External Comments on GE's *Pre-Design Investigation Work Plan for Reach 5A Banks and Sediments* dated September 27, 2021

U.S. Environmental Protection Agency, Region 1

GE-Pittsfield/Housatonic River Site

Rest of River

HOUSATONIC REST OF RIVER MUNICIPAL COMMITTEE

November 18, 2021

Dean Tagliaferro, EPA Project Manager
GE-Pittsfield/Housatonic River Site
Boston, MA
Submitted via email to R1Housatonic@epa.gov

Re: Comments on the *Pre-Design Investigation Work Plan for Reach 5A Sediment and Riverbanks*

Dear Mr. Tagliaferro:

The Housatonic Rest of River Municipal Committee (the Committee) respectfully submits the following comments on the *Pre-Design Investigation Work Plan for Reach 5A Sediment and* Riverbanks (hereafter referred to as the Work Plan).

In order to design upcoming remedial action efforts, the entire amount of sediment and bank that will require removal and capping must be quantified. This may require sampling depths greater than 3 feet for sediment and greater than 1 foot for riverbank. Proper disposal of the removed sediments requires analysis of their PCB content. In accordance with the December 2020 Rest of River Revised Final Permit, sediments with high PCB concentrations are to be disposed of out of state while remaining sediment that averages 25 milligrams per kilogram (mg/kg) or less of PCBs will be disposed of in the Upland Disposal Facility.

As such, the entire sediment and bank soils volume needs to be analyzed for PCB content and a sampling plan for characterizing the disposal material needs to be included. These are not included in the proposed Work Plan.

While the current Work Plan proposal limits sediment probing and PCB sampling to a depth of 3 feet, historical information has identified PCB contamination below this level. Data Quality Objective #6 and portions of subsections 3.3.1 and 3.3.2 mention riverbank soil and sediment disposal requirements, but the Work Plan document does not clearly define how these media will be analyzed for disposal method selection.

The Committee requests additional information about how sediment below 3 feet will be characterized, and to review, and comment upon, as needed, the sampling plan that will be put in place in the proposed Work Plan to ensure both riverbank soil and sediment concentrations disposed of in the Upland Disposal Facility do not exceed an average PCB concentration of 25 mg/kg.

The Committee's comments on the *Pre-Design Investigation Work Plan for Reach 5A Sediment and Riverbanks* are enclosed as Attachment A.

Sincerely,

The Housatonic Rest of River Municipal Committee

Enclosure: Attachment A - Housatonic Rest of River Municipal Committee Comments on GE's Pre-Design Investigation Work Plan for Reach 5A Sediment and Riverbanks

Enclosure: Attachment B - Technical Assistance Services for Communities Comments, October 29, 2021

ATTACHMENT A
HOUSATONIC REST OF RIVER MUNICIPAL COMMITTEE
Comments on GE's *Pre-Design Investigation Work Plan for Reach 5A Sediment and Riverbanks*
GE/Housatonic River - Rest of River

In general, the field sampling approach presents a well-founded step-wise approach for sediment sampling by proposing to first conduct sediment probing to define the depth of sediment. However, the proposed sampling depth parameters are not adequate to identify high concentrations of PCBs that could be buried in sediment and bank. Sampling cores must be of sufficient depth to identify areas where high concentrations of PCBs have settled and may be exposed following excavation, to support design of the engineered cap, to properly delineate the boundaries of these areas, and to plan for removal and disposal of these areas.

As we read the 2020 Rest of River Revised Final Permit (the Permit) and the Settlement Agreement, we do not see any language that restricts sampling and excavation of river sediment to three feet in Reach 5A, nor any that precludes EPA from requiring GE to identify and, if necessary, to conduct deeper sampling and excavation of riverbank in 5A.

EPA has stated that banks are a significant source of ongoing PCB redistribution in the river system. Footnote 9 on page 21 of the Permit expressly gives EPA latitude to require more bank removal "if the new data to be collected identifies the need for greater bank excavation." All cleanup actions and disposal will be dependent on collecting accurate and thorough sediment and bank soil samples; therefore, it is very important to the Committee that the work achieves the highest possible standards for accomplishing these goals.

The Rest of River Committee highlights the following Sections:

1. Section 1 (pp 1-4) – includes a subsection defining riverbanks, but does not include a definition of sediments. We request and recommend adding a subsection to define sediments similar to 1.4 Definition of Riverbanks.

2. Section 3.1 (pp 7-8) – includes data quality objectives (DQOs) proposed for the pre-design investigation activities. We request and recommend adding DQOs for the riverbed sediments that outline the specific required core sampling procedures and the performance standards required for main channel sediment characterization.

   Reach 5A riverbed main channel sediments are a focus of future remedial decision making; however, the characterization of the main channel sediments is not a distinct DQO. Riverbed sediments must be clearly defined, and the Work Plan should include a distinct DQO to achieve during the proposed work. At a minimum, the Work Plan should include a DQO that quantifies the riverbed sediment volume with the use of the proposed sediment

probing data, such as “provide updated survey, basemap and sediment core information to support the definition and delineation of riverbed sediments”.

Likewise, the Work Plan should include a sediment sample PCB sampling DQO that defines volumes of PCB sediment to be removed since disposal of the contaminated sediment is defined by PCB concentration. The requested and recommended DQO could state: “characterize riverbed sediment PCB concentrations (starting from surface to a depth of sediment probe refusal) to assess the extent of removal and capping required to achieve the riverbed sediment performance standard”.

3. Section 3.2.3 (pp 9-10) – describes the approach for the sediment probing field studies. As currently written, the probing will be conducted in advance of sediment sample collection. The results of the probing analysis will help define the samples to be collected for PCB analysis. However, it is not clear in the document if EPA will be given the chance to review the selection of sample locations prior to the sampling field event. We request and recommend that EPA assert within its conditional approval its right to review and approve the selection of sediment PCB sample locations prior to the sampling being conducted. EPA’s review and approval are required as the analysis results are integral to the final estimation of sediments to be removed and capped.

4. Section 3.2.6 (p 14) – proposes a limited number of locations to be measured for velocity during three flow periods (low, moderate and high) to support the development of a hydraulic model. It is recommended EPA require that water velocity measurements bracket the entire reach (be located at the beginning and end of the each) and bracket possible sources and losses of surface water and groundwater.

