soil or soil cover at the Site.

4. Implement construction procedures associated with, or that may affect, erosion and sediment control to ensure minimum damage to the environment during construction.

5. Vegetation Removal:
   a. Remove only those shrubs, grasses, and other vegetation that must be removed for construction. Protect remaining vegetation.
      1) Grind removed stumps into mulch for use as temporary erosion control material of prepare stumps or unusable vegetation debris for off-site disposal as approved by the CM.

6. Access Roads and Parking Areas: When possible, access roads and temporary roads shall be located and constructed to avoid adverse effects on the environment. Provisions shall be made to regulate drainage, avoid erosion and sedimentation, and minimize damage to vegetation.

7. Earthwork and Temporary Controls:
   a. Perform excavation, fill, and related operations in accordance with Specification Section 31 23 00 – Excavation and Fill.
   b. Control erosion to minimize transport of silt from the Site into existing waterways and surface waters. Such measures shall include, but are not limited to, using berms, silt fencing, gravel or crushed stone, slope drains, and other methods. Apply such temporary measures to erodible materials exposed by activities associated with the remedial construction.
   c. Hold to a minimum the areas of bare soil exposed at one time.
   d. In performing earthwork, eliminate depressions that could serve as mosquito pools.
   e. Provide special care in areas with steep slopes. Minimize vegetation disturbance to maintain soil stability.

8. Inspection and Maintenance:
   a. Periodically inspect areas of earthwork and areas where soil or soil cover are disturbed to identify evidence of the start of erosion and sedimentation; apply corrective measures as required to control erosion and sedimentation. Continue inspections and corrective measures until soils are permanently stabilized and permanent vegetation has been established.
   b. Inspect erosion and sediment controls prior to conducting any intrusive activities. During Work, erosion and sediment controls shall be inspected at least once every seven days until restoration is complete.
   c. Repair or replace damaged erosion and sediment controls within one day of becoming aware of such damage.
   d. Periodically remove silt and sediment that has accumulated in or behind sediment and erosion controls. Properly dispose of silt and sediment.

9. Duration of Erosion and Sediment Controls:
   a. Maintain erosion and sediment controls in effective working condition until the associated drainage area has been permanently stabilized.
   b. Maintain erosion and sediment controls until the Site is restored and site improvements including landscaping, if any, are complete with underlying soils permanently stabilized.

10. Work Stoppage: Provide additional temporary controls necessary to prevent environmental damage to the Site and adjacent areas if the Work is temporarily stopped or suspended for any reason.

11. Failure to Provide Adequate Controls: In the event that Contractor repeatedly fails to satisfactorily control erosion and siltation, CM reserves the right to employ outside assistance for erosion and sediment controls as required to meet Project objectives and requirements.

B. Reinforced Silt Fencing:

1. Install and maintain silt fencing in a vertical plane, at the location(s) shown or indicated on the Design Drawings.

2. Locations of Reinforced Silt Fencing:
   a. Where possible, install silt fencing along contour lines so that each given run of fencing is at the same elevation.
   b. On slopes, install silt fencing at intervals that do not exceed the maximum lengths indicated in Table 1, unless otherwise approved by the Engineer.

TABLE 1
MAXIMUM LENGTH OF UPGRADIENT SLOPE BETWEEN RUNS

Slope	Upgradient Slope Length (feet)
< 2%	N/A
2 – 10%	250
10 – 20%	150
20 – 33%	80
33 – 50%	70
> 50%	30

   c. Provide silt fencing around the perimeter of each stockpile of topsoil, general fill material, and excavated material. Install silt fencing before expected precipitation and maintain until stockpile is removed.
   d. Do not install silt fencing at the following types of locations:
      1) Area of concentrated storm water flows such as ditches, swales, or channels;
      2) Where rock or rocky soils prevent full and uniform anchoring of silt fencing; and
      3) Across upstream or discharge ends of storm water piping or culverts.

3. Installation:
   a. Securely fasten filter fabric to each support post in no less than four locations. Spacing between support posts shall not exceed 10 feet (center to center).
   b. When two sections of filter fabric abut each other, fold over edges and overlap by minimum of six inches and securely fasten to wire mesh.
   c. Embed posts in the ground to the depth necessary for proper controls, but not less than 16 inches below ground surface.
   d. Extend filter fabric a minimum of six inches below ground and a minimum of 16 inches above ground.
   e. Bury filter fabric at bottom of silt fence in a trench, in a “J” configuration, to a depth of six inches below grade.
   f. Remove sediment accumulated at silt fencing as required. Repair and reinstall silt fencing as required.

4. Maintenance:
   a. Conduct routine inspection at least once every seven days until final restoration.
   b. Remove accumulated sediment when depth reaches one-half the effective height of the sediment control.
   c. Repair and reinstall silt fencing as required.
   d. Do not allow formation of concentrated storm water flows on slopes above silt fencing unless so shown or indicated in the Contract Documents. If unauthorized concentrated storm water flows occur, stabilize the slope via earthmoving and other stabilization measures, as required, to prevent flow of concentrated storm water flows toward silt fencing.

C. Protection of Storm Water Drainage Inlets:

1. Protect each drainage inlets that has the potential to receive storm water run-off from exposed soils.
2. Install inlet filter bags inside of drainage inlet or catch basin in accordance with manufacturer's instructions. Secure inlet filter bag with the structure's grate or by other acceptable means.
3. Inlet filter bags shall not pose any obstruction above the elevation of the drainage inlet or catch basin grate requiring barricades or flashers.
4. When removing silt and sediment from inlet filter bag, do not dump filter bag's contents into the drainage inlet or catch basin.
5. Remove silt and sediment from inlet filter bag, or replace inlet filter bag, when inlet filter bag is not more than half full.

