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Via Electronic Mail

February 18, 2026

Mr. Richard Fisher
Office of Site Remediation and Restoration
U.S. Environmental Protection Agency, Region I
5 Post Office Square - Suite 100
Boston, MA 02109-3912

Re: GE-Pittsfield/Housatonic River Site
Rest of River (GECD850)
Upland Disposal Facility Construction Supplemental Information Package

Dear Mr. Fisher:

Attached for EPA's review and approval is the *Upland Disposal Facility Construction Supplemental Information Package*.

Please let me know if you have any questions about the attached submittal.

Very truly yours,

Matthew Calacone / amm

Matthew Calacone
Senior Project Manager
GE Aerospace

Attachment

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Charter

General Electric Company

Upland Disposal Facility Construction Supplemental Information Package

GE-Pittsfield/Housatonic River Site

February 2026

Upland Disposal Facility Construction Supplemental Information Package

GE-Pittsfield/Housatonic River Site

February 2026

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Appendix C Design Drawings
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Appendix E Contractor's Stormwater Pollution Prevention Plan

Abbreviations

BMP	best management practice
Contractor	Charter Contracting Company, LLC
CEPP	Contingency and Emergency Procedures Plan
CM	Construction Manager
cy	cubic yards
EPA	U.S. Environmental Protection Agency
GCL	geosynthetic clay liner
GE	General Electric Company
GPS	Global positioning system
GW	groundwater
HASP	Health and Safety Plan
HDPE	high-density polyethylene
$\mu g/m^3$	micrograms per cubic meter
PLCS	primary leachate collection system
PM_{10}	particulates smaller than 10 micrometers in diameter
QA	quality assurance
QC	quality control
QOL	quality of life
Revised QOL Plan	Revised Quality of Life Compliance Plan
SLCS	secondary leachate collection system
SIP	Supplemental Information Package
SMA	Stormwater Management Area
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
SWPPP	Stormwater Pollution Prevention Plan
UDF	Upland Disposal Facility

1 Introduction and Background

1.1 Purpose

In accordance with the requirements of the Revised Final Permit issued by the U.S. Environmental Protection Agency (EPA) to the General Electric Company (GE) for the Rest of River (ROR) Remedial Action (Revised Permit), the Final Revised Rest of River Statement of Work, which specified the deliverables that GE will submit to design and implement that Remedial Action (Anchor QEA et al. 2021), and the revised Final Design Plan and Operation, Monitoring, and Maintenance Plan for the Upland Disposal Facility (UDF) (Arcadis 2024a, 2024b), GE has prepared this Supplemental Information Package (SIP) for construction of the UDF. This SIP includes construction-related information pertaining to the comprehensive construction activities to be performed by the selected construction contractor for those activities, Charter Contracting Company, LLC. (the Contractor). The UDF construction work associated with this SIP represents the full construction phase of work for the UDF and is based on the design requirements of the UDF Revised Final Design Plan with relevant updates incorporated in accordance with EPA's March 10, 2025 conditional approval letter for that design plan.

1.2 Key Project Participants

EPA

EPA is the lead agency responsible for overseeing the UDF construction in accordance with the Revised Permit. As such, EPA exercises approval authority for this UDF SIP.

GE

GE is responsible for implementing the ROR Remedial Action in accordance with the Revised Permit and for requiring that its contractors and subcontractors perform the required construction activities in accordance with the approved remedial design. This UDF SIP details the systems that GE has put in place to ensure that its responsibilities for quality are met. GE will be responsible for verifying that the Construction Manager (CM) (defined below) implements and manages the systems detailed in this UDF SIP. GE will provide targeted construction oversight such that each task is generally overseen at least once during a 24-hour period. GE will also be responsible for formal communications with and submittals to EPA.

Engineer of Record

The Engineer of Record is an independent, duly qualified, licensed design professional retained directly by GE to provide design and engineering services for the UDF construction project. This definition includes all subcontractors to the Engineer of Record. Arcadis is the Engineer of Record for the UDF construction. Arcadis will review all construction-related submittals and resolve any design issues that may arise during UDF construction.

Construction Manager (CM)

The CM is a duly qualified entity that will be retained by GE to provide professional construction management and related services in connection with the project. The CM will be responsible for implementation of this UDF SIP. The CM will manage the construction 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 Contractor (and any other contractors or subcontractors). The CM will provide quality assurance (QA) and monitor the day-to-day construction quality control (QC) activities performed by the Contractor (and its subcontractors) to verify compliance with the contract plans and specifications. The CM will also manage, coordinate, and administer QA/QC activities and requirements, including

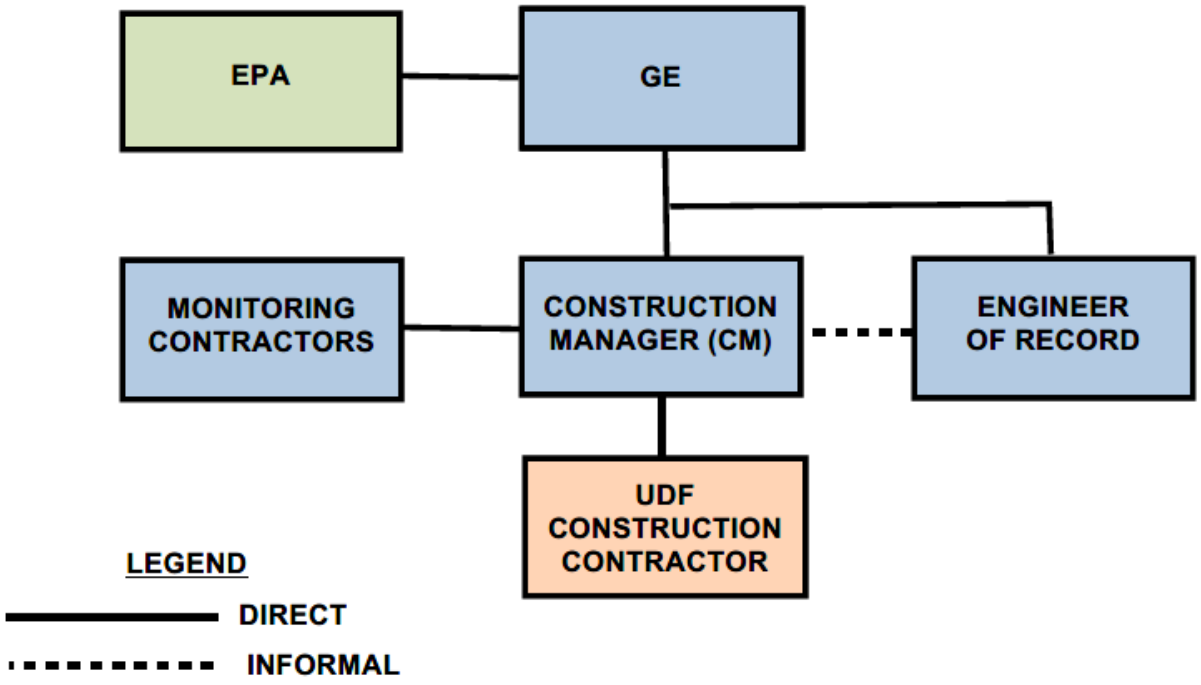
those of subcontractors to the CM. Additionally, the CM may be assigned management of any third-party QA inspection and testing firms retained by GE.

UDF Construction Contractor

The UDF Contractor (Charter Contracting Company) has been retained by GE to provide the labor, materials, and equipment required to construct the UDF in accordance with the contract documents. The Contractor will be responsible for the QC of its constructed work product as well as the necessary inspections and tests required to ensure that its work complies with the contract documents. The Contractor will exercise authority over its workforce, including QC personnel and its third-party QC support services.

The lines of communication among the key project participants are illustrated in Figure 1 below.

Figure 1 – Project Lines of Communication



1.3 Report Organization and Scope

This SIP is organized into the sections listed below. Each section includes information provided by the Contractor.

- Section 2 provides a summary of the site construction plan that includes a general description of the UDF site and the primary work tasks to be completed by the Contractor.
- Section 3 provides a summary of the safety plan components that will be implemented as part of the site construction work.
- Section 4 provides a project quality plan that contains components pertaining to quality-of-life (QOL) protection measures and construction quality assurance.
- Section 5 provides an overview of technical project documents that include specifications and design drawings for the UDF construction work.
- Section 6 presents the anticipated project schedule for the UDF construction work.

- Section 7 discusses project submittals and backfill sources.

This SIP is supported by several appendices that consist of the following:

- Appendix A contains the Contractor's site-specific Health and Safety Plan (HASP).
- Appendix B contains project technical specifications for this construction project.
- Appendix C contains project design drawings for this construction project.
- Appendix D contains the project submittal register for this construction project.
- Appendix E contains the Contractor's Stormwater Pollution Prevention Plan (SWPPP).

This SIP has been developed in conjunction with the Contractor and presents the planned means and methods for the UDF construction work. This SIP provides information for EPA review and approval prior to initiation of construction activities. It is expected that the scope of activities and the sequence and schedule of activities may vary during construction and that these variations will be discussed with EPA representatives on-site and during routine project meetings. To the extent that these variations represent changes to the design, they will be approved by GE, the Engineer of Record, and EPA and will be documented in appropriate project closeout documentation reports. It is not intended that this SIP will be updated or re-issued to reflect such changes. Further, supporting documents such as the Contractor's HASP and SWPPP may undergo periodic review and updating, as necessary, during implementation of the project. These documents (including any updates) will be available in the CM's trailer for review by project personnel and EPA.

2 Site Construction Plan

2.1 Site Location and Access

The UDF is located on GE property along Woodland Road in Lee, Massachusetts. The UDF property will be accessed at various locations described in this section to facilitate construction activities across multiple areas of the UDF site in an efficient manner while also enhancing the safety of construction vehicle traffic. The Contractor will access the UDF site from three primary locations during the project to sequence and execute various aspects of the work. Two of these locations exist or were previously established access points on GE's UDF property, and one additional access point will be established through a property adjacent to the UDF property. These three access locations are shown in Figure 2.

The two existing site access points are off Woodland Road and include the main construction entrance and a temporary vernal pool construction entrance. The main construction entrance off Woodland Road will serve as the primary access point to the UDF site. This entrance will be used primarily for personnel and construction site vehicle access but also for project equipment mobilization and material deliveries. The temporary vernal pool construction entrance point, also off Woodland Road, will provide access to the UDF site for work associated with the vernal pool enhancement.

An additional access point to the UDF will be through an adjacent property to the west of the UDF site via an access road referred to as the west access road. This west access road will be used for heavy equipment mobilization, construction vehicles, and material deliveries. Equipment mobilization and material deliveries will be prioritized to enter the UDF site through the west access road to the extent possible.

There are two secondary access points to the UDF site that will be used only in the initial stages of the construction project. These are an on-site gravel road that is accessed from the northern end of the UDF property (north gravel access road) and an existing gravel road on the Eversource Energy substation property located off the intersection of Willow Hill Road and Woodland Road.

As previously noted, the main UDF construction entrance is located off Woodland Road at the southern end of the site and will serve as the primary access point for construction vehicles and equipment throughout the majority of the UDF construction project. At the outset of construction, a temporary stabilized construction entrance structure composed of crushed rock, which was installed as part of the previous UDF site preparation work, will prevent soil from being tracked out onto Woodland Road through the main construction entrance. Toward the end of UDF construction, a permanent stabilized construction entrance structure will be installed at the main entrance for use during the UDF operations phase, as shown in the project design drawings provided in Appendix C. This permanent entrance will be composed of a single row of 12-foot-wide manufactured track-out control mats.

In addition to the main site entrance, a second site entrance (west entrance) will be established on the west access road through the adjacent property described above. A crushed rock-stabilized construction entrance structure will be installed on the outbound lane of this road close to its intersection with Willow Hill Road. This stabilized construction entrance will prevent soil from being tracked out onto Willow Hill Road. It is anticipated that the west access road will be useable by early to mid-summer 2026.

2.2 Pre-Construction Work Tasks

Prior to mobilization for construction, pre-construction soil investigation and classification activities will be performed by the Contractor in coordination with a geotechnical consultant retained by the Contractor. The on-site work for

this pre-construction soil investigation will be conducted in early spring 2026 and will involve the use of an all-terrain drill rig to collect soil samples at predetermined locations and depths selected to improve and refine classification of the existing subsurface soils data so that the Contractor can better plan its earthwork sequence. Samples will be collected at notable changes in soil conditions or at five- to ten-foot vertical intervals from the existing ground surface to the targeted subgrade. The geotechnical consultant will log soil conditions at each depth, and samples will be submitted for laboratory analysis as described below.

Drilling will be advanced through overburden soils that will allow for split-spoon sampling. Standard Penetration Tests will be performed and all results, including blow counts for every six inches of penetration, drilling resistance, and recovered soil characteristics, will be documented on boring logs. Groundwater, obstructions, or material transitions encountered during drilling will also be recorded to support excavation planning.

Approximately 100 additional soil samples are planned from 25 to 30 new locations. In total, approximately 290 samples from the planned boring locations are anticipated, representing about one sample per 2,500 cubic yards (cy) of excavated material or one sample per ~1,500 cy of material to be reused for UDF construction. Each sample will be analyzed for classification, grain size distribution, Modified Proctor values, and direct shear strength. Based on soil classification and grain-size distribution at each location and depth, soils will be assigned to Groups A–E (with “A” being suitable for structural fill and “E” being unsuitable without blending or amendments), and a 3D model will be developed for the Contractor’s use to map the extents and depths of each soil group before excavation. Data from the pre-construction investigation will be incorporated with existing soils data for use by excavation equipment guided by global positioning system (GPS).

Sampling and analysis will continue throughout the project earthwork operations during which up to 740 additional samples may be collected (approximately one per 1,000 cy excavated or one per 600 cy placed). Results will be integrated and updated into the project’s 3D model in near real time to improve soil management during excavation and placement.

Work activities associated with the site pre-construction soil investigation activities will be performed by the Contractor in coordination with the CM. The CM will conduct on-site observation of the field work activities and will provide EPA with relevant data from the investigation work for its review as the data become available.

2.3 Construction Work Tasks

This plan for UDF construction activities is based on the Contractor’s planned execution of the UDF construction work. Key aspects of the Contractor’s planned work activities are described in the following sections.

2.3.1 Mobilization

Mobilization will include delivery of Contractor equipment to the UDF site along with materials necessary to initiate site construction activities. Further description of the Contractor’s planned mobilization activities is provided below.

2.3.1.1 Erosion and Sediment Controls

During mobilization to the UDF site, the Contractor will install erosion control materials at the locations described and shown in the project design drawings and in the project Stormwater Pollution Prevention Plan (SWPPP) provided in Appendix E. The general areas covered by erosion control measures include the two temporary construction entrances, the UDF site perimeter, and soil stockpile areas. The erosion and sediment controls will include, but are not limited to, the following practices: straw wattle, silt fencing, compost filter sock, rock check dams, turf reinforcement mat, and stabilized construction entrances. Other best management practices (BMPs)

specified in the project SWPPP include dust mitigation, minimizing soil tracking off-site, temporary and permanent stabilization using seed and mulch, and minimizing steep slope disturbances. Erosion control materials will be inspected regularly and maintained throughout the duration of the project.

2.3.1.2 Equipment and Material Staging

During mobilization, the primary equipment and material staging areas will be located in the site Operations Area adjacent to the South Stormwater Basin and in the site Operations Area west of the main construction entrance off Woodland Road, in an area south of the west entrance to the UDF and on the adjacent property to the west of the UDF site. Additional staging areas within the project work limits may be identified and used as needed to support safer, more efficient construction operations. Staging areas will be operated and maintained in manner that accommodates site access, vehicle traffic patterns, site drainage conditions, and safety.

Equipment staged on-site for UDF construction purposes will include, but are not limited to, heavy construction equipment such as excavators, bulldozers, front-end loaders, off-road forklifts, skid steers, dump trucks, water trucks, vibratory rollers, site vehicles, and generators. Staged equipment will be inspected and maintained regularly in accordance with appropriate operating procedures to ensure safe and efficient operations.

Materials staged on site for UDF construction purposes will include, but are not limited to, imported soils, aggregates, geosynthetics, temporary or permanent erosion and sediment control materials, infrastructure supplies, other necessary materials identified in the plans and specifications, and miscellaneous construction materials necessary to support project activities.

Staging areas will be managed by the Contractor's on-site personnel to maintain organized, safe, and efficient staging areas. These activities will include regular inspections and maintenance to ensure that the staging areas are properly maintained and protected.

2.3.1.3 Temporary Facilities

Temporary facilities will be established on-site during the mobilization period and used to support construction activities. These temporary facilities will include, but are not limited to, field office trailers, construction-related waste containers, storage trailers, and steel storage boxes. The field office trailers will be set up in the Operations Area located west of the UDF main construction entrance off Woodland Road. The other temporary facilities will be located on the UDF site in areas appropriate for their use and may be subject to relocation based on construction progress. At the completion of the project work, the Contractor will remove all temporary facilities from the UDF site unless otherwise allowed to remain as approved by the CM.

Temporary utilities used on-site for construction purposes will include sanitary provisions, potable water, light and power, and telecom/data. Sanitary provisions consisting of portable toilets will be used throughout the duration of the project and will be located in site areas that provide appropriate access for use and service.

Temporary light towers may be used during periods of reduced daylight or shorter day lengths to provide adequate illumination for safe work operations. The light towers will generally be turned off when the site is not in use (although some may be operated for 24-hour periods in certain areas for security purposes) and will be operated in accordance with project QOL requirements. Temporary power for the office trailers will be provided by portable generators until such time as permanent electrical service is installed at the site and connected to each office trailer.

Bottled water or water cooler filling stations will be provided to all on-site personnel for use as potable drinking water for the duration of the project work. Telecomm/data service used by the Contractor will be high-speed internet accessed via mobile WiFi hotspots for the field office trailers.

In addition to temporary office trailers for the Contractor's use, other office trailers will be brought to the UDF site for long-term use by GE, the CM, and EPA. These trailers will be brought to the site after the Contractor has completed the site work and after utilities (electric, water, communications, and septic tanks) have been installed in the site Operations Area west of the main construction entrance. GE and the CM will coordinate on the acquisition and setup of these long-term office trailers, which will be connected to the project utilities installed by the Contractor.

2.3.2 Gravel Pond Area Clearing

The sloped area surrounding the gravel pond will be cleared of woody vegetation (i.e., small trees and shrubs) and other deleterious materials shown in the project design drawings. Clearing work within the sloped area will be performed using chainsaw equipment and other equipment appropriate for the work such as tracked machines capable of removing tree and stump materials. The cleared materials will be transported to a processing area centrally located within the UDF site, where the materials will be managed for off-site disposition unless otherwise approved by the CM for reuse on-site.

Where clearing work occurs within proximity of high-voltage electrical utility lines within the work area, a dedicated spotter will be used for the duration of the clearing work near power lines and associated equipment. Clearance distances will be maintained in accordance with Occupational Safey and Health Administration and utility standards and requirements.

2.3.3 Earthwork Construction

The following subsections describe the Contractor's approach for excavation, backfilling, compaction, and related earthwork for construction of the UDF. These earthwork activities will primarily involve the use of on-site soil materials and, where needed, the import of selected fill materials necessary to meet the project specifications. Excavation of on-site soils to construct the UDF will result in the generation of excess soil material. That excess material will be loaded into articulated end-dump trucks and transported via internal site roads to project stockpile areas located on the adjacent property to the west for future use by that property owner.

2.3.3.1 On-Site Debris Piles

There are debris piles at the UDF site that contain a variety of materials, including concrete, asphalt, brick, and general stone aggregate. Those debris piles were sampled in January 2026 to determine potential uses for the debris material. The results of that sampling are expected to be available and will be provided to EPA in March 2026 for its review and, if warranted, approval for reuse at the UDF site. During preparatory sitework activities, any debris pile materials approved for reuse on-site based on the sampling of the materials will be loaded into articulated end-dump trucks using an excavator and will be transported to a designated area for resizing, crushing, and stockpiling. An excavator-mounted hydraulic hammer will be used for initial material resizing. An excavator-mounted pulverizer and a mobile tracked jaw or impact crusher, will perform final material processing to a size of three - inches or less. Reinforcing materials recovered from concrete processing operations will be removed for off-site recycling. This processed material will be used as fill for on-site roadway subbase construction (e.g., below the top six inches of roadway surface material). Any debris pile materials that are not approved for reuse on-site will be loaded into trucks and transported off-site for disposal.

2.3.3.2 Operations Areas, Parking Areas, and Access Roads

Excavation and fill within the Operations Areas, access roads, and parking areas will begin with shallow cuts at the southern end of the UDF site using GPS-enabled excavators and dozers. Excavated material will be either pushed

by dozers to adjacent southern/southwestern fill areas or loaded into articulated end-dump trucks by loader equipment and transported to project stockpile areas, depending on the type of soil excavated and its intended use. Initial fill placement work will focus on the deepest and narrowest portions of designated fill areas. Fill areas will expand horizontally as additional lifts are placed and completed. This initial filling work will establish the foundation for larger-scale cut-and-fill work such as in UDF cell areas. After excavation and filling work is completed to establish the required subgrade elevations, the subgrade areas will be fine graded and compacted by vibratory roller compaction equipment in preparation for placement of final surface cover materials. Horizontal and vertical limits of fill placement will be guided and monitored using GPS-enabled dozer equipment and/or handheld GPS survey equipment as appropriate. Completed lifts will be verified by field measurements to ensure compliance with the project specifications. An as-built survey of completed areas will be conducted using handheld GPS equipment to confirm and document the final constructed conditions.

Lift thickness control measurements and compaction results obtained by the Contractor will be monitored by the CM to ensure that the work is performed in conformance with the project specifications. Excavation, filling, and grading earthwork performed by the Contractor will be done in coordination with the CM. The CM will conduct on-site observation of the earthwork and surveys and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.3.3 Gravel Pond Backfilling

Prior to gravel pond backfilling operations, standing water will be pumped from the gravel pond to allow for vegetation removal. The amount of water to be removed from the pond will depend on site conditions in the area of the pond (e.g., snowmelt, precipitation, stormwater runoff). Standing water in the gravel pond will be removed using a generator-powered pump that will transfer water from the gravel pond at the west edge of the site to a location where it can drain to the adjacent pond west of the gravel pond. Pumped water will be passed through a filter bag to remove suspended solids and other deleterious materials before discharge. The discharge outfall will be configured to provide for non-erosive outflow. The gravel pond water level will be reduced as needed to complete vegetation removal and begin the initial pond backfilling with coarse, self-compacting granular material.

Vegetation matter that includes phragmites (common reed) and other deleterious debris materials around and within the gravel pond will be removed, processed, and transported off-site for disposal. Phragmites encountered within the project area will be managed under invasive-species control protocols to prevent the spread of viable seeds, stolons, rhizomes, or plant fragments. Handling, staging, and transportation procedures will be implemented to contain the material and minimize the risk of off-site release of phragmites materials, as detailed below.

An excavator and trained invasive species removal personnel will excavate phragmites and associated root mats from the designated clearing area in a controlled manner. As phragmites material is excavated, it will be processed by placing the material in windrows, dried, or piled within site areas already impacted by phragmites. The purpose of drying will be to reduce moisture and overall biomass volume and improve handling during loading operations. To minimize the potential for escape of phragmites material during loading and hauling operations, transport trucks will be lined with polyethylene sheeting before loading. After loading is complete, the polyethylene sheeting will be folded, wrapped, or draped over the material. Trucks will be further covered and secured to minimize plant fragments, seeds, or soil escape during transportation. The loading area will be inspected before each truck departs to identify if any residual fragments remain. In the event that fragments are found, they will be collected and placed in the truck bed before departure.

At this time, it is anticipated that the dried phragmites vegetation will be transported off-site for final disposal at Casella Waste Systems in Newport, Vermont. Copies of shipping documents and disposal receipts/weight slips will be provided to the CM and maintained in the project file.

Equipment used for excavation, handling, and loading of phragmites material will be cleaned by removing visible soil and mud with the use of scrapers and brushes and then rinsing of equipment and tool contact surfaces with water before demobilization from the removal work area. The purpose of cleaning is to remove any residual rhizomes, stem fragments, adhering soil, and any organic debris. Equipment cleaning will occur in a designated area within the removal work area. Upon removal of phragmites and associated materials, the pond will be backfilled and graded in accordance with the project specifications and as further described below.

The use of herbicides is not anticipated as part of the vegetation removal work. In the event that use of an herbicide product is determined to be necessary to address phragmites, the Contractor will propose an EPA-approved herbicide product, and GE will submit this proposed product use to EPA for review and approval.

Following dewatering and removal of phragmites, the gravel pond will be backfilled to achieve final grades shown in project design drawings. Materials for backfilling will comply with project specifications which allow for the use of suitable on-site soils obtained from project excavation operations. Coarse, self-compacting granular material will be used for the initial placement up to approximately one foot above the pre-removal water elevation in the pond at the time of construction. Once the initial fill is placed, the fill surface will be dynamically compacted to achieve adequate density. Backfilling will continue above the initial fill using suitable on-site fill material that will be transported in off-road articulated end-dump trucks to the pond area and placed in controlled lifts using GPS-enabled dozers and smooth drum vibratory roller compactor equipment. Backfilling will proceed until the pond area reaches the specified subgrade elevations. After backfilling is complete, the filled area will be fine-graded in preparation for placement of final surface materials.

Selection of on-site soils for pond backfilling will be confirmed and approved by the CM prior to placement. Survey control will be maintained throughout pond backfilling operations by the Contractor. Horizontal and vertical limits of fill placement will be guided and monitored using GPS-enabled dozer equipment and handheld GPS survey equipment as appropriate. Completed lifts and slope gradients will be verified by field measurements and surveys to ensure compliance with design grades.

Backfilling and grading work performed by the Contractor will be done in coordination with the CM. The CM will conduct on-site observation of the earthwork and survey and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.3.4 Embankments and Berms

Embankments and berms will be constructed in accordance with the project specifications and will have a slope no steeper than three-feet horizontal to one-foot vertical (3H:1V). At fill locations, off-road articulated end-dump trucks will deposit material in a controlled manner, enabling various sized dozers equipped with GPS machine controls to grade and shape uniform lifts thicknesses before compaction by smooth-drum vibratory roller compactors. In areas where excavation is required to construct the embankments and berms, various sized GPS-enabled dozers and excavators will shape the required surface grades in preparation for subgrade surface density verification. Excavation, placement, and compaction will follow relevant project specifications for lift thickness, equipment, testing frequency, and acceptance criteria. An as-built survey of completed areas will be conducted using handheld GPS equipment to confirm and document the final constructed conditions.

Embankment and berm construction work performed by the Contractor will be done in coordination with the CM. The CM will conduct on-site observation of the earthwork and survey and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.3.5 Containment Cells

Excavation and grading to construct the subgrade for the UDF containment cells will be accomplished using various sized GPS-enabled dozers and excavators. Existing soil that is cut will be used as fill where needed, and excess cut material will be transported out of the cell areas by off-road articulated end-dump trucks for use as fill material elsewhere on-site or transported to project material stockpile areas. Dozers will shape and fine grade the cell floor areas to an approximate 2.8 percent slope and sideslope areas to no greater than 3H:1V, as shown in the project design drawings. Once the cell subgrade elevations are achieved and verified by survey to confirm compliance with the project specifications, trenches in the cell sideslopes and floor areas for leachate collection system piping as well as the leachate collection sumps on the cell floors, will be dug by an excavator to the subgrade elevations and dimensions required in the design drawings. The Contractor will make field measures to confirm the geometry of the trenches. An as-built survey of the constructed trenches will be conducted using handheld GPS equipment to confirm and document the constructed alignment and elevations.

Fills will be placed in controlled lifts by GPS-enabled dozers and compacted with rollers. The subgrade will be fine graded and compacted using vibratory roller compactors to yield a smooth, firm surface prior to the installation of overlying baseliner system components. Excavation, placement, and compaction will follow relevant project specifications for lift thickness, equipment, testing frequency, and acceptance criteria. Horizontal and vertical limits of fill placement will be guided and monitored using GPS-enabled dozer equipment and/or handheld GPS survey equipment as appropriate. Completed lifts will be verified by field measurements to ensure compliance with the project specifications. An as-built survey of completed areas will be conducted using handheld GPS equipment to confirm and document the final constructed conditions.

Lift thickness control measurements and compaction results obtained by the Contractor will be monitored by the CM to ensure that the work is performed in conformance with the project specifications. Excavation, filling, and grading earthwork performed by the Contractor will be done in coordination with the CM. The CM will conduct on-site observation of the earthwork and surveys and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.3.6 Stormwater Management Areas and Basins

Construction of the five stormwater management areas (SMAs) and the two stormwater basins will primarily involve excavation of existing site soils to achieve the design grades and elevations shown in the project design drawing. Excavation of the SMAs and basins will be sequenced to coordinate with planned filling work elsewhere at the UDF site to the extent practicable. Any surplus soil generated during construction of these stormwater features will be loaded into articulated end-dump trucks and transported to project stockpile areas.