   The proposed work described in the Work Plan presents three velocity measurement locations chosen primarily due to ease of access. It does not include a velocity sampling location above Reach 5A. In addition, as currently defined, the spatial dispersion of the locations may miss possible surface water sources (West Pond, Moorewood Lake outlet, Sackett and Sykes Brooks, groundwater) or water loss (the intermittent side channel, backwater areas, vernal pools). EPA should consider requiring field study locations that are more spatially diverse and inclusive of surface water sources to provide a more complete and accurate model of fluid mechanics.

5. Section 3.3 (pp 14-26) – EPA should ensure that the sampling and analysis phase of this proposed Work Plan includes sufficient sampling to characterize riverbed sediments and riverbank soils in potentially high exposure portions of the reach. EPA should review, and include changes as needed, to the final sediment/bank sampling approach that is designed from the results of the sediment probing and bank erodibility assessments. The EPA must also determine if the resultant sampling approach will address Exposure Area 27 future

exposure considerations. (See Attachment B - Technical Assistance Services for Communities Comments, October 29, 2021, pp 12-13)

6. Section 3.3.1 (pp 14-15) – indicates that there will be a total of 5,961 samples taken. However, it is important to consider that subsurface riverbank soil contamination may have occurred on both sides of the river as well as subsurface. With 1,987 transects, 6 samples per transect for both sides of the river should equal 11,922 samples, not 5,961. In addition, each sample collected should be discrete (and not composited) so that hotspots can be identified and adequate data is collected to ensure contaminated soil is disposed of in the proper location based on PCB concentration. Lastly, it is important to ensure that removal of surface riverbank soil does not expose contamination present at depth without addressing such found contamination.

   We request and recommend EPA evaluate whether the proposed riverbank soil sampling will capture both sides of the river within a given transect and that each sample collected be required to be a discrete sample (rather than composited for an average). Additionally, EPA should evaluate whether subsurface riverbank materials have ever demonstrated elevated PCB concentrations of potential concern and require subsurface riverbank soil PCB sampling at subsurface levels (> 12 inches) in highly erosive riverbank settings. These recommended changes to the Work Plan are important to identify hot spots, ensure adequate sampling is collected for future disposal decisions, and ensure riverbank soil removal does not expose contaminated soil without properly addressing such exposures.

   Section II.B.2.a.(2)(c) of the Revised Final Permit provides that for Reach 5A banks that do not require remediation based on the criteria described, 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, consider supplemental riverbank removal and propose any further action consistent with its evaluation.

   However, this Section of the Work Plan does not contain sufficient information to describe how GE will conduct such an evaluation or how such a determination will be made with regard to supplemental riverbank removal. Surficial (0-to 12-inch) riverbank soil samples alone do not provide adequate PCB data to determine the likelihood of future downstream transport and at probable concentration levels, should such banks erode. Further, it is important to carefully evaluate potentially or currently erodible banks containing elevated PCB concentrations that are upstream of important habitats (such as backwater areas, vernal pools and core area habitats) to determine, monitor and eliminate future scour of contaminated riverbank materials that may cause deposition or recontamination of these important habitat areas. The Committee requests and recommends EPA reserve its right to review the results of the riverbank soils PCB analysis upgradient of these important features

to ensure future erosion of the banks will not be a source of PCB deposition or recontamination.

7. Section 3.3.2 (pp 15-18) –describes sediment samples to be collected in the main channel and six backwaters within Reach 5A. These samples will be used to: (1) support assessment of on-site versus off-site disposal requirements for sediments removed from these areas (DQO 6); (2) assess the extent of removal and capping or backfill required to achieve an average post-remediation concentration of 1 mg/kg in the backwaters (DQO 7); and (3) support design of the engineered cap placed in these areas (DQO 8).

   The proposed work described in the Work Plan includes collecting sediment cores to a total depth of three feet (or less depending on sediment thickness). However, Section 2.1 of the Work Plan (p 5) states that surface sediment (0-to 6-inch) PCB concentrations within Reach 5A ranged from non-detect to 290 mg/kg and previous investigations show that average PCB concentrations in Reach 5A generally increase with depth down to four feet, and then decrease considerably for depths below four feet. Attachment E of the Permit states that "vertical sediment cores will be of sufficient depth to characterize sediment PCB concentrations throughout the full vertical interval required to comply with the Performance Standards for each reach, subreach and backwater under the 2016 Permit or Revised Permit" (Item 5, first bullet, Page E-3 [pdf 142]). In line with this requirement, the proposed sediment core sampling of riverbed and backwater sediments to a total depth of 3 feet or less, is not consistent with the Permit. In addition, core sampling at a depth to 4 feet would be necessary to characterize PCBs in sediment which will remain post excavation and to support the design of the engineered cap in these areas (DQO 8).

8. Section 3.3.2.2. (pp 16-17) – proposes to collect surface (0-1 foot) and subsurface (1-up to 5 feet) sediment in backwaters using a 50-foot grid system. GE has proposed that averaging areas for these areas in Reach 5A be at the scale of an individual backwater. Two of these backwaters are larger than 1 acre is size, and the Committee questions if these areas are too large for averaging. It is also unspecified how such spatial averaging will be completed. The modified permit states (in regards to backwaters, subparagraph (a) page 27 of the document [pdf page 32]) "the Permittee shall propose in a Pre-Design Work Plan, additional sampling for PCBs in sediment, and a method for averaging surface and subsurface PCB concentrations using a 50-foot grid, including proposed averaging areas and depth intervals". The Work Plan does not clearly describe the averaging method to be applied to all parameters. As such, the Committee recommends EPA require such information be included in the Work Plan.

9. Section 3.3.3 (pp 19-20) - describes the proposed porewater PCB sampling that will measure groundwater seepage rates and estimate dissolved-phase PCB mass flux under current conditions. Certain concerns were raised from the review of the proposed strategy, as

outlined in Attachment B - Technical Assistance Services for Communities Comments, October 29, 2021 (pp 9-10).

EPA should require explanations of the discrepancies identified in order to understand the porewater sampling approach presented in the document and correct any discrepancies if necessary.

10. Section 3.3.2.3 (pp 17-18) - describes the approach for "Other Waterbodies in Reach 5A Containing Sediment". Several data gaps of concern were noted in Attachment B - Technical Assistance Services for Communities Comments, October 29, 2021 (pp 12).