3.02 SURFACE WATER CONTROL

A. General:

1. Provide methods to control surface water to prevent damage to the Work, the Site, and adjoining properties.
2. Control fill, grading, and ditching to direct surface water away from disturbed areas, excavations, pits, tunnels, and other construction areas, and to direct drainage to proper run-off courses to prevent erosion, damage, or nuisance.

B. Equipment and Facilities for Surface Water Control:

1. Provide, operate, and maintain equipment and facilities of adequate size to control surface water.

C. Discharge:

1. Discharge surface water in a manner to prevent flooding, erosion, and other damage to any and all parts of the Site and adjoining areas, and that complies with Laws and Regulations.

3.03 REMOVAL OF EROSION AND SEDIMENT CONTROLS

A. Remove erosion and sediment controls only when directed by the CM.

- END OF SECTION -

SECTION 31 37 00 – RIPRAP

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Providing all labor, materials, tools, equipment, and incidentals as shown, specified, and required to install riprap.
2. Extent of riprap is shown or indicated on the Design Drawings.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with or before riprap.

C. Related Sections:

1. Section 31 05 16.10 – Materials for Earthwork.
2. Section 31 05 19.13 – Geotextiles for Earthwork.
3. Section 31 11 00 – Clearing and Grubbing.
4. Section 31 23 00 – Excavation and Fill.

1.02 SUBMITTALS

A. Informational Submittals:

1. Delivery Tickets: Submit copy of delivery ticket for each load of material delivered to the Site. Each delivery ticket shall indicate Supplier name and source address, project name, contract number, date, material type, MassDOT item number when applicable, and quantity delivered.

1.03 DELIVERY

1. Notify the CM no less than one (1) week in advance of delivery of all riprap materials unless otherwise approved by the CM.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Refer to Section 31 05 16.10 – Materials for Earthwork for riprap material product description.

PART 3 – EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which the Work will be performed and notify the CM in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected in a manner acceptable to the CM.

3.02 PREPARATION

A. Clear ground surface of brush, trees, stumps, and other objectionable material, and dress to a smooth surface. Clearing and grubbing, where required, shall comply with Section 31 11 00 – Clearing and Grubbing.

B. Remove all soft or spongy material to depth shown or indicated on the Design Drawings or as directed by the CM and replace with acceptable material. Excavation, removal of unsuitable material if any, and backfilling shall comply with Section 31 23 00 – Excavation and Fill.

3.03 INSTALLATION

A. Riprap Placing:

1. Minimum total thickness of riprap shall be as shown on the Drawings.
2. Place riprap stones so that weight of stone is carried by underlying material and not by adjacent stones. Carefully place the stones on geosynthetics, where required, to produce an even distribution of pieces, with minimum of voids and without damaging the geosynthetic. Place the full-course thickness in one operation while preventing segregation and avoiding displacing of underlying material. Do not place stones in layers, by dumping into chutes, or by other methods that cause segregation or damage to geosynthetic, if any. When necessary, rearrange individual stones for uniform distribution.
3. Riprap may be placed using equipment, and placing shall produce an installation of firm and solid riprap. Level the top surface of riprap to required alignment and slope by hand-placing stones to fill large voids and to make surface even.
4. On slopes, place the largest stones at the bottom. Riprap shall be properly sized to form compact, solid blanket to protect the slope or channel, as applicable. On slopes steeper than one foot vertical to 1.5 feet horizontal, do not use rounded boulders or cobbles without grouting stones in place.
5. When existing riprap is in proximity to riprap provided under this Section, place riprap to conform as closely as practicable in size and character to existing riprap.

3.04 FIELD QUALITY CONTROL

A. Contractor shall perform thickness measurements in the field as directed by the CM, to determine compliance with the Contract Documents.

3.05 CRITERIA AND TOLERANCES

A. Fill materials shall be constructed to the lines and grades shown on the contract drawings unless otherwise requested by the CM. Acceptance of final grades will be based on site observations by the CM and review of a final as-built survey information. Any settlements that occur prior to final acceptance of the work shall be restored to design and/or intended grades by the Contractor.

- END OF SECTION -

SECTION 31 91 19.13 – TOPSOIL PLACEMENT AND GRADING

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment, and incidentals as shown, specified, and required to place and grade topsoil as shown or indicated on the Design Drawings.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of other items that must be completed with or before topsoil placement, grading, and vegetating.

C. Related Sections:

1. Section 31 05 16.10, Materials for Earthwork.
2. Section 31 11 00, Clearing and Grubbing.
3. Section 31 23 00, Excavation and Fill.

1.02 REFERENCES

A. Terminology:

1. The following words or terms are not defined but, when used in this Section, have the following meaning:
   a. “Finished grade” describes the finished surface elevation of topsoil.
   b. “Subgrade” describes the surface or elevation of subsoil remaining after completing excavation, or the top surface of a fill or backfill, before placing topsoil.

1.03 SUBMITTALS

A. Informational Submittals:

1. Delivery Tickets: Submit copy of delivery ticket for each load of material delivered to the Site. Each delivery ticket shall indicate Supplier name and source address, project name, contract number, date, material type, MassDOT item number when applicable, and quantity delivered.

1.04 DELIVERY

A. Notify the CM no less than one (1) week in advance of delivery of all aggregate materials unless otherwise approved by the CM.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Refer to Section 31 05 16.10 – Materials for Earthwork for material product description.

PART 3 – EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which placement and grading will be performed and notify CM in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected in a manner acceptable to CM.