Excavation and grading to construct subgrades will be accomplished using GPS-enabled excavators and dozers. As shown in the design drawings, the floor areas of the SMAs and basins will remain as open, permeable areas and therefore will not be heavily tracked or compacted by equipment following their excavation and fine grading. The subgrade of the SMAs and basins that will be covered will be fine graded and compacted in preparation for placement of final surface cover materials described in Section 2.3.7.4.

Horizontal and vertical limits of excavation and grading will be guided and monitored using GPS-enabled dozer equipment and/or handheld GPS survey equipment as appropriate. An as-bult survey of completed areas will be conducted using handheld GPS equipment to confirm and document the final constructed conditions.

Lift thickness control measurements and compaction results obtained by the Contractor will be monitored by the CM to ensure that the work is performed in conformance with the project specifications. Excavation, filling, and grading earthwork performed by the Contractor will be done in coordination with the CM. The CM will conduct on-

site observation of the earthwork and survey and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.3.7 Vernal Pool Enhancements

The UDF construction will include earthwork activities to expand and enhance the existing vernal pool and adjacent wetland habitats in a site area west of Woodland Road. Woody vegetation within the vernal pool areas designated for earthwork was cleared previously as part of the UDF site preparation work. Although not anticipated at this time, any further vegetation clearing in the vernal pool or surrounding areas that may be required to facilitate the vernal pool enhancement work will be discussed with the CM prior to any vegetation removal work.

Traditional excavation means and methods will be used to achieve the designed cut-and-fill subgrades and final grades shown in the project design drawings. Timber crane mats will be used as needed to provide equipment access, thereby reducing ground pressure and minimizing compaction of the existing subgrade during construction in the vernal pool area. A tracked excavator will be used to excavate to the designed subgrades and to place backfill materials to the proposed finished grades. Where required by the design documents, selected areas will be over-excavated one foot from the design final grades. In areas adjacent to mature trees, excavations that will extend to one foot below existing grade will be performed under the oversight of a wetland scientist retained by the Contractor.

Horizontal and vertical limits of earthwork will be guided and monitored using GPS-enabled excavator and dozer equipment and/or handheld GPS survey equipment as appropriate. Completed work will be verified by field measurements to ensure compliance with the project specifications. An as-built survey of completed areas will be conducted using handheld GPS equipment to confirm and document the final constructed conditions.

Field verification data obtained by the Contractor will be monitored by the CM to ensure that the work is performed in conformance with the project specifications. Excavation, filling, and grading earthwork performed by the Contractor will be done in coordination with the CM. The CM will conduct on-site observation of the earthwork and survey and will provide EPA with relevant conformance verification data for its review as the data become available.

Stormwater runoff will be directed away from excavation areas. Water that accumulates within the excavation area will be pumped into the adjacent wetland and allowed to infiltrate. All pumped water will be passed through a filter bag to remove suspended solids and other deleterious materials before discharging on-site, including to the adjacent wetland area. Following completed excavation and grading work, the earthwork areas will be finished in accordance with the project specifications. As mentioned above, work conducted by the Contractor in the vernal pool area will be done in coordination with and under oversight by the CM.

Prior to any restoration plantings, the planting materials will be provided to the CM for review and approval. Once the planting materials are approved, the restoration planting areas will be prepared and the planting materials established in accordance with the project specifications. Planting and seeding will be completed within the specified windows. The spring window extends from April 1 through June 30, and the fall window extends from August 15 through December 15. If any deviations from the defined planting windows are necessary, prior approval will be obtained from the CM in coordination with the Contractor's wetland scientist. As required at the time of installation, water obtained from the on-site fire hydrant will be transported by water truck down to the vernal pool area and applied to the newly installed plants and shrubs.

Woody shrubs and/or saplings materials previously cut and stockpiled in the vernal pool area as part of the UDF site preparation work will be placed in the selected vernal pool enhancement areas. After restoration plantings have been completed, erosion control matting will be placed on disturbed areas at the discretion of the wetland scientist, as needed.

The restoration work will also include improving the existing roadside swale to maximize surface runoff into the existing culvert that drains to the vernal pool area. This restoration work will involve clearing out accumulated vegetation matter and reshaping the swale in the upgradient area leading to the culvert. The temporary stabilized vernal pool construction entrance installed previously as part of the UDF site preparation work will be removed and the aggregate and riprap materials will be transported via over-the-road haul trucks to the UDF for reuse.

2.3.4 Multi-Layer Baseliner System

The baseliner system to be installed across the footprint of Cells 1 and 2 will include primary and secondary liners as well as primary and secondary leachate collection systems. The baseliner system will include low-permeability soil, granular soils, and geosynthetics as required in the EPA approved design drawings and specifications. Construction of the baseliner system will include required preconstruction laboratory testing as well as field and laboratory testing as work progresses to ensure that construction adheres to the project specifications. Baseliner installation work and any testing conducted by the Contractor and subcontractors, including the test fill construction described below, will be done in coordination with the CM. The CM will conduct on-site observation of the baseliner installation work and testing activities and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.4.1 Soil Clay Liner

The lowest component of the baseliner system is a minimum one-foot-thick low-permeability soil liner having a maximum permeability of $1x10^{-7}$ centimeters/second. This layer will extend across the floors and on the sideslopes of the cells and will be constructed using soil clay imported from off-site. The Contractor and CM will visit the borrow source of the clay to evaluate the materials, source location, origin of the material, historical use of the borrow source area, and any chemical/physical test data that may already exist for the material. Once a borrow source has been initially evaluated by the Contractor and deemed acceptable by the CM, soil samples will be collected and submitted by the Contractor for laboratory testing for chemical constituents. Following review and approval of the results of chemical testing by the CM, additional soil samples will be collected and submitted by the Contractor for laboratory testing for geotechnical characteristics to confirm that the material can meet project requirements. Following this initial laboratory testing, the low-permeability soil liner material will be tested at the frequency and for the characteristics specified in the project design documents.

Following approval of the borrow source, transport and stockpiling of soil clay at the site will commence. Prior to construction of the soil clay liner in the UDF footprint, a test fill will be constructed either within an area of the UDF cells or in an on-site area with comparable cell subgrade conditions, using the imported soil clay to evaluate the equipment and methods proposed for construction of the soil clay liner. The test fill will use the same means and methods that are proposed for the soil clay liner installation within the UDF cells and will be tested for in-place dry density and permeability to verify compliance with the project requirements. The test fill will be a minimum of 20 feet wide by 60 feet long and will be constructed from two six-inch-thick lifts (post-compaction). The results of the test fill will be evaluated by the Contractor in coordination with the CM to determine the most efficient and effective method for placement of the soil clay liner.

Following successful completion of the test fill demonstrating that the Contractor's proposed means and methods can produce a soil clay liner that meets the project requirements, construction of the actual soil clay liner within the UDF footprint will commence. An access road composed of clay soil material or other suitable on-site soil will be constructed into a cell area to allow delivery of clay soil to the cell placement areas. Placement of the soil clay liner will commence on the cell floors and progress up the sideslopes using GPS-enabled dozers. Placement, lift thickness, and compaction operations will be performed in the same manner as the test fill construction. QC of each

lift will be performed by the Contractor and its QC geotechnical testing service in accordance with the project specifications, and will include compacted lift thickness verification measurements, in-place moisture-density testing, and undisturbed sampling of the compacted clay soil for laboratory hydraulic conductivity testing. Construction of overlying lifts will not commence until all QC testing of the underlying lift has been performed, reviewed, and determined to meet project requirements. The top of the final lift of the clay liner will be prepared to yield a uniform and stable surface on which overlying baseliner components will be installed.

2.3.4.2 Geosynthetic Liners

The primary and secondary liners of the baseliner system will each contain a layer of 60-mil (nominal thickness) textured high-density polyethylene (HDPE) geomembrane underlain by a geosynthetic clay liner (GCL) composed of needle-punched reinforced geotextile outer layers with a uniform core of natural sodium bentonite clay to form a hydraulic barrier. Regardless of material type, all geosynthetic liners will be delivered to the site by truck in rolls, unloaded, and stockpiled in the material staging area. Unloading, on-site transport, and deployment of material rolls will be performed using heavy equipment, such as a loader or excavator, equipped with a steel spreader bar. Deployment of geosynthetic liners will be performed using workers to pull the material off the rolls suspended from the spreader bar. GCL panels will be installed with the long direction of the panel oriented up/down sideslopes to the extent practicable. Panels will be configured to minimize seams. Seams between adjacent GCL panels will be made by overlapping a minimum of six inches on each side. Installed GCL will be covered by tarps or geomembrane liner at the end of each work day to protect the GCL from precipitation.

Geomembrane roll (i.e., panels) will be installed using heavy equipment, such as a loader or excavator, equipped with a steel spreader bar, with the long direction of the panel oriented up/down slopes to the extent practicable. Panels will be laid out to minimize seams. Geomembrane placement will occur immediately following placement of the underlying GCL to minimize exposure of GCL to rainfall. Seams between adjacent panels of geomembrane will be made by overlapping panels and double-track fusion welding panels where possible and extrusion welding where necessary. Both non-destructive and destructive testing of completed seams will be performed in accordance with the project specifications.

In addition to individual seam testing, the integrity of the completed primary and secondary geomembranes will each be verified by electrical leak location surveys. Electrically conductive wires needed for the leak location survey will be installed by the geosynthetics installer at designated locations across the UDF cell footprint to allow the testing of each geomembrane layer. The designated conductive wire locations will be predetermined by the leak location survey subcontractor and depicted on a liner layout plan prepared by the geosynthetics installer in coordination with the leak location survey subcontractor, which will be submitted to the CM for review and record-keeping purposes. The lower, secondary geomembrane will be electrically tested following placement of the overlying secondary leachate collection layers. In this way, damage that could be incurred during placement of these overlying layers can be detected and subsequently repaired by the geosynthetics installer. Similarly, the upper, primary geomembrane will be electrically tested following placement of the overlying primary leachate collection layers. Any leaks that are detected during the leak location survey will be flagged, exposed, and repaired in accordance with the project requirements. An electrical retest of the geomembrane will then be conducted. A written report will be prepared by a leak location survey subcontractor to document the detection and repair of any leaks and will be submitted to the CM.

The Contractor will provide submittals for the geomembrane liner material being used for the project, including liner material technical information from the manufacturer, prior to ordering the material. This documentation and any supporting information regarding the chemical compatibility of the HDPE liner with PCB-impacted wastes will be submitted to EPA for review when received.

2.3.4.3 Leachate Collection Systems

As noted above, the baseliner system will include two separate leachate collection systems (primary and secondary systems). Each system will be located above the corresponding liner system (e.g., the primary leachate collection system is above the primary liner system). The primary and secondary leachate collection systems will both include a one-foot-thick granular layer consisting of well-graded, clean, durable stone or screened gravel material placed atop a geocomposite drainage layer across the cell floors. On the sideslopes, the primary and secondary leachate collection systems will include only the double-sided tri-planar geocomposite drainage layer. Seams between adjacent geocomposite panels will be made by overlapping the geocomposite panels a minimum of four inches each side, zip-tying the geonet core, and sewing or heat bonding the upper geotextile of the adjacent panels. Granular drainage layers will be placed on top of the geosynthetic drainage composite in a single 12-inch-thick lift using low-ground-pressure dozers. For placement of the granular drainage layer material, dozers will be operated in a manner that avoids sharp turning and rapid starting-stopping maneuvers that could damage the underlying geosynthetics and leachate collection piping. The granular drainage material will be carefully pushed to a thickness of no less than 12 inches, with measures (e.g., spotters, GPS machine controls) employed during placement to gage and control layer thickness. Over-the-road or articulated end-dump trucks used to deliver the granular drainage material to the placement areas will operate on built-up temporary cell access roads that are a minimum of three feet thick to protect the underlying geosynthetic and pipe materials from damage due to equipment operation. The temporary cell access roads will consist of either granular drainage material or operations layer material, depending on the stage of installation progress, and will be constructed and removed as needed to facilitate the placement of granular drainage material.

2.3.4.4 Geosynthetics Anchor Trench

Construction of the baseliner geosynthetics anchor trenches will include excavation of the (inboard) baseliner geosynthetics anchor trench and the (outboard) geosynthetics extension anchor trench in the UDF perimeter berm as shown in the project design drawings. The trench locations on the perimeter berm and completed depths will be constructed by excavators following placement of the soil clay liner and prior to installation of the secondary geomembrane liner. The baseliner geosynthetic materials will be placed sequentially with the secondary and primary geomembranes welded together at the inboard trench location to seal the liners against leakage.

As shown in the project design drawings, an additional geomembrane extension will be installed at the inboard trench location and welded by either fusion or extrusion to the primary or secondary liner geomembrane. The geomembrane flap will be welded by either fusion or extrusion to the extension geomembrane and placed inward toward the cells and over the baseliner geosynthetics and then covered with protective non-woven geotextile. Operations layer and general soil fill materials will be placed over the anchor trenches as shown on the project design drawings. The placement and testing results of the geosynthetic materials in the anchor trenches along with soil backfilling of the trenches, will be completed as part of the anchor trench construction.

2.3.5 Leachate Collection and Removal Systems

2.3.5.1 Collection Pipes and Sumps

Placement of the secondary eight-inch-diameter perforated leachate collection pipe will begin at the sump and proceed upgradient within the cells using an excavator or other similar equipment to lift and position the pipe. The top geotextile layer of the geocomposite will be removed and cut back to allow placement of the pipe, followed by backfill with 12 inches of filter stone. A layer of geotextile filter fabric will be placed over the filter stone, overlapped, and heat-bonded using a hand leister heating device or sewn to the upper geocomposite geotextile layer to maintain

a geotextile separation barrier. The pipe will be routed to the secondary collection sumps in each cell. Non-perforated eight-inch solid cleanout pipes will be installed on the sideslopes of both Cells 1 and 2 for future cleanout purposes using appropriate pipe handling equipment.

The primary eight-inch HDPE diameter perforated leachate collection pipe will be installed as described above for the secondary leachate collection pipe. Pipe placement will begin at the sump and proceed upgradient. As with the secondary pipe, non-perforated eight-inch solid cleanout pipes will be installed on the sideslopes of both Cells 1 and 2 for future cleanout purposes.

The secondary 18-inch and primary 24-inch diameter HDPE leachate collection pipes and the eight-inch diameter HDPE cleanout pipes will be placed in the sumps within Cells 1 and 2, in conjunction with the placement of the baseliner and sideslope liner materials. The pipes in Cells 1 and 2 will be perforated, set on the corresponding drainage net, and covered with a layer of filter stone using an excavator. The pipes on the sideslope will consist of solid HDPE. By placing the pipes on the drainage net, the cell subgrade will be sloped to the leachate collection sumps, and therefore, the pipes will also be sloped into the secondary or primary collection sumps. The non-woven geotextile over the filter stone will be heat-bonded using a hand leister heating device or sewn to the top layer of the geocomposite drainage net to maintain a geotextile separation barrier. Pipe installation work and verification activities conducted by the Contractor will be done in coordination with the CM. The CM will conduct on-site observation of the pipe installation work and verification activities and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.5.2 Removal Pipes and Pumps

Each UDF cell will include construction of a trench within the sideslope baseliner system to accommodate the installation of both primary and secondary riser pipes. Grading for the sumps in the cell floors and for the sideslope trenches to hold the primary and secondary sideslope risers and cleanout pipes will be performed as part of the cell earthwork subgrade preparation. Grading and trench excavation work will be guided and monitored using GPS-enabled dozers and excavators and/or handheld GPS survey equipment as appropriate. Completed earthwork will be verified by field measurements to ensure compliance with the project specifications.

Following the earthwork subgrade preparation, the side slope risers and clean out pipes will be installed and the pipes backfilled. The primary and secondary leachate pumps will then be lowered into the sumps through the riser pipes on a pump sled with a retrieval cable so that they may be retrieved in the future for maintenance or replacement. The primary leachate pumps will be four-inch, 13-horsepower, high-head, constant-speed submersible pumps. The secondary leachate pumps will be two-inch, eight-horsepower, high-head, constant-speed submersible pumps. Each leachate pump for the UDF cells will include the installation of power, sensors, and a communication cable for pump liquid-level controls (low, high, and high-high) that are connected to the leachate management programmable logic controller/operator terminal. The leachate pumps will transfer liquid in the four-inch/eight-inch HDPE dual containment force main from the cell sumps to the leachate storage tanks. The leachate pumps will be fitted with a retrieval cable, a flexible discharge hose with quick-connect fittings, high- and low-water-level sensors that control pump operation, and a water-tight electrical supply cable. The pumps will be connected to an electrical control panel installed in each leachate riser vault.

Work performed by the Contractor for installation of the cell leachate removal pipes and pumps will be monitored by the CM to ensure that the work is performed in conformance with the project specifications. Verification measurements obtained by the Contractor will be done in coordination with the CM. The CM will conduct on-site observation of the work and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.5.3 Riser Vaults

A precast concrete leachate riser vault will be located at the top of the western sideslope of both Cell 1 and Cell 2. The leachate collection system sideslope riser pipes will be terminated within each corresponding vault. Operation and maintenance of the leachate collection system serving each cell will be performed from within the vault.

Each vault requires installation of a prefabricated eight-foot-high by 54-inch-diameter HDPE manhole with a one-inch HDPE welded base below the vault. The excavation for the riser vault will be performed by an excavator using an excavation support system to allow personnel and materials safe access for installing the HDPE manhole at each location. The four-inch/eight-inch HDPE dual containment piping will penetrate through the sidewall of the HDPE manhole. The HDPE outer pipe will be extrusion-welded to the HDPE manhole opening to create a water-tight connection. Electrical and communication conduits will be installed in the HDPE manhole to provide power for the submersible sump pumps, control the leak detection system, and connect the communication system.

The HDPE manhole will be set on the prepared subgrade and leveled using an excavator. The manhole excavation will then be backfilled with excavated material or on-site general fill soil to the subgrade elevation required for the precast concrete leachate riser vault. A geotextile fabric will be laid over the prepared subgrade, followed by placement of a 12-inch-thick layer of graded aggregate that will serve as the base for the riser vault structure. Placement and grading of backfill and graded aggregate materials will be conducted by a GPS-enabled excavator and dozer. Backfilling will be completed in lifts and compacted using vibratory compaction equipment. Horizontal and vertical limits of fill placement will be guided and monitored using GPS-enabled dozer equipment and/or handheld GPS survey equipment as appropriate. Completed lifts will be verified by field measurements to ensure compliance with the project specifications. Backfill lift thickness control measurements and compaction results obtained by the Contractor will be monitored by the CM to ensure that the work is performed in conformance with the project specifications.

The vault structure will be set over the HDPE manhole using an excavator, with the 54-inch-diameter opening in the vault floor positioned on the manhole top opening. The precast concrete vault will be approximately 12 feet wide, 20 feet long, and 8.7 feet high. The riser vault will be fitted with three-foot-wide steel double doors with the threshold set above the top of the HDPE flat stock. The interior bottom and a lower portion of the vault sides will be fitted with one-inch HDPE flat stock extrusion-welded in place to form a sealed containment liner within the riser vault. A sump pump with liquid-level controls and a leak-detection sensor will be placed in each HDPE vault manhole. A removable reinforced grate system will be fitted over the top of the HDPE manhole opening that will allow drainage into the manhole from within the vault in case of leakage and will allow walking access over the manhole.

Placement and grading of the graded aggregate will be conducted by an excavator and dozer. Backfilling will be completed in lifts and compacted using vibratory compaction equipment. Horizontal and vertical limits of fill placement will be guided and monitored using GPS-enabled dozer equipment and/or handheld GPS survey equipment as appropriate. Completed lifts will be verified by field measurements to ensure compliance with the project specifications. Backfill lift thickness control measurements and compaction results obtained by the Contractor will be monitored by the CM to ensure that the work is performed in conformance with the project specifications.

2.3.5.4 Cell Secondary Leachate Collection System Testing and Monitoring

The cell secondary leachate collection system (SLCS) will be evaluated to ensure performance and compliance with the Action Rate requirement of 100 gallons per acre per day, as defined in Section 2.3 of Appendix B to the UDF Revised Final Design Plan. The SLCS testing will be performed by the Contractor as part of the leachate

collection and storage system startup and testing process after the primary and secondary containment cells and conveyance systems are constructed, tested, and the leachate collection and storage system is fully operational.

The initial drawdown period of pumping will involve pumping of water accumulated in the SLCS sump. This will be conducted by the Contractor under controlled conditions to fully evacuate the sump and establish baseline conditions before the commencement of monitoring activities. Water accumulated in the SLCS sump will be evacuated using submersible electric pumps from the Cell 1 and 2 secondary leachate collection system, with all necessary monitoring equipment installed and calibrated prior to testing. Discharge piping will use HDPE or reinforced hoses connected with cam-lock fittings, and inline flow meters will ensure accurate measurement of pumped volumes. The initial drawdown may require several days, and water levels will be measured by the Contractor before and after each pumping event. All water that is removed which has not contacted consolidation materials will be discharged to the UDF stormwater drainage system at locations stabilized with erosion-control measures and approved by the CM. Results of the initial drawdown period pumping obtained by the Contractor will be submitted to the CM for review and approval, which will be required before initiating the testing and monitoring period.

After CM approval of the initial drawdown, the CM will provide written notification to the Contractor authorizing the start of the testing and monitoring period. At that time, the testing and monitoring will commence and water in the SLCS sump will be periodically pumped, using the primary and secondary leachate pumps, at controlled rates during the testing and monitoring period to assess system performance, with each event continuing until the sump is emptied and no additional pumping on the same day. Temporary generator-powered submersible pumps and inline flow meters will be used to pump and measure volumes removed by the Contractor, while valves will regulate flow and prevent backflow. Water levels in both the SLCS and primary leachate collection system (PLCS) sumps will be measured before each event, and all relevant data, including pumping times, volumes, water levels, and observations, will be recorded. The monitoring period will capture at least three significant precipitation events, and if insufficient rainfall occurs within 30 days, the Contractor will coordinate with the CM to introduce potable water into the PLCS using approved methods, ensuring adequate water levels for testing. The testing and monitoring period will extend for at least 30 days following CM approval of the initial drawdown results. Monitoring will continue beyond the initial 30-day period until the observed flow rate to the SLCS sump decreases to one-half of the Action Rate, as defined in Section 2.3 of Appendix B to the UDF Revised Final Design Plan.

The SLCS testing and monitoring work to be conducted by the Contractor at the completion of the cell baseliner installation will be done in accordance with the project specifications and in coordination with the CM. At least 30 days prior to the start of the SLCS testing and monitoring work by the Contractor, the Contractor will convene a meeting with the CM to discuss and confirm the following:

- The date for commencement of testing and monitoring work by the Contractor;
- Contractor preparation activities and schedule;
- Field activities that will require CM oversight;
- Contractor-CM communication frequency and format;
- Schedule for Contractor progress updates;
- Notification timeframes and format for key testing and monitoring elements; and
- Documentation format and submittals.

The CM will conduct on-site observation of the SLCS testing and monitoring work and data review as the work progresses. The CM will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.6 Leachate Conveyance and Storage Systems

2.3.6.1 Conveyance Pipes and Manholes

The HDPE piping and appurtenances within each leachate riser vault will allow the transfer of primary and secondary leachate-collection sump water through the two four-inch/eight-inch dual-containment force mains that will extend to the leachate storage tank system. The two force mains will provide redundancy, allowing maintenance or repair of one force main while continuing to pump leachate through the other force main.

The trench for the force main will be excavated to the required depth using an excavator, beginning at the leachate riser vault and continuing to the valve house at the leachate storage tanks. A trench box will be used to provide sidewall support during excavation. The trench subgrade will be sloped toward an adjacent HDPE manhole to allow drainage of the force mains. A minimum six-inch sand bedding layer will be placed in the trench below the bottom of the pipe. The two four-inch/eight-inch HDPE dual containment pipes will be installed parallel to each other with a minimum of one foot of space between them. Sand bedding backfill will be placed around and over the pipe and compacted to a minimum of 12-inch thickness above the pipes. Detectable metallic warning tape will be placed on top of the sand bedding material, and the remainder of the trench will be backfilled and compacted with soil from the trench excavation.

The eight-inch outer containment pipe will daylight inside each manhole and be extrusion-welded to the exterior of the HDPE manhole to create a water-tight seal. The four-inch inner pipe connections will be made within the manhole. Any leakage from the four-inch force main that occurs will be captured in the eight-inch outer containment pipe and will flow by gravity to the adjacent downstream HDPE manhole. Electrical and communications conduit and cable will be provided at each manhole for power and operation of the installed and tested leak detection sensor.

Intermediate 54-inch-diameter DR-17 HDPE manholes will be installed along the force main alignment to facilitate monitoring and maintenance at the locations shown in the project design drawings. The HDPE manholes will be supplied with a factory-welded HDPE base and factory-bored holes to receive the four-inch/eight-inch HDPE dual containment pipes. There will be two leachate junction manholes (one outside each leachate riser vault) and three leachate conveyance manholes spaced along the force main pipe alignment for access and leak detection. As pipe installation progresses upgradient, excavation will be conducted to the required subgrade depth for the HDPE manholes. A manhole excavation support box will be used to allow personnel to access the excavation and place materials within it. A layer of woven geotextile will be placed over the manhole subgrade, followed by a 12-inch layer of graded aggregate to be placed and compacted. The manhole will then be set and leveled to the required elevation using an excavator.

Following installation, the manhole excavations will be backfilled by an excavator with excavated overburden soil and will be compacted by vibratory compaction equipment to the required grade. Each manhole will be topped with a precast reinforced concrete cover by an excavator. The covers will consist of an H-20 traffic-rated steel, water-tight locking worker access hatch. The concrete cover and hatch will be set over the manhole, and graded aggregate will be placed and compacted around the cover to final grade.

Backfilling and final grading work will be conducted using excavators, dozers, and vibratory compaction equipment. Horizontal and vertical limits of fill placement will be guided and monitored using GPS-enabled dozer equipment and/or handheld GPS survey equipment as appropriate. Completed lifts will be verified by field measurements to ensure compliance with the project specifications.

Backfill lift thickness control measurements and compaction results obtained by the Contractor will be monitored by the CM to ensure that the work is performed in conformance with the project specifications. Earthwork, manhole

installation work, and pipe installation work performed by the Contractor will be done in coordination with the CM. The CM will conduct on-site observation of the utility installation work and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.6.2 Valve House and Truck Loadout System

A valve house will be located between the two leachate aboveground storage tanks and will contain the leachate system controls, as well as the leachate force main piping connections from the UDF cells that route leachate to the above-ground leachate storage tanks.

Excavation to the required subgrade will be performed using an excavator within an excavation support box. Once the subgrade is prepared, an HDPE manhole with HDPE base will be placed by an excavator at the required elevation, and the leachate force mains will be inserted into the HDPE manhole pipe opening. The outer dual containment piping for the leachate force main will be extrusion-welded to the HDPE manhole and hydrostatically tested to confirm its watertightness. Electrical and communications conduit will be fitted through the HDPE manhole and sealed. The HDPE manhole excavation will then be backfilled by an excavator with on-site excavated material and vibratory compacted to the subgrade elevation required for the valve house structure. A layer of geotextile will be placed over the prepared subgrade, followed by placement of a 12-inch-thick layer of graded aggregate that will serve as the base for the precast concrete valve house structure. Placement and grading of the graded aggregate will be conducted by an excavator and dozer. Backfilling will be completed in lifts and compacted using vibratory compaction equipment. Horizontal and vertical limits of fill placement will be guided and monitored using GPS-enabled dozer equipment and/or handheld GPS survey equipment as appropriate. Completed lifts will be verified by field measurements to ensure compliance with the project specifications. Backfill lift thickness control measurements and compaction results obtained by the Contractor will be monitored by the CM to ensure that the work is performed in conformance with the project specifications.

The valve house will consist of a 10-foot x 12-foot x 8.5-foot-high precast concrete structure set over the HDPE manhole. The valve house will include a double three-foot-wide steel entry door and a 54-inch-diameter floor opening over the HDPE manhole. One-inch-thick HDPE flooring material will be welded to the rim of the 54-inch-diameter HDPE manhole. HDPE curbs will be applied to the sidewalls and welded to the dual containment outer pipe for the truck loadout pipe, penetrating the HDPE flat stock.

The four-inch/eight-inch dual-contained HDPE leachate equalization pipes will be installed above grade between the valve house and the sides of the leachate storage tanks. Above-grade equalization piping will be insulated and heat-traced to prevent freezing during cold-weather operations. The equalization pipes between the two tanks will be connected within the valve house to the truck loadout piping. The valve house will include an electrical breaker panel to control an interior and exterior lighting circuit, an interior electric unit heater, duplex wall receptacles, and a power supply for the submersible pump and the inline truck loadout pump. A submersible pump system with liquid-level controls and a leak-detection sensor will be installed in the HDPE manhole within the valve house.