    EPA should require that the recommended sediment sampling identified in Attachment B - Technical Assistance Services for Communities Comments, October 29, 2021 (pp 12) be added to the sampling strategies for the "other waterbodies in Reach 5A".

11. Section 3.3.3 (pp 19-20) – The approach to the proposed sediment porewater sampling involves the collection of bulk sediment samples gathered from 1-to-3-foot subsurface. Similar to the concerns previously identified, the limited depth of 3 feet may not characterize the total depth of contaminated sediments.

    EPA should evaluate whether the proposed porewater PCB sampling depth from 1-to-3 feet is sufficient to capture the entire profile of contaminated sediments and consider requiring a PCB sampling depth to 4 feet and correct any deficiencies.

12. The Permit requires the Permittee to describe the methods behind spatial-averaging, and Attachment E of the Permit discusses volume-weighted and depth-weighted averaging. However, the Work Plan does not describe the methods used to define how spatial, depth, and volume derived averages are to be developed. The methods employed to characterize sediment and soil prior to final disposal should be included in the Work Plan.

13. The proposed sampling program calls for thousands of samples, some of which call for discrete 6" depth intervals. The PDI does not describe how GE will maintain the integrity of samples taken at these small depth increments throughout the entire collection, recording and packaging processes. The SOP for Soil Sample Collection and Handling, Rev. 2 Rev. September 2021 (found in Appendix C of the PDI), also does not outline in sufficient detail how sediment cores will be collected, handled, packaged, and labeled for analysis. Such procedures need to be described for all aspects of the collection, recording, and packing and retention process to avoid errors.

ATTACHMENT B

Technical Assistance Services *for* Communities
Comments on GE-Pittsfield/Housatonic River Site Pre-Design Investigation Work Plan for Reach 5A Sediment and Riverbanks October 29, 2021

Contract No.: EP-W-13-015
Task Order No.: 68HE0S18F0209: OSRTI – Multi Regions & Headquarters Support
Technical Directive No.: R1 2.4.3 GE Pittsfield

Technical Assistance Services for Communities (TASC)
Comments on GE-Pittsfield/Housatonic River Site
Pre-Design Investigation Work Plan for Reach 5A
Sediment and Riverbanks, September 2021

Introduction

This document provides TASC comments on the GE-Pittsfield/Housatonic River Site Pre-Design Investigation Work Plan for Reach 5A Sediment and Riverbanks, September 2021 (Sediment and Riverbanks PDI Work Plan). This document is for the city of Pittsfield, the Berkshire Regional Planning Commission (BRPC) and municipalities to use as they develop comments to share with EPA. TASC does not make comments directly to EPA on behalf of communities. This document is funded by the U.S. Environmental Protection Agency's (EPA's) Technical Assistance Services for Communities (TASC) program. The contents do not necessarily reflect the policies, actions or positions of EPA.

Pursuant to the Revised Resource Conservation and Recovery Act (RCRA) Permit Modification (Revised Final Permit) issued by EPA to the General Electric Company (GE) on December 16, 2020, for the Rest of River portion of the GE-Pittsfield/Housatonic River site, GE is required to prepare pre-design investigation work plans for the collection of pre-design data to be used to support the remedial activities in the Rest of River. GE has prepared two PDI work plans for Reach 5A covering floodplain PDI activities – one for residential floodplain properties and another for non-residential floodplain areas. This third work plan describes PDI activities for sediment and riverbanks.

Summary

The September 2021 Sediment and Riverbanks PDI Work Plan has five sections:

- Introduction
- Summary of Prior Reach 5A Sediment and Riverbank Soil Investigations and Field Surveys
- Pre-Design Investigation Activities
- Schedule and Reporting
- References

Table 1 shows a summary of pre-design investigation activities. It is adapted from Table 3-4 of the Sediment and Riverbanks PDI Work Plan. Work described in the work plan includes both field surveys and sampling and analysis.

Results from the light detection and ranging (LiDAR) (topographic and bathymetric) surveys will be used to develop more specific target riverbank soil sampling locations. The sediment probing survey will be used to inform the sediment sampling. GE proposes to start those surveys within 45 days after EPA approval of the Sediment and Riverbanks PDI Work Plan, subject to weather constraints and the timing of EPA approval. The LiDAR survey is best performed during low-flow, leaf-off conditions, so approval for that portion of the work plan would be needed by early 2022 to conduct that survey in early spring of that year. After completion of those surveys, GE will provide specific target coordinates for riverbank soil sampling locations for EPA review and approval within 30 days of receipt of the processed LiDAR information from the survey contractor. GE will initiate riverbank soil and sediment sampling for polychlorinated biphenyls (PCBs) and the remaining survey activities described in the work plan within 45 days after EPA approval of the riverbank soil sampling locations.

Planned Action	**Timeframe**
GE starts LiDAR field surveys	Within 45 days after EPA approval of the Sediment and Riverbanks PDI Work Plan, , subject to weather constraints and the timing of EPA approval
GE provides specific target coordinates for riverbank soil sampling locations for EPA review and approval	After completion of surveys
EPA approves specific target coordinates for riverbank soil sampling locations	Within 30 days of receipt of the processed LiDAR information
GE initiates riverbank soil and sediment sampling for PCBs and the remaining survey activities described in the work plan	Within 45 days after EPA approval of the riverbank soil sampling locations