3.02 PREPARATION

A. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

B. Excavate or fill subgrade, as required, to bring subgrade to elevations shown or indicated. Maintain all angles of repose. Confirm that subgrade is at proper elevations and that no further earthwork is required to bring the subgrade to proper elevations. Provide subgrade elevations that slope parallel to finished grade and in the direction shown on the Drawings.

C. Remove all construction debris, trash, rubble, and other extraneous materials from subgrade. In the event that fuels, oils, concrete washout, or other material harmful to plant growth or germination have been spilled into the subgrade, excavate the subgrade sufficiently to remove all such harmful materials and fill with approved fill, compacted to the required subgrade compaction level.

D. Notify CM that subgrade has been prepared and obtain CM's approval before spreading topsoil.

3.03 FINE GRADING

A. Do not attempt to spread excessively wet, muddy, or frozen topsoil. Do not spread topsoil more than five days before seeding.

B. Spread topsoil to a depth of six inches but not less than required to meet finished grades after light rolling and natural settlement.

1. Spread approximately one-half the thickness of required topsoil depth. After spreading topsoil, rototill, disk, or harrow topsoil and subgrade to bring top two inches of subgrade upward into topsoil layer, so that there is a transitional layer between topsoil and subgrade.
2. Spread remainder of topsoil to required finished grades.
3. Compact each lift sufficiently to reduce settling, but not enough to prevent the movement of water and feeder roots through topsoil.

4. Phase the placement of the final lift so that wheeled vehicles do not have to travel over areas where final lifts have already been placed.

5. Spread and compact to a smooth, uniform surface plane, to within plus-or-minus 1/2 inch of finished elevations. Roll and rake and remove all ridges, and fill depressions, as required. Remove all stones larger than one inch in any dimension, and all sticks, roots, trash, and other extraneous materials.

C. Moisten prepared areas before seeding. Water thoroughly and allow surface moisture to dry before seeding. Do not create a muddy topsoil condition.

D. Restore topsoil to specified condition if eroded or otherwise disturbed after fine grading and before seeding.

3.04 CLEANING AND PROTECTION

A. Promptly remove soil and debris, created by topsoil placement, from paved areas. Clean wheels of vehicles before leaving Site to avoid tracking soil onto roads, walks, or other paved areas.

3.05 FIELD QUALITY CONTROL

A. Contractor shall perform lift thickness measurements in the field as directed by the CM, to determine compliance with the Contract Documents.

3.06 CRITERIA AND TOLERANCES

A. Fill materials shall be constructed to the lines and grades shown on the contract drawings unless otherwise requested by the CM. Acceptance of final grades will be based on site observations by the CM and review of a final as-built survey information. Any settlements that occur prior to final acceptance of the work shall be restored to design and/or intended grades by the Contractor.

- END OF SECTION -

SECTION 32 92 00 – TURF AND GRASSES

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, tools, equipment, and incidentals as shown, specified, and required to furnish and install lawns.
2. Extent of lawns is shown or indicated on the Design Drawings.
3. Types of products required under this Section include the following:
   a. Grass seed mixture;
   b. Fertilizers;
   c. Mulches; and
   d. Erosion-control blankets.

B. Related Sections:

1. Section 31 25 00 – Erosion and Sediment Controls.

C. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with or before lawns.

1.02 REFERENCES

A. Terminology:

1. The following words or terms are not defined but, when used in this Section, have the following meaning:
   a. “Finished grade” describes the finished surface elevation of topsoil.
   b. “Percent pure live seed”, or “percent PLS”, is the percent (%) purity multiplied by percent (%) germination divided by 100 and shall be calculated for all seed lots using each seed lot’s own unique purity and germination test results. A PLS pound is the bulk weight of seed required to equal one pound of 100 percent pure, germinated seed.
   c. “Subgrade” describes the surface or elevation of subsoil remaining after completing excavation, or the top surface of a fill or backfill, before placing topsoil.

1.03 QUALITY ASSURANCE

A. Qualifications:

1. Installer:
   a. Engage a single landscape installer skilled, trained, and with successful and documented experience in the planting of lawns and in the installation of the types of materials required (i.e., native seed mixes), and who agrees to employ only tradesmen with specific skill and successful experience in the type of Work required.
   b. When requested by the CM, submit record of experience documenting not less than three successful, completed projects. For each project, submit the following information:
      1) Project name;
      2) Location of project;

3) Names and telephone numbers of owner, architects, or engineers responsible for the project;
4) Approximate area of lawns installed; and
5) Approximate contract price of lawns installed.

c. Installer's Site Supervisor: Require installer to maintain an experienced full-time landscape supervisor on-site during the time of preparation for, and planting of, lawns. Supervisor shall have achieved landscape or horticultural certification acceptable to governing authorities having jurisdiction at the Site.

d. Ratio of laborers to certified landscape supervisors shall not exceed twelve to one. Certified landscape supervisor shall be on-site throughout the day-to-day performance of the Work of this Section.

B. Application of herbicides, chemicals, and insecticides shall be done by personnel licensed to perform such applications by governing authorities having jurisdiction at the Site and in accordance with each manufacturer's instructions provided on each product label.

1.04 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Submit planting schedule showing scheduled start and finish dates for lawn Work in each area of the Site.

2. Product Data:
   a. Submit composition and analysis of commercial starter fertilizer and all purchase receipts showing the total quantity actually purchased for the Project.
   b. Submit proportions of each component contained in hydroseed mixture. Identify number of pounds of each component required for each 100 gallons of water. Include the number of square feet of seed mixture that can be installed with each full tank of hydroseed mixture.
   c. Submit percent PLS for each type of seed and each seed lot. Include bulk weight of seed required to equal one pound of 100 percent pure, germinated seed.