An aboveground truck loadout connection will be located adjacent to the valve house that will serve as a loading point for transferring stored leachate from the leachate storage tanks into over-the-road tank trucks. The truck loadout connection will include installation of the four-inch/eight-inch dual-contained HDPE effluent pipe above grade with insulation and heat tracing. The loadout connection equipment will include installation of an exterior-rated pump control panel, a flow totalizer, and a stainless-steel-flanged ball valve. A quick-connect coupling will be provided for connection to the loadout tank truck at the end of the loadout pipe. Two eight-inch-diameter steel bollards with concrete infill and concrete foundation, will be installed on either side of the truck loadout pipe.

Work performed by the Contractor to install the valve house and truck loadout facilities will be done in coordination with the CM. The CM will conduct on-site observation of the facilities' installation work and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.6.3 Storage Tanks

The subgrade for each leachate storage tank will be established through use of an excavator that will dig down to the required elevations. If necessary, the excavated grade will then be compacted using vibratory compaction equipment, followed by the placement of a layer of geotextile and then a 12-inch-thick layer of vibratory compacted gravel. To support each tank, a cast-in-place reinforced concrete foundation slab will be constructed, approximately 45 feet in diameter and 14 inches thick with 4,000 pounds per square inch concrete and 60 kilopounds per square inch rebar, with an embedded base ring. Construction of the tank foundation slab will include assembly of any necessary formwork, installation of reinforcing rebar materials, and pouring of concrete to the required slab thickness and finished elevation. Testing of the tank slab subgrade to verify the required compaction density will be performed using in-place density measuring equipment. The slab concrete material will be sampled during pouring and tested to confirm that the concrete installed meets the required design specifications.

The preliminary tank information prepared by the storage tank supplier includes two open-top primary leachate storage tanks, approximately 31 feet in diameter by 32 feet high, with stainless steel floors and bolted 304 stainless steel sidewalls. Each primary tank will have a working capacity of approximately 173,300 gallons at a liquid depth of 31 feet and includes a 32-inch stainless steel side manway. The two outer leachate containment tanks will be approximately 43 feet in diameter and 33 feet high, with bolted 304 stainless steel sidewalls. A mobile crane or other comparable equipment will be used to erect the steel tank sections and components.

Each secondary containment tank will have a working capacity of approximately 339,800 gallons at a liquid depth of 31 feet and will include insulated sidewalls, a 32-inch stainless steel side manway, an insulated aluminum dome roof with a roof vent, an aluminum dormer with an access door to the connecting platform, a hot-dipped galvanized ladder with cage, lockout, and a step-off platform. As will be done for the primary tank, a mobile crane or other comparable equipment will be used to erect the steel tank sections and components.

The tank supplier will provide the concrete foundation and tank construction and, upon completion, will conduct hydrostatic testing of the tank system. Hydrostatic testing of the leachate storage tanks will be performed in the following sequence:

- Fill and test primary Tank 1.
- Fill and test secondary containment Tank 1.
- Transfer water to and test primary Tank 2.
- Fill and test primary Tank 2.
- Fill and test secondary containment Tank 2.

Water used for the tank hydrostatic testing of each tank will be obtained from the on-site fire hydrant. After testing is complete, the hydrostatic test water may be reused on-site (e.g., for dust control), retained for reuse during the secondary leachate collection system testing and monitoring, or discharged to the site's stormwater management system.

Testing and verification work performed by the Contractor and the tank installation contractor to construct the leachate storage tanks will be monitored by the CM to ensure that the work is performed in conformance with the project specifications. Earthwork and tank installation work performed by the Contractor will be done in coordination

with the CM. The CM will conduct on-site observation of the tank installation work and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.7 Stormwater Management System

Descriptions for construction of the UDF stormwater management system components shown in the project design drawings are provided in the following sections.

2.3.7.1 Drainage Pipes and Manholes

Trenches for the corrugated HDPE drainpipes will be excavated using GPS-enabled excavators to the required subgrade depths. The trench sides will be sloped back or supported with a trench box to allow safe worker entry to the trench for pipe installation purposes. Following excavation to the required subgrade, sand bedding material will be placed by excavator to a minimum thickness of six inches below and around the drainpipes and to a minimum thickness of 12 inches above the drainpipes. The drainpipes will be laid from the lowest point of the installation to the highest point and to the lines and grades as shown in the design drawings. Installed drainpipes will be surveyed using handheld GPS survey equipment before backfilling of the pipe trench to verify and document the alignment, slopes, and inlet-outlet elevations of the drainpipes.

Corrugated pipe joints with pipe invert slopes equal to or greater than 25 percent will use split couplers and Mar Mac Polyseal pipe wrap-couplers or equivalent joint restraints. Detectable metallic warning tape will be placed atop the drainpipe sand bedding. Where drainpipes are installed below a gravel road, a geotextile fabric and 12 inches of graded aggregate will be placed over the trench backfill material. Where drainpipes are installed below a grass/vegetated area, six inches of topsoil will be placed on top of the backfill material to the specified final grade and hydroseeded. Stone check dams to control flow into the drainpipe inlets will be constructed as indicated on the project design drawings using an excavator to place and shape the stone material. At the drainpipe outlets, a layer of geotextile fabric will be placed, followed by 12 inches of riprap material that will be placed and shaped using excavator.

Excavation for the precast concrete stormwater drain manholes will be conducted using an excavator to the required elevations at each location by sloping back the sidewalls or using a manhole box to allow safe entry for workers. Geotextile fabric will be placed on the prepared subgrade, followed by placement of 12 inches of graded aggregate by excavator and compaction by vibratory compaction equipment. The manhole will be set on the prepared subgrade by an excavator, leveled, and the invert openings of the manhole positioned to align with inlet and outlet drainpipes. Drainpipes will be inserted into the manhole pipe openings at the required elevation, and non-shrink grout will be used to seal the annular space between the drainpipes and the manhole pipe openings. The manhole excavation will be backfilled in lifts using an excavator and compacted by vibratory compaction equipment to the required final surface subgrade elevation. A cast-iron manhole frame and cover will be set in mortar on top of the manhole, and the surrounding area then backfilled with graded aggregate to the specified final grade. Backfilling and final grading work will be conducted using excavators, dozers, and vibratory compaction equipment. Horizontal and vertical limits of fill placement will be guided and monitored using GPS-enabled dozer equipment and/or handheld GPS survey equipment as appropriate. Completed lifts will be verified by field measurements to ensure compliance with the project specifications.

Backfill lift thickness control measurements and compaction results obtained by the Contractor will be monitored by the CM to ensure that the work is performed in conformance with the project specifications. Earthwork, manhole installation work, and drainpipe installation work performed by the Contractor will be done in coordination with the CM.

2.3.7.2 Stormwater Ditches

Ditches will be constructed during site cut-and-fill operations to the required design depths and cross sections shown on the project design drawings using GPS-enabled excavators, dozers, and compaction equipment. The sideslope of the ditches will be generally sloped at 3H:1V. A three-foot-wide, riprap-crushed stone mix will be placed in the bottom area of the ditches using an excavator. A six-inch-thick topsoil layer will be placed and graded by a dozer on the ditch sideslopes and hydroseeded. A permanent turf reinforcement mat will then be installed on the hydroseeded sideslopes to three feet above the ditch invert. Using an excavator, the ditches will be completed with the installation of stone check dams at specified locations to reduce water flow velocities within the ditches and to promote soil particle settlement.

Horizontal and vertical limits of ditch construction work will be guided and monitored using GPS-enabled dozer equipment and/or handheld GPS survey equipment as appropriate. Completed lifts will be verified by field measurements to ensure compliance with the project specifications.

2.3.7.3 Stream Culvert Crossing

For future site operations, it will be necessary to provide an access road across an intermittent stream that exists on the northern side of the UDF area to allow for on-site vehicles to access the northern portion of the UDF property. There is no location on the northern portion of the UDF property where access from north to south can feasibly be provided without impact to the intermittent stream. The north access road culvert provides vehicle access across an existing drainage ditch as shown on the project design drawings. The existing ditch will not be disturbed during construction of a culvert crossing that will be composed of an open bottom, corrugated single-radius structural plate steel arch. To facilitate construction access for the arch culvert, temporary concrete blocks will be set by an excavator on either side of the existing ditch, with crane mats placed by an excavator on top of the blocks and spanning across the ditch to allow for equipment access to work areas on both sides of the ditch. Straw wattles will be installed on both sides of the existing ditch to control erosion and sediment migration.

An excavator will be used to prepare the subgrade required for installation of the culvert cast-in-place concrete footings, while maintaining the existing ditch channel flow. A geotextile will be laid on the prepared subgrade, followed by placement and compaction of 12 inches of graded aggregate using an excavator and vibratory compaction equipment. Formwork will be assembled on top of the compacted aggregate, followed by placement of reinforcing materials and poured concrete. The arch culvert sections will be set in place with an excavator, backfilled with on-site soil, and compacted using vibratory compaction equipment to the roadway subgrade elevations, allowing for at least two feet of cover above the culvert crown following completed construction. A geotextile will be laid on the completed subgrade, followed by placement of 12-inches of graded aggregate in roadway areas and a 12-inch-thick layer of riprap on the sideslope areas above the culvert, as shown in the project design drawings. Placement of graded aggregate in the roadway areas will be performed using GPS-enabled dozers and vibratory roller compaction equipment. Riprap on sideslope areas will be placed by an excavator.

Following completed installation arch culvert, temporary work items will be removed, and the work area will be finished as needed to stabilize any disturbed or newly graded surfaces.

Installation of the stream culvert will be guided and monitored using GPS-enabled dozer equipment and/or handheld GPS survey equipment as appropriate. Completed lifts will be verified by field measurements to ensure compliance with the project specifications.

2.3.7.4 Stormwater Management Areas and Basins

The north and south stormwater basins and all five SMAs will be shaped and graded as shown in the project design drawings and in coordination with on-site cut-and-fill earthwork operations. The basins and SMAs will function as stormwater runoff infiltration measures that include open native soil bottom areas, topsoiled-vegetated sideslopes, inflow forebays constructed to manage sediments and provide additional infiltration, and overflow spillways.

Subgrade preparation for the SMAs and stormwater basins will include soil excavation and filling using GPS-enabled excavators, dozers, and roller compactors to achieve the required grades. Riprap material underlain with geotextile will be placed on top of the prepared subgrade surface along the interior toe of slope for the bottom areas using an excavator. A rock pilot drainage channel will be constructed in the open bottom areas of the basins and SMAs. This channel will be constructed by using an excavator to dig a trench in the prepared subgrade, followed by placement of geotextile fabric and stone material as shown in the project design drawings. The basin and SMA sideslope areas will be completed with six inches of topsoil material, which will be placed and graded using GPS-enabled dozers, and then hydroseeded.

Once shaped and graded and following installation of any inflow stormwater drainpipes, the basin forebay areas and overflow channels into the basins will be lined with geotextile and riprap to protect and stabilize the forebay areas against stormwater inflows. Except for the south basin and SMA-2, overflow spillways will be excavated in the top berm areas of the basin and SMAs using an excavator and lined with geotextile and riprap. The overflow spillway for the south basin will include the installation of a precast concrete manhole spillway and corrugated HDPE outflow drainpipe. Any potential overflow from SMA 2 will drain to SMA-3A, where an overflow spillway will be constructed using an excavator to dig the spillway channel, followed by placement of geotextile and riprap materials.

Where soil filling is required to construct the SMAs and stormwater basins, the fill material will be placed and graded in controlled lift thicknesses using GPS-enabled dozers and will then be compacted by vibratory compaction equipment. Horizontal and vertical limits of fill placement will be guided and monitored using GPS-enabled dozer equipment and/or handheld GPS survey equipment as appropriate. Completed lifts and slope gradients will be verified by field measurements and surveys to ensure compliance with design grades.

Backfill lift thickness control measurements and compaction results obtained by the Contractor will be monitored by the CM to ensure that the work is performed in conformance with the project specifications. The work performed by the Contractor to construct the SMAs and stormwater basins will be done in coordination with the CM. The CM will conduct on-site observation of this construction work and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.8 Underground Utilities

2.3.8.1 Water Service

A fire hydrant was previously installed adjacent to the UDF main entrance as part of the UDF site preparation work. Until an additional hydrant is installed where shown in the project design drawings, this hydrant will be used for construction activities, including mainly dust control. If use of an off-site fire hydrant is necessary, any necessary approvals for connecting to and use of the off-site fire hydrant will be obtained before use. For use of both the on-site hydrants and any off-site hydrant, the fire hydrant connection will be fitted with a backflow preventer and a valve conforming to Town of Lenox Water Department service requirements.

A new, six-inch diameter cement-lined ductile iron water service pipe will be installed on the UDF site in an excavated trench using an excavator at the locations and minimum depth shown on the project design drawings. The new six-inch pipe will be connected to the existing water line pipe at a blind flange located approximately 20

feet west of the existing fire hydrant. A four-inch-thick layer of sand bedding material will be placed by excavator on the prepared trench subgrade. The water pipe will be laid on top of the sand bedding and backfilled by excavator to a minimum thickness of 12 inches above the pipe centerline with sand bedding material. Detectable metallic warning tape will be placed over the completed sand backfill material. The remainder of the trench will be backfilled by excavator, using excavated overburden material from the trench or on-site general fill material, up to the subgrade elevation necessary for placement of final surface cover materials. The trench backfill material will be compacted using hand-operated compactors. The surface cover materials will consist of geotextile and 12 inches of graded aggregate (with or without pavement) in roadway areas and six inches of topsoil and hydroseed in vegetated areas.

A new fire hydrant will be installed at the location shown on the project design drawings in the easternmost part of the Operations Area. The hydrant location will be excavated to the required subgrade depth using an excavator. Hydrant and pipe bedding materials will be placed on the excavated subgrade using an excavator, followed by installation of the fire hydrant assembly and branch pipe connection to the water line pipe. A concrete thrust block will be formed and poured behind the hydrant elbow, followed by placement of crushed stone drainage material surrounding the hydrant drain. The remainder of the trench will be backfilled by an excavator, using excavated trench overburden or on-site general fill material, up to the required subgrade elevation necessary for placement of final surface cover materials The trench backfill material will be compacted using hand-operated compactors. A layer of geotextile will be placed, followed by 12 inches of graded aggregate to the specified final grade. The surface cover materials will be the same as discussed in the prior paragraph.

Following its installation, the water service pipes will be disinfected and hydrostatically tested in accordance with the project specifications and Town of Lenox Water Department requirements. The pipe disinfection chlorinated water will be flushed from the pipes after testing and disposed of off-site at the Lenox Wastewater Treatment Plant.

Backfill lift thickness control measurements and compaction results obtained by the Contractor will be monitored by the CM to ensure that the work is performed in conformance with the project specifications. Earthwork and hydrant and pipe installation work performed by the Contractor will be done in coordination with the CM. The CM will conduct on-site observation of this utility installation work and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.8.2 Septic Tanks

The septic tanks identified in the project design drawings in the western part of the Operations Area and in the parking area near the UDF main entrance will be permanent structures that will be installed as part of the UDF construction work and will remain in place for use during the UDF operations phase. Once installed during the UDF construction phase, these septic tanks will be designated for use associated with on-site office trailers for GE, the CM, EPA, and others. Additionally, a sufficient number of temporary portable toilets will be provided by the Contractor for the duration of the construction project for use by Contractor and subcontractor personnel and for GE and CM staff and visitors.

The number of portable toilets and locations will be determined based on the current work activities and will factor in the number of on-site personnel, visitors, and locations where work is occurring on the jobsite. Typically, the Contractor estimates that there should be one portable toilet per five employees, but more toilets may be necessary if work activities occur in more remote locations of the site, further from the office trailer support area. At least one gender-separate toilet will be provided and labeled. Portable toilets will have regular maintenance by the portable toilet rental company to ensure that the facilities remain clean and sanitary.

2.3.8.3 Electric and Communication Services

The electrical subcontractor will install electrical materials, components, and systems for the UDF as specified in the project design documents. On-site inspections and testing will be performed on the installed electrical systems by the Contractor's independent inspection and testing subcontractor to confirm proper operation, including for the leachate riser vault equipment, valve house truck loadout equipment, leachate junction manhole equipment, leachate conveyance manhole equipment, office trailer equipment, guard house trailer equipment, motorized entrance gate system equipment, emergency backup power system equipment, and roadway lighting equipment.

Office trailer telephones will not be utilized on-site. Cellular phones will be provided by the Contractor as necessary for Contractor personnel use. The Contractor will set up high-speed internet access for the temporary office trailers with a mobile WiFi hotspot. Conduits for electric and fiber optic communications cables and fittings and electric cables will be installed to the main construction entrance gate (including guard house trailer location), the leachate riser vaults, the leachate force main manholes, the leachate storage valve house and truck loadout, and to the western part of the Operations Area for connection to future office trailers.

The electric and communications conduits and electric cable will be installed below grade in a common or separate utility trench, as required, and to the minimum design depth. Conduits placed in a common utility trench will be spaced at least 12 inches apart and a minimum of five feet from the leachate force mains. Excavation to the required trench subgrade depth will be conducted by an excavator, followed by placement of a four-inch-thick layer of sand bedding. The conduits will then be laid on the sand bedding and covered by 12 inches of sand bedding material. A layer of detectable metallic warning tape will be placed over the conduit locations. The remainder of the trench will be backfilled by an excavator, using excavated overburden material from the trench or general fill material from on-site excavations, up to subgrade elevation necessary for placement of final surface cover materials. The trench backfill material will be compacted using hand-operated compactors. The surface cover materials will consist of geotextile and 12 inches of graded aggregate (with or without pavement) in roadway areas and six inches of topsoil and hydroseed in vegetated areas.

Backfill lift thickness control measurements and compaction results obtained by the Contractor will be monitored by the CM to ensure that the work is performed in conformance with the project specifications. Earthwork and conduit installation work performed by the Contractor will be done in coordination with the CM. The CM will conduct on-site observation of this utility installation work and will provide EPA with relevant conformance verification data for its review as the data become available.

2.3.9 Communication System

The communication system for the UDF will consist of an integrated programmable logic controller/operator interface terminal system that will be installed by the Contractor's communications systems subcontractor during UDF construction in accordance with project requirements. The system will be designed by the Contractor's communications systems subcontractor and will include submittals for shop drawings, product data, and test procedures for review and approval by the CM prior to installation. Commissioning of the communications system is described in Section 2.3.11.1.

2.3.10 Waste Management

The Contractor will manage waste material in accordance with the project requirements, applicable regulations, and best management practices for disposal and recycling. Project waste material quantities will vary based on final means and methods, construction conditions, and material procurement/packaging, as well as different phases of

the project, with phases such as geosynthetics deployment producing more anticipated waste than average and other phases producing less.

Any oils, greases, epoxies, or potentially hazardous waste materials associated with the upkeep of construction equipment will be properly disposed of in accordance with Massachusetts's hazardous waste or solid waste disposal requirements as applicable. Office-based waste materials will be disposed of or recycled as appropriate. A local waste hauler will be used to haul recycled and waste products from the UDF site. Properly sized waste containers for each phase of work will be delivered to the site and managed/removed by the local waste hauler(s) as they are filled. Waste packaging materials associated with delivered products will be returned to the suppliers, if feasible, or disposed of or recycled off-site.

The anticipated disposal locations and haulers for various types of waste materials identified for off-site disposal or recycling are listed in Table 1 below. Receipts will be obtained for waste materials transported off-site. Records documenting the quantity of materials hauled off-site for recycling, reuse, salvage, or disposal, including bills of lading, shipping documents, manifests, weight slips, and receipts, will be submitted monthly to the CM.

Table 1 - Waste Material Disposal Locations

Disposal Location	Anticipated Hauler	Waste Materials
Casella Transfer Station - Lenox, MA	Casella	Cardboard, clean dimensional wood, batteries, wood pallets, demolition debris, office and general site solid wastes
AutoZone - Pittsfield	Varies	Batteries
Veolia Environmental Services – Middlesex, NJ	Veolia Environmental Services	Paints, solvents, & other hazardous fuels
Pearlman Recycling, LLC. – Pittsfield, MA	Berkshire Fence Company	Fencing materials
Lenox Wastewater Treatment Plant – Lenox, MA	Yankee Septic Tank Services	Disinfection water (hydrostatic testing of water service line), sanitary water (from portable toilets)
Casella Waste Systems – Newport, VT	Rifenburg Contracting Corp	Vegetation (invasive species and root balls)

The truck routes anticipated for use by local and regional waste haulers for pickup and off-site transportation of UDF-generated waste materials will be those described in Section 2.4 below.

2.3.11 Systems Commissioning and Training

2.3.11.1 Commissioning

Commissioning of the installed equipment and systems will be performed by the Contractor in coordination with the GE and CM at the completion of the construction work. The Contractor has established procedures, documentation requirements, coordination methods, and acceptance criteria necessary to deliver fully functional systems at the completion of construction. The Contractor's commissioning activities will be integrated into the overall construction schedule and coordinated with the CM, equipment suppliers, testing entities, and other involved parties.

Installed equipment and systems subject to commissioning include components associated with but not limited to the following:

- Electrical;
- Communication;
- Pumps;
- Switches;
- Sensors;
- Motors;
- Lighting;
- Water supply;
- Force mains; and
- Tanks (leachate, septic).

In general, the commissioning of designated equipment and systems to be conducted by the Contractor will include the following activities:

- Preparation of pre-functional inspection checklists for major equipment and systems being commissioned (with each checklist to document equipment nameplate information, system characteristics, and verification that the equipment or system is accurately reflected on the record drawings);
- Start-up and pre-functional inspection of equipment and systems;
- Functional performance testing of equipment and systems to verify and record proper operation (with each test to be performed under conditions that simulate normal operating conditions as closely as possible);
- Problem solving that may be required to determine solutions of any deficiencies noted during functional testing, including identifying root causes, implementing corrective actions, and performing retesting; and
- Coordination and documentation of all functional performance test activities and results.

The Contractor will provide written reports to the CM summarizing all issues identified during start-up, testing, and commissioning activities, including a description of any issues and the actions taken to resolve them. Reports will identify any outstanding deficiencies and the status of corrective actions or any retesting. Reports will be submitted in a format acceptable to the CM and will become part of the permanent commissioning documentation for the project. Commissioning results for the major system components of the UDF will be provided to EPA at its request.

2.3.11.2 Training

Training modules will be developed by the Contractor that provide for an overview of the construction work to be conducted at the UDF site and instruction on the operation and maintenance of following UDF components:

- Leachate collection system;
- Leachate conveyance and storage system;
- Stormwater management system;
- Utilities; and
- Security elements that include operation of the main construction entrance gate.

On-site training modules to be provided by the Contractor will include description and identification of equipment, operation, monitoring, inspection, troubleshooting, safety, housekeeping, preventive maintenance, and equipment calibration. These modules will be available for use by GE, the CM, and the future operations contractor.

2.3.12 Post-Construction Activities and Demobilization

As major construction work is completed, activities will be conducted to terminate the construction phase, stabilize the site, and make it ready for UDF operations. Completed areas will be fine graded to match the required elevations required to complete subgrade preparation. Approximately one-half of the topsoil depth needed in vegetated areas will be applied and blended with the top two inches of the subgrade using rototilling, disk harrowing, or harrowing. The remaining topsoil thickness will be applied with each lift being graded and lightly compacted to reduce future settling. Prepared areas will be moistened before seeding. A spreader or seeding machine will apply project seed materials in areas where hydroseeding will not be used. The seed will be lightly raked into the topsoil to ensure proper integration and success of growth. For hydroseed applications, a homogeneous slurry will be created by blending seed, fertilizer, and fiber mulch in water. A non-asphalt-based tackifier will be mixed into the slurry. The slurry will then be uniformly applied to the designated topsoil areas, followed by a slurry cover coat of fiber mulch. Erosion blankets will be placed in the required sloped areas.

A post-construction survey, conducted by a licensed Professional Land Surveyor, will be conducted upon completion of construction to document completed construction work and post-construction activities, including topographic and site features. The survey will identify structures, features, surface topography, slope break lines, roadways, and drainage features. Elevations data will be obtained and documented for structures and drainage features.[1]

Demobilization of construction personnel and equipment will occur over time as work tasks are completed. Paved surfaces will be broom-cleaned, and other surfaces will be cleared of any surplus materials and debris. Debris and sediment will be removed from drainage systems and related features. Where feasible, drainage systems will be flushed to remove accumulated sediment and debris. Construction equipment will be broom-cleaned before demobilizing from the site.

Temporary utilities will be disconnected, and the office trailers, sanitary facilities, and other support facilities supplied by the Contractor will be removed or, if approved by the CM, may remain in place for the operations contractor's use. The disturbed areas will be regraded and stabilized as needed to meet project specifications. Temporary pedestrian and vehicle traffic barriers, signs, temporary security fences, and gates installed by the Contractor will be removed. After vegetation of seeded areas has been established and approved by the CM, erosion and sediment controls will be removed and disposed of off-site.

2.4 Transportation Routes for Construction and Traffic Management

The primary truck traffic to and from the UDF site will be limited to designated travel routes that include Route 20, Walker Street, Mill Street, Willow Hill Road, and Woodland Road. Construction-related traffic (i.e., Contractor vehicles and vehicles operated by the Contractor's subcontractors and vendors) will avoid use of the Bradley Street-Woodland Road connection between Mill Street and Willow Hill Road.

More specifically, for trucks traveling to the UDF site from the north, the designated truck route will be via Route 20 east from Pittsfield to Walker Street, Mill Street, Willow Hill Road, and Woodland Road. For trucks traveling from

[1] Preparation of a UDF Construction Completion Report is discussed in Section 6.2.

the south to the UDF site, the designated truck route will extend from the I-90 Massachusetts Turnpike at Exit 10 in Lee, up Route 20 west toward Pittsfield, then to Walker Street, Mill Street, Willow Hill Road, and Woodland Road. Once on Willow Hill Road, trucks will enter the UDF site either through the west access road or by continuing on to Woodland Road and then entering through the main construction entrance off Woodland Road. The truck transportation routes described above for the UDF construction project are shown in Figure 3.

During construction activities using Woodland Road in the area of the main construction entrance, associated utility work, and construction work at the vernal pool area, the Contractor will utilize roadway traffic management devices, including signs, cones, and drums to direct traffic around and away from work activities. Contractor personnel will serve as flaggers when needed to manage traffic flow in the work areas.

3 Project Safety Plan

3.1 Health and Safety

Health and safety of on-site personnel, the public, and the environment are of paramount importance to the project and GE. The Contractor's on-site activities will be performed in accordance with a site-specific Health and Safety Plan (HASP) prepared by the Contractor, which is provided in Appendix A. The HASP identifies hazards that may be encountered due to site conditions and/or the expected types of work to be implemented and presents procedures and controls to protect the health of on-site personnel, the public, and the environment from those hazards. Also included in the Contractor's HASP are the names, roles, and responsibilities of individuals employed or subcontracted by the Contractor who will be responsible for the implementation of the HASP. The Contractor's HASP will cover its own personnel, its subcontractors, and any visitors associated with the Contractor.

3.2 Site Management and Site Security

The UDF site is encircled with a chain-link fence that was installed previously as part of the UDF site preparation work. Currently, as described in Section 2.1, there are four vehicle access gates and two personnel gates. These gates will be controlled by the Contractor and locked when not in use. The main construction site entrance will be used for visitor access, and signs will be posted instructing visitors where to go for sign-in purposes.

As part of UDF construction, the existing main construction entrance access gate will be modified to include motorized operators with touchpad entry controls. Until these modifications are implemented, the gates will be operated and locked manually. Sections of the UDF site perimeter fencing will be removed and replaced along the western, northwestern, and northeastern limits of work to facilitate UDF construction. Temporary fencing will be installed by the Contractor at these locations to secure the site while the site work is being conducted.

Temporary field office trailers and storage units will be locked at the end of each work day. Except at the vernal pool enhancement area, all construction equipment and materials will be stored inside of the site perimeter fence. For the period in which work will occur in the vernal pool enhancement area, equipment and materials for that work will be kept within the limits of vernal pool work areas. Temporary fencing will be placed across the vernal pool temporary construction entrance and locked at the end of each work day.

In general, the Contractor will be responsible for security of its work areas within the site and for security of the its office trailers, storage units, equipment, and materials. GE and the CM will have responsibility for overall site security. which will include conducting regular inspections of the site perimeter fence, posted signage, and gates for evidence of tampering or other damage. GE and the CM will also perform servicing and maintenance of the perimeter fence components that may be needed to maintain their function.

3.3 Spill Prevention, Control, and Countermeasures

The Contractor will implement spill prevention, control, and countermeasure procedures and controls to prevent and, if necessary, control spills of materials that are potentially harmful to on-site personnel, the public, and/or the environment (spill examples include fuel, oil, and hydraulic fluid). The Contractor has developed a Spill Prevention, Control, and Countermeasure (SPCC) Plan to provide contingency measures for potential spills and discharges resulting from construction and remedial activities, including the handling, storage, and transfer of contaminated materials.