Table 1: Summary of Pre-Design Investigation Activities

Program	Survey / Sampling [text in Work Plan]	Description	Sampling Details
Field Surveys	Topographic Survey (pdf page 15)	LiDAR[a] survey of the entire Primary Study Area (PSA), from the Confluence to Woods Pond Dam, including the river channel, riverbanks, approximate 100-year floodplain and nearby infrastructure.	Not applicable (example shown in Figure 3-1).
	Bathymetric Survey (pdf page 16)	Conventional survey of PSA main channel with cross-sections every 100 feet along the centerline of the river. Includes evaluation of feasibility of supplementing conventional bathymetric transect survey using topobathymetric LiDAR.	Cross-section every 100 feet (locations shown on Figures 3-2a through 3-2i of the work plan).
	Sediment Probing (pdf page 16)	Probing on transects within Reach 5A spaced 250 feet apart with three probe locations per transect (left, center and right) to characterize sediment thickness and general sediment texture in support of sediment sampling activities and remedial design. The objective is to map the presence or absence of sediment deposits in the river channel and determine the likelihood of obtaining the desired sediment sample collection depth at the target sampling locations.	Total of 98 transects and 294 discrete probing locations (locations shown on Figures 3-2a through 3-2i of the work plan).
	Bank Erodibility Assessment (pdf page 17)	Visual observations and field measurements of the bank erosion hazard index (BEHI)/near bank stress (NBS) methods.	Banks will be divided into segments and inventoried based on the changes of physical bank characteristics and the applied shear stress.
	Shoreline Structures and Utility Surveys (pdf page 20)	Utility clearance via Massachusetts Dig Safe, and field reconnaissance of in-river or shoreline structures and utilities. Active outreach will be conducted during the PDI with local city building departments and county and state transportation agencies regarding the presence of utilities and structures that could affect the PDI, remedy implementation, worker safety and/or utility integrity.	The presence and locations of observed in-river or shoreline structures and utilities will be documented during field reconnaissance activities.
	Water Surface Elevation and Current Velocity (pdf page 21)	Measurement of current velocity and water surface elevation at six locations across the PSA (three in Reach 5A, one in Reach 5B, two in Reach 5C) during low and moderate flow conditions. Measurements at high flow conditions will be taken only at bridge locations.	Locations in Reach 5A (Holmes Road bridge, adjacent to Joseph Drive, and near Pittsfield Wastewater Treatment Plant). Locations in Reach 5C (South of Roaring Brook and Woods Pond Headwaters near Woodland Road) (locations shown on Figure 3-4).
Sampling and Analysis	Riverbank Soil PCBs (pdf page 21)	Collection of surficial (0-to-12-inch) riverbank soil samples at toe, midpoint and top-of-bank along transects spaced 25 feet apart to characterize the extent of riverbank soils with PCB concentrations greater than 5 milligrams per kilogram (mg/kg) in the top 1 foot of soil	Total of 1,987 transects (considering both riverbanks) and 5,961 discrete riverbank soil sampling locations composited into 1,987 PCB analyses.

Program	Survey / Sampling [text in Work Plan]	Description	Sampling Details
		and to support assessment of on-site versus off-site disposal requirements. Compositing the three samples collected at each transect location for PCB analysis.	
	Sediment PCBs in Main Channel (pdf page 23)	Collection of three sediment cores on transects (i.e., a core located to the left, center and right of the channel at each transect), with transects spaced 250 linear feet apart. Cores to be collected to a total depth of 3 feet and processed in 6-inch intervals, with analysis for PCBs and total organic carbon (TOC).	Total of 98 transects and 294 discrete samples. If sediment probing indicates that total sediment thickness is less than 6 inches, a single grab sample will be collected at that location.
	Sediment PCBs in Backwaters (pdf page 23)	Collection of sediment cores on a 50-foot grid. Within Core Area 1 habitat, a single interval to be collected to a depth of 1 foot for PCB and TOC analyses. Outside of Core Area 1 habitat, cores to be collected to a total depth of 5 feet and segmented into a 0-to-1-foot interval and 6-inch intervals between 1 and 5 feet, with analysis of the samples collected from the top 3 feet for PCBs and TOC and samples from 3 to 5 feet to be archived for potential future analysis.	Total of 127 core locations (shown on Figures 3-5a through 3-5e of the work plan). Core Area 1 includes 51 samples. Outside Core Area 1, samples in the top 3 feet will be analyzed for PCBs (380 samples). Samples collected from lower depths will be held for potential future analysis if the depth of PCB contamination in a core is found to be greater than 3 feet (304 additional samples).
	Sediment PCBs in Other Waterbodies (pdf page 24)	Collection of sediment cores in five waterbodies (outlet from Morewood Lake, portions of Sackett Brook and Sykes Brook, West Pond, and an intermittently flowing side channel located east of the Confluence), to be collected in 6-inch intervals to a maximum depth of 2 or 3 feet, as indicated in text, with analysis for PCBs (and potentially TOC).	Outlet from Morewood Lake: five locations, spaced about 100 feet apart in 6-inch intervals to a maximum depth of 2 feet (less if less than 2 feet of sediment is present) (proposed sample locations shown on Figure 3-6a). Portions of Sackett Brook and Sykes Brook: sample accumulated sediments where they intersect the Housatonic River to the point where they first intersect the wetland. Beyond that point, streams will be characterized as boatable floodplain. Samples collected at 12 locations spaced about 100 feet apart (proposed sample locations are shown on Figure 3-6b).

Program	Survey / Sampling [text in Work Plan]	Description	Sampling Details
			West Pond: cores collected on a 50-foot grid and segmented in 6-inch intervals to a maximum depth of 3 feet (proposed sample locations are shown on Figure 3-6c). Intermittently Flowing Site Channel Located East of Confluence: 10 locations, spaced about 100 feet apart, in 6-inch intervals to a maximum depth of 2 feet (or less if less than 2 feet of sediment is present) (proposed sample locations are shown on Figure 3-6d).
	Porewater PCBs (pdf page 26)	Collection of bulk sediment samples at 20 locations for *ex situ* analysis of freely dissolved PCBs in sediment porewater using solid-phase microextraction (SPME) passive samplers. This data will be used to inform the design of the engineered cap isolation layer in the Reach 5A main channel and backwaters.	Bulk sediments from the 1-to-3-foot depth interval at 20 locations will be homogenized. A portion will be used for ex-situ porewater analysis. The remaining portion will be sent to the analytical laboratory for analysis of PCBs as well as for analysis of total and dissolved organic carbon (locations are shown on Figure 3-7).
	Groundwater Seepage (pdf page 27)	Measurement of hydraulic head using piezometers installed at 10 locations in Reach 5A, and measurement of vertical hydraulic conductivity using sediment cores collected at the same locations as piezometers. This is required to support the design of the engineered cap isolation layer in the Reach 5A main channel and backwaters.	Hydraulic head measured beneath the river at 10 selected locations shown on Figure 3-7. A piezometer will be installed into the sediment to a depth of 6 feet. Hydraulic conductivity will be measured from sediment cores collected where piezometers are installed.
	Geotechnical (pdf page 28)	Collection of geotechnical characterization data, including various soil/sediment properties (moisture, particle size distribution, Atterberg limits, bulk density, and specific gravity), vane shear testing, SIC testing, CPT [cone-penetrating testing]/FFP [full-flow penetration] testing, and geotechnical borings for visual classification and geotechnical laboratory testing. This data will support the remedial design and provide information about the strength and compressibility of the sediment to be removed and capped, and the stability of	Phase 1 testing will be performed in conjunction with the PCB characterization sampling and will include: • 450 samples for moisture content.