B. Informational Submittals:

1. Qualifications Statements:
   a. Installer: Submit name and address of landscape installer. When requested by the CM, submit qualifications and record of experience.
   b. Landscape Supervisor: When requested by the CM, submit name and qualifications of installer's landscape supervisor, including copy of valid certifications applicable to the Project.

2. Certificates:
   a. For each seed mixture, submit seed Supplier's certification stating the botanical and common name, and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging. Certify that seed has been stored in compliance with all recommendations of the seed Supplier.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Do not deliver fertilizer, or grass seed until Site conditions are ready for installation.
2. Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery.
3. Deliver seed in undamaged, original containers, sealed by the Supplier and indicating compliance with the required seed mixture.
4. Inspect materials upon arrival at the Site. Immediately and permanently remove unacceptable materials from Site.

B. Storage:

1. Store and cover materials to prevent deterioration. Remove packaged materials that become wet or show deterioration or water marks from the Site.
2. Seed that becomes wet, moldy, or damaged during the time of storage on-site, or that has been damaged during transit, is not acceptable.

1.06 SITE CONDITIONS

A. Environmental Requirements:

1. Proceed with and complete lawn planting as rapidly as portions of the Site become available, working within the seasonal limitations for each type of lawn planting required.
2. Proceed with planting only when current and forecasted weather conditions are favorable to successful planting and establishment of lawns.
   a. Do not spread seed when wind velocity exceeds five miles per hour.
   b. Do not plant when there is drought, excessive moisture, or other unsatisfactory conditions prevail.

B. Scheduling:

1. Plant during one of the following periods:
   a. Spring Planting: March 15 to June 1; and
   b. Fall Planting: September 1 to October 30.
2. Do not begin lawn planting until water, acceptable for use and adequate in supply, is available on-Site and can be successfully transported to the areas of Work. Coordinate provision of adequate and acceptable water supply with Progress Schedule.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Grass Seed:

1. Grass Seed Mixture: Provide fresh, clean, new crop seed complying with the tolerance for purity and germination established by AOSA. Provide seed of the grass species, proportions, and minimum percentages of purity and germination, and maximum percentage of weed seed, specified.
2. New England Erosion Control/Restoration Mixture for Dry Sites: Seed with New England Wetland Plants Inc. (www.newp.com) New England Erosion Control/Restoration Mixture

for Dry Sites at a rate of 1lb/1250sq. ft. or approved equivalent mixture. Apply seed mix by hydro-seeding, mechanical spreader, or on smaller sites it may be spread by hand. Lightly rake or roll to ensure proper soil-seed contact. Preparation of a clean weed free seed bed is necessary for optimal results.

a. Seed species are as follows: Creeping Red Fescue, (Festuca rubra), Canada Wild Rye, (Elymus canadensis), Annual Ryegrass, (Lolium multiflorum), Perennial Ryegrass, (Lolium perenne), Little Bluestem, (Schizachyrium scoparium), Indian Grass, (Sorghastrum nutans), Switch Grass, (Panicum virgatum).
b. Seed in the Spring or Late summer for optimal results. If seeding during the late Spring or Mid-Summer, light mulching of weed-free straw may be used to conserve moisture.
c. If conditions encountered are drier than usual, watering will be required per manufacturer's specifications or recommendations.
d. Fertilization is not required unless the soils are particularly infertile.

B. Fertilizer: Commercial-grade, complete starter fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.

C. Mulches:

1. Straw Mulch: Provide clean, dry, and seed-free salt hay or threshed straw of wheat, rye, oats, or barley.

2. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; non-toxic; free of plant-growth or germination inhibitors; with maximum moisture content of 15 percent and pH range of 4.5 to 6.5.

3. Non-Asphaltic Tackifier: Colloidal tackifier recommended by fiber mulch manufacturer for slurry application; non-toxic and free of plant-growth or germination inhibitors.

4. Asphalt Emulsion: ASTM D977, Grade SS-1; non-toxic and free of plant-growth or germination inhibitors.

D. Water: Clean, acceptable for lawn application, and containing no invasive plant materials or other materials harmful to plant growth and establishment.

2.02 SOURCE QUALITY CONTROL

A. Analysis and Standards: Package all products with manufacturer's certified analysis performed in accordance with methods established by AOAC, wherever applicable, or as specified.

B. Seed that has been stored at temperatures, or under conditions not recommended by the seed Supplier, or has become wet, moldy, or otherwise damaged, shall not be acceptable. The PLS for each seed lot shall be 75 percent, minimum.

C. Certify that all seed has been stored under conditions recommended by the seed Supplier and has not been subjected to conditions damaging to PLS percentages.

D. Seed may be mixed by an approved method on-site or at the seed Supplier's facilities. If the seed is mixed on-site, each variety shall be delivered in the original containers and shall bear the Supplier's certified analysis. Where seed is mixed by the seed Supplier, provide the CM with the seed Supplier's certified statement as to the composition of the mixture.

PART 3 – EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which lawn Work will be performed and notify the CM in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected in a manner acceptable to the CM.

3.02 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, and trees, shrubs, and other plants from damage caused by planting operations. Protect adjacent and adjoining areas from hydroseeding overspray.

B. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Excavate or fill subgrade, as required, to bring subgrade to elevations shown or indicated. Maintain all angles of repose. Confirm that subgrade is at proper elevations and that no further earthwork is required to bring the subgrade to proper elevations. Provide subgrade elevations that slope parallel to finished grade and in the direction shown on the Drawings.