Potential spills or discharges of particular concern during UDF construction include releases of fuel, oil, lubricants, hydraulic fluids, and other petroleum products from vehicles, vessels, and equipment; releases from fuel storage tanks or wastewater storage tanks; spills of contaminated sediment or debris; and discharges of water resulting from leaks, spills, or the failure of tanks, pipes, or hoses.

The Contractor's SPCC Plan identifies potential spill or discharge locations and describes the preventive measures that will be implemented to prevent spills. In the event of a spill, the Plan also describes the secondary containment and response measures to prevent spilled material from entering surrounding waterbodies or the ground.

The Contractor will not install any storage tanks for petroleum, oil, and lubricants that exceed 1,320 gallons or any single storage container that exceeds 660 gallons. The Contractor will comply with applicable federal, state, and local requirements governing stationary aboveground storage tanks.

The substantive components of the SPCC Plan are summarized herein. A copy of the full SPCC Plan (including any updates) will be maintained in the Contractor's and CM's trailers.

The Contractor will implement the following spill prevention procedures:

- Secondary containment will be provided at locations where spills or discharges could reasonably reach surrounding water bodies or the ground. Secondary containment measures will include, as appropriate, spill pans placed beneath stationary equipment, plastic sheeting or containment membranes installed under equipment or material storage areas, and steel troughs or channel sections installed beneath hydraulic fittings and hoses.
- Stored fuel will be covered or enclosed to prevent exposure and releases, and appropriate spill controls will be implemented during fueling operations. Fueling nozzles will be equipped with automatic shutoff devices to avoid overfilling and drips and fueling operations will not be left unattended at any time.
- Vessels, vehicles, and equipment will be inspected each day on which they are in use to identify leaks or conditions that could result in a spill. Any equipment found to be leaking will be repaired immediately or removed from the UDF site until repairs are completed.
- Absorbent spill cleanup materials and fully stocked spill kits will be available in fueling areas and on fueling trucks. Project personnel will promptly address small spills using absorbent materials and will properly containerize and dispose of used spill response materials in accordance with approved waste management procedures. Berms and dikes will be installed and maintained at fueling locations as necessary to prevent runoff and to contain incidental spills.
- The Contractor will make arrangements with a qualified spill response contractor who will be available on an on-call basis for the duration of project operations.

If a spill occurs, the Contractor will implement the following SPCC procedures:

- The Contractor will be responsible for providing the resources needed to respond to a spill, including methods, means, facilities, materials, equipment, and trained personnel (including emergency response subcontractors).
- In the event of a spill or discharge, the Contractor will immediately notify the CM and implement measures to control and contain the contamination. Response actions may include isolating the affected area, applying foam when necessary, recovering free liquids where feasible, absorbing spilled liquids, and removing, isolating, and covering contaminated soil or debris. If the spill exceeds reportable quantities or concentrations, GE will make the required notifications to the appropriate regulatory authorities.

- The Contractor may be required to implement decontamination procedures to remove spilled materials from previously uncontaminated structures, equipment, or materials and to reduce contaminant concentrations to levels acceptable to the CM. Contaminated materials that cannot be effectively decontaminated will be containerized appropriately, labeled, and stored for off-site disposal. Personnel decontamination procedures will include the cleaning or disposal of contaminated clothing, tools, and personal protective equipment. Specific decontamination procedures are described in Appendix B to the Contractor's HASP.
- Contaminated soils, absorbent materials, solvents, and other materials generated during spill cleanup activities will be properly containerized, labeled, stored, transported, and disposed of in accordance with applicable regulations.

3.4 Fire Prevention

The Contractor has in place a fire prevention plan. That plan is focused on eliminating the causes of fire, preventing loss of life and property by fire, and complying with the Occupational Safety and Health Administration standard on fire prevention, 29 CFR 1910.39, and USACE EM 385-1-1 Section 9 Fire Prevention and Protection. This plan provides site personnel with information and guidelines to help recognize, report, and control fire hazards. The Contactor's fire prevention plan to be implemented at the UDF site aligns with the Contractor's HASP and will be discussed with staff on-site prior to commencement of work.

The Contractor's fire prevention plan is committed to minimizing the threat of fire to site personnel, visitors, and property and complies with applicable laws, regulations, codes, and good practices pertaining to fire prevention. The Contractor's fire prevention plan serves to reduce the risk of fires at the project in several ways. Specifically, it:

- Identifies materials that are potential fire hazards and their proper handling and storage procedures;
- Distinguishes potential ignition sources and the proper control procedures of those materials;
- Describes fire protection equipment used to control fire hazards;
- Identifies people responsible for maintaining the equipment and systems installed to prevent or control ignition of fires;
- Identifies people responsible for the control and accumulation of flammable or combustible material;
- Describes good housekeeping procedures necessary to ensure the control of accumulated flammable and combustible waste material and residues to avoid a fire emergency; and
- Provides training to site personnel about fire hazards to which they may be exposed.

On-site equipment is subject to routine maintenance, inspection, and testing procedures that reduce the risk of fire-related events. The Contractor will provide basic fire prevention training to site personnel at the project start, when new personnel begin work at the site, and periodically as needed throughout the project. The Contractor will perform a review of its fire prevention plan at least annually for necessary changes.

4 Project Quality Plan

4.1 Quality-of-Life Protection Measures

4.1.1 Project Work Hours

The Contractor's active construction work is planned to be conducted between the hours of 7:00 a.m. and 6:00 p.m. on Monday through Friday unless otherwise approved by the CM. Some pre-work and/or supporting activities may be conducted at the UDF site before 7:00 a.m. or after 6:00 p.m., such as pre-construction safety tailgate meetings, equipment startup and inspections, equipment servicing, delivery and offloading of materials from off-site vendors, servicing of on-site facilities, and vehicle entry to and from the UDF site by oversight and construction personnel. Additionally, some office administrative activities or equipment maintenance may occur on Saturdays. In the event that it becomes necessary to perform active construction work on Saturdays to make up schedule, GE will discuss this with EPA and receive its concurrence before proceeding.

4.1.2 Dust Control

The Contractor will implement routine measures and BMPs to control dust during construction activities at the UDF site, as specified in the UDF Revised Operation, Monitoring, and Maintenance Plan (Revised UDF OMM Plan; Arcadis 2024b). The control measures and BMPs to be implemented for UDF construction include the following:

- Water application (water truck spreader, water gun/hose spray) on site roads, earthwork areas, stockpile areas;
- Use of temporary surface coverings (e.g., wood chips, vegetation, tarps, etc.) on dust-prone areas that may be dormant for a period of time;
- Management of vehicle speeds (since lower speeds can reduce dust generation from tires);
- Assessment of wind conditions to determine if vehicle routes could be adjusted to minimize dust generation;
- Possible use of certain road surface materials such as aggregates or pavement in high-traffic areas prone to dust generation;
- Use of stabilized construction entrances for removal of dust prone materials from truck tires before exiting the site; and
- Street sweeping at the UDF site entrances as needed.

These techniques will be utilized to mitigate the potential for generation of fugitive dust and minimize the opportunity for visible dust to leave the work area.

The QOL standards for airborne particulate matter, which include Notification and Action Levels, standards for visual observations, and the actions to be taken in responses to exceedances of those standards (including notifications and contingency measures) are described in Section 4.3 of the Second Revised Quality of Life Compliance Plan (Revised QOL Plan) (Anchor QEA and Arcadis 2025). The particulate matter standards apply to particulates smaller than 10 micrometers in diameter (PM_{10}), The airborne particulate matter Notification and Action Levels included the QOL Plan, which will be used at the UDF site during construction, are shown in Table 2 below.

Table 2. Air Quality QOL Standards for Particulate Matter (as PM_{10})

Type	Averaging Period	Numerical Standard
Notification Level	10-hour average	120 micrograms per cubic meter (µg/m^3)
Action Level	10-hour average	150 µg/m^3

To verify that air quality meets the established QOL standards for particulate matter, air monitoring for PM_{10} will be conducted at the UDF site perimeter during construction activities to assess potential impacts on air quality due to particulate generation resulting from construction equipment and activities. The air monitoring equipment for particulate matter is described in Section 4 of the revised Ambient Air Monitoring Plan, which is Attachment D of GE's revised Project Operations Plan (Arcadis 2025); and the procedures for particulate matter air sampling are provided in Appendix G to GE's Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP; Arcadis 2023).

During construction activities, monitoring for airborne particulate matter will be conducted at five specific locations near the UDF site boundary, which are shown in Figure 2. Particulate matter air monitoring will also be conducted at an additional, temporary location when construction activities are being performed in the vernal pool enhancement work area. This temporary monitoring location will maintain appropriate positioning between the work zone and potential receptors (i.e., Woodland Road). If work-day average PM_{10} concentrations exceed the Notification or Action Levels based on monitoring at the UDF locations, the Contractor will promptly implement additional controls, such as increasing water truck use or adding materials to work areas, to reduce dust and prevent repeat exceedances. Any dust suppression agents considered for use by the Contractor will first need to be submitted and approved by the CM; and in severe drought conditions, dust-generating activities may be limited or rescheduled with possible traffic diversion or speed restrictions.

Monitoring for airborne particulate matter will be conducted throughout the duration of daily active construction work between the hours of 7:00 a.m. and 6:00 p.m. on Monday through Friday unless otherwise approved by the CM. At times when work activities being performed on the UDF site will not involve ground disturbances that could potentially result in the generation of dust, the CM will confer with EPA's field representative to request approval from EPA for either a reduction in the number of monitors operating at the site or the temporary stoppage of monitoring at the site for a given period. This request will be based on the Contractor's planned activities and the anticipated duration of those activities.

In addition to particulate matter monitoring, weather monitoring will be performed at a meteorological station installed and operated in a fixed location to record wind speed and wind direction, as well as other meteorological data, over 24-hour periods to support evaluation and understanding of the air monitoring results. The location of the meteorological station maintained on the UDF site is shown in Figure 2.

4.1.3 Noise Control

As noted in Section 4.1.1, the Contractor is planning to perform active construction work between the hours of 7:00 a.m. and 6:00 p.m. (on weekdays) so as not to disturb the neighboring community during nighttime hours. To minimize unnecessary noise during those active construction work hours, the Contractor will implement routine control measures and BMPs to control noise impacts. Such measures and BMPs will include the following:

- Maintaining equipment in good working order;
- Use of broad-spectrum backup alarms on all applicable construction vehicles and equipment;
- Use of sound-shielding equipment for noise suppression around temporary generators and mufflers on applicable construction vehicles and equipment; and

- Training personnel on awareness of noise-reduction techniques during equipment operation, such as techniques to avoid slamming tailgates on dump trucks.

As appropriate, based on monitoring results (as discussed below), additional control measures and BMPs (e.g., modification of construction methods, use of sound-attenuating barriers) may be implemented to further minimize noise impacts.

The approved QOL standards for noise are set forth in Section 4.4.1 of the Revised QOL Plan. These standards include a residential daytime noise standard (which is applicable from 7:00 a.m. to 9:00 p.m. and includes both Notification and Action Levels), a residential nighttime noise standard, and a non-residential noise standard (applicable at any time), measured as maximum hourly average decibel levels. As agreed with EPA, the non-residential noise standard will be used at the UDF area. To verify that noise levels meet that standard, noise levels will be periodically monitored during UDF construction activities in accordance with the Revised UDF OMM Plan. Noise monitoring will be conducted during active work hours at representative locations near the closest receptor to the work activities or between the active work areas and the closest receptor. The selected noise monitoring locations for UDF construction activities will generally be co-located with the air monitoring stations established for the project, discussed in Section 4.1.2 and shown in Figure 2. As described for air monitoring in Section 4.1.2, an additional, temporary location will be monitored for noise at the vernal pool work area during work in that area. Monitoring at this additional location will be conducted at variable locations determined each work day based on where work is being performed on a given day.

Noise monitoring locations may be adjusted in the field during construction activities based on the following site conditions:

- Location of construction activities;
- Location of nearest potential receptor(s);
- Property access;
- Proximity to other noise sources (e.g., roads, commercial operations); and
- Location-specific conditions, such as, but not limited to, topography and vegetation density.

Additionally, if noise monitoring is performed in response to a noise complaint, it will be performed at a location situated to evaluate that noise complaint.

During construction work, initial noise monitoring will be performed at the beginning of active construction on a day that is representative of full-scale operations. If that initial monitoring indicates that noise levels meet the non-residential noise standard, subsequent monitoring will be performed monthly during site construction activities. Additional monitoring will be performed when a new activity, equipment, or reduced distance to receptors has the potential to increase noise levels, as well as in response to noise complaints (if any).

On each day of noise monitoring, monitoring will be conducted continuously during active construction work hours as described in Section 4.1.1, so that one-hour averages can be computed throughout the entire construction day for use in comparison to the non-residential noise standard.

The noise monitoring to be conducted during the construction work will be conducted in accordance with Section 3.7 of the revised Construction Monitoring Plan, which is Attachment G of the revised Project Operations Plan. In general, the point of compliance for these standards will be at the closest receptor location, but noise monitoring may be performed closer to the source(s) for ease of implementation and to conservatively demonstrate compliance.

In the event of an exceedance of the non-residential noise standard, the Contractor will investigate the cause of the exceedance and determine whether modifications or additional measures are necessary and can be implemented. Written records of exceedances will be kept documenting the date and time of exceedances and the type of activities occurring onsite at the time. Further details on the QOL noise standard and responses to exceedances of that standard (including notifications and contingency measures) are included in Section 4.4 of the Revised QOL Plan.

4.1.4 Lighting Control

Generally, most of the Contractor's active work activities will be performed during daylight hours, as discussed in Section 4.1.1, and will be conducted outdoors where natural light should be sufficient. Supplemental lighting may be used in support and/or equipment laydown areas as necessary and may be operated for 24-hour periods in certain areas for security purposes. Supplemental lighting will also be used as needed when working within structures and may also be used for exterior work occurring before sunrise or after sunset. Supplemental lighting may include portable light towers, equipment-mounted lights, and/or task-specific lights. Power sources for supplemental lighting could include portable generators, electrical supply from vehicles (for fixtures mounted to vehicles), local utility grid, solar panels, and/or batteries. To the extent practicable, supplemental lighting will be directed away from nearby properties and will be positioned to avoid creating traffic hazards. Depending on the position and direction of supplemental lighting, additional provisions may be implemented to avoid disturbing neighboring properties. These provisions could include limiting the height at which lights are positioned, reducing the brightness of lighting, and using shields to control where light is cast.

The QOL standard for lighting, as set forth in Section 4.6.1 of the Revised QOL Plan, is to mitigate nuisance project-related lighting impacts based on any complaints from nearby receptors. In the event of any lighting complaint, the Contractor will investigate the complaint to determine whether the lighting issue is related to the UDF construction project. If the lighting complaint is related to that project, GE will evaluate whether the lighting can be adjusted or mitigative measures can be implemented in a manner that does not compromise public safety or the safety of project workers and in a manner compliant with applicable safety regulations. Written records of complaints will be kept documenting the date and time of the complaint and the type of activities occurring onsite at the time. Further details on the QOL lighting standard and responses to complaints are included in Section 4.6 of the Revised QOL Plan.

4.1.5 Odor Control

Nuisance odors are not anticipated as a result of work associated with UDF construction activities. The QOL standard for odor, as set forth in Section 4.5.1 of the Revised QOL Plan, 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. 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.[2] 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 UDF construction. If so, the documentation, evaluation, and notification procedures described in Section 4.5.3 of the Revised QOL Plan will be implemented.

If mitigation measures are deemed necessary to address an odor report or complaint, the Contractor may apply odor mitigation agents such as BioSolve Pinkwater, Atmos Shield 645 (AC-645) Foam Concentrate, or ConCover 180 spray-on cover. Other methods for odor suppression may be used, such as clean dirt cover, woodchips, or

[2] In addition, the QOL standards include a specific one-hour standard for hydrogen sulfide, as described in Section 4.5.1 of the Revised QOL Plan. That standard will be applied at the UDF construction site if an odor resembling rotten eggs is reported.

tarps. The use of these odor mitigation measures will be dependent on the nature and source of the odor and will be subject to CM review and approval prior to use.

4.2 Construction Quality Control

The Contractor will be responsible for the establishment of an effective quality control (QC) system to be used for laboratory services provided in support of the field sampling and analysis programs and for work conducted in the field by the Contractor during UDF construction. This responsibility includes surveillance of project activities to ensure conformance with the design documents and safety requirements, conducting and documenting certifying tests and qualifications, and documenting quality control work, including the occurrence of deficiencies and corrective actions (if they occur). To ensure construction quality control, the following activities will be conducted by the Contractor:

- All relevant design documents and related plans will be reviewed by site personnel and sampling-testing service providers prior to starting work.
- Data sheets and/or analytical testing results for any required materials (e.g., soils and aggregates, baseliner materials, utility components) will be reviewed by the Contractor and submitted to the CM prior to material delivery to the site.
- Materials will be inspected for conformance upon delivery to the site and before installation.
- Delivery tickets will be obtained to track and document materials brought to or taken from the site UDF during construction.

The CM will also be responsible for the establishment of an effective quality assurance (QA) system to be used to ensure that the QC system is working effectively.

Further description of laboratory-based and field-based construction QA/QC is provided in the following sections.

4.2.1 Laboratory QA/QC

The Contractor will utilize laboratory services for chemical analytical testing of imported soil fill materials, for geotechnical field and laboratory-based testing of both imported and on-site soil fill materials, and for testing of baseliner geosynthetic materials. All field and laboratory-based testing will be conducted in accordance with relevant requirements in the FSP/QAPP and the project specifications. These testing requirements will apply to field sampling activities, laboratory testing work, test data management and review, and data documentation-reporting.

Analytical testing laboratories predetermined by the Contractor for the UDF construction services include Pace Analytical and Eurofins, both of which are identified in the FSP/QAPP. Geotechnical laboratories predetermined by the Contractor for UDF construction services include Allied Testing Laboratories and John Turner Consulting, Inc. (for soils), and RSA Geolab, LLC. (for geosynthetics).

4.2.2 Construction QA/QC

Construction QA/QC will include construction personnel activities, procedures, inspections, and controls implemented during construction of the UDF to ensure that quality-impacting activities are implemented and recorded in the Contractor's document control system, and that they are performed in accordance with the project construction documents and requirements. Construction QA/QC will involve both on-site and off-site Contractor work as well as work by subcontractors, fabricators, suppliers, and vendors.

The Contractor's construction QC program includes a four-phase inspection program to verify compliance with the project construction document requirements and standards for activities that affect quality on and off the jobsite. The four-phase inspection program includes preparatory, initial, follow-up, and completion inspections of each definable feature of work. Contractor personnel include on-site staff responsible for implementing, overseeing, and documenting QC activities on a daily basis.

Various QA/QC activities to be conducted during construction are described throughout Section 2. To support the planned 2028 commencement of UDF operations, it will be necessary to gain EPA acceptance of several key QA/QC components during active UDF construction. This acceptance will provide assurance that ongoing and newly completed construction work meets project requirements and will facilitate EPA's subsequent timely approval of the UDF Construction Completion Report (described in Section 6.2) and the consequent authorization for UDF operations. Provided below is a listing and summary description of the UDF key QA/QC components identified at this time for EPA review and acceptance during construction.

Baseliner System Subgrade

As the baseliner grading progresses and design subgrade elevations are achieved, completed portions of the UDF cells will be surveyed and inspected to confirm compliance with the project specifications. Data elements that will be provided to and reviewed with EPA will include as-built survey information (pipe trenches, sumps, slope gradients, grade elevations) and subgrade surface compaction results to confirm suitability for placement of soil clay liner material.

Low Permeability Soil Clay Liner

Following completion of the soil clay liner test fill, the data obtained from the test fill will be provided to and reviewed with EPA to confirm that the clay liner installation criteria achieved for thickness, compaction density, and permanently meet project requirements.

As the soil clay liner installation progresses within each cell, test results obtained for in-place density, permeability, constructed thickness will be provided to and reviewed with EPA to confirm that the clay liner installation meets project requirements.

Secondary Leachate Collection Sump and Pipes

Following installation but prior to covering of the secondary leachate collection pipes (including sump and cleanout pipes), data obtained for the completed work (surveyed elevations, pipe configuration and type, dimensional measurements) will be provided to and reviewed with EPA to confirm that the pipe installations meet project requirements.

Secondary Granular Drainage Layer

Data obtained during installation of the secondary granular drainage layer will include thickness verification measurements and will be provided to and reviewed with EPA to confirm that the layer thickness meets project requirements.

Secondary Geomembrane Liner Leak Detection

The secondary geomembrane liner will be subject to a liner leak location survey to determine the integrity of the liner against leakage. The results of the leak location survey, including the results of any subsequent testing due to any needed liner repairs identified from the leak location survey, will be provided to and reviewed with EPA to confirm that the layer thickness meets project requirements.

Primary Leachate Collection Sump and Pipes

Following installation but prior to covering of the primary leachate collection pipes (including sump and cleanout pipes), data obtained for the completed work (surveyed elevations, pipe configuration and type, dimensional measurements) will be provided to and reviewed with EPA to confirm that the pipe installations meet project requirements.

Primary Granular Drainage Layer

Data obtained during installation of the primary granular drainage layer will include thickness verification measurements and will be provided to and reviewed with EPA to confirm that the layer thickness meets project requirements.

Primary Geomembrane Liner Leak Detection

The primary geomembrane liner will be subject to a liner leak location survey to determine the integrity of the liner against leakage. The results of the leak location survey, including the results of any subsequent testing due to any needed liner repairs identified from the leak location survey, will be provided to and reviewed with EPA to confirm that the layer thickness meets project requirements.

Baseliner System Operations Layer

Data obtained during installation of the baseliner operations layer will include thickness verification measurements and will be provided to and reviewed with EPA to confirm that the layer thickness meets project requirements.

Baseliner System Geosynthetics Anchor Trench

Construction of the baseliner geosynthetics anchor trenches will include excavation of the (inboard) baseliner geosynthetics anchor trench and the (outboard) geosynthetics extension anchor trench in the UDF perimeter berm. The trench locations on the perimeter berm and completed depths will be surveyed and measured prior to installation of geosynthetic materials. The placement and testing results of the geosynthetic materials in the anchor trenches along with soil backfilling of the trenches will be documented. As these results data become available during construction, they will be provided to and reviewed with EPA to confirm that the constructed components meet project requirements.

At the start of field construction work, GE and the CM will coordinate with EPA to determine and schedule progress meetings during which data obtained for the key components described above can be reviewed as needed to facilitate EPA approval.

5 Project Technical Documents

The project technical documents used for the UDF construction work include construction specification sections and design drawings. Further discussion of these project technical documents is provided in the following sections.

5.1 Specifications

Technical specification sections prepared for the UDF construction work were based on the specifications included in the UDF Revised Final Design Plan with relevant updates made to those selected specifications as required by EPA's conditional approval letter for that plan. Further updates were made to the specifications where necessary to better align with the UDF construction work and to improve continuity across the individual specification sections. As previously noted, the UDF construction technical specifications are provided in Appendix B.

5.2 Design Drawings

Design drawings prepared for the UDF construction work were based on the design drawings included in the UDF Revised Final Design Plan with relevant updates made to those selected design drawings as required by the EPA's conditional approval letter. Further updates were made to the design drawings where necessary to better align with the UDF construction work and to take account of work completed previously for the UDF site preparation phase. As previously noted, the UDF construction design drawings are provided in Appendix C.

6 Project Schedule and Construction Completion Report

6.1 Construction Work Tasks

UDF construction work tasks and the Contractor's planned implementation schedule are presented in Table 3. The project schedule shown in Table 3 is based on the following assumptions and qualifications:

- The project schedule is based on information available at the time of schedule preparation. Any changes to project scope or site conditions may impact on the project schedule.
- This schedule assumes that:
  - The remaining UDF preparatory work is completed by May 1, 2026;
  - Weather conditions (e.g., frost conditions, rain amounts, ambient temperature limitations, and typical wind velocities) meet average seasonal limitations for construction in the western Massachusetts work area;
  - Actual site conditions are consistent with site condition data that have been previously obtained and relied upon for the basis of design and construction;
  - The different project team representatives (GE, EPA, CM, and Contractor) are available as needed for review, coordination, and approval;
  - Proposed truck routes are acceptable and are not changed;
  - There is timely coordination and communication with relevant utilities (electric, communications); and
  - Sufficient materials that meet the project design requirements are available and there are no delays in the supply of key long-lead items.
- All durations are based on typical productivity rates and working five days per week, up to 10 hours per day.
- The schedule assumes EPA approval of this SIP by April 20, 2026.
- The sequence of activities is subject to change based on site conditions and coordination with other contractors.

Following mobilization to the UDF site, work will commence with additional site preparation activities, including tasks such as surveying, installation of erosion controls, establishing temporary facilities and controls, and creating staging areas. Initial sitework will involve limited vegetation clearing within the gravel pond and surrounding slope area along with other clearing work throughout the site to remove remnant tree stumps from areas designated for earthwork. This limited vegetation clearing work is not considered to be subject to seasonal schedule limitations associated with protecting rare bat species given that the vegetation to be cleared is sparse in density and is distant from the primary forested areas.

Once initial site work activities have been completed in a given area, earthwork will commence to construct the site Operations Areas, site access roads and parking areas, embankments and berms, and the cell subgrades. As shown in the project schedule, the initial earthwork will target completion of primary site subgrade conditions in 2026 so as to allow for installation of the cell baseliner system components in 2027. To the extent possible, other

sitework elements will be mostly completed in 2026, including stormwater management features, the vernal pool enhancements, new utilities, and certain leachate conveyance and storage system components. The cell baseliner system, leachate collection system, remaining leachate management system elements, and final site restoration work will be completed in 2027.

6.2 Construction Completion Report

Following the completion of the UDF construction work and prior to UDF operations, a UDF Construction Completion Report will be prepared and submitted to EPA for review and approval. That report will include the following items:

- Background information and a description of pre-construction activities;
- A description of the construction activities performed;
- A description of any deviations from the design submittals approved by EPA and any other difficulties and problems encountered;
- Results of QA and QC testing performed prior to and during construction;
- As-built record construction drawings signed and stamped by a professional engineer, including:
    - Baseliner subgrade and top of baseliner liner system survey drawings showing elevation contours, grade changes, constructed limits, and features; and
    - Final elevation survey drawings showing limits, grade changes, and constructed features associated with access roads, drainage components, leachate systems, etc.
- Representative project photographs; and
- Demonstration of achievement of the applicable Performance Standards in Section II.B.5.a.(2) of the Revised Permit for design and construction of the UDF.

At this time, it is anticipated that the UDF Construction Completion Report will be submitted to EPA for review and approval in mid-March 2028. To allow for commencement of UDF operations in late May 2028, EPA approval of the Construction Completion Report will be needed by mid-May 2028.

7 Additional Project Activities and Submittals

7.1 Project Submittal Register

Submittals prepared by the Contractor for UDF construction work will be tracked on a project submittal register. This submittal register identifies the required Contractor submittals, including those which contain data sheets or other documentation, to demonstrate that the equipment and materials used on site meet approved project specifications. The submittal register for the UDF construction will be updated, as needed, throughout the duration of the project based on the timing of when the submittals are needed and their subsequent review process. A copy of the current project submittal register is provided in Appendix D.

7.2 Backfill Sources

Backfill materials originating from off-site sources to be used for the UDF construction work will include low-permeability soil liner material for construction of the cell baseliner soil clay liner, topsoil material for placement in areas that will be revegetated, riprap for use in constructing drainage feature armaments, and other various aggregate types (sand, gravel. drainage stone, etc.). The Contractor has proposed Century Aggregates in Lee, MA, as a source for these backfill materials, and it may propose other borrow sources.

As required in project specifications, an initial borrow source assessment will be conducted at the currently proposed borrow source and any other proposed borrow source(s). Following approval of each borrow source by GE, representative samples of the project backfill materials from the borrow source will be obtained for laboratory testing of geotechnical and chemical properties. The results of these laboratory tests will be reviewed and approved for use by GE prior to their delivery to the site. All laboratory testing of the construction backfill materials will be performed as specified in project specifications. Test reports obtained for the project backfill materials will also be provided to EPA in a subsequent submittal for its approval.

Other backfill materials to be used for UDF construction work will include backfill materials obtained from on-site areas that will be excavated to achieve project subgrades elevations. This material will be tested for geotechnical properties in accordance with the project specifications. On-site excavated material may also be processed to meet the project specifications, if necessary, either at the UDF site or on the adjacent property and will be stockpiled for subsequent use. Chemical testing of materials obtained from on-site excavations will not be required.