Program	Survey / Sampling [text in Work Plan]	Description	Sampling Details
		the riverbank that will be subject to soil excavation and reconstruction. The geotechnical investigation will be conducted using a phased, adaptive approach, in which data gathered during initial phases will be used to inform or adjust the scope of the subsequent phases of the investigation. There are four planned phases: • Phase 1: Analysis of geotechnical parameters conducted during the PDI on samples collected in conjunction with the sediment and riverbank soil PCB characterization sampling. • Phase 2: CPT and FFP testing to provide data on the subsurface soil stratigraphy and strength over the general areas where capping and removal will occur. • Phase 3: Geotechnical borings, as necessary, at locations to provide additional data on the stratigraphy, consistency, and geotechnical properties in specific areas of the river identified phased on the Phase 2 CPT investigation. • Phase 4: Additional location specific geotechnical investigations that may be implemented, if needed, following completion of the PDI and submission of the Conceptual Remedial Design/Remedial Action Work Plan, based on conditions encountered as part of the PDI and to address data gaps identified during development of the Conceptual Remedial Design/Remedial Action Work Plan.	• 450 samples for particle size. • Samples for Atterberg limits – to be determined • 90 samples for bulk density. • 30 samples for specific gravity. The number of samples to be analyzed for Atterberg limits will depend on the amount of fine-grained sediment/soils encountered. Phase 2 will include cone penetration test and full flow penetration (CPT and FFP) testing at 21 locations shown in figures 3-9 (main channel) and figures 3-8a through 3-8e (backwaters). Phase 3: the need to perform riverbank geotechnical characterization will be determined after the extent of riverbank remediation is determined. Phase 4: would involve more location-specific investigations, if warranted. It is not part of the pre-design investigation.

Notes:

a. LiDAR is a method that uses light to measure distance to the land surface to generate relatively precise, three-dimensional information about land surface characteristics. The sensor will be mounted in a small airplane – or possibly an unmanned aerial system. A topographic LiDAR survey typically uses a near-infrared laser to map the land surface, and a bathymetric LiDAR survey uses water-penetrating green light to measure riverbed elevations. A focused survey of the riverbanks will be conducted, as needed, using a mobile LiDAR system mounted to a shallow draft boat or held manually by staff wearing waders in areas of shallower water.

TASC Comments

Results of the TASC review indicate that the Sediment and Riverbanks PDI Work Plan provides a fairly thorough proposed sampling plan to characterize PCBs in riverbed sediment and riverbank soils. Gaps specifically related to the Performance Standards set forth for Reach 5A riverbed sediment were identified.

TASC comments below focus on potential additional sampling needs to comprehensively characterize PCB contamination in riverbed sediments and riverbank soils.

1. In order to design upcoming remedial action efforts, it is important to quantify the entire amount (including depths greater than 3 feet) of sediment that will require removal and capping. Proper disposal of the removed sediments requires analysis of PCB content. Sediments with high concentrations are to be disposed of out of state while remaining sediment that averages 25 milligrams per kilogram (mg/kg) or less will be disposed of in the Upland Disposal Facility. The entire sediment volume needs to be analyzed for PCB content and a sampling plan for characterizing the disposal material needs to be included. The current work plan proposal limits sediment probing and PCB sampling to a depth of 3 feet. Historical information has identified PCB contamination below this level. Data Quality Objective #6 and portions of subsections 3.3.1 and 3.3.2 mention riverbank soil and sediment disposal requirements, but the document does not clearly define how these media will be analyzed for disposal method selection. *The community may want to request information about how sediment below 3 feet will be characterized, and may want to request to see and understand the sampling plan that will be put in place to ensure both riverbank soil and sediment concentrations disposed of in the Upland Disposal Facility do not exceed an average PCB concentration of 25 mg/kg.*

2. Section 3.1 of the Sediment and Riverbanks PDI Work Plan includes data quality objectives (DQOs) proposed for the pre-design investigation activities. Reach 5A riverbed main channel sediments are a focus of future remedial decision making – although the characterization of the main channel sediments is not a distinct DQO. It is important that riverbed sediments are clearly defined, and that the work plan develop a distinct DQO to achieve during the proposed work. At a minimum, it would be helpful to include a DQO that quantifies the riverbed sediment volume with the use of the proposed sediment probing data. For instance, a DQO that states "provide updated survey, basemap and sediment core information to support the definition and delineation of river bed sediments" would be appropriate. It could also be helpful to include a sediment sample PCB sampling DQO that defines volumes of PCB sediment to be removed since disposal of the contaminated sediment is defined by PCB concentration. An example could be: "characterize riverbed sediment PCB concentrations (starting from surface to a depth of sediment probe refusal) to assess the extent of removal and capping required to achieve the riverbed sediment performance standard." Additionally, since "all sediments" in the riverbed are targeted for removal and capping, it could be helpful to clearly define sediments. For example, GE might consider adding a subsection to Section 1 that provides a 'Definition of River Bed Sediments'). *The community may want to ask EPA if DQOs could be added for the riverbed sediments that outlines the core sampling*

procedures necessary and the performance standard required for main channel sediment characterization.