D. Remove all construction debris, trash, rubble, and other extraneous materials from subgrade. In the event that fuels, oils, concrete washout, or other material harmful to plant growth or germination have been spilled into the subgrade, excavate the subgrade sufficiently to remove all such harmful materials and fill with approved fill, compacted to the required subgrade compaction level.

3.03 CONVENTIONAL SEEDING

A. Maintain grade stakes until removal is approved by the CM.

B. Rake or harrow all seedbeds immediately prior to seeding to produce a rough, grooved surface, no deeper than one inch. Seed only when seedbed is in a friable condition and not muddy or hard.

C. Sow seed using a spreader or seeding machine.

D. Distribute seed evenly over entire area by sowing equal quantity in two directions at right angles to each other.

E. Sow grass seed mixture at a rate of not less than 30 pounds per acre.

F. Rake the seed lightly into the uppermost 1/8 inch of topsoil and roll in two directions with a light lawn roller. Take care during raking that seed is not raked from one spot to another.

G. Protect seeded areas against erosion by spreading straw mulch after completion of seeding operations.

1. Spread straw mulch at an approximate rate of two tons per acre to form a continuous loose blanket not less than 1.5 inches deep.

2. Anchor mulch by spraying with asphalt emulsion at a rate of 10 to 13 gallons per 1,000 square feet.

3. Spread mulch with equipment that will blow or eject, by means of a constant air stream, controlled quantities of the mulch and asphalt in a uniform pattern over the specified area. If the mulch is excessively cut or broken, take measures to reduce the cutting or breakage. Introduce the asphalt into the air stream by means of a spray arranged so that it will partially coat the mulch with a spotty asphalt tack prior to the depositing of the mulch covering. Rate of application shall be not less than 75 gallons per ton of mulch.

H. Mulch shall be used as erosion control on all slopes less than 1:3 (V:H). Where slopes meet or exceed 1:3 (V:H), erosion control blankets shall be installed to protect seeded areas, unless otherwise approved by the CM. Erosion control blankets shall be installed in accordance with manufacturer's specifications and as follows:

1. Cover entire area to be stabilized with erosion control blankets.

2. Provide anchoring trenches at the top and bottom of slopes to receive erosion control blankets. Bury at least the top and bottom ends of erosion control blanket, four inches or more wide, at top and bottom of slope. Tamp trench full of soil. Four inches from trench, secure erosion control blanket with appropriate stakes or staples spaced at intervals of 10 inches, or as recommended by the manufacturer.

3. Overlap adjacent strips of erosion control blanket by not less than four inches.

I. Using a uniform fine spray, thoroughly and evenly water seeded areas. Provide adequate water to moisten seedbed to a depth of two inches.

J. Maintain all seedbeds in a uniformly moist condition, conducive to seed germination and plant establishment, as specified.

K. Reseed areas that remain without mulch for longer than three days.

L. Take precautions to prevent damage or staining of construction or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

M. Prevent foot or vehicular traffic, or the movement of equipment, over the mulched areas. Reseed areas damaged as a result of such activity.

3.04 HYDROSEEDING

A. Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

B. Mix slurry with asphalt-emulsion tackifier.

C. Apply slurry uniformly to all areas to be seeded in a two-step process.

1. Apply first slurry application at a minimum rate of 500 pounds per acre dry weight, but not less than the rate required to obtain specified seed sowing rate so that the seed comes into direct contact with topsoil.

2. Apply slurry cover coat of fiber mulch at a rate of 1,000 pounds per acre.

D. Where slopes exceed 1:6 (V:H), provide erosion control blankets to protect hydroseeded areas. Unless otherwise approved by the CM. Install in accordance with manufacturer's specifications and as follows:

1. Cover entire area to be stabilized with erosion control blankets.
2. Provide anchoring trenches at the top and bottom of slopes to receive erosion control blankets. Bury at least the top and bottom ends of erosion control blanket, four inches or more wide, at top and bottom of slope. Tamp trench full of soil. Four inches from trench, secure erosion control blanket with appropriate stakes or staples spaced at intervals of 10 inches, or as recommended by the manufacturer.
3. Overlap adjacent strips of erosion control blanket by not less than four inches.

3.05 RECONDITIONING EXISTING LAWNS

A. Recondition existing lawns damaged by Contractor's operations, including areas used for the storage of materials and equipment and areas damaged by the movement of vehicles. Recondition existing lawns where minor regrading is required.

B. Provide fertilizer, seed, and mulch as required to recondition existing lawns. Provide new topsoil as required to fill low spots and meet final or existing grades, as specified.

C. Till stripped, bare, and compacted areas thoroughly to a depth of 12 inches.

D. Remove diseased or unsatisfactory lawns; do not bury into soil. Remove topsoil containing extraneous materials resulting from Contractor's operations, including oil drippings, stone, gravel, and other construction materials.

E. In areas approved by the CM, where substantial lawns remain (but are thin), mow, dethatch, core aerate, and rake. Fill low spots, remove humps, cultivate soil, fertilize, and seed. Apply mulch, if required, to maintain moist condition.

F. Water newly planted areas and keep moist until new lawns are established, as specified.

3.06 ACCEPTANCE CRITERIA FOR RESTORATION AREAS WITH NATIVE SEED MIXES

A. Lawn Work will be considered acceptable when a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 80 percent over any 10 square feet and bare spots not exceeding five inches by five inches.

3.07 CLEANING AND PROTECTION

A. Promptly remove soil and debris, created by lawn Work, from paved areas. Clean wheels of vehicles before leaving Site to avoid tracking soil onto roads, walks, or other paved areas.