8 References

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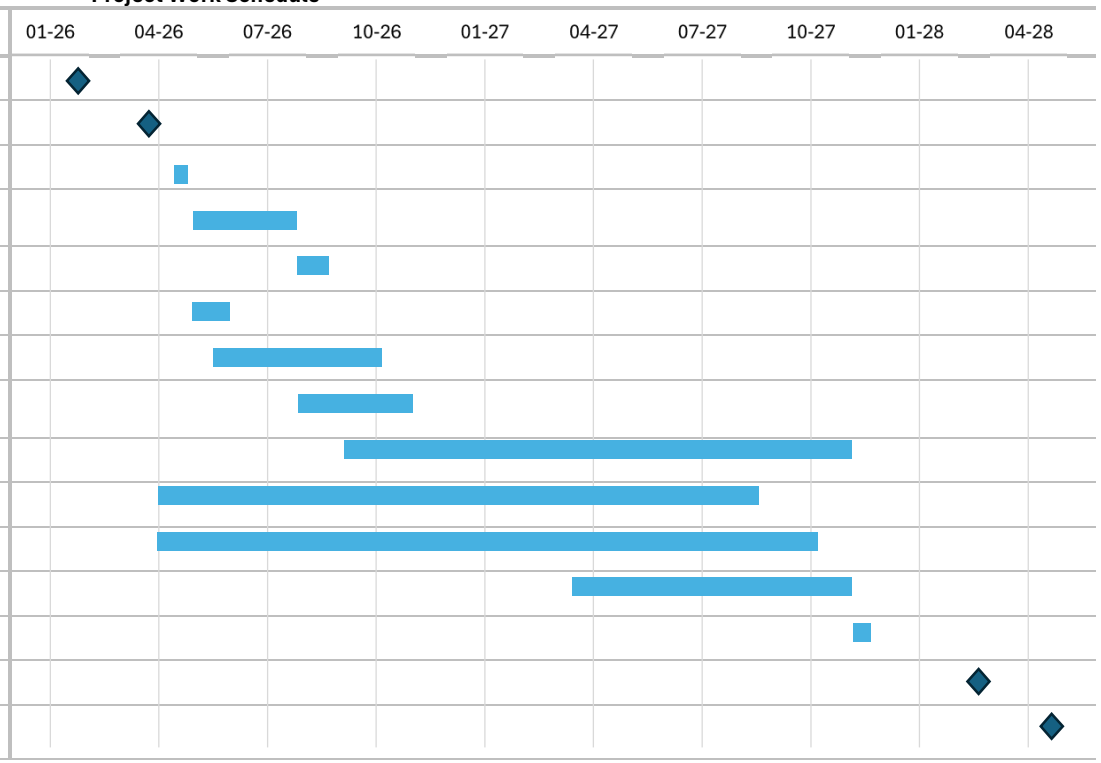
Arcadis. 2025. Project Operations Plan. Prepared for Prepared for General Electric Company, Pittsfield, Massachusetts. Revised May.

Tables

Table 4 - Project Work Schedule

Project Work Schedule

ID	Task Name	Start	Finish
1	**SIP Submittal by GE**	2/18/26	2/18/26
2	**EPA SIP Approval**	4/21/26	4/21/26
3	**Mobilization**	5/11/26	5/22/26
4	**Operations/Support Area Visitor Parking, & Construction Entrance**	5/26/26	8/20/26
5	**Vernal Pool Enhancement & Habitat Mitigation**	8/21/26	9/16/26
6	**Gravel Pond**	5/26/26	6/26/26
7	**Mass Earth Excavation to Subgrade**	6/12/26	10/30/26
8	**North Stormwater Basin, SMA 1, & 5 Cell 1 Drainage Pipes, Culvert**	8/21/26	11/24/26
9	**Install Multi-Layer Baseliner System**	9/29/26	11/23/27
10	**Leachate Storage System**	4/27/26	9/7/27
11	**Leachate Riser Vaults & Conveyance**	4/27/26	10/26/27
12	**Perimeter Access Road**	4/5/27	11/23/27
13	**Demobilization**	11/24/27	12/9/27
14	**Construction Completion Report Submittal by GE**	3/9/28	3/9/28
15	**EPA Approval of Construction Completion Report**	5/9/28	5/9/28



Legend

Item	Symbol
Activity	
Milestone	

Figures

C:\Users\jlharris\DC\ACCDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2026\01-DWG\UDF CONTRACT 11 SIP_2-UDF SITE LAYOUT FOR CONSTRUCTION ACTIVITIES.dwg LAYOUT: 2 SAVED: 2/17/2026 7:07 AM ACADVER: 25.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTCONT.CTB PLOTTED: 2/17/2026 7:07 AM BY: HARRIS, JESS

VERNAL POOL INSET

TEMPORARY VERNAL POOL CONSTRUCTION ENTRANCE

PROPOSED VERNAL POOL ENHANCEMENTS

MAIN CONSTRUCTION ENTRANCE

VEHICLE ACCESS SLIDE GATE

EXISTING PERSONNEL ACCESS GATE

EXISTING PERSONNEL ACCESS GATE

EXISTING VEHICLE ACCESS GATE

EXISTING VEHICLE ACCESS GATE

METEOROLOGICAL STATION

CONTRACTOR TO AVOID DISTURBANCE BEYOND ESTABLISHED WORK LIMITS THAT BORDER WETLANDS AND WATER BODIES

CONTRACTOR TO AVOID DISTURBANCE BEYOND ESTABLISHED WORK LIMITS THAT BORDER WETLANDS AND WATER BODIES

WEST ENTRANCE

EXISTING VEHICLE ACCESS GATE

MW 2022-1S (ABANDONED)

MW 2023-1SR

MW 2022-1D

MW 2022-2

MW 2022-3

MW 2022-4D

MW 2022-4S

MW 2022-5

MW 2022-6

MW 2022-7

N/F THOMAS M. GARRITY STEVEN A. GARRITY BK. 6809, PG. 213 "LB CORP"

WOODLAND ROAD

GRAVEL ROAD

GRAVEL DRIVE

BUILDING AREA

GRAVEL AREA

WET AREA (NO FIELD TOPO)

PHRAGMITES (NO FIELD TOPO)

POND

BM#2 TOP OF SK IRON PIPE ELEV.=1013.02'

BM#3 TOP OF BEK REBAR ELEV.=1030.86'

12" CMP INV. IN=1012.70'±

12" CMP INV. OUT=1013.46'±

12" CMP INV. IN=1013.83'±

12" CMP INV. IN=966.62'±

12" CMP INV. OUT=995.68'±

EXISTING FEATURES LEGEND

- REBAR FOUND
- IRON PIN FOUND
- CONCRETE BOUND FOUND
- GRANITE BOUND FOUND
- BENCH MARK
- UTILITY POLE
- LAMP POST
- GUY WIRE
- MW 2022-1D — MONITORING WELL
- WET AREA
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- EDGE OF WATER
- STONEWALL
- OH — OVERHEAD WIRES
- W — WATERLINE
- EVERSOURCE RIGHT-OF-WAY
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- X — UDF SECURITY FENCE

DESIGN FEATURES LEGEND

- EROSION CONTROL MEASURE
- APPROXIMATE LIMITS OF GRADING
- APPROXIMATE TREE AND BRUSH CLEARING AREA
- AIR AND NOISE MONITORING STATION
- METEOROLOGICAL STATION

100' 0 100' 200'
1"=100'

NOTES:

1. SITE PLAN INFORMATION BASED ON CONTRACT 11 - UDF CONSTRUCTION DRAWING UC-3B (ARCADIS DECEMBER 2025).
2. AIR AND NOISE MONITORING STATION LOCATIONS MAY BE ADJUSTED TO FACILITATE CONSTRUCTION.

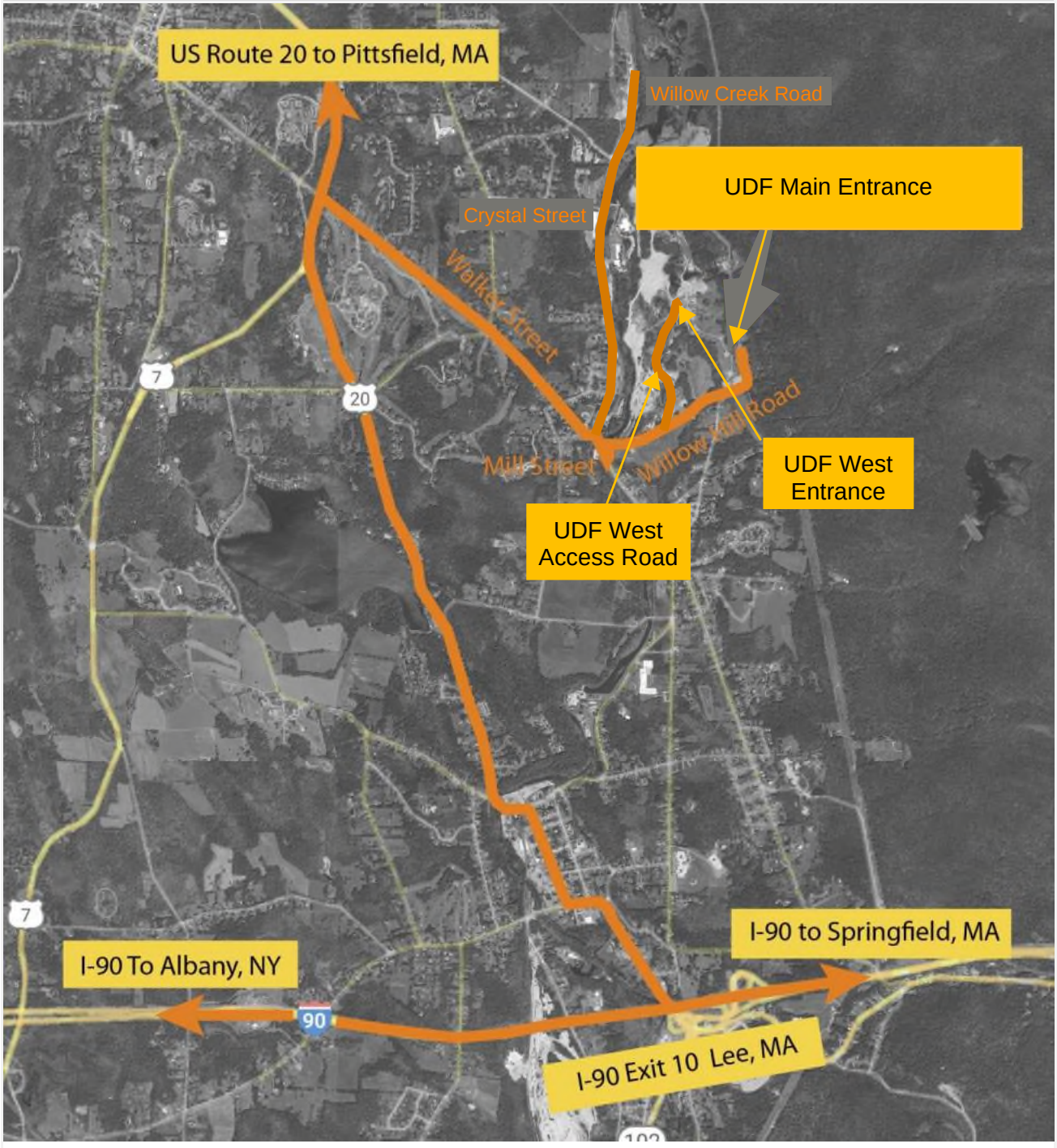
GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
GE-PITTSFIELD/HOUSATONIC RIVER SITE

UDF SITE LAYOUT FOR CONSTRUCTION ACTIVITIES

ARCADIS

FIGURE
2

Figure 3 – Construction Truck Transportation Routes



Notes:
1. Truck routes shown on this figure are for UDF construction only.
2. Truck routes for UDF operations will be detailed in the UDF Operations SIP.

Appendix A

Contractor's Health and Safety Plan

Plan Title: **01350 Health and Safety Plan**

Project Title: GE Contract 11 UDF Construction

Prepared For: Arcadis of New York, Inc.
One Lincoln Center
110 West Fayette Street, Suite 300
Syracuse, NY 13202

Prepared By: Charter Contracting Company, LLC
500 Harrison Avenue, Suite 4R
Boston, MA 02118-2439

Contract No.: TBD

Charter No.: 2-1859

Date: 2/17/2026

Revision No.: 01



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File: @Charter Health and Safety Plan GE - REV00KL.docx

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1. SITE HISTORY

The UDF will be constructed on a 75-acre property that was formerly part of an active sand and gravel quarry and that GE acquired from The Lane Construction Corporation (Lane) in April 2021. The GE Parcel generally consists of previously disturbed and barren ground areas devoid of vegetation, open grassy and wooded areas, and ponds created during prior quarry operations. The east-central portion of the parcel was determined to have wetland conditions consisting primarily of a forested red maple swamp, with smaller areas of shrub swamp and a potential vernal pool at the northern edge of the wetland. Additionally, there is an existing Eversource Energy (Eversource) utility easement containing overhead electric utility lines on the western side of the GE Parcel. The bordering site features are Valley Street to the north, Woodland Road to the east, the Eversource substation to the south, and the remaining former Lane property (now Northeast Paving, a Division of Eurovia Atlantic Coast, LLC) to the west, which is located off Willow Hill Road.

2. SITE DESCRIPTION AND EVALUATION INTRODUCTION

The purpose of this Health and Safety Plan (HASP) is to establish in detail the procedures and protocols necessary for protecting workers and the public from the potential hazards associated with the soil remediation activities to take place on the GE Contract 11 UDF project. The property is referred to as the "Site". This Plan has been developed in accordance with the requirements of:

Occupational Safety and Health Act (OSHA) Standard 29 CFR 1910.120 - "Hazardous Waste Operations and Emergency Response"; 29 CFR 1926.65; OSHA, 29 CFR 1910, General Industry Standard; OSHA, 29 CFR 1926, Construction Industry Standard; and 29 CFR Part 1904 - Recording and Reporting Occupational Injuries and Illnesses.

In general, this project involves:

1. Mobilization
2. Construction and maintenance of support areas;
3. Daily air monitoring and sampling as required to ensure the health and safety of its employees and subcontractors.
4. Installing and maintaining soil erosion and sedimentation controls,
5. Installing and maintaining temporary stormwater controls
6. Controlling dust, odors, releases of volatile organic compound vapors, and vectors, and implementing dust and odor control measures, as needed.
7. Repairing and upgrading existing site access roads and temporary roads
8. Implementing and maintaining traffic control measures.

9. Clearing and grubbing of vegetation.
10. Chipping and grinding of vegetation for on-site placement and/or off-site disposal.
11. Preservation (i.e., handling, stockpiling, and protecting) of select on-site vegetation for re-use in restoration activities.
12. Site preparation (vegetation and debris removal in the gravel pond area, removal of debris piles, installation of erosion and sediment controls);
13. Earthwork for the construction of embankments, berms, site access roads, and stormwater
14. Installation of a multi-layer baseliner system for the waste containment cells;
15. Installation of leachate collection and removal systems (pipes, vaults, pumps) for the two waste containment cells;
16. Construction of leachate conveyance and storage systems (force mains, manholes, vaults, and two large above-ground leachate storage tanks);
17. Construction of stormwater management systems (ditches, culverts, swales, drainage, manholes);
18. Installation of utilities (municipal water, hydrants, electric, communications); and
19. Vernal Pool Construction.

Hazards associated with this work may include slip, trip, and fall injuries; contact with energized utilities; cuts and punctures; weather exposures; struck-by moving equipment; exposure to fugitive dust emissions; exposure to silica; and chemical exposures potentially above the Permissible Exposure Limit (PEL).

The Site activities required for the execution of the contract will be performed and managed by Charter Contracting Company LLC (Charter).

This HASP is to be implemented during ongoing contract work. This HASP is intended to address the potential hazards associated with the handling and management of impacted soils, sediment, and debris excavated from the property identified by the GE, site restoration, and other activities that may be encountered during the execution of the contract. There is always potential for exposure to potentially hazardous conditions, which can be loosely defined as those conditions and chemicals that can cause harm to persons, property, or the environment. For the purposes of developing and implementing this plan, it is not possible to address all potential hazards associated with soil excavation, landfill construction, and restoration activities. This document provides general information about potential or suspected hazardous and toxic substances on a site. If additional hazards are identified during the course of work, they will be characterized and added to this HASP.

Site-specific hazardous materials present at the Site will or may potentially include:

- Dust
- Odor

- Silica
- Heavy Metals

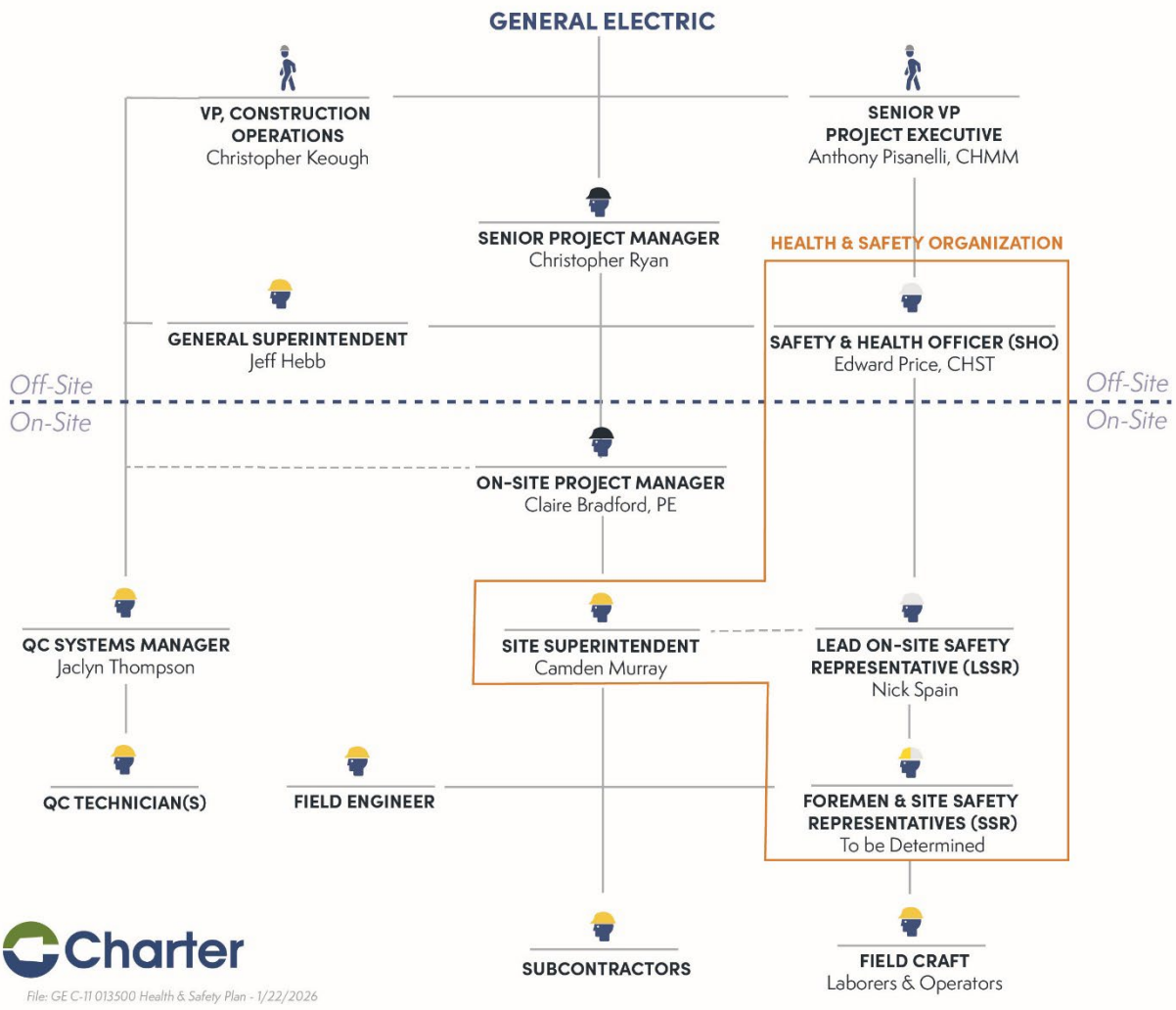
This HASP is intended to achieve the following objectives:

- Summarizes the project organization and responsibilities
- Establishes procedures for preventing accidents, injuries, and illnesses
- Identifies hazards
- Discusses the personal protective equipment that may be used at the Site
- Identifies personnel health and safety training requirements
- Summarizes the monitoring techniques to be used
- Establishes emergency response procedures **(Appendix B)**
- Describes the medical surveillance program
- Identifies that appropriate first aid equipment is available
- Provides for accident record keeping
- Establishes a schedule for safety inspections

3. KEY SITE SAFETY PERSONNEL/RESPONSIBILITIES

Table 3-1 below illustrates Charter's Health and Safety Organization for the project.

Table 3-1 Health & Safety Organization



The following outlines the key project health and safety personnel designations and general responsibilities for site activities.

3.1. Safety & Health Officer (SHO) – Edward Price, CHST, Charter Director of Health & Safety

Responsibilities of the SHO include:

- Review and modify the site-specific HASP.
- Providing guidance for updates to the site-specific HASP, as needed.
- Assist Lead SSR with;
  - the health and safety of personnel and the personnel of their subcontractors

- monitoring site health and safety conditions,
- Protecting the surrounding community from potential hazards associated with the Work.
- Assist, as needed, with JSA development.

3.2. Lead Site Safety Representative (Lead SSR) – Nicolas Spain

The Lead SSR will be responsible for the continuous daily implementation and enforcement of the HASP. The Lead SSR is assigned to the Site on a full-time basis during project activities, consults with, and reports to the SHO, and enforces matters related to site safety and health. The Lead SSR has stop-work authorization, which they will exercise upon determination of an imminent safety hazard, an emergency, or other potentially dangerous situations, such as severe weather conditions. In addition to the Lead SSR, all project personnel will have stop-work authorization in the event of unforeseen safety-related hazard or condition. The Lead SSR will issue authorization to proceed with work in conjunction with the Project Manager (PM), Construction Manager (CM), and CM. The Lead SSR will select the proper levels of protection based on the details of this plan.

The Lead SSR is trained and certified in First Aid, CPR, and Universal Precautions for Bloodborne Pathogens Training. The Lead SSR is responsible for preparing and maintaining Job Safety Analyses (JSAs), daily safety logs, and reports. First Aid/CPR assistance by individuals on-site will be on a Good Samaritan basis. The Lee Police, Fire, and Ambulance services will act as First Responders for emergency response actions. In the event of an emergency, the senior responding officer from the Lee Fire Department will assume the role of Incident Commander upon arrival on-site.

3.3. Site Superintendent – Camden Murray

Responsibilities of the Site Superintendent include:

- Carry out instructions of the Safety & Health Officer relating to the implementation of various mandatory safety policies and procedures.
- Be familiar with Federal, State, local, and the contractor's general safety rules and regulations.
- Make inspection tours and continuously check for unsafe conditions or practices.
- Keep in close contact with the foreman to advise them about safety deficiencies in their work areas.
- Show personal interest in safety by setting an example through actions and attitudes.
- See that the Supervisor/foreman does not permit their workers to take unnecessary risks and give them proper instructions for working safely.
- Recognize that the safety of employees under their supervision is a top priority.
- Ensure that personnel and subcontractor personnel attend Daily Health and Safety briefings conducted before each day's work.

- Ensure air monitoring is consistent with this HASP.

3.4. Other Field Personnel – Crew Foremen & Site Safety Representatives

Other field personnel include employees, representatives, and subcontractors. Field personnel take direction regarding safety and health issues from the Lead SSR. A crew foreman is designated as a Site Safety Representative (SSR) responsible for their immediate crew members and the activities they are performing.

Field personnel who will be working in the vicinity of environmentally impacted site materials are fully trained in compliance with OSHA HAZWOPER Standard 1910.120(e)(3), (4), (8), and (9), and are required to complete a current 8-hour refresher course and annual medical monitoring by an occupational physician.

Personnel, including subcontractor personnel, not expected to encounter environmentally impacted materials or conduct specialty work operations, will be required to have appropriate training for the specific task they are performing. The Lead SSR will be responsible for determining the likelihood of potential exposure to environmentally impacted materials for a particular task. The Lead SSR will then determine the minimum required training for that task and shall consult with the CM on these matters.

The resumes of the key health and safety personnel described above managing the project are provided in **Appendix A**.

3.5. Chain Of Command/Line Management Responsibilities

The following details Charter's Chain of Command for this project and identifies the roles and responsibilities of each.

Responsibilities of the Safety & Health Officer (SHO) include:

- Oversee implementation and enforcement of the HASP and safety program on the project.
- Delegate responsibility to the Project Superintendent and Lead SSR to ensure that they are trained to handle the responsibility capably.
- Promote safety awareness programs.
- Conduct or delegate the Safety Audits
- Assist with the collection and verification of safety metrics.

Responsibilities of the Lead SSR include:

- The Lead SSR is responsible for the continuous daily implementation and enforcement of the HASP on-site.

- The Lead SSR is responsible for the observation of construction operations and the monitoring of field activities. In addition to observation of worker behaviors, compliance with all plans and regulations
- The Lead SSR is responsible for preparing and maintaining daily safety briefing attendance sheets and associated reports.
- The Lead SSR makes decisions on the upgrade/downgrade of personal protective equipment. Any such changes require notification of the CM.
- The Lead SSR makes decisions on the need to evacuate the worksite in the event of an emergency and will implement the Emergency Response Plan under such circumstances.
- The Lead SSR conducts daily jobsite safety meetings/Tool Box Talks.
- The Lead SSR and the project team develop and review JSAs for each task to be conducted.

Responsibilities of the Site Superintendent include:

- Carry out instructions of the PM and the Lead SSR relating to the implementation of various mandatory safety policies and procedures.
- Be familiar with Federal, State, Local, and the contractor's general safety rules and regulations.
- Make inspection tours and continuously check for unsafe conditions or practices.
- Keep in close contact with the foreman to advise them about safety deficiencies in their work areas.
- Show personal interest in safety by setting an example through actions and attitude.
- See that Supervisors/Foremen do not permit their workers to take unnecessary risks and give them proper instructions for working safely.
- Recognize that the safety of employees under their supervision is a top priority.
- Ensure that personnel and subcontractor personnel attend Daily Health and Safety briefings conducted before each day's work.
- Ensure air monitoring is consistent with this HASP.
- The Lead SSR and the project team develop and review JSAs for each task to be conducted.

4. STOP WORK AUTHORITY

Should any unforeseen safety-related factor, hazard, or condition that poses a potential threat of physical injury or harm to Site personnel or the environment become evident during the performance of the Work, all Site personnel shall have the authority, as granted by OSHA regulations, to issue a Stop Work Directive. In addition, CM shall have the authority to issue a Stop Work directive upon observing a safety-related factor, hazard, or condition that poses a potential injury or environmental harm.

If a Stop Work directive is issued, Charter will immediately take prudent corrective action to secure the Work and provide safe conditions for Site personnel and the environment. An immediate notification to the CM will follow this corrective action. All Stop Work directives will be obeyed. Failure to comply with a Stop Work directive will result in disciplinary action, up to and including dismissal from the Site.

4.1. Safety Stops

While conducting tasks and changes are identified, potential safety hazards are identified, or modifications to the type of equipment or tools are required, a safety stop will be called. All Charter personnel have the authority to conduct a safety stop. The team members will then discuss the changes, modify the JHA, and then resume the work.

4.2. Employee Observations

Employees will utilize the HCSS employee observation tab to complete observations during the project work. The objectives of an employee observation (EO) are to: (1) positively reinforce correct behaviors and work practices; (2) identify potential deviations from safe work practices that could result in an incident; and (3) identify and implement prompt corrective action.

4.3. Incident Reporting Procedures

In the event of a safety incident, including injuries, near-misses, and vehicle accidents occurring during the performance of the work, Charter shall provide details of the incident to the CM and GE as soon as possible and shall follow up with written information. The SHO, Lead SSR, and CM will complete an Incident Investigation Form and submit it to GE within 24 hours of the incident. All injuries, accidents, and illnesses occurring during on-Site work must be recorded on Charter's or affected Subcontractor's OSHA 300 and 301 or equivalent forms. Charter will report all injuries to the proper authorities, including OSHA if necessary, and to GE and the CM immediately.

Arrangements with ambulance services, medical professionals, and hospitals for the emergency treatment of employees will be made before commencing work on the Site. GE and CM will not give any emergency medical treatment.

4.4. Substance Abuse and Awareness

Charter Contracting Company. (referred to herein as "Company") is firmly committed to ensuring a safe, healthy, productive, and efficient work environment for our employees, customers, and the public. The unlawful presence of controlled substances in the workplace conflicts with these vital interests. For these reasons, we have established a substance abuse policy as a condition of employment and continued employment. Drug and alcohol testing is an integral part of our substance abuse policy. Compliance with the policy is required as a condition of continued employment with the Company.

This policy includes instructions for accessing our employee assistance program (EAP). The EAP and our policy provide methods for Alternative Return-to-Work Programs. Charter personnel receive training on the manifestations and behaviors that may indicate alcohol or controlled substance use or abuse.