3. The nature and extent of riverbed sediments is dependent upon the Reach 5A channel morphology. As stated in the PDI Work Plan, Reach 5A meanders substantially, which creates different flow pathways. These differing flow pathways will affect the location of riverbed sediments and riverbank soils. Therefore, it is important to define the channel completely using morphologic features during all flow regimes. It is unclear in this document as to how the river channel was defined. *The community may want to ask for the work plan to be revised to provide clear definitions of key features such as riverbed sediments and riverbanks.*

4. As noted in the Sediment and Riverbanks PDI Work Plan, Reach 5A "contains numerous meanders" (Section 1.2, second paragraph, second sentence, pdf page 8), indicating that the flows within Reach 5A are very dynamic. This will affect the position of riverbed sediments and riverbank soils. It is unclear as to how varying flow-condition defined materials will be addressed when key field measures such as the proposed LiDAR will focus on low flow. It seems important to measure the "worst case" conditions of both media by capturing flow conditions that yield the highest amount of each of these materials. *The community may want to ask if river sediment bed and riverbank soils media are defined by flow condition.*

5. The Sediment and Riverbanks PDI Work Plan indicates the future use of a hydraulic model (DQO. 2, pdf page 14, and Section 3.2.6, pdf page 21) as a design support tool in evaluations of cap armor layer design, flood storage capacity and riverbank stabilization. Hydraulic models are as effective and accurate as the data that is applied to the model, which are typically based on measures of flow (velocity). The work described in the work plan proposes a limited number of locations to be measured for velocity during three flow periods (low, moderate and high). If Reach 5A is to be modeled, TASC recommends water velocity measures that:
    a. Bracket the entire reach (be located at the beginning and end of the each).
    b. Bracket possible sources and losses of surface water and groundwater.

    The proposed work described in the work plan presents three velocity measurement locations chosen primarily due to access. It does not include a velocity sampling location above Reach 5A. In addition, the spatial dispersion of the locations may miss possible surface water sources (West Pond, Moorewood Lake outlet, Sackett and Sykes Brooks, groundwater) or water loss (the intermittent side channel, backwater areas, vernal pools). *The community may want to ask if the proposed field study locations are sufficient to provide information necessary for the hydraulic modeling, or if field study locations that are more spatially diverse and inclusive of surface water sources would provide a more complete and accurate model of fluid mechanics.*

6. Section 1.3 provides a summary of applicable requirements that states that "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, consider

supplemental riverbank removal and propose any further action consistent with its evaluation" (second paragraph, last sentence, pdf page 9). Since GE is willing to consider additional further action, it could be valuable to carefully evaluate erodible banks with elevated PCB concentrations that are upstream of important habitats (such as backwater areas, vernal pools and core area habitats) to eliminate future scour of contaminated riverbank materials that may cause deposition or recontamination of these important habitat areas. *The community may want to ask if EPA plans to review the results of the riverbank soils PCB analysis upgradient of these important features to be sure future erosion of the banks does not cause potential PCB deposition of concern.*

7. The Sediment and Riverbanks PDI Work Plan addresses the collection of pre-design data to be used to support the remedial activities in the Rest of River. Remedial designs for riverbank materials will focus on banks that are contaminated and erodible. The measure of riverbank erodibility is based on two approaches: the bank erosion hazard index (BEHI) and near bank stress (NBS) ratings. The work plan states that a riverbank segment will be defined as erodible if "both a BEHI rating of Moderate or greater and an NBS rating of High or greater" is obtained (pdf page 20). This indicates that a segment has to have both approaches yield results within the acceptable ranges before it will be considered erodible. The BEHI is a measure of erosional risk while the NBS evaluates energy distribution to evaluate potential for accelerated streambank erosion. the measures are fairly different in their methods. *The community may want to ask EPA if it is more conservative and appropriate to identify an erodible riverbank if either the BEHI or the NBS results fall within the required range (a BEHI rating of moderate or greater or an NBS rating of high or greater).*

8. The BEHI method relies on qualitative eye calibration for measurement of bank conditions. Unfortunately, in-field tools relying on qualitive observations can yield varying results. TASC recommends that this qualitative field measure integrate steps of quality assurance and quality control (QA/QC), since this field method is critical to the definition of an erodible riverbank to be addressed in remedial designs. TASC also recommends that a program of in-field random duplicate checks either with a second field team observer (such as the EPA field member or a second, trained field member) be applied. *The community may want to ask EPA if the in-field BEHI method integrates a system of QA/QC measures to ensure data results with acceptable precision and accuracy.*

9. Attachment E of the 2020 Modification to the 2016 Reissued RCRA Permit and Selection of CERCLA Remedial Action and Operation & Maintenance for Rest of River document outlines the performance standards for Reach 5A riverbed sediment assessment and disposal. The proposed sampling described in this work plan may not comply with Attachment E requirements. The proposed subsurface (sediment core) sampling (items a and b below) and porewater PCB sampling (item c below) may not achieve the goals of Attachment E for three reasons.

a. Attachment E states that "vertical sediment cores will be of sufficient depth to characterize sediment PCB concentrations throughout the full vertical interval required to comply with the Performance Standards for each reach, subreach and backwater under the 2016 Permit or Revised Permit" (Item 5, first bullet, Page E-3 [pdf 142])". The proposed sediment core sampling of riverbed and backwater sediments stops at a depth of 3 feet, which may be insufficient to characterize the entire sediment profile. As stated in the document, "previous investigations show that average PCB concentrations in this reach generally increase with depth down to four feet, and then decrease considerably for depths below four feet, although the number of samples is reduced at these deeper depths" (last sentence, first paragraph, Section 2.1, pdf page 12).

b. The 2020 Modification to the 2016 Reissued RCRA Permit defines Performance Standards for Reach 5A riverbed sediment as "river bed sediment shall be removed and an Engineered Cap … shall be placed over the entire riverbed" (Section 2. River Sediment and Banks, a. Reach 5A, (1) Performance Standards, subparagraph (a) page 19 (pdf page 24)). There are no numeric PCB concentration-based performance standards in the 2020 Modification or in the Sediment and Riverbanks PDI Work Plan that define the extent of riverbed sediments to be removed from Reach 5A. However, there are numeric standards applied to the sediment disposal process. The field sampling approach presents a well-founded step-wise approach for sediment sampling by proposing to first conduct sediment probing to define the depth of sediment (and follow-on sediment sampling for PCB analysis that is described to reach a maximum depth of 3 feet [Subsection 3.3.2.1, third sentence, pdf page 23 of the PDI Work Plan]). However, with the maximum sample depth of 3 feet as proposed by the document, there may be sediments of unknown PCB content below 3 feet that require analysis before they can be properly disposed of.

   The community may want to ask if the proposed sediment core sampling (to a maximum depth of 3 feet) is sufficient to assess the nature and extent of possible contaminated sediments that occur below this depth.

c. The approach to the proposed sediment porewater sampling involves the collection of bulk sediment samples gathered from 1-to-3-feet subsurface. Similar to the concerns identified in items (a) and (b) above, the limited depth of 3 feet may not adequately characterize the total depth of contaminated sediments.