B. Take all precautions to ensure that hydroseed slurry is only placed on the areas designated. Completely clean any overspray, on areas not designated to receive slurry.

C. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades until specified acceptance criteria is achieved.

3.08 MAINTENANCE

A. Maintain lawns until specified acceptance criteria is achieved.

1. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth lawn.

2. In areas where mulch has been disturbed by wind or maintenance, add new mulch. Anchor as required to prevent displacement.

3. Watering: Provide and maintain temporary piping, hoses, and lawn watering equipment to convey water from sources. Keep newly germinated plants uniformly moist to a depth of four inches, applied at a minimum rate of one inch per week or greater as required to maintain minimum moisture depth specified.
   a. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
   b. After grasses show mature blades, watering shall be performed to provide moisture to a depth of six inches and shall not be performed again until top one inch of loam has dried.

4. After seed has passed its expected germination period, reseed all areas and parts of areas that fail to show a uniform stand of grass. Reseed repeatedly until all areas are covered with grass.

- END OF SECTION -

Load Rating Summary Report

Valley Street over Tributary to Housatonic River

Lee, Massachusetts



Rated by: David Hornback
Reviewed by: Frank Getz, PE
Date: 12/12/25

BRIDGE LOAD RATING SUMMARY REPORT

ARCADIS

SNBI Bridge Number (SFN)	Facilty Carried on Bridge		CITY,STATE	GPS Coordinates	
				LATITUDE:	LONGITUDE:
N/A	Valley Street		Lee, MA	42.3461	-73.24482
Year Built/Reconstructed	Span Length	Material	Span Type	Feature Intersected	
Unknown	6 ft	Aluminum	Buried Culvert	Tributary to Housatonic River	

Description, Assumptions & Comments	Type: Single Cell, Corrugated Metal Pipe Culvert Culvert Shape: Circular Culvert Diameter: 6'-0" Culvert Length: 39'-9.5" Culvert Material: Aluminum (Fy = 24 ksi) Corrugation Size: 2 1/2" x 1/2" Fill Depth: 2'-6" Analysis Assumptions: Assumed 10% pipe crown deflection and 30% section loss.
	Please type or select on right using drop down arrow
Load Rating Purpose:	Initial Load Rating
Bridge Appraisal Rating (0-9):	6 - Fair
Load rating Software:	AASHTO BrR
Software version:	7.6.1.3001
Rating Source:	Field measured information for load rating analysis
Load Rating Method:	LRFR - Load & Resistance Factor Rating
Design Load:	Unknown

Sealed by:

Frank Getz

STATE OF OHIO
FRANK JOHN GETZ
E-66992
REGISTERED PROFESSIONAL ENGINEER

STRUCTURE RATING SUMMARY

AASHTO LEGAL VEHICLES

Legal Load	GVW (Tons)	No of Axles	Rating Factor RF	Safe Weight (Tons)
Type 3	25	3	3.564	25.00
Type 3-3	40	6	5.127	40.00
Type 3S2	36	5	3.861	36.00
GE VEHICLE				
GE Trailer (Tandem)	25	2	2.496	25.00
SPECIALIZED HAULING VEHICLES (SHV)				
SU4	27	4	3.300	27.00
SU5	31	5	3.300	31.00
SU6	34.75	6	3.300	34.75
SU7	38.75	7	3.300	38.75
EMERGENCY VEHICLES (EV) *Check box if rating for EV3* ☑				
EV2	28.75	2	2.720	28.75
EV3	43	3	4.282	43.00
Controlling Legal Load RF			250%	2.50

DESIGN AND OPERATING RATINGS

Loading Type	Rating by RF	
	Inventory	Operating
HL93 Loading	2.397	3.107
Recommendation	No Load Posting is Recommended	

Sign Posting Recommendation:

AGENCY/FIRM/OFFICE	ARCADIS					
	Name	PE Number	Phone Number	Email	Report Date:	2025-12-12
Rated By	David Hornback		513-418-1438	david.hornback@arcadis.com		
Reviewed By	Frank Getz	66992	330-515-5677	frank.getz@arcadis.com		

Appendix M
Implementation, Monitoring, and Maintenance Plan Matrix

Table 1
Reach 5A Long-Term Remediation Monitoring Summary[1]