5. HAZARD ASSESSMENT

The potential hazards for this project have been categorized into site hazards, activity hazards, physical hazards, and chemical hazards.

- Site hazards are defined as hazards associated with the general site conditions. Site hazards include topography, ground conditions, climate and weather conditions, traffic, etc.
- Activity hazards are associated with the activity and work performed by the Charter personnel and any subcontractors on-site. Activity hazards include construction work and earth-moving, etc.
- Physical hazards are associated with materials, structures, equipment, machinery, etc., that present a physical danger to personnel.
- Chemical hazards are associated with chemicals and substances that may present an immediate danger to life and health (IDLH) hazard, acute or chronic effects, or may be listed as hazardous under OSHA, CERCLA, SARA, RCRA, 40 CFR 261.3, 49 CFR 171.8, or DOT 49 CFR 172.101

If Site conditions suggest the existence of a situation more hazardous than anticipated or if an unplanned release, fire, explosion, or other emergency occurs, Site personnel evacuate the immediate area. The Charter Safety Team reevaluates the hazard level and level of protection.

The project team, with input from the Lead SSR and SHO (as needed), will develop a JHA for each work task before starting.

5.1. Hazard Communication

Charter has a HAZCOM plan, and all Charter personnel have had HAZCOM training. Safety Data Sheets (SDSs), which provide information on the health effects and other hazards associated with the chemicals used on the project. To meet this standard, Site safety meetings will include a discussion of known hazards and a review of SDSs for on-site products. If any further contaminants are identified, work will be stopped, and an immediate toolbox meeting will be held with all personnel. An inventory of products and SDSs is included in Charter's Chemical Management Plan submitted separately.

5.2. Specific Hazards

The following chemical information is presented for the types of materials that may be encountered at the Site. The detailed information on these materials was obtained from:

- American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices for 2017.
- Safety Data Sheets.
- National Institutes of Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards - 2016.

The following is a list of chemicals and compounds that may be found on-site, either as existing contamination or in products used during remediation activities. Safety Data Sheets for each chemical product (e.g., gasoline) listed below, providing information such as the chemical's characteristics, health hazards, protective measures, exposure limits (see **Table 5-2),** and first-aid procedures, are available in the Chemical Management Plan and on-site.

These chemicals include:

- Benzene/Toluene/Ethyl Benzene (gasoline)
- Diesel Fuel
- Oils / Grease
- Silica
- Total Petroleum Hydrocarbons (TPHs)
- Lead
- Mercury
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Heavy Metal
- SVOC's
- Pesticides
- PCB's

The chemical materials may be encountered in the following media (**Table 5-1**):

Table 5-1 Chemical Materials

	Media
Liquid	Groundwater and free product
Solid	Soil, other solid wastes, dust (Portland Cement), wood, building components
Gaseous	Fugitive Vapors and off gases
Solids, sludge, sediment, semi-solids	Residual wastes, soil water-free product interfaces

Three TLV standards are presented, if available, for each chemical. The Time Weighted Average (TWA) is the time-weighted average concentration for a typical 8-hour day and a 40-hour

workweek, to which workers may be repeatedly exposed, day after day, without adverse effect. The Short-term Exposure Limit (STEL) is a 15-minute time-weighted average exposure that should not be exceeded at any time during a workday, even if the 8-hour TWA is within the TLV. Exposures above the TLV-TWA up to the STEL should not exceed 15 minutes and should not occur more than 4 times per day. There should be at least 60 minutes between successive exposures in this range. The ceiling limit (CEIL) is the maximum exposure concentration for any duration.

Table 5-2 Exposure Limits

Contaminants of Concern

				PEL STEL	IDLH
Benzene	0.5 ppm	2.5 ppm	1.0 ppm (skin)	5.0 ppm	500ppm (ca)
Ethyl Benzene	20 ppm	---	100 ppm	---	800ppm
Portland Cement	1 mg/m^3	---	15 mg/m^3	---	5000 mg/m^3
Crystalline Silica	---	---	0.025 mg/m^3	---	25 mg/m^3 (ca)
Fuel Oil / Diesel - (as Stoddard)	100 ppm	---	500 ppm	---	20000 mg/m^3
Gasoline	300 ppm (skin)	500 ppm (skin)	---	---	500 ppm
Toluene	20 ppm (skin)	---	200 ppm	300 ppm (ceil)	500 ppm
Hydrogen Sulfide	1 ppm	5 ppm	20 ppm	50 ppm (10 min max peak)	100 ppm
Xylene	100 ppm	150 ppm	100 ppm	---	900 ppm
Mercury	0.025 mg/m^3	0.1 mg/m^3	0.1 mg/m^3	0.5 mg/m^3	10 mg/m^3
Lead	50 µg/m^3	30 µg/m^3	50 µg/m^3	-----	50 µg/m^3
PAH			3.5 mg/m3		1750 mg/m3
SVOC			0.2 mg/m3		80 mg/m3
VOC			0.2 mg/m3		80 mg/m3
PCB's	0.001 mg/m3		0.5mg/m3		5.0 mg/m3
Arsenic			10ug/m3	0.002 mg/m3	5 mg/m3

Skin – indicates the potential for dermal absorption.
ca - indicates that a chemical is considered to be carcinogenic.
* - Notice of Intended Change

Also presented are the OSHA Permissible Exposure Limits (PELs). The PEL values are enforceable standards presented as an 8-hour TWA, a 15-minute STEL, or a CEIL. The CEIL indicates the upper limit of acceptable excursions above the TWA. The immediately dangerous to life and health (IDLH) value represents a maximum concentration from which one could escape within 30 minutes without any escape-impairing symptoms or any irreversible health effects. Other relevant health-based information that applies to this health and safety plan or to the employee's right to know, in compliance with OSHA's Right-to-Know requirements, is discussed in the toxicity summaries for each chemical of concern.

The Lead SSR will monitor the atmosphere at the surface of the individual work areas during excavation or other intrusive activities using a portable combination combustible gas/hydrogen sulfide/carbon monoxide and oxygen detector.

The work areas will be tested periodically with a photoionization detector (PID) to monitor organic vapors, and with a dust monitor to measure particulate levels.

If air quality does not meet each of the following requirements, work will stop, the CM will be notified, and engineering controls will be implemented. As needed, the Lead SSR will determine if Personal Protective Equipment (PPE) will be upgraded to the next appropriate level:

- Oxygen content of 19.5% to 22.0%
- Hydrogen sulfide content of < 10 ppm (5 ppm action level)
- Combustible gas content of < 10% of the lower explosive limit (LEL) (5% action level)
- Carbon monoxide content <25 ppm
- Silica <25 µg/m^3 TWA Action Level
- Exposure level for any toxic substance determined or suspected to be present, which is below the PEL-TWA or TLV-TWA for any substance specified by OSHA or ACGIH

5.3. Degree of Hazard

On-site hazards include physical and chemical hazards. Many potential chemicals at the site can affect the body if they are inhaled, come into contact with the eyes or skin, or are ingested. These materials may be released during soil excavation. The primary concerns are for skin contact and inhalation exposure to impacted subsurface media and dangerous fugitive vapor/gas emissions. Atmospheric monitoring will be conducted to define the level of respiratory protection needed.

Physical hazards that may be encountered during contract execution include incidents associated with heavy equipment operations, electrical hazards, overhead/tripping hazards commonly associated with excavation operations, and explosive or flammable conditions. Excessive noise levels may be generated from air compressors, heavy construction equipment, etc. As a precaution, hearing protection will be available for use when working around construction-related equipment or when deemed necessary. In areas where sound levels exceed the OSHA PEL (90 dBA) and where personnel will spend extended time (>1 hour), hearing protection will be required.

Depending on seasonal weather conditions, on-site workers may be affected by heat stress. Site activities scheduled for the warmer months may require the use of personal protective equipment. Hypothermia may also be a consideration since site activities will continue through colder weather. The Lead SSR will monitor for heat stress or cold exposure in accordance with this HASP.

Electrical storms will likely impact operations. Visible lightning and audible thunder are action limits for suspending operations and personnel seeking shelter. Exterior work activities will resume 30 minutes after the last observed lightning or audible thunder.

5.4. Site Tasks

5.4.1. Site Preparation

This task involves construction activities performed in preparation for remedial work, such as clearing and grubbing vegetation, installing temporary access roads, and installing erosion and sedimentation controls. Such work will be performed using typical construction equipment and/or by hand.

This task includes subsurface investigations of the property where the UDF will be built and construction of the UDF. The Investigative activities include surveying, subsurface exploration, and soil sampling.

5.4.2. Construction and Operation of Upland Disposal Facility

This task involves the construction of the Upland Disposal Facility, which includes a new landfill with two lined landfill cells for receiving future dredged sediment from the Housatonic River and for the removal of soil from riverbanks, floodplains, and other portions of the Housatonic River Superfund Site. Construction will include earthwork (e.g., soil removal/placement), installation of berm and baseliner systems, installation of primary and secondary leachate collection and storage systems, management of surface water, installation of site lighting and communications systems, restoration of disturbed areas, and other general support and materials-handling activities.

A summary of task-specific physical hazards and control measures is presented in **Table 5-4** and provides an abbreviated overview of potential physical hazards. Air monitoring and Action Levels are presented in the Air Monitoring Section of this HASP.

Table 5-4: Physical Hazards

Task(s)	Hazard	Description	Prevention / Monitoring Techniques
All tasks	Slips, trips, falls, vehicle traffic, noise	From various debris on the ground, cluttered conditions, equipment, slippery footing, working near water, Heavy equipment/vehicles	Ensure buddy system awareness and good housekeeping practices. High-Viz PPE required on-site; hearing protection.
Rigging, Lifting	Overhead, Struck by, Pinch points	When loading, offloading, moving, or setting equipment	Qualified Rigger, Qualified Signal person, Inspect Rigging, Tag lines, Use spotter if necessary, Communication with operator. Never work under an elevated load. Establish eye contact with operators.

Table 5-4: Physical Hazards			
			Prevention / Monitoring Techniques
Drilling, Excavation, and backfilling	Pinch points, sharp corners, restricted movement, explosion/fire	From "tight" spaces and clearances, objects and components	Ensure a clear work area, good housekeeping, move unnecessary equipment, utilize the buddy system, place guards on machinery, and wear gloves where appropriate. Before excavation, a GPR survey of the area will be completed. Any anomalies will be identified by hand digging to determine the object before proceeding.
Excavation, Drilling	Explosion, fire	Ignition of fugitive flammable gases or vapors	Mandatory use of ambient air monitoring equipment and implementing proper inspection/characterization techniques, documentation. Cover stockpiles. Maintain a fire extinguisher on-Site.
All tasks	Heat Stress, Cold Stress	Associated with protective garment use, respiratory protection, and exposure	Ensure adequate work and rest schedule, buddy system, and dress appropriately for the weather. Provide shaded areas for breaks. Stay hydrated.
Drilling, Excavation, and backfilling	Struck by Equipment	From accidental contact with heavy equipment during remedial activities	Excavators, backhoes, dump trucks, and other equipment are equipped with backup alarms. Employees remain clear of the swing radius and rotating parts of equipment. Use spotters near live utilities. Utilize Hi-Viz clothing. Establish eye contact with operators.
Excavation, backfilling	Collapse of excavation walls	From improperly shored or sloped excavations	No employees are allowed in the excavated area unless protection methods are in place and authorized by a competent person. Samples from the bottom of the excavation will be collected from the backhoe bucket. Placement of excavated soil minimum 2’ from the edge of the excavation to prevent wall failure.
Operation and repairing pumps, operating and repairing electrical equipment, and heavy equipment	Electrocution	Bad wiring, unsafe work practices, improper placement of wires adjacent to wet areas, Overhead/Underground utilities	Electrical safe work practices, GFCI protection, identify overhead and underground utilities, and maintain required clearances from utilities. Use an electrically qualified spotter. Inspect all extension cords for damage before use.
All tasks	Inclement weather	High winds, lightning, hail, etc.	Restrict work in exposed areas, seek shelter, and terminate work activities.

Task(s)	Hazard	Description	Prevention / Monitoring Techniques
All tasks	Struck By	Vehicle Traffic	Utilize Hi-Viz Clothing, enforce on-site speed limit of 5 mph, and establish work zones. Establish eye contact with operators.
Cleaning of General Debris	Drug Paraphernalia	Puncture, cuts, scrapes, etc., due to broken or non-broken drug paraphernalia	Wear puncture-resistant protective gloves. Maintain well-lit cleaning areas to ensure clear vision, and wear puncture-resistant steel-toe boots. Utilize hand tools to pick up materials.
Work on or near the water.	Drowning	Falls into the water, currents	All personnel working within 25' of the waters edge and while on the water shall wear a USCG-approved Type I, II, or III PFD. Emergency throw rings will be stationed in the work areas, and a work boat will be in the immediate area.
Work on Boats, barges.	Drowning	Falls into water, capsizing, currents	All personnel will be trained in proper boat operations and barge operations under Charters Marine operations. Personnel shall wear a USCG-approved PFD
Work near the overhead lines.	Struck by Equipment Electrocution	From accidental contact with heavy equipment during remedial activities	Excavators, backhoes, dump trucks, and other equipment are equipped with backup alarms. Employees remain clear of the swing radius and rotating parts of equipment. Use spotters near live utilities. Utilize Hi-Viz clothing. Establish eye contact with operators. Use electrically qualified flaggers when work is within 25' of overhead lines.

5.5. Confined Space Entry

A confined space is defined as a space that has any one of the following characteristics: a limited opening for entry and exit; is large enough to be bodily entered; can inhibit ventilation or air exchange; and is not designed for continuous worker occupancy. A permit-required confined space is a confined space that contains or has the potential to possess a recognized hazard to personnel (e.g., a hazardous atmosphere, engulfment potential, etc.).

Sampling and soil excavation are achieved using an excavator or other tools that allow the person to remain outside of the confined space. Excavations will be properly supported to prevent sidewall collapse. If confined space entry is required, Charter's Confined Space Entry Program (**Appendix C**) procedures will be followed, including the completion of a confined space entry permit. Personnel with Confined Space Entry training would be required to perform any work

associated with a Permit-required Confined Space Entry, including non-entry rescue. Charter anticipates using non-entry rescue methods for any permit–required confined space entries on this project. If non –entry rescue is not feasible or would create a greater hazard, confined space rescue-trained personnel would be employed. The Lead SSR will evaluate each space in advance of an entry to determine its classification (Permit versus Non-Permit) and the appropriate rescue service requirements. The rescue team's availability will be confirmed before issuing a permit for entry.

5.6. Hot Work

The term "Hot Work" refers to any activity that can create sparks capable of igniting surrounding combustible material.

Charter has developed **Standard Operating Procedures for Hot Work, Welding, and Cutting. (Appendix D)** Any Hot Work shall be in accordance with Charter SOP and (GE) requirements. Charter is responsible for completing a Charter hot work permit 24 hours prior to all hot work and submitting it to the CM for approval. Charter is responsible for all exterior and interior fire watches as needed for hot work. In addition, Charter will confirm the Hot Work activity's location and duration with the onsite CM before the start of each workday. Charter will not conduct any Hot Work without permission from the Charter Superintendent or other approved Charter Permit Authorizing Individual (PAI). The PAI is responsible for administering and issuing hot work permits.

5.7. Smoking

Smoking is not permitted on the jobsite.

5.8. Utilities

To initiate project field activity, Charter will review site conditions and project requirements with on-site project management personnel. This will be accomplished through an internal project kickoff meeting among project management, estimating, health & safety, field operations personnel, and major subcontractor representatives. Additionally, the following activities will also be initiated:

Operations personnel will verify existing field conditions (including utilities) as depicted on the Contract Drawings and assess further information needs

- Visit the Site to review all details of the Work and working conditions and to verify dimensions in the field, including headroom and interferences from adjacent structures and utilities. Notify CM in writing of any discrepancy before performing any Work.
- Consult official records of existing utilities, both surface and subsurface, and their connection, to be fully informed on all existing conditions and limitations as they apply to this Work and its relation to other Work.

- File for and obtain necessary permits (excluding those provided by the GE) and provide other required documents.
- Clear utilities:
- Contact DigSafe to coordinate clearance of Site utilities a minimum of 72 hours before the start of any intrusive Site activities.
- Field-locate and protect existing underground and overhead utilities to remain within the Limits of Work in accordance with the requirements of authorities having jurisdiction. If utilities are to remain in place, provide adequate protection during earthwork and construction operations, including temporary support, disconnection, or rerouting of utilities.
- Perform ground penetrating radar (GPR) surveys in all locations of elevation cuts of more than 18 inches below the existing ground surface. Identify all known utility locations and anomalies via hand digging or vactor prior to excavation.
- Locate and mark out all known below-grade utilities.
- Coordinate with CM to confirm utility locations.
- Verify clearances for work proximate to overhead utilities.
- Compile and compare utility location information from these sources; identify and obtain further information as needed
- Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult CM immediately for direction. Cooperate with CM to keep services and facilities operational. Repair damaged utilities to the satisfaction of the CM. Do not interrupt existing utilities serving facilities occupied and used by others.
- Follow specification requirements for termination and grouting of all utilities.

5.9. Electrical Safety & Lockout Tagout (LOTO)

5.9.1. Lockout / Tagout

Only fully qualified and trained personnel will perform maintenance procedures. Before maintenance begins, lockout/tagout procedures will be followed in accordance with 29 CFR 1910.147. Lockout is the placement of a device that uses a positive means, such as a lock, to hold an energy- or material-isolating device so that the equipment cannot be operated until the lockout device is removed. If a device cannot be locked out, a tagout system will be used. Tagout is the placement of a warning tag on an energy- or material-isolating device, indicating that the equipment controls may not be operated until the tag is removed by the personnel who attached it.

5.9.2. Electrical Safety

If wiring or other electrical work is needed, a MA Licensed NFPA 70 E qualified electrician must perform the work. If portable electrical equipment is to be used.

- All electrical wiring and equipment must be a type listed by Underwriters Laboratories (UL), Factory Mutual Engineering Corporation (FM), or other recognized testing or listing agency.
- All installations must comply with the National Electrical Safety Code (NESC), the National Electrical Code (NEC), or OSHA regulations.
- Portable and semi-portable tools and equipment must be grounded by a multi-conductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle.
- Tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Double-insulated tools must be distinctly marked and listed by UL or FM.
- Live parts of wiring or equipment must be guarded to prevent persons or objects from touching them.
- Electric wire or flexible cord passing through work areas must be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.
- All circuits must be protected from overload.
- Temporary power lines, switchboxes, receptacle boxes, metal cabinets, and enclosures around equipment must be marked to indicate the maximum operating voltage.
- Plugs and receptacles must be kept out of water unless they are of an approved submersible construction.
- All extension cord outlets must be equipped with ground fault circuit interrupters (GFCIs).
- Exhibit plugs or other connectors must be equipped with a cord grip and be constructed to endure rough treatment.
- Extension cords or cables must be inspected before each use and replaced if worn or damaged. Cords and cables must not be fastened with staples, hung from nails, or suspended by bare wire.
- Flexible cords must be used only in continuous lengths without splices, except for molded or vulcanized splices made by a qualified electrician. Cords may not be daisy chained.

5.10. Safe Lifting Procedure

Using proper lifting techniques may prevent back strain or injury. The fundamentals of proper lifting include the following:

- The size, shape, and weight of the object to be lifted should be considered. A mechanical lifting device or additional persons must be employed to lift an object if it cannot be lifted safely by one person.
- The hands and the object should be free of dirt or grease that could prevent a firm grip.
- Cut-resistant gloves must be used, and the object must be inspected for metal slivers, jagged edges, burrs, or rough or slippery surfaces.
- Fingers must be kept away from points that could crush or pinch them, especially when putting an object down.
- Feet must be placed far enough apart for balance. The footing should be solid, and the intended pathway should be clear.
- The load should be kept as low as possible, close to the body, with the knees bent.
- To lift the load, the worker should grip firmly and lift with the legs, keeping the back as straight as possible.
- A worker should not carry a load they cannot see around or over; reduce the load size.
- When putting an object down, the stance and position are identical to those for lifting; the legs are bent at the knees, and the back is straight as the object is lowered.

5.11. Fall Protection

Fall protection hazards will be controlled through 1) comprehensive fall hazard assessments, 2) proper selection, use, and maintenance of fall protection controls, and 3) employee training. Specific Fall protection controls and policies are included in Charter's Work at Heights Program, located in **Appendix E**.

5.12. Noise

Exposure to noise above the OSHA action level of 85 dBA can cause temporary hearing impairment; prolonged, repeated exposure can cause permanent hearing damage. The risk and severity of hearing loss increase with the intensity and duration of noise exposure. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of on-site accidents.

Control: All personnel must wear hearing protection with an EPA Noise Reduction Rating (NRR) of at least 20 when exposed to noise levels exceeding 85 dBA on an eight-hour TWA or when they exceed higher levels for shorter periods (refer to 29 CFR 1910.95). When it is difficult to hear a co-worker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary. Site personnel who may be exposed to noise must also receive baseline (within 6 months of first exposure to noise) and annual audiograms, and training on the causes and prevention of hearing loss.

Whenever possible, equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, barriers or increased distance will be used to minimize worker exposure to noise, if feasible. Charter's Hearing Conservation Plan is located in Appendix E.

5.13. Spill Containment

The Lead SSR and the contractor supervisory personnel are familiar with the notification requirements for chemical spills. Emergency contact information will be posted in the administrative areas and fueling areas. The Lead SSR will modify spill containment procedures as required when chemicals are brought to the project for use.

Once a spill has been recognized and appropriate client/site notifications have been made, the Lead SSR will implement appropriate spill control and countermeasures. The following response principles apply:

- Follow contingency and evacuation procedures in this plan. Alert the CM and implement the Emergency Response Plan (**Appendix B**). All spills, regardless of size, shall be reported to the CM.
- For spills less than 5 gallons, contain the spill to the smallest area possible, using absorbents and site equipment to build berms. Prevent, to the extent possible, the migration of spills to nearby sewers, drainage structures, open waters, and other sensitive human and environmental receptors. For small hazards, such as spills of petroleum products less than 10 gallons, the spill will be handled by the Contractor Emergency Response Personnel, subject to the CM's determination. The CM must be notified before proceeding with cleanup. Refer to the Emergency Phone List and Project Contact List for the phone numbers of personnel and emergency response contractors to be notified for cleanup of large spills for which the Contractor Emergency Response Personnel do not have approval to handle.
- Conduct and complete the response in accordance with applicable local, state, and federal regulations. Seek assistance from the CM and appropriate authorities (i.e., the MA DEP, EPA, NRC) in determining the extent and completeness of the spill response.
- For spills 5 gallons or greater, contain the spill to the smallest area possible, as noted above. Subject to the CM's determination, notify the appropriate emergency response contractor, where applicable. Coordinate with the CM to determine the methods to be employed for collection, storage, and the ultimate disposal of contaminated materials. Applicable hazardous waste regulations will be adhered to.

6. TRAINING REQUIREMENTS

6.1. Basic Training Requirements

Personnel working in an Exclusion Zone (EZ) or Contamination Reduction Zone (CRZ) (e.g., where the potential exists for contact with hazardous materials) shall complete training and have site experience conforming to the requirements of 29 CFR 1910.120(e). The required 40-hour course covers procedures for working at hazardous waste sites. Personnel are also required to have received 8 hours of refresher training annually thereafter. The Contractor will comply with OSHA's Right-to-Know (HAZCOM) requirements and applicable State laws.

Personnel, including subcontractor personnel, not expected to encounter environmentally impacted materials will be required to have appropriate training for the specific task they are performing. The Lead SSR will be responsible for determining the likelihood of potential exposure to environmentally impacted materials for a specific task. The Lead SSR will then determine the minimum required training for that task.

Contractors/subcontractors shall complete Charter's Pre-qualification forms as well as provide written documentation that these training/experience requirements have been met.

Personnel, anticipated to wear a respirator for more than 30 days, shall receive medical surveillance and be trained in the contents of Charter's "Respiratory Protection Program," in accordance with 1926.65 (f).

Competent persons must be identified before site activities begin. These individuals have been identified by their employer and can identify existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees. These individuals are knowledgeable of the applicable standards and are also authorized by their employer to take prompt corrective actions to correct or eliminate the hazards.

6.2. Site-Specific Training

Site-specific employee training to minimize on-site hazards will be provided to address field operations activities, procedures, monitoring, and equipment, and will be completed before work starts. This training will include identifying the names of personnel and alternate personnel responsible for site safety.

In addition, this training, at a minimum, will include the following:

- Site description and history
- Project activities, including coordination with other contractors
- Hazard evaluation
- On-site safety responsibilities
- Site Control and work zones
- Medical monitoring, in accordance with 1910.120 (f)
- Atmospheric monitoring

- Personal protection, clothing, and equipment
- Respiratory selection, use and care
- Decontamination procedures
- Emergency procedures
- Review of site-specific Safety Data Sheets (SDS)
- Safe work practices
- Other elements covered in this HASP

This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safe operations. Training will also include emergency response provisions, including emergency preparedness, the location of assembly areas, proper entry and exit procedures for the Exclusion Zone, warning systems, incident management, the location of emergency equipment, and the driving route to the hospital. Daily site safety meetings will be documented using the Daily Safety Briefing Form on the tablet.

6.3. Safety Briefings

Project personnel will receive briefings from the Lead SSR at the start of each workday to further assist site personnel in conducting their activities safely. Briefings will also be provided for new operations, changes in work practices, or if site or environmental conditions change. Briefings will also be provided to facilitate compliance with prescribed safety practices when performance deficiencies are identified during routine daily activities or during safety audits. Some information that should be covered includes: a review of this Plan with the Contractor's personnel; a check of personnel training certifications; a discussion of potential hazards; and a discussion of what is expected of personnel. Copies of training certifications/cards should be kept on-site for reference.

6.4. Safety Audits

The Lead SSR and Safety Team will conduct daily safety walks and weekly safety audits of field operations and subcontractor performance to assess compliance with health and safety policies and procedures, as well as this plan. Daily operations will adhere to the protocols outlined in this HASP and will be enforced by the Lead SSR.

6.5. First Aid, CPR, AED and Bloodbourne Pathogens Protection (BBP)

The Lead SSR, their alternate and other supervisory personnel are trained and certified to administer First Aid, CPR, AED and BPP. Additionally, the majority of Charter craft personnel are trained to administer First Aid, CPR, AED and BBP. First Aid/CPR assistance by individuals on-site will be on a Good Samaritan basis. At least two people trained in First Aid, CPR, AED and BBP will always be on-site.

7. MEDICAL SURVEILLANCE PROGRAM

Charter has a medical surveillance program in accordance with 29 CFR 1910.120(f) and 1926.65 (f). Personnel performing field work involving hazardous materials are required to have passed a periodic medical examination by an occupational physician that is consistent with 29 CFR 1910.120(f), and if applicable, 29 CFR 1926.59 and 1926.62.

Subcontractors will maintain medical records for their own employees in accordance with OSHA's Access to Records and provide written documentation certifying that each employee at the Site has met the requirements of the Medical Surveillance Program. This documentation will be provided for each employee assigned to the Site before the first day of work. The pre-assignment and annual examinations are essentially the same in content and may include:

- An updated medical and occupational history
- A screening physical examination
- Blood and urine laboratory tests (including lead)
- Chest x-ray (where required by physician)
- Electrocardiogram
- Pulmonary function tests
- Audiometry
- Visual acuity test
- Other tests authorized by the occupational physician.
- Respirator fit testing

7.1. Emergency Medical Treatment

Provisions for emergency medical treatment are detailed in the Emergency Response Plan. They will include:

- An individual qualified to render first aid and CPR on a Good Samaritan Basis.
- An AED will be in the site trailer.
- First aid kits in compliance with OSHA requirements. Universal precautions are to be used for first aid operations.
- Conspicuously posted phone numbers and procedures for contacting ambulance services, fire department, police, and medical facilities.

8. SITE CONTAMINATION CONTROL PLAN

The purposes of the Site Control Plan discussed in this section are to maintain order at the Site and to minimize chemical and physical hazards to on-site personnel, visitors, and the public. Site control work zones will include an Exclusion Zone, a Contamination Reduction Zone, and a Support Zone. The work zones, as well as the other portions of the HASP, will be coordinated with the CM. Site control plans will be completed once areas and locations of contaminants have been identified at the start of field activities.

The extent and relative positions of the control zones will change as the project progresses. The limits of these control zones will be adjusted as Site-specific conditions relative to contaminant conditions become well defined. Control zones will be designated for each work area. These changes from the original defined field parameters will be made available to the CM. Site fencing, caution tape, signage, barricades, or other appropriate measures will be used to separate the work zones defined below physically.

8.1. Support Zone

The Support Zone, or cold zone, is considered the uncontaminated area and will be identified by the Lead SSR upon the start of field activities. The Support Zone should be located upwind, upstream, and uphill from the Exclusion Zone, within the construction boundaries, but away from areas designated for stockpiled material awaiting chemical characterization. The Support Zone for the work at the Site is within the construction limits, but not near any areas identified for excavation or other intrusive activities.