   The community may want to ask if the proposed porewater PCB sampling depth from 1-to-3 feet is sufficient to capture the entire profile of contaminated sediments.

10. The riverbank soil PCB sampling efforts are focused on surface soils at various positions within a bank (toe, midpoint and top of bank). The historical riverbank sampling was also focused on the surface fraction (0-to-12-inches, Section 2.2, pdf page 12). The flows within Reach 5A demonstrate a meandering flow pathway that can erode riverbank surface material and expose subsurface material. Given the 100-year history of the contamination in this watershed and the variability of flows in the river, it seems

important to consider that subsurface riverbank soil contamination may have occurred on both sides of the river, and may also occur subsurface. These conditions raise three possible concerns: (a) that the proposed toe, midpoint and top of bank sampling should occur on both river banks (right and left) (Section 3.3.1 of the PDI Work Plan says there will be 5,961 samples, but 1,987 transects, 6 samples per transect for both sides of the river should equal 11,922 samples); (b) each sample collected should be discrete (and not composited) so that hotspots can be identified and adequate data is collected to ensure contaminated soil is disposed of in the proper location based on PCB concentration; and (c) removal of surface riverbank soil does not expose contamination present at depth. *The community may want to ask if: the proposed river bank soil sampling will capture both sides of the river within a given transect; and that each sample collected be discrete (rather than composited for an average). Additionally, the community may want to ask if subsurface riverbank materials have ever demonstrated elevated PCB concentrations of potential concern, and if it is worthwhile to pursue subsurface riverbank soil PCB sampling at subsurface levels (> 12 inches) in highly erosive riverbank settings. These changes are important to identify hot spots, ensure adequate sampling is collected for future disposal decisions, and ensure riverbank soil removal is not exposing contaminated soil.*

11. Section 3.2.3 describes the approach for the sediment probing field studies. This text indicates that the probing will be conducted in advance of sediment sample collection. The results of the probing analysis will help define the samples to be collected for PCB analysis. It is not clear in the document if EPA will be given the chance to review the selection of sample locations prior to the sampling field event. *The community may want to ask if EPA will be allowed to review and approve the selection of sediment PCB sample locations since the analysis results are integral to the final estimation of sediments to be removed and capped.*

12. Section 3.3 describes the proposed porewater PCB sampling that will measure groundwater seepage rates and estimate dissolved-phase PCB mass flux under current conditions. Certain concerns were raised from the review of the proposed strategy, as follows:
    a. Co-located collection of proposed porewater and groundwater seepage sampling locations are not spatially consistent throughout the reach. In general, co-located locations occur “every other” sampling site, with the exception being between river stations 70.00 – 100.00 and 180.00 – 230.00.
    b. The sampling strategy is inconsistent for the backwater areas. BW5A-2, BW5A-3, BW5A-4 and BW5A-6 lack sampling of any type, while BW5A-5 will be sampled for porewater only, and BW5A-1 will be sampled for porewater and groundwater seepage. It is not clear why the backwater sampling strategies vary so significantly.
    c. Footnote 14 at the bottom of page 19 (pdf page 26) indicates that sampling at the 20 locations chosen across Reach 5A “is anticipated to capture the range of PCB concentrations experienced in this reach.” However, as stated in the first paragraph of Section 3.3.3, these 20 locations will help verify/update the site-specific partitioning relationships developed previously by GE in 2001. Displaying the historical information from the 2001 GE study in this work plan along with the derived

partitioning relationships to determine if the planned 20 locations truly capture the spectrum of Reach 5A partitioning conditions would be helpful.

The community may want to ask for explanations of the above discrepancies to understand the porewater sampling approach presented in the document.

13. TASC recently reviewed the "Revised Pre-Design Investigation Work Plan for Reach 5A Non-Residential Floodplain Exposure Areas, June 2021 (Floodplain Work Plan)". This document provided a well-founded approach for the evaluation of floodplain materials that included an assessment of available PCB floodplain soil concentration isopleths to assist with the design of the sampling program. The maps provided in Figure 2-3 of the Floodplain Non-residential Work Plan were extremely helpful in identifying possible riverbank soils (to be sampled in this Sediment and Riverbank Work Plan) that exhibit high PCB concentrations. TASC reviewed the information in Figure 2-3 of the Floodplain Non-residential Work Plan to determine if the riverbank sampling approach was sufficiently comprehensive to capture areas of high PCB occurrence. A few possible data gaps were noted for the "other waterbodies in Reach 5A" (subsection 3.3.2.3), as follows:
    - Outlet from Moorewood Lake (Figure 3-6a). It is recommended that a sample (and a flow measurement) be taken at the confluence between the outlet and Reach 5A to understand the possible contaminant loading from Moorehead Lake to the Reach.
    - Portions of Sackett Brook and Sykes Brook (Figure 3-6b). It is not clear why sampling for Sykes Brook terminates at the wetland. It would be helpful if additional samples for Sykes Brook could be gathered from the wetland area to comprehensively characterize the Brook, unless these samples are to be collected for a separate effort (such as floodplain soils). It is recommended that a sample be taken at each confluence point (along with a flow measurement) between Sackett Brook and Reach 5A, and Sykes Brook and Reach 5A.
    - West Pond (Figure 3-6c). The drainage channel between West Pond and Reach 5A does not have any identified sediment sampling locations. A few samples should be collected throughout this drainage channel length with a terminus sampling location at the confluence where both flow and a sediment sample are taken to understand the possible Pond contamination contribution to Reach 5A.
    - Intermittent Side Channel (Figure 3-6d). Figure 3-6d depicts a braided channel that does not contain any sediment sampling locations. TASC recommends collecting samples from both sides of this braided channel to obtain a complete characterization of this channel. TASC also recommends that measurements of flow be taken at the channel inlet and outlet to Reach 5A.

    The community may want to ask if the above recommended sediment sampling should be added to the sampling strategies for the "other waterbodies in Reach 5A, or if these areas are to be addressed as part of other investigations such as the floodplain soils."