Remedial Element	Remediation Description	Remediation Performance Objective(s)	Proposed Monitoring	Note(s)
Main Channel Sediment Cap	Sediment removal and engineered capping of entire riverbed	Cap must reduce the flux of PCBs through the chemical isolation layer by 99% and have sufficient erosion protection to remain in place permanently (i.e., no significant loss of cap material).	• Physical monitoring of cap armor layer: – Comprehensive LiDAR survey of main channel bathymetry; traditional survey to be performed to verify LiDAR results if any significant areas of lower elevation are identified; – Probing and visual inspection to be performed if survey shows a decrease in elevation of the top of the erosion protection layer greater than six inches over either of the following:[a,b] • A contiguous area greater than 4,000 sf; or • A total area over a 200-foot length of river greater than 20% of the cap area in that segment of river; – Routine monitoring to be performed during post-construction Years 1, 3, 5, 10 and 15; additional monitoring beyond Year 15 TBD (monitoring to be performed in each of these years during period of low flow following spring high flow); and – Event-based monitoring to be performed after first occurrence of a threshold high-flow event (i.e., 10-year return frequency or higher based on flow measured at USGS Coltsville gage); subsequent event-based monitoring TBD based on results of first event. • Monitoring of effectiveness of chemical isolation layer: – No direct measurement of PCB concentrations within the chemical isolation layer; rather, surface water monitoring associated with evaluation of achievement of the Downstream Transport Performance Standard in the Revised Final Permit (described below) will be used to assess cap performance.[c]	[a] This criterion for assessing the results of probing and visual inspection is based on professional experience and adaptation of similar criteria applied at other sites (e.g., Grasse River, Hudson River, and Onondaga Lake) to Housatonic River Reach 5A. [b] The main channel sediment cap within Reach 5A will also include a separate habitat layer on top of the erosion protection layer. Some movement of this habitat material is expected and is thus not included as part of the physical monitoring of the cap. [c] As noted, cap performance will be evaluated based on assessment of achievement of the Downstream Transport Performance Standard. Direct measurement of PCB concentrations in the chemical isolation layer material may be proposed in the future (as a response action) if the Downstream Transport Performance Standard is not achieved.
Backwaters Outside Core Area 1 Habitat	Sediment removal and capping or backfill[2] to achieve an average PCB concentration of 1 mg/kg (surface and subsurface) in each backwater	In areas subject to capping, the cap must reduce the flux of PCBs through the Chemical Isolation Layer by 99% and have sufficient erosion protection to remain in place permanently (i.e., no significant loss of cap material).	<u>Cap Areas</u> • Physical monitoring: – Survey of cap elevation; – Visual inspection (including vegetation) to assess for erosion; – Sediment coring as a verification measure if survey shows a decrease in elevation greater than six inches over a total area of greater than 20% of the entire capped area of each backwater; and – Routine monitoring to be performed during post-construction Years 1, 3, 5, 10 and 15; additional monitoring beyond Year 15 TBD (monitoring to be performed in each of these years during period of low flow following spring high flow). • Monitoring of effectiveness of chemical isolation layer: – No direct measurement of PCB concentrations within the chemical isolation layer; rather, surface water monitoring to assess achievement of the Downstream Transport Performance Standard (described below) will be used to assess cap performance.[c] <u>Backfill Areas</u> • No physical or PCB monitoring[d]	[c] See note c above. [d] There is no proposed monitoring for PCBs in backfill material because PCBs in sediment remediation areas subject to backfill will have been removed to achieve a concentration less than 1 mg/kg. Physical monitoring is not needed in these areas because the backfill is being placed in low-energy (backwater) areas.

Table 1
Reach 5A Long-Term Remediation Monitoring Summary[1]

Remedial Element	Remediation Description	Remediation Performance Objective(s)	Proposed Monitoring	Note(s)
Backwaters Within Core Area 1 Habitat[3]	Sediment removal and capping in areas where PCB concentrations in surface sediments are greater than or equal to 50 mg/kg AC-based amendment placement in areas where PCB concentrations are between 1 and 50 mg/kg	In areas subject to capping, the cap must reduce the flux of PCBs through the Chemical Isolation Layer by 99% and have sufficient erosion protection to remain in place permanently (i.e., no significant loss of cap material). No performance standard is specified in the Revised Final Permit for areas subject to amendment; however, AC type and dose have been specified in the Final RD/RA Work Plan to achieve a reduction in sediment porewater PCB concentrations of 70% to 99%.	Cap Areas • Same monitoring as specified above for Backwaters Outside Core Area 1 Habitat AC Amendment Areas • None[e]	[e] There is no proposed monitoring for amendment areas because there is no specific Performance Standard for these areas in the Revised Final Permit.
Other Waterbodies (Intermittent Side Channel, West Pond, and Lower Sykes Brook	West Pond: Sediment removal and backfill to achieve an average PCB concentration of 1 mg/kg in surface and subsurface sediment Lower Sykes Brook: Sediment removal and engineered capping Intermittent Side Channel: Elimination of hydraulic connection to main river channel, and backfill	In areas subject to capping, the cap must reduce the flux of PCBs through the Chemical Isolation Layer by 99%, and have sufficient erosion protection to remain in place permanently (i.e., no significant loss of cap material).	Cap Areas • Same monitoring as specified above for the Main Channel Sediment Cap Backfill Areas • No physical or PCB monitoring[d] Intermittent Side Channel • Same physical monitoring specified below for riverbanks at the three locations where the hydraulic connection of this side channel to the main river channel will be eliminated by rebuilding the bank	[d] See note d above.
Riverbanks	Removal, stabilization, and restoration of erodible riverbanks	Removal and stabilization/restoration of erodible banks with total PCB concentrations greater than or equal to 5 mg/kg in the surficial one foot of soil	• Physical Monitoring: – LiDAR survey of all remediated/stabilized banks; – Visual inspection to be performed as a verification measure if LiDAR survey indicates any significant change in elevation of surveyed riverbanks over a significant area; – Routine monitoring to be performed during post-construction Years 1, 3, 5, 10 and 15; additional monitoring beyond Year 15 TBD (monitoring to be performed in each of these years during period of low flow following spring high flow); and – Event-based monitoring to be performed after specific high-flow event (i.e., 10-year return frequency or higher based on flow measured at USGS Coltsville gage).	
Floodplain Soil – Non-Residential Exposure Areas	Soil excavation (generally one foot, but three feet in Frequently Used Subareas) and backfill	Removal of soil to achieve Primary and Secondary Performance Standards for each Non-Residential Floodplain Exposure Area set forth in Tables 1 and 2 of the Revised Final Permit	None; not necessary	
Floodplain Soil – Residential Properties	Soil excavation (generally ranging from one to six feet in depth) and backfill	Removal (and backfill) of soil to achieve an average PCB concentration of 2 mg/kg in the top foot of soil and in the 1- to X-foot depth increment (where X equals the depth at which PCBs are detected at 2 mg/kg or greater, with no discrete PCB concentration in the top foot of soil exceeding 10 mg/kg for parcels exceeding 0.25 acre in size	None; not necessary	
Vernal Pools	Soil excavation/restoration or application of AC-based amendment (depending on results of pilot study)	Soil excavation to achieve a spatially weighted average total PCB concentration in each vernal pool of 3.3 mg/kg, or an equivalent reduction in PCB bioavailability for pools subject to amendment	Same as post-construction remediation monitoring of vernal pools described in GE's *Final Revised Vernal Pool Pilot Study Work Plan*. (This monitoring may be revised, in consultation with EPA, following completion of the pilot study monitoring.)	Only one non-pilot study vernal pool (5A-VP-13) is being advanced in the Final RD/RA Work Plan; remediation in this one pool is soil excavation/restoration.