The Support Zone contains temporary administrative facilities that support team communications, emergency response, and coordination of daily field operations. Communications equipment is in this area. Appropriate sanitary facilities, safety equipment, medical equipment, and support equipment are identified and kept in this area. Boundaries for the Support Zone are separated from public access using site fencing and other barricades to separate the work zones physically. Signage is also used to demarcate zones.

8.2. Contamination Reduction Zone

A Contamination Reduction Zone, also known as a warm zone or decontamination zone, is a safety buffer that limits access to the Exclusion Zone. The Contamination Reduction Zone is established at the perimeter of the Exclusion Zone and provides physical separation of the Support Zone and Exclusion Zone.

The Contamination Reduction Zone provides an entry point for personnel, vehicles, and equipment into the Exclusion Zone and an exit area for decontaminating personnel, materials, and equipment from the Exclusion Zone. The Contamination Reduction Zone will be surrounded by a

suitable temporary barricade system to physically separate the work zones and allow adjustments to the size and location as site conditions change.

Operations within the Contaminant Reduction Zone require specialized training and equipment, including portable eyewash, potable water, soap, towels, medical supplies, plastic garbage bags, fire extinguishers, extra PPE, and decontamination supplies.

8.3. Exclusion Zone

The Exclusion Zone, or hot zone, is the area containing or suspected of containing contaminated materials. Since work activities will be conducted at various locations within the property, a construction fence will be used to delineate the EZ. Entrance into the EZ will be through an access point. The CRZ and decontamination facilities will be located outside the construction fence line, immediately adjacent to the EZ entrance gate.

The Exclusion Zone includes and encompasses areas identified as excavation areas. The fence line around the area serves as the Exclusion Zone's perimeter. The Exclusion Zone is to be clearly marked by orange construction fencing and signage.

Access and egress from the Exclusion Zone will be through the Contamination Reduction Zone, following procedures described in the Decontamination Section of this HASP. Activities within the Exclusion Zone require specialized training and experience, appropriate PPE, and pre-planning.

8.4. Staging / Storage Area

For this project, clean soils for use as backfill will be stored on the site in a designated stockpile area.

8.5. Personnel And Small Equipment Decontamination

Refer to Section 11.0 - Decontamination Procedures of this document for further decontamination procedures.

8.6. Heavy Equipment Decontamination

Refer to Section 11.0 - Decontamination Procedures of this document for further decontamination procedures.

8.7. Employee Alarm System - Communications Plan

The Lead SSR and Supervisory personnel will carry portable radios, allowing contact with field personnel at all times. Compressed air containers will also be available to signal and alert workers in case of an emergency.

In addition, Charter communicates to its employees and subcontractors the following:

- Explain to its employees the preferred means of reporting an emergency.
- Establish procedures for sounding emergency alarms in the workplace.
- Post emergency telephone numbers near employee notice boards and other conspicuous locations when telephones serve as a means of reporting emergencies. Where a communications system also serves as the employee alarm system, emergency messages have priority over non-emergency messages.
- Assurance that devices, components, combinations of devices or systems constructed and installed comply with this standard is approved.
- Assurance that employee alarm systems are restored to normal operating condition as promptly as possible after each test or alarm.
- Assure spare devices and components subject to wear or destruction are available in sufficient quantities and locations for prompt restoration of the system.
- Employee alarm systems are restored to normal operating conditions except when undergoing repairs or maintenance.

8.8. Medical Treatment and First Aid

Workers are informed of locations and directions to locations where emergency medical attention may be received. A roadmap and an emergency phone list will be posted at the work Site, displaying the most direct route to the appropriate medical facilities. The Lead SSR will assign individuals the responsibility of driving the Contractor's vehicle to the hospital. The designated drivers will be familiar with the most direct route and time required to reach the hospital. The Emergency Route directions are presented in **Appendix B**. Copies of these maps will be posted at the job Site and provided to Charter and subcontractor vehicles on site.

An Emergency Contact list is presented **in Appendix B**. Local EMS professionals have in-depth knowledge of local hospitals and their current capabilities and make the final decision on the most appropriate medical facility for the patient.

Depending on the seriousness of the injury, treatment may be given at the Site by trained contractor personnel. For more serious injuries, additional assistance may be required at the Site, or the victim may be transferred to an appropriate medical facility.

Lifesaving care will be instituted if it is safe for the caregiver to do so. If the scene is unsafe or poses a hazard to rescuers or other workers, the Lee Fire Department will be notified, and emergency services will be activated (911). Decontamination procedures, as applicable, are implemented before medical treatment.

In the event of minor injury and minimal contamination, medical care may be rendered immediately without considering decontamination. Outer garments can be removed provided this does not cause delays, interfere with treatment, or aggravate the injury. Respiratory protection

must always be removed, and chemical-resistant clothing can be cut away. If the outer contaminated garments cannot be safely removed, the individual should be wrapped in plastic or blankets to help prevent contamination of medical personnel and/or the interior of transfer vehicles. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim unless it is suspected that the individual has been contaminated with a highly toxic or corrosive material that could cause serious injury or loss of life. For minor medical issues or injuries, the standard decontamination procedure should be followed.

Prior to beginning work review all SDS to determine if continuous flow eyewash/ shower stations are required onsite for the use or emergency response to the chemicals being used.

Injuries from contaminant inhalation can be treated only by qualified physicians. If eye or skin contamination occurs, immediate measures must be taken to counteract its effects. First aid treatment generally involves flushing the affected areas with water and assessing the need for further medical attention.

When protective clothing is grossly contaminated, contaminants may be transferred to the wearer or to treatment personnel, causing injuries. Unless splashing could cause severe medical problems, the protective clothing should be rinsed as quickly as possible and carefully removed.

9. PERSONAL PROTECTIVE EQUIPMENT

The purpose of personal protective clothing and equipment (PPE) is to shield or isolate individuals from the chemical, physical, and biological hazards that may be encountered at a hazardous substance site. No single combination of protective equipment and clothing can protect against all potential hazards. PPE should be used in conjunction with other protective measures, and its effectiveness should be evaluated periodically, as required by OSHA standard 29 CFR 1910.120(c)(h)(5).

The use of PPE can itself create significant worker hazards. For any given situation, equipment and clothing should be selected that provide adequate protection. However, over-protection, as well as under-protection, can be hazardous and should be avoided where possible. Two basic objectives of any PPE program should be to protect the wearer from safety and health hazards and to prevent injury from incorrect use and/or malfunction of the PPE.

Worker Hazards Associated with Protective Equipment

- Heat stress
- Physical stress
- Psychological stress
- Impaired vision

- Impaired mobility
- Impaired communication

Personnel are responsible for their own health and safety on jobsites. Personnel shall remain aware of site conditions and exercise sound judgment when confronted with unsafe or potentially hazardous conditions. If presented with an unsafe and/or hazardous situation, personnel shall call a safety stop and evacuate the scene. Personnel shall not re-enter a scene until it is deemed safe by the Lead SSR.

9.1. General

Personal protective equipment (PPE) for general operations will be consistent with the requirements of 29 CFR 1910 Subpart I, “Personal Protective Equipment.” Basic levels of protection for hazardous waste operations will be selected in accordance with the provisions of 29 CFR 1910.120(g) (3), “Personal Protective Equipment Selection,” and 1926.65, and 40 CFR 311. Several manuals and guidebooks are available for evaluating PPE performance.

The PPE selection will be based on hazards specific to the work activities and the anticipated duration of the activity. Procedures for the establishment, implementation, and enforcement of maintenance, storage, decontamination, disposal, proper fitting, and training will be implemented by the Lead SSR, CIH, and PM. Further provisions for evaluation of effectiveness, medical concerns, and extreme conditions will also be addressed.

Modification to basic PPE ensembles may be necessary for specific operations. In these cases, further definition will be provided through a review of particular hazards, conditions, and proposed operational requirements, as well as through monitoring at the operation. Protection may be upgraded or downgraded, as deemed appropriate by the Lead SSR, with notification to the CM.

9.2. Levels of Protection

OSHA has established four levels of PPE to reduce workers' exposure to chemical, physical, and biological hazards (29 CFR 1910.120 (B)).

The clothing material must be compatible with the chemicals of concern and the task being performed. PPE must be able to resist tears, abrasions, punctures, and temperature effects. The manufacturer tests chemical suits to ensure compatibility with specific chemicals. Each manufacturer can provide data on the rated chemical, penetration levels, degradation time, and incompatible chemicals.

Contact lenses are not to be worn on-site by personnel exposed to hazardous chemicals. Contact lenses can interfere with proper eye-wash techniques and may act as a barrier, trapping chemicals between the lens and the eye.

9.2.1. Level A Protection

Level A offers the greatest protection from hazardous materials. It is used at sites where extremely hazardous or unknown materials are present. It is also used for sites that present a significant hazard from splashes, vapors, gases, and particulates. This level consists of:

- Positive pressure self-contained breathing apparatus (SCBA)
- Total encapsulating chemical protective suit
- Chemically resistant inner and outer gloves and boots
- Boots with steel toe or shank
- Hardhat
- Disposable outer suit (optional)
- Reflective Vest

No work will be conducted in Level A. If Level D is not adequate for worker protection, Site operations will be immediately suspended, CM notified, and PPE requirements evaluated by the Lead SSR.

9.2.2. Level B Protection

Level B protective clothing is used in situations where atmospheric quality or contamination is a concern, but there is limited concern regarding skin hazards. Level B protective clothing includes:

- Full one-piece chemical-resistant suit
- Outer rubber boots with steel toe or shank
- Outer nitrile or neoprene gloves and inner disposable chemical-resistant gloves
- Full-face self-contained positive pressure or pressure-demand breathing apparatus (SCBA) or supplied air-line respirator
- Reflective Vest
- Hardhat

No work will be conducted in Level B. If Level D is not adequate for worker protection, Site operations will be suspended immediately, CM notified, and PPE requirements evaluated by the Lead SSR.

9.2.3. Level C Protection

Level C protective clothing is an upgrade from Level D. Level C will be used in work areas where the chemical or chemical concentrations present an inhalation hazard. Use of

respirators will be an appropriate measure against airborne contaminants. Level C may not be used in areas where atmospheric quality is degraded by asphyxiates or poor ventilation, or where conditions are not known. Level C protective equipment includes:

- Full-face or half-face air-purifying respirator (NIOSH approved) fitted with appropriately rated cartridges (acid gas / organic vapor / High Efficiency Particulate Air filter (HEPA) cartridges).
- Hardhat.
- Safety glasses.
- Safety-toe boots
- Disposable Tyvek coveralls.
- Disposable nitrile inner gloves and nitrile outer gloves.
- Reflective safety vest.
- Disposable or reusable rubber outer boots.

No work will be conducted in Level C. If Level D is not adequate for worker protection, Site operations will be immediately suspended, the CM notified, and PPE requirements evaluated by the Lead SSR.

9.2.4. Level D Protection

Level D is assumed to be the initial PPE level. Level D personal protective clothing and equipment includes:

- Work clothes or uniform
- Disposable or reusable (as appropriate), Tyvek coveralls - required when splashing by contaminated liquids is a possibility. Thicker coveralls may be selected for heavy spill risk (e.g., Modified Level D).
- Hardhat.
- Face and eye protection from safety glasses, goggles, or a face shield.
- Reflective safety vest or Hi-Viz Clothing (shirt/sweatshirt with reflective strips).
- Safety toe boots
- Level A4 Cut-resistant work gloves.
- Disposable 6 mil or higher nitrile gloves - required when handling and collecting soil and water samples.
- Outer nitrile gloves - required when splashing by contaminated liquids is expected to be heavy or excessive (e.g., Modified Level D).
- Chemically resistant or disposable outer boots (e.g., Modified Level D).

- Noise protection - as warranted by noise monitoring

9.2.5. Modified Level D Protection

- Work clothes or uniform
- Disposable or reusable (as appropriate), Tyvek coveralls - required when splashing by contaminated liquids is a possibility. Thicker coveralls may be selected for heavy spill risk (e.g., Modified Level D).
- Hardhat.
- Face and eye protection from safety glasses, goggles, or a face shield.
- Reflective safety vest or Hi-Viz Clothing (shirt/sweatshirt with reflective strips).
- Safety toe boots
- Disposable nitrile gloves - required when handling and collecting soil and water samples.
- Outer 6 mil or higher nitrile gloves - required when splashing by contaminated liquids is expected to be heavy or excessive (e.g., Modified Level D).
- ANSI Level A4 cut-resistant work gloves shall be worn when conducting work activities with the hands.
- Chemically resistant or disposable outer boots (e.g., Modified Level D).
- Noise protection - as warranted by noise monitoring

9.3. Respiratory Protection

Whenever possible, respiratory hazards are engineered out of the work environment. Engineering controls may include increased ventilation, dust or vapor suppression, or other mechanisms to eliminate the respiratory hazard.

If Engineered controls are not a viable option, or do not adequately control exposure, then a personal respirator plan shall be implemented. Charter employs a Respiratory Protection Program. Respirator types can range from simple particulate-filtering face masks to half- or full-face masks with specialized filter cartridges, to supplied-air or self-contained breathing apparatus (SCBA).

Any respirator or facemask used at the Site will be appropriately rated for the work performed and for Site-specific contaminants, and will meet NIOSH approval guidelines. Only individuals who have been trained and fit-tested within 12 months and have received medical approval will be permitted to use a respirator.

Air-purifying respirators and face masks are not used in environments where contaminants are present in a form or at concentrations that may be an immediate danger to life and health (IDLH),

or in oxygen-deficient atmospheres. These conditions require SCBA or a supplied-air respirator (SAR).

9.4. Anticipated Protection for Site Operations

Most routine daily operations at the Site that do not involve potential soil contact will require personal protective equipment Level D. These include mobilization/demobilization, setup, heavy equipment operation, truck operations, construction, and support activities.

Independent of the level of protection used, workers at the Site will be required to wear proper work clothes (short pants and tank-top shirts are prohibited), safety boots or shoes, safety glasses, reflective safety vest or class II reflective shirt or coat, hard hat, and be clean-shaven to allow proper respirator fit (when necessary).

Tasks that involve contact with impacted debris or soil require the use of PPE. The following are tasks that have been identified for this project with their anticipated PPE level:

- Mobilization Operations – Level D
- Housekeeping – Level D
- Fueling – Level D
- General Labor – Level D
- Utility Clearance and Identification – Level D Electrical PPE to be determined by the Lead SSR and/or utility company.
- Unloading of Equipment and Materials – Level D
- Traffic Control-Level D
- Cold/Hot weather Work – Level D
- Night Work – Level D
- Surveying – Level D (Surveyor to determine gloves with appropriate dexterity)
- Hot Work for Welding, Splicing – Level D (Flame Resistant Clothing, Leather Protective Hot Work Gloves and PPE)
- Heavy Equipment Operation – Level D
- Office Trailer Site Setup – Level D
- Construction Staging/Materials Management Area – Level D
- Erosion / Sedimentation / Storm water Controls Installation/Removal – Level D
- Work on the water – Level D plus USCG-approved PFD
- Decontamination – Modified Level D (Lead SSR to determine gloves appropriate for decontamination, Rubber, Nitriles)

- Drilling, Excavation, and Backfilling – Modified Level D (Lead SSR to determine gloves appropriate for task);
- Storage, Management, Treatment, and/or Disposal of Fluids – Modified Level D (Lead SSR to determine gloves appropriate to task)
- Fencing – Level D
- Loading out of Site materials for off-site disposal/recycling –Modified Level D (Lead SSR to determine gloves appropriate for decontamination, Rubber, Nitriles)
- Demobilization Operations – Determined by SHO/Lead SSR based on contaminants.

If critical action levels are unexpectedly exceeded and, based on the evaluation of conditions, unanticipated respiratory protection is deemed necessary, the work will be stopped, the CM will be notified, and the Lead SSR will evaluate before upgrading the level of protection. Action levels used to determine whether to upgrade or downgrade protection levels are described in the Air Monitoring section of this HASP.

9.5. Personnel and Equipment Decontamination

Personnel and equipment decontamination areas will be established on-site as needed. Personnel will decontaminate or dispose of soiled protective clothing and equipment (e.g., disposable boots and gloves) in the Contamination Reduction Zone. Refer to Section 11.0 - Decontamination Procedures of this document for further decontamination procedures.

9.6. Site Visitors

The site is secure, and employees and authorized visitors will sign in at Charter's Field Office and sign out before leaving the site for accountability purposes.

Visitors must report to the Lead SSR before accessing the Site. The Lead SSR will determine the purpose of individual visits and will document decisions regarding their access to the Site. If granted limited access, visitors must sign in and out under the Lead SSR's direction daily for the duration of their approved visit. Under no circumstances will visitors be allowed to interfere with or participate in construction or field operations.

If required, the Lead SSR will establish a designated Level D area as an observation point for visitors during intrusive activities. This designated area will be located to provide proximate viewing of site operations. It will be positioned so that visitors do not in any way inhibit site access, logistics, or general operations. Further, the Lead SSR will locate the viewing areas such that visitors present are at minimal risk of exposure to site hazards.

Before gaining access to the designated viewing areas described above, visitors must provide the Lead SSR with documented compliance with Section 5 of the HASP, comply with other applicable

sections, and satisfy additional conditions imposed by the Lead SSR, as deemed appropriate to assure visitor safety. The Lead SSR or designee will escort Site visitors throughout the Site.

10. AIR AND NOISE MONITORING

Air and Noise monitoring will be conducted on an as-needed basis. Before soil excavation and/or other intrusive construction activities, a baseline air quality program will be established to determine the existing Site air quality. Perimeter Dust, Odor, and VOC monitoring will be conducted daily by the CM along the perimeter boundary fence line. Charter will perform monitoring for dust, odor, VOCs, and combustible gases in the Exclusion Zone, as determined by the Lead SSR or Charter Safety Team.

10.1. General

Atmospheric conditions will be monitored during on-site excavation or other intrusive activities to determine whether on-site workers' PPE needs to be upgraded and to identify potential emergency conditions. Ambient air monitoring techniques will be utilized for this section. Air monitoring will be conducted to maximize the detection of Site-specific contaminants. The Contractor will be responsible for OSHA compliance worker exposure air monitoring for dust (in accordance with 29 CFR 1910.120), as required by site conditions, as part of their work plan. The Lead SSR or its designee monitors the atmosphere in the Exclusion Zone at the worker-breathing zone. Instrument readings are documented using the Atmospheric Monitoring Log**.** Air monitoring equipment is maintained and calibrated in accordance with the manufacturer's recommendations. Such maintenance and calibration data will be recorded and included in the Atmospheric Monitoring Log.

10.2. Exclusion Zone and Exclusion Zone Perimeter

Building demolition activities in the Exclusion Zone are initiated in Level D PPE with the contingency to upgrade the level of protection based on monitoring results and action levels. The Lead SSR is responsible for establishing air-monitoring strategies and protocols to characterize and quantify any airborne releases and the transport of contaminants during excavation in any excavation area.

Monitoring for VOCs and particulates will be performed periodically in the Exclusion Zone and Perimeter to characterize and quantify any airborne release of contaminants during intrusive activities. A photoionization detector (PID) with a 10.6 eV lamp is used during the work to monitor the breathing zone and screen geological samples for VOCs. A Combustible Gas Indicator (CGI) equipped with an oxygen alarm, and lower explosive level, carbon monoxide, and hydrogen sulfide sensors will be used to monitor the work zone. Particulate levels are measured using a MiniRAM, RAM-1, or equivalent. Personal silica and lead personal air sampling pumps are used to measure silica or lead levels in the air around workers. Vapor suppression activities (i.e., minimize

or stop soil disturbance) and dust suppression activities (i.e., water trucks or water mist over exposed soils) will be utilized as required.

10.3. Action Levels

Instrumentation will include a PID for total VOCs; a MiniRAM, DataRAM, or equivalent for particulate; and a Combustible Gas Indicator equipped with an oxygen sensor, a lower explosive level sensor, a carbon monoxide sensor, and a hydrogen sulfide sensor. The Action Levels in this HASP will apply to site work throughout the project. Action Levels for direct-reading instruments are provided below.

This section presents requirements for the use of real-time air monitoring instruments during Site activities involving potential for exposure to Site contaminants and excessive sound levels. It establishes the types of instruments to be used, the frequency with which they are to be used, techniques for their use, action levels for upgrading/downgrading protection levels, and methods for instrument maintenance and calibration.

The following action levels, as measured in the breathing zone during work activities, will be in effect during the entire project.

PID Monitor – VOC's (Above Background)	
0 ppm – 1 ppm	Level D, Engineering controls are implemented. >1 ppm sustained for 5 minutes Lead SSR test for benzene
>10 ppm.	Upgrade to Level C PPE and implement engineering controls
10 ppm - 20 ppm	Stop Work, Contact Lead SSR, Implement Engineered Controls, Level C PPE
LEL Monitor	
<10% LEL (ambient atmosphere)	Continue monitoring (Identify source if levels increase)
>10% but <20% LEL (ambient atmosphere)	Stop work, Contact Lead SSR
>20% LEL (ambient atmosphere)	Stop work, evacuate affected areas, contact Lead SSR
Oxygen Monitor	
<19.5% O2	Stop work and evacuate affected area until levels are >19.5% but <23.5% O2 are measured in ambient air, or >19.5% but <23.5% O2 is measured in a confined space.
>19.5% to 23.5% (ambient atmosphere)	Acceptable O2 levels for ambient atmosphere, continue monitoring.
>19.5% to 23.5% (confined space)	Acceptable O2 levels for ambient atmosphere, continue monitoring.

>23.5% (confined space)	Fire/explosion hazard potential, stop work and remove personnel from the space.
Hydrogen Sulfide	
>5 ppm	Stop work and evacuate the affected area.
Particulate Matter (Exclusion Zone Perimeter Readings)	
Particulate Level - no visible/<300 ug/m^3	Continue work
Particulate Level - visible dust/>300 ug/m^3	Implement Engineered controls/dust suppression
Silica (Personal Air Pump with Off-site Analysis)	
Silica Levels < 25 mg/m^3	Continue Work
Silica levels $\geq$ 25 mg/m^3	Stop work – implement Engineered controls
Lead Exposure Monitoring (Personal Air Pump with Off-site Analysis)	
Lead in air <0.03 mg/m3	Continue work
Lead in air $\geq$ 0.03 mg/m3	Implement Engineered controls/dust suppression/Upgrade PPE
PCBs in air < 0.25 mg/m3	Continue work
PCBs in air ≥ 0.25 mg/m3	Implement Engineered controls/dust
Noise Dosimeter (Work Zone)	
Sound Levels <80 dB(A)	Continue work, Lead SSR monitors for peaks exceeding 140 dB
Sound Levels >80 dB(A)	Continue work, don hearing protection, Lead SSR monitors for peaks exceeding 140 dB
Noise Dosimeter (Work Zone Perimeter)	
Sound Levels <80 dB(A)	Continue work
Sound Levels >80 dB(A)	Stop work, Lead SSR consult with Superintendent & CM/Implement Mitigation Procedures if necessary

Notes: Action Levels presented above for VOC's are for 15 – minute sustained readings within the breathing zone.

Additionally, Level C PPE (full-face or half-face air-purifying respirators with organic vapor cartridges/P100 or equivalent) is to be worn when potentially contaminated particulates become airborne.

10.4. Dust, Odor, and Vapor Control Plan

Charter is required to perform adequate control of dust, objectionable odors as determined by the CM, and vapor during work, always to achieve the perimeter limits established for the project. This may include vapor suppression activities (i.e., minimizing or stopping soil disturbance) and/or

dust suppression activities (i.e., water trucks and/or water mist). It is important to account for olfactory fatigue. Over time, on-site personnel may become desensitized to odors. Monitoring equipment will be used in addition to odor observations.

10.5. Air Monitoring Plan

Charter will conduct periodic air monitoring (type and duration as determined by Lead SSR and SHO) using the equipment discussed above to monitor employees' breathing zones. Based on work activities and dust monitoring Charter SHO/SSR may collect Personal air samples for Silica or Lead. Samples will be collected utilizing personal air sampling pumps and media as prescribed by NIOSH sampling methods.

11. DECONTAMINATION PROCEDURES

Decontamination is the procedure to remove hazardous substances from employees and equipment to the extent necessary to preclude foreseeable health effects. It also prevents cross-contamination between personnel, eliminates the potential for bringing contaminants home, and improves quality control and assurance with environmental sampling.

It is important to note the duration of decontamination procedures. Many factors, such as environmental temperature, airflow, contamination, and breakthrough potential, will affect the time personnel can remain in PPE. Factors such as work duration, distance from the Contaminant Reduction Zone to the Exclusion Zone, work effort, and physical condition may also affect personnel's ability to remain within PPE.

Decontamination is handled in several phases: gross (primary), secondary, and tertiary. These phases may be altered based on contamination or other conditions.

- Gross (primary) decontamination is the removal or neutralization of a majority of the contaminant. Gross decontamination is performed either in the Exclusion Zone or at the start of the Contaminant Reduction Zone. It is always assumed that residual contamination remains after gross decontamination.
- Secondary decontamination is the removal or neutralization of most of the residual contamination. This is performed in the middle of the Contaminant Reduction Zone. It is presumed that contamination is present after secondary decontamination.
- Tertiary decontamination and PPE removal is the final phase of decontamination. Remaining contamination is removed, and remaining PPE is discontinued. This is performed at the end of the Contaminant Reduction Zone, before the Support Zone. Contaminated PPE is placed in covered containers within the Contaminant Reduction Zone.

Several decontamination mechanisms can be used to decontaminate personnel and equipment. Each technique has both positive and negative aspects regarding personnel, resources, and time constraints.

A decontamination technique may work well for one contaminant but not another. Several techniques of decontamination include: emulsification, chemical reaction and degradation, disinfection, dilution, absorption, and physical removal.

- Emulsification is the production of a suspension of material. The contaminant is emulsified into a form that is immiscible and insoluble in water. Emulsifying agents are typically used for nonpolar liquids and insoluble solids. Emulsifying agents can include surfactants, soap, or detergents; check with the manufacturer's recommendations for use.
- Chemical reaction is a process that neutralizes, degrades, or chemically alters the contaminant. Chemical neutralization may not ensure that hazards are eliminated, and reactions may be difficult or dangerous to perform. Chemical neutralization may cause exothermic or endothermic reactions and may damage PPE or living tissue.
- Disinfection with chemicals or bleach is used to destroy biological or pathological compounds.
- Absorption of chemicals into another substance.
- Physical removal of contaminants by brush, wipes, vacuum, or water.

Decontamination procedures are to be tailored to the specific hazards of the Site. They will vary in complexity and number of steps, depending on the level of hazard and the employee's exposure to it. Decontamination procedures and PPE decontamination will vary depending on the specific substance, since one procedure or method will not work for all substances. Evaluation of decontamination methods and procedures should be performed, as necessary, to ensure that employees are not exposed to hazards by reusing PPE (29 CFR 1910.120 (H) (3)).

The Lead SSR determines the level of decontamination required based on evaluations of specific work activities, the potential level of contamination encountered, and project specification requirements. Temporary Contamination Reduction Zones are established at sampling locations. Appropriate levels of Decontamination Equipment are provided as deemed necessary by the Lead SSR.

11.1. Personnel and Small Equipment

Personnel perform personal decontamination upon entering the Contamination Reduction Zone. The Lead SSR is responsible for ensuring that personal protective equipment is decontaminated before reissue.

Decontamination of personnel in Modified Level D PPE will consist of removing and disposing of coveralls, disposable boots (when worn), and gloves. Boot wash stations and trash receptacles will be set up.

Decontamination of personnel using Level C protective equipment will consist of:

- Removal and disposal of boot covers.
- Removal and disposal of coveralls.

- Removal and disposal of outer gloves.

Washing boots or other non-disposable protective equipment (i.e., hard hat, safety glasses/goggles, etc.) suspected of being contaminated using soap solution followed by potable water rinse. Collected decontamination fluids must be disposed of.

- Removal, cleaning, and storage of respiratory equipment.
- Removal and disposal of inner gloves.

Contaminated wash solutions and PPE will be disposed of at an appropriate approved disposal facility. Hand tools and other small equipment will be decontaminated as needed by washing in decontamination basins. The Contractor will supply washing facilities with an adequate supply of potable water for personal hygiene.

11.2. Contamination Prevention

One of the most important aspects of decontamination is preventing contamination. Good contamination prevention should minimize worker exposure and support worker hygiene by preventing cross-contamination. Procedures for contamination avoidance include:

11.2.1. Personnel

- Know the limitations of the PPE being used
- Do not walk through areas of obvious or known contamination
- Do not handle or touch contaminated materials directly
- Do not sit or lean on potentially contaminated surfaces
- Make sure PPE has no cuts or tears before donning
- Fasten closures on suits, covering with tape, if necessary
- Take extra care to protect any skin injuries
- Stay upwind of airborne contaminants
- Do not carry cigarettes, gum, food, or candy into contaminated areas
- Wash hands and face before eating and drinking
- Do not smoke, eat, or drink in contaminated areas
- Shower at the end of the workday

11.2.2. Sampling/Monitoring

- Cover instruments with clear plastic, leaving openings for sampling ports and sensor points.
- Bag sample containers before placement of sample material into containers.