14. During the previous review of the Revised Pre-Design Investigation Work Plan for Reach 5A Non-Residential Floodplain Exposure Areas, June 2021 (Floodplain Work Plan), the city of Pittsfield identified a potential Frequently Used Subarea associated with Exposure Area 27 (EA 27). EA 27 correlates to river stations 160.00 through 170.00 on Figure 1-1

of the Sediment and Riverbanks PDI Work Plan. TASC recommends ensuring that the sampling and analysis phase of this proposed work includes sufficient sampling to characterize riverbed sediments and riverbank soils in this potential high exposure portion of the reach. *The community may want to ask EPA to review the final sediment/bank sampling approach that is designed from the results of the sediment probing and bank erodibility assessments, and determine if the sampling will address EA 27 future exposure considerations*.

TASC Summary of Potential Community Questions

1. *The community may want to request information about how sediment below 3 feet will be characterized, and may want to request to see and understand the sampling plan that will be put in place to ensure both riverbank soil and sediment concentrations disposed of in the Upland Disposal Facility do not exceed an average PCB concentration of 25 mg/kg.*
2. *The community may want to ask EPA if DQOs could be added for the riverbed sediments that outlines the core sampling procedures necessary and the performance standard required for main channel sediment characterization.*
3. *The community may want to ask for the work plan to be revised to provide clear definitions of key features such as riverbed sediments and riverbanks.*
4. *The community may want to ask if river sediment bed and riverbank soils media are defined by flow condition.*
5. *The community may want to ask if the proposed field study locations are sufficient to provide information necessary for the hydraulic modeling, or if field study locations that are more spatially diverse and inclusive of surface water sources would provide a more complete and accurate model of fluid mechanics.*
6. *The community may want to ask if EPA plans to review the results of the riverbank soils PCB analysis upgradient of these important features to be sure future erosion of the banks does not cause potential PCB deposition of concern.*
7. *The community may want to ask EPA if it is more conservative and appropriate to identify an erodible riverbank if either the BEHI or the NBS results fall within the required range (a BEHI rating of moderate or greater or an NBS rating of high or greater).*
8. *The community may want to ask EPA if the in-field BEHI method integrates a system of QA/QC measures to ensure data results with acceptable precision and accuracy.*
9. *The community may want to ask if the proposed sediment core sampling (to a maximum depth of 3 feet) is sufficient to assess the nature and extent of possible contaminated sediments that occur below this depth. The community may also want to ask if the proposed porewater PCB sampling depth from 1-to-3 feet is sufficient to capture the entire profile of contaminated sediments.*

10. *The community may want to ask if: the proposed river bank soil sampling will capture both sides of the river within a given transect; and that each sample collected be discrete (rather than composited for an average). Additionally, the community may want to ask if subsurface riverbank materials have ever demonstrated elevated PCB concentrations of potential concern, and if it is worthwhile to pursue subsurface riverbank soil PCB sampling at subsurface levels (> 12 inches) in highly erosive riverbank settings. These changes are important to identify hot spots, ensure adequate sampling is collected for future disposal decisions, and ensure riverbank soil removal is not exposing contaminated soil.*
11. *The community may want to ask if EPA will be allowed to review and approve the selection of sediment PCB sample locations since the analysis results are integral to the final estimation of sediments to be removed and capped.*
12. *The community may want to ask for explanations of the above (see supporting text at comment number 12) discrepancies to understand the porewater sampling approach presented in the document.*
13. *The community may want to ask if the recommended sediment sampling should be added to the sampling strategies for the "other waterbodies in Reach 5A, or if these areas are to be addressed as part of other investigations such as the floodplain soils." (see supporting bullets at comment number 13).*
14. *The community may want to ask EPA to review the final sediment/bank sampling approach that is designed from the results of the sediment probing and bank erodibility assessments, and determine if the sampling will address EA 27 future exposure considerations.*

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CITY OF PITTSFIELD

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MEMORANDUM

To: Dean Tagliaferro, EPA Project Manager Housatonic Site
From: James McGrath, Park, Open Space, and Natural Resource Program Manager
Date: November 18, 2021
Subject: *Comments on GE-Pittsfield/Housatonic River Site Pre-Design Investigation Work Plan for Reach 5A Sediments and Riverbank*

The City of Pittsfield has reviewed the document referenced above and - working with Skeo under a Technical Assistance Services for Communities (TASC) arrangement with EPA - we offer the following comments:

In order to design upcoming remedial action efforts, it is important to quantify the entire amount (including depths greater than 3 feet) of sediment that will require removal and capping. The entire sediment volume should be analyzed for PCB content and a sampling plan for characterizing the disposal material needs to be included. The current work plan proposal limits sediment probing and PCB sampling to a depth of 3 feet, but the document does not clearly define how these media will be analyzed for disposal method selection. Additional consideration should be given to how sediment below 3 feet will be characterized with a sampling plan put in place to ensure both riverbank soil and sediment concentrations disposed of in the Upland Disposal Facility do not exceed an average PCB concentration of 25 mg/kg.

The riverbank soil PCB sampling efforts are focused on surface soils at various positions within a bank, for instance toe, midpoint and top of bank. Given the 100-year history of the contamination in this watershed and the variability of flows in the river, it seems important to consider that subsurface riverbank soil contamination may have occurred on both sides of the river, and may also occur subsurface. Consideration should be given to proposed river bank soil sampling that will capture both sides of the river within a given transect, and that each sample collected be discrete, rather than composited for an average. Additionally, it may be worthwhile to pursue subsurface riverbank soil PCB sampling at subsurface levels greater than 12 inches in highly erosive riverbank settings. These changes are important to identify hot spots, ensure adequate sampling is collected for future disposal decisions, and ensure riverbank soil removal is not exposing contaminated soil.

Further, the proposed subsurface (sediment core) sampling and porewater PCB sampling may not achieve the goals of Attachment E. There is concern around whether the proposed sediment core sampling (to a maximum depth of 3 feet) is sufficient to assess the nature and extent of possible contaminated sediments that occur below this depth, and whether the proposed porewater PCB sampling depth from 1-to-3 feet is sufficient to capture the entire profile of contaminated sediments.

We appreciate the opportunity to provide comments on plans and studies associated with the Rest of River clean up, and are grateful for the technical assistance provided by Skeo through EPA.

From: Ziegler, John (DEP)
To: Smith, Christopher
Subject: RE: Revised Banks and Sediment CAL
Date: Tuesday, March 15, 2022 12:29:21 PM

Chris,

MassDEP has no additional comments on the 5A Banks and Sediment CAL and supports EPA's issuance of the CAL. Thank you for the opportunity to comment.

John