Table 1
Reach 5A Long-Term Remediation Monitoring Summary[1]

Remedial Element	Remediation Description	Remediation Performance Objective(s)	Proposed Monitoring	Note(s)
Downstream Transport Performance Standard	Site-Wide Performance Standard	Remediation to achieve Revised Final Permit criteria for future allowable average annual PCB load (kg/year) passing Woods Pond Dam and Rising Pond Dam	None specifically for Reach 5A	• Monitoring for compliance with the load standard at Woods Pond Dam will not be performed until completion of remediation in all of Reaches 5 and 6. • Monitoring for compliance with the load standard at Rising Pond Dam will not be performed until completion of remediation in all of Reaches 5 through 8.
Biota Performance Standards	Site-Wide Performance Standards	Remediation to achieve both short-term and long-term biota standards: • Short-Term: An average total PCB concentration of 1.5 mg/kg wet weight, skin off, in fish fillets in each reach of the river and backwaters.[4] This standard is to be achieved within 15 years of completion of construction-related activities in each reach. An exceedance of this standard would occur in the event that the standard is exceeded in any two consecutive monitoring periods after the 15-year period. • Long-Term: Continue to monitor (even after the Short-Term Biota Performance Standard has been attained) the expected reduction in biota PCB concentrations and the progress toward achieving average total PCB concentrations of 0.064 mg/kg wet weight, skin off, in fish fillets in each reach of the river and associated backwaters in Massachusetts;[5] 0.00018 mg/kg wet weight, skin off, in fish fillets in each reach of the river in Connecticut;[6] and 0.075 mg/kg in duck breast tissue in all areas along the river.[7]	Post-construction collection of adult fish in Reach 5A only; sampling design generally consistent with adult fish collection performed during Baseline Monitoring Program: • Species: largemouth bass, yellow perch, white sucker • Target 20 fish (fillets) per species • PCB and lipid analysis Fish collection to be performed during post-construction Years 3, 6, 9, 12, and 15 to monitor progress toward achievement of short-term standard; frequency of sampling beyond Year 15 is TBD.	• It was difficult to obtain the target number of adult fish (20) in Reach 5A in a single year during baseline monitoring. Therefore, post-construction fish collection will be performed as follows: – For Years 3, 6, 9, and 12, a reasonable level of effort will be expended to collect as many fish as possible (up to 20) in a single year. – For Year 15, sampling may be conducted over more than one consecutive year if necessary to obtain the target number of fish. • Duck sampling will not be performed until after completion of all remedial activities.

Notes:

Anchor QEA, AECOM, and Arcadis, 2021. *Final Revised Rest of River Statement of Work*. Housatonic River – Rest of River. Prepared for General Electric Company, Pittsfield, Massachusetts. September 2021.

Arcadis and AECOM, 2024. *Revised Restoration Performance Objectives and Evaluation Criteria Report*. Prepared for General Electric Company, Pittsfield, Massachusetts. April 2024.

1. This table is limited to long-term monitoring to assess remediation objectives. Long-term monitoring and assessment of post-restoration conditions of restored habitats are discussed in GE's Reach 5A Restoration Plan based on the approved *Revised Restoration Performance Objectives and Evaluation Criteria Report* (Arcadis and AECOM 2024), and therefore have not been included in this table. It is anticipated that both of these monitoring programs will be described in the actual Inspection, Monitoring, and Maintenance Plan for Reach 5A in accordance with the *Final Revised Rest of River Statement of Work* (Anchor QEA et al. 2021).
2. Backwaters BW5A-2, -4, and -5 will be capped and backwaters BW5A-3 and 6 will be backfilled.
3. The only backwater within Reach 5A located within Core Area 1 habitat is BW5A-1.
4. This criterion was based on the estimate, in EPA's probabilistic risk assessment of fish consumption by humans, of the PCB concentration corresponding to a non-cancer HI of 1 for the Central Tendency Exposure of adults to PCBs in fish fillets.
5. This criterion was based on the estimate, in EPA's probabilistic risk assessment of fish consumption by humans, of the PCB concentration associated with an excess cancer risk of 1×10-5 for the RME of both young children and adults to PCBs in fish fillets.
6. This criterion was developed by the State of Connecticut.
7. This criterion was based on the estimate, in EPA's probabilistic risk assessment of waterfowl consumption by humans, of the PCB concentration associated with an excess cancer risk of 1×10-5 for the RME exposure of both young children and adults to PCBs in duck breast consumed.

AC: activated carbon
EPA: U.S. Environmental Protection Agency
Final RD/RA Work Plan: *Final Remedial Design/Remedial Action Work Plan for Reach 5A*
HI: hazard index
kg/year: kilogram per year
LiDAR: light detection and ranging
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl
Revised Final Permit: Revised Final Resource Conservation and Recovery Act Permit Modification
RME: Reasonable Maximum Exposure
sf: square feet
TBD: to be determined
USGS: U.S. Geological Survey