11.3. Heavy Equipment Decontamination

To prevent off-site transport of contamination, contaminated construction equipment and vehicles will be decontaminated at a fixed temporary decontamination area in the Contamination Reduction Zone immediately after exiting the Exclusion Zone.

Vehicles and equipment requiring decontamination shall be washed sufficiently to remove visible soil, sediment, and other residuals from the vehicle body, undercarriage, and tires, and no visible tracking of soil, sediment, or residuals onto public roadways occurs, as confirmed by the CM.

All liquid and other materials (i.e., non-disposable, PPE, etc.) generated as part of the decontamination process will be collected, handled, stored, and disposed of separately from other remediation waste generated on site. Each waste stream shall be stored and disposed of separately, unless otherwise authorized by the GE's Representative in writing. Wheel wash stations will be constructed at the exit of the exclusion zone out of an HDPE liner, geotextile, and gravel. Liquid will be collected in a sump and pumped to a fractionation tank for treatment and disposal. Solids will be dewatered and mixed with the excavated soils within the excess materials staging area.

Before leaving the Site, material transport vehicles and containers will be inspected for evidence of contamination (including inside of wheels and undercarriage). Trucks leaving the Site will proceed to a decontamination station for cleaning before exiting onto public roads.

- Brush off equipment using a broom and/or brushes on the decontamination pad.
- If necessary, at the decontamination pad, heavy equipment shall be pressure-washed before leaving the Site.
- Equipment leaving the Site will be decontaminated. In addition, any equipment previously utilized to excavate impacted material will be decontaminated before use in backfilling (e.g., excavator bucket).
- Decontamination pads must ensure that the largest piece of equipment can be adequately decontaminated. Overspray must be controlled at the decontamination pads.
- Waste soil collected from the decontamination pads will be bulked with the related impacted material and sent to the properly licensed, approved disposal facility, as necessary.

Wheels shall be cleaned to remove sediment before entering the public right-of-way. When washing is required, it shall be done on an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin. All sediment shall be prevented from entering any storm drain, ditch, or watercourse through the use of sandbags, gravel, boards, or other approved methods.

The entrance shall be maintained in a condition that prevents sediment from tracking or flowing onto the public right-of-way. This may require periodic top dressing with additional stone as

conditions demand, and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed, or tracked onto adjacent paved road surfaces must be removed immediately.

12. ACCIDENT PREVENTION PLAN

12.1. Job Hazard Analysis

The Job Hazard Analysis (JHA) for each component of work anticipated for this project is created by the field team and Lead SSR before the start of tasks. These JHAs are used to identify the hazards associated with a task and the controls to abate them. The JHAs are then reviewed with project personnel before the start of each new task and periodically during the work. Hazards identified in the sections above and/or task-specific hazards will be addressed in the JHAs, as will the control measures to protect employees and property from those hazards. The task-specific JHAs will also list the type of PPE required for the completion of the task or activity. JHA's will incorporate GE's Lifesaving Principles Guide (Appendix J) requirements into the JHA.

12.2. Standard Operating Procedures

Charter is responsible for supplying the equipment to perform the excavation and other intrusive activities. The operator(s) are adequately trained, licensed (if applicable), and experienced in operating the type of equipment. Safety precautions are strictly followed, including proper demolition techniques, excavation support, the use of stabilizers, and equipment with a clear swing radius. The swing zone of an excavator is marked, and personnel are briefed on the dangers associated with swing areas. Workers in the swing area of heavy machinery acquire visual contact with the operator before entering into a zone impacted by the equipment. Charter's Trenching and Excavation Program is located in **Appendix H**

12.3. Fire Protection

Charter Contracting Company, LLC. (Charter) is committed to minimizing the threat of fire to site personnel, visitors, and property. Charter complies with applicable laws, regulations, codes, and good fire prevention practices. Specific fire prevention controls and policies are included in **Appendix G - Fire Prevention Plan**.

12.4. Hazard Controls

The following controls will be implemented during Site operations:

- Proper fencing, portable barriers, traffic controls, etc., around the building to be demolished to prevent pedestrian or vehicle entry.

- Excavations and trenches will be secured by a combination of the following: fences, caution tape, shielding barriers, or barricades.
- Support of Excavation (SOE) where appropriate
- Roll-over Protection on Heavy Equipment (ROPS)
- Equipment Operator Seat-belt use
- Provide lights for night work/low light conditions
- Trucks and heavy equipment will have a functional back-up or movement alarm, which is a maximum of 5dB(A) above ambient noise (Noise Mitigation)
- Swing Areas demarcated
- Limit use of air or gasoline-driven saws (Noise Mitigation)
- Use electric instead of diesel or gas-powered equipment where feasible (Noise Mitigation)
- Limit equipment idling (Noise Mitigation)
- Secure vehicle and equipment parts to secure against rattling and banging (Noise Mitigation)
- Equipment powered by internal combustion engines shall be equipped with a muffler (Noise Mitigation)
- Construct temporary enclosures around noisy equipment or activities if feasible (Noise Mitigation)
- Phase work so that different vibration-inducing activities do not occur at the same time (Vibration Mitigation)
- Route heavy traffic away from sensitive structures (Vibration Mitigation)
- Grade surface irregularities to prevent the generation of impact noise and vibrations by vehicles (Vibration/Noise Mitigation)
- Visual barriers identifying demolition exclusion zones will be maintained

12.5. Safety Equipment

Basic emergency and first aid equipment will be available on the Site., as appropriate. This includes communications equipment, a first-aid kit, an AED, emergency eyewash, fire extinguishers, and other safety-related equipment.

12.6. Communications

12.6.1. Two-Way Radios

Hand-held units are used as much as possible by field teams for communication between Exclusion Zone operations and the Support Zone. Communication Equipment will be in the Support Zone for communication with emergency support services/facilities.

12.6.2. Air Horns

Universal signals will be used to direct employees to evacuate a work area in the event of an emergency. The Lead SSR will brief employees on how to recognize these signals.

The following signals will be used to indicate an emergency:

- One long blast repeated three times at five-second intervals - Man down
- Three short blasts repeated three times at five-second intervals - Evacuate site
- Alternating short and long blasts - All clear

12.6.3. Hand Signals

Hand signals will be used between spotters and operators. These signals are very important when working with heavy equipment and will be agreed upon between the spotter and operator. Basic hand signals are to be known and understood by workers and reviewed at the safety meeting. These hand signals are shown in **Table 10-1**.

Signal	Meaning
Closed fist	Stop
Waving hand	Okay to move, backing up trucks.
Thumbs up	OK, I'm alright; I understand
Thumbs down	No, negative

12.7. Safe Work Practices

Safe work practices will be implemented during Site operations:

- Before the start of work, this HASP will be reviewed and conspicuously posted, and emergency phone numbers will be posted. Emergency phone numbers will include hospital, ambulance, fire, and police.
- Only properly trained and equipped personnel will be allowed to work in potentially contaminated areas.
- Regular work shifts will be limited to 12 hours. Shifts exceeding 12 hours will require Lead SSR and management approval. Personnel fatigue will be a key focus for the Lead SSR.
- The number of personnel and equipment in the excavation areas will be kept to a minimum, consistent with safe Site operations.

- Workers adhere to the "buddy system" while working in the Exclusion Zone and in designated exclusion areas. Radio contact is maintained between pairs on-site to assist each other in case of emergencies.
- Workers do not exit an Exclusion Zone until soiled equipment and clothing have been removed and decontaminated or properly disposed of.
- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer, ingestion, and inhalation of potentially contaminated materials is prohibited. Personnel will wash their hands and face before eating and drinking.
- As necessary, personnel will thoroughly wash their hands and faces upon leaving the Exclusion Zones.
- Contact with potentially contaminated materials and surfaces is to be avoided. Personnel are to comply with contamination control measures.
- Personnel with facial hair or other face-piece seal obstructions will not be permitted to work where respirators are required.
- Work is only conducted if adequate illumination is provided, i.e., visual observation is not impaired due to loss of daylight conditions.
- Sampling personnel are not to work near operating heavy equipment.
- No application of cosmetics in areas with contamination (Exclusion Zone).

12.8. Excavation / Trench Hazard

Collapse of trench sidewalls may occur during excavation and trenching. The area around trenches and excavations will be demarcated to prevent access by personnel not involved in the work. Charter's competent person for excavations will evaluate the condition of the excavation before personnel enter and at the beginning of each shift, after any rainfall event, and during each tidal event. The competent person will complete the Excavation Jobsite Inspection. This individual will be identified before the start of excavation-related activities. Actions to minimize the potential for hazards related to these activities include:

- Excavation and trenching activities will be in accordance with OSHA 29 CFR 1926 (p) and 29 CFR 1910.650 – 1910.652.
- Lay back slope to a stable pitch. The construction Contractor's competent person must inspect the sloping of the excavation or trench sidewalls.
- Equipment and excavated materials are placed no closer than 2 feet from the edge of the backfill.
- Install Temporary Excavation Support System around excavation areas that cannot be safely sloped.
- Heavy equipment not required for work activity will be kept away from the excavation.
- Personnel will not be permitted to enter the excavation without shielding or sloping in place.

12.9. Machinery And Mechanized Equipment

Actions to be taken to minimize the potential for hazards related to the operation of machinery and other mechanized equipment include:

- Only licensed & experienced operators will operate machinery.
- Crane Lift Plan(s) will be prepared for proposed lifting or hoisting activities. These plans will include detailed information regarding the lift, such as: crane cut sheets; lift capacity; weight(s) of items to be lifted; crane swing radius; crane location; stability of ground beneath crane; wind speed restrictions; hoisting and associated supports; and a description of how the restricted area will be demarcated.
- Machinery will be inspected daily before use.
- Equipment will be outfitted with audible back-up or movement alarms.
- Safety features such as belts, harnesses, and warning lights/alarms will be used throughout these activities.
- Tag lines will be used when lifting items.
- Equipment will be locked out and tagged out before conducting repairs or maintenance. The person who placed a lock and tag will only remove their lock and tag.
- Equipment capable of stopping, lowering, and holding at least the full test load shall be provided.
- Riding on load, hoods, hammers, buckets, material hoists, etc., not meant for personnel, is prohibited.
- The operator of hoisting equipment will not perform any other work or leave their position at the controls until the load has been safely landed or returned to ground level.
- Adequate clearance is maintained between moving or rotating parts of the equipment and fixed objects to allow for the safe passage of personnel.

12.10. Work On or Near the Water

Personnel working in such areas must wear a United States Coast Guard (USCG)-approved Commercial Type I, II, or III personal floatation device (PFD) appropriate to the circumstance. The task-specific JHA will identify the appropriate PFD required for each task. All PFDs will be colored (International Orange or high-visibility yellow) and will have SOLAS-grade reflective panels. Before and after each use, the PFD must be inspected for defects that would alter its strength and buoyancy. Defective units will be removed from service. The task-specific JSA will identify the appropriate additional PPE (e.g., Float Coat, Mustang Suit) required for working in, on, or within 6 feet of a water body when water temperatures are below 50°F. However, an exception to the usual PPE requirement can be made when the air temperature is high enough that work would be hindered by the risk of overheating on land (even when the water temperature remains cold).

The operator of each boat must complete a current version of the USCG float plan (included in **Appendix I**) and an approved boating safety training course before initial mobilization for work in the water body. Before each day of boat operation, the operator of each boat must communicate to the Lead SSR via email, phone, or text message the following information:

Actions to minimize the potential hazards associated with working on or near the water.

- Personnel will have training in boat operations and working on the water.
- Workers will use proper Personal Protective Equipment, including a Coast Guard Type I, II, III, or IV personal floatation device for each phase of work.
- Boats will be equipped with water rescue devices.
- Charter Standard Operating Procedures will be followed for boat operations.
- The Site Superintendent and Site Safety Representative will monitor the weather conditions and notify water operations personnel whenever adverse weather is one hour away.
- If incoming weather has the potential to cause flooding, all equipment and materials will be secured in a location to be determined by the superintendent. Boats will be secured in place or removed.

12.11. Hazardous Materials

Hazardous Materials (Department of Transportation) are defined as any substance or material in a quantity or form that poses an unreasonable risk to health, safety, or property when transported. A hazardous substance (Environmental Protection Agency) is any substance designated under the Clean Water Act and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) that poses a threat to waterways and the environment when released. An extremely hazardous substance poses a hazard to the community during an emergency spill or release due to its toxicity and chemical and physical properties (required reporting under SARA Title III). Hazardous waste (DOT & EPA) is a substance that is ignitable, corrosive, reactive, toxic, or that may pose a substantial or potential hazard to human health and safety or the environment when improperly managed.

Actions to be taken to minimize the potential for hazards (refer to Section 3.0) related to personnel who may encounter hazardous materials include:

- Hazardous materials expected to be on-site will be discussed at the morning safety meeting. The HASP, including SDS copies, will be kept on-site.
- Workers will use appropriate Personal Protective Equipment for each phase of work, as described in Section 7.0.
- Worker exposure will be monitored by the Lead SSR to ensure an adequate level of protection.

- Standard Operating Procedures will be followed for loading and sealing containers and trucks, which may contain hazardous materials.
- Control zones will be established as described in Section 6.0.
- The directives of the Lead SSR will be followed for emergency supplies, response, and spill cleanup procedures.
- If a spill occurs, the area will be sampled and tested to ensure complete cleanup. Local, State, Federal, and GE requirements will be followed to eliminate the spill and reduce impact to off-site receptors.

12.12. Miscellaneous Hazards

Actions to be taken to minimize the potential for hazards associated with on-site activities not previously addressed (e.g., operation of power tools, vehicular traffic control, etc.) include:

- Only trained personnel are to use power tools. Operation of power tools will be as specified by the manufacturer. American National Standards Institute (ANSI) rated safety glasses and protective guards will be employed. Ground fault circuit interrupters will be used on electrical connections. Charter has Standard Operating Procedures (SOPs) in place for the use of hand and power tools.
- DOT-approved containers will be used to store fuels. Fuel Storage Tanks will be appropriately grounded.
- Shutdown of engines will be performed before any fueling/refueling or servicing activities. Power cords will be disconnected when not in use.
- A fire extinguisher will be on hand in each work area and rated ABC for minor fire suppression applications.
- Open flames are not allowed in the work area.
- Equipment will be inspected and removed from service, and locked out and tagged out if not in good working condition.
- The Lead SSR will brief employees on potential traffic hazards before starting activities involving exposure to traffic.
- Personnel are to wear fluorescent orange safety vests with orange, white, or yellow reflector materials (ANSI Class 2).
- No smoking, eating, or drinking will be allowed in the Exclusion and Contamination Reduction Zones. Employees will be allowed to eat, drink, and rest only in designated areas.
- Construction barricades, warning signs, traffic cones, and other devices are used appropriately to minimize potential exposures to vehicular traffic.

13. ADVERSE WEATHER CONDITIONS

In the event of adverse weather conditions, the Lead SSR will determine if work can continue without endangering the health and safety of field workers. Some items to be considered before determining if work should continue are:

- Intensity of adverse weather conditions
- Potential for heat stress and heat-related injuries
- Potential for cold stress and cold-related injuries
- Treacherous weather-related working conditions
- Slip and fall conditions from water, ice, and precipitation
- Limited visibility
- Potential for electrical storms
- Water reactivity of chemicals
- Offsite migration potential and worsening of Site conditions or incident
- Electrical Services in standing water

13.1. Heat Exposure

Heat exposure is a function of activity, temperature, humidity, solar intensity, work heat (welding, cutting), and PPE (Tyvek). The body will react to heat by attempting to shed excess heat. Signs and symptoms of heat exposure include:

- Muscle cramping
- Dizziness and disorientation
- Nausea and vomiting
- Altered levels of consciousness
- Headache
- Loss of consciousness
- Cold clammy skin (dangerous sign of excessive sweating)
- Hot dry skin (extremely dangerous sign of dehydration)

13.1.1. Heat Stress

Heat stress is a localized reaction of muscles, typically in the legs and abdomen, to heat. It is caused by activity and operations in heat without appropriate rest breaks or rehydration. It is easily preventable with proper breaks and fluids.

13.1.2. Heat Exhaustion

The body cools itself through sweating. As it reaches the breaking point, heat exhaustion develops. Heat exhaustion can rapidly develop into heat stroke. Treatment of heat exhaustion includes:

- Stop work.
- Decontaminate as appropriate.
- Allow to rest.
- Re-hydrate the victim with water only.
- Remove heavy clothing, PPE, or wet clothes.
- Allow the victim to cool off, and provide dry and wet towels to maintain body temperature.
- If the victim's condition does not improve in 15 minutes, arrange transport to an emergency medical facility.

13.1.3. Heat Stroke

Heat stroke is a life-threatening condition caused by the body's inability to dissipate excess heat. Prolonged exposure to excessive heat causes the body to dehydrate as it continues to sweat. The skin becomes hot and dry, and the body enters shock because there is not enough fluid to function effectively. Heat stroke can lead to cardiac, respiratory, and liver and kidney problems, and it can rapidly lead to death. An emergency medical facility must treat heat stroke. Treatment of heat stroke includes:

- Stop work
- Decontaminate as appropriate
- Remove heavy clothing, PPE, or wet clothes
- Allow the victim to cool off, and provide wet towels to reduce body temperature
- Contact 911 for transportation to an emergency medical facility

13.1.4. Prevention of Heat Exposure

Prevention of heat exposure is easy and effective. The Lead SSR visually monitors personnel for signs of heat stress and the current Heat Index during project operations. Monitoring will begin by the Lead SSR when the air temperature reaches 70°F, or the heat index exceeds 75^{o}F. The Lead SSR will consult with the On-Site Project Manager and Site Superintendent to determine daily tasks, PPE requirements, and the required level of effort for personnel (light, moderate, or heavy) when temperatures are forecast to exceed 70^{0} F. In addition,

field personnel will be instructed to observe for signs of heat stress and to use methods to control it. One or more of the following control measures can be used to help prevent heat stress:

- Workers become gradually acclimatized when exposed to hot conditions. Workers' exposure to hot conditions must be gradual over approximately 5 days to allow newer workers to acclimatize. Workers who have not worked in hot conditions for 2 weeks must be allowed to acclimatize upon their return.
- Provision of adequate liquids to replace lost body fluids. Employees must replace water and salt lost from sweating. Employees must be encouraged to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement. As a guide, 1-2 cups (8oz) of water every 20 minutes should be consumed.
- Replacement fluids should consist of water and smaller quantities of a commercial electrolyte mix such as Gatorade. Avoid caffeinated and or sweetened drinks. Water should have a palatable (pleasant and odor-free) taste and have a temperature between 50^{o} F and 60^{o} F, if possible.
- Employees exposed to solar radiation with potential for sunburn should be encouraged to use sunscreen with a sun protection factor (SPF) of 30 or greater. They should wear hats, long-sleeve shirts, sunglasses, and other protective attire.
- Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.
- Personnel breaks are to be taken in a cool and shaded rest area (77^{o} F is best).
- Employees are to remove impermeable protective garments during rest periods.
- Employees are not to be assigned other tasks during rest periods.
- Employees are briefed on the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

13.1.5. Heat Stress Monitoring

- Every worker who works in extraordinary conditions that increase the risk of heat stress should be personally monitored. The conditions include wearing semi-permeable or impermeable clothing when the temperature exceeds 80°F or the heat index exceeds 85°F.
- Personal monitoring will be performed by a person with a current first aid certification (Lead SSR) and who is trained to recognize symptoms of heat stress.
- Personal monitoring can be done by measuring the heart rate, recovery heart rate, and oral temperature.
- To check the heart rate, count the radial pulse for 30 seconds at the start of the rest period. If the heart rate exceeds 110 beats per minute (bpm), shorten the next work period by one-third while maintaining the same rest period.

- The recovery heart rate can be assessed by comparing the pulse rate taken at 30 seconds with the pulse rate taken at 2.5 minutes after the rest break begins. A pulse rate below 90 bpm indicates satisfactory recovery. A pulse rate at 2.5 minutes of 90 bpm or higher, but reduced by 10 bpm or more from the 30-second reading, indicates recovery with continued monitoring. A pulse rate at 2.5 minutes at or above 90 bpm, but lowered by a difference of less than 10 bpm from the 30-second reading, indicates no recovery and is a sign of heat stress.
- Check temperature with a clinical thermometer at the start of the rest period. If the oral temperature exceeds 99.6°F, shorten the next work cycle by one-third. A worker with a temperature exceeding 100.6°F will not be permitted to wear impervious clothing (Tyvek)
- When strenuous work is performed in impervious clothing, and the Heat Index Chart reading is at or above 90°F (see Chart below), work cycles will be reduced to 1 hour, followed by a 15-minute rest period. Strenuous work is defined as the following: intense arm and trunk work; carrying loads; shoveling; pushing or pulling heavy loads; and lifting 10 lbs. 14 times per minute or 25 lbs. 10 times per minute. When working in direct sunlight, add 15 degrees to the Heat Index reading.

13.2. Cold Exposure

Persons working outdoors in temperatures at or below freezing may be subject to injury from cold exposure. Extreme cold for a brief time may cause severe injury to the body's surface (frostbite) or profound generalized cooling of the body's core (hypothermia), leading to coma and death. Areas of the body with a high surface area-to-volume ratio, such as the fingers, toes, and ears, are most susceptible.

Two factors influence the development of a cold injury: ambient temperature and wind velocity. Wind chill is used to describe the chilling effect of moving air combined with low temperatures. For instance, 10°F with a wind of 15 miles per hour (mph) has the same chilling effect as still air at -18°F.

As a rule, the most significant incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing beneath is saturated with perspiration.

13.2.1. Frostbite

Frostbite is a localized injury resulting from cold. It occurs when skin tissue becomes cold enough and freezes. Frostbite of the extremities can range from minor to severe and is characterized by:

- Skin has a waxy or white appearance

- Skin is cold and pale
- Tingling or numb
- Prevention of frostbite is vital. Keep the extremities warm. Wear insulated clothing as part of one's protective gear during extremely cold conditions. Check for symptoms of frostbite at every break. The onset is painless and gradual--you may never know you have been injured until it is too late.

Treatment of frostbite includes:

- Bring the victim indoors.
- Remove any wet clothes and replace them with dry/warm blankets.
- If fully conscious, allow the patient to drink warm fluids. Avoid alcoholic, carbonated, or caffeinated drinks.
- Submerge the affected body part in warm water (102 F to 105 F). Keep the affected part submerged for 30 minutes. Do not use heat lamps or hot water bottles to rewarm the part.
- Do not break blisters.
- Cover affected areas with sterile, soft, dry material.
- Do not rub the frostbitten part.
- Do not apply ice, snow, gasoline, or anything cold on frostbite.
- Do not place the victim's part near a hot stove.
- Keep the victim warm and get immediate medical care. After warming, the victim should try to move the injured areas a little, but no more than can be done alone (without medical help).
- If the victim has more than one body part affected or presents with a large surface area affected, then the victim should be transported to a hospital for medical evaluation.

13.2.2. Hypothermia

Hypothermia is caused by exposure to temperatures less than 80F. It occurs when the body cannot adjust to a lower environmental temperature. It does not have to be below freezing to cause hypothermia. Symptoms of hypothermia include:

- Shivering.
- Apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95 F.
- Decreased mental status, including unconsciousness.
- Glassy stare.
- Decreased pulse and respiratory rate.

- Freezing of the extremities.
- Hypothermia is life-threatening and should be treated immediately. Treatment should include:
- Remove patient from exposure.
- Removal of wet clothes and application of warm/dry blankets.
- Continuous monitoring of the patient. Do not leave them alone.
- If fully conscious, allow the patient to drink warm fluids. Avoid alcoholic, carbonated, or caffeinated drinks.
- If the patient is or becomes unconscious, or does not respond to treatment, then immediate transport to a medical facility is required.

13.2.3. Prevention of Cold Exposure and Injury

Preventative measures can save a lot of time, money, and personnel in the long run. Preventative measures include:

- Clothing and PPE that are appropriate to the environment and task being performed
- Personnel should keep a change of clothes on-site
- Modifying work activities to account for wind chill and cold
- Appropriate breaks and fluids to maintain body temperature
- Workers exposed to temperatures below -10 F with wind speeds of more than 5 miles per hour should be medically certified by the Physician as suitable for such exposure. The ultimate responsibility for delaying or curtailing work at the Site due to inclement weather rests with the Lead SSR.

14. BLOODBORNE PATHOGENS

Exposure to bloodborne pathogens presents a very real risk to workers in machinery, construction, or other areas with potential for injury. Used hypodermic needles could potentially be found at this Site, and if found, personnel are to contact the Lead SSR. Handling of soils without gloves will not be permitted. With any injury resulting in cuts, lacerations, and bleeding, there is a potential exposure to bloodborne pathogens, including hepatitis B and human immunodeficiency virus (HIV).

The OSHA standard (29 CFR 1910.1030) applies to employees who may be exposed to blood or other potentially infectious materials. While the standard is defined for maritime applications rather than construction applications, construction workers (and similar) are covered under the General Duty Clause (Section 5(a) (1)). OSHA defines blood as human blood, human blood components, or products made from human blood. OSHA defines other potentially infectious materials as saliva, semen, vaginal secretions, cerebrospinal fluid, synovial, pleural, pericardial, peritoneal, and amniotic fluids

Employees who are trained and designated to render first aid or medical assistance as part of their job duties will be trained on the hazards associated with bloodborne pathogens and allowed to receive appropriate vaccinations (consult with professional medical personnel regarding appropriate vaccinations). Clean–up kits are available on-site at the same location as First Aid Supplies.

14.1. Exposure Control Plan

Universal precautions (also known as body substance isolation precautions), including medical-grade disposable gloves, must be worn during first aid and medical treatment. These precautions will include face shields and splash protection as necessary.

Reporting procedures for medical incidents and bloodborne pathogen exposures include the names of first aid providers, a description of the incident, including date and time, and whether an exposure occurred. These reports must be filed with the Lead SSR before the end of the shift.

If there is exposure to bloodborne pathogens, the Lead SSR and CM are notified, and the exposed worker will wash the affected body parts with warm, soapy water and seek immediate medical attention.

14.2. Decontamination And Disposal

Equipment that may become contaminated during the work is to be decontaminated before servicing and/or shipping off-site. Washing and scrubbing contaminated equipment with a 10% bleach solution can decontaminate bloodborne pathogens. PPE, including gloves, a face shield, and appropriate splash protection, is used to decontaminate equipment.

Materials contaminated with blood or body fluids that cannot be appropriately decontaminated are bagged in a plastic biohazard container (29 CFR 192.25). These biohazard materials must be disposed of at an appropriate facility. Contaminated materials that must be bagged and disposed of consist of any materials that contain liquid or semi-liquid blood or caked blood. Contaminated material should be bagged and given to an ambulance or medical personnel for appropriate disposal.

Needles or “sharps,” including items used for IV access, phlebotomy, or injections, will not be used at the jobsite. Sharps containers will not be provided. Any personnel who require the use of sharps, i.e., diabetics who require frequent, self-administered injections, will provide appropriate containers and dispose of personal waste. The work area will be reviewed for disposed needles/sharps before the start of site activities.

Clothing can be cleaned at an appropriate dry cleaner. The dry cleaner organization must be notified of the contaminated material and advised of the potential hazards. Contaminated

laundry is to be bagged or containerized to prevent soak-through or fluid leakage. Employees should not be permitted to take contaminated clothing home to launder.

15. NATURAL HAZARDS

15.1. Bees / Hornets / Wasps

Bees, hornets, and wasps can present a hazard. They can become a distraction or nuisance or present a greater hazard due to their stings.

Some personnel may be highly allergic to the venom present in stings. This is a serious condition and can result in death. These personnel typically carry special devices known as an “EpiPen” to counteract the body’s response to the venom. The Lead SSR will maintain a record of any individuals on the site with a known insect allergy. If a person is stung and requires an EpiPen, the Lead SSR should assist the patient in using the device. The use of an EpiPen is a temporary measure and needs further evaluation at a medical facility. Contact an ambulance for emergency transport of the individual to the hospital. Do not transport the patient by car. State law may restrict the use of an EpiPen to the individual to whom it is prescribed.

Remove any implanted stingers by scraping the area with a credit card. Do not pinch the stinger with fingers or tweezers; this will force the stinger to inject more venom, increasing the pain.

If any nests of bees, hornets, or wasps are discovered, notify the Lead SSR. The Lead SSR then takes appropriate steps to reduce or eliminate the hazard.

15.2. Poison Ivy / Poison Oak / Poison Sumac

If someone comes into contact with poison ivy, poison sumac, or poison oak, the individual should immediately wash the affected area with Ivy Cleaner provided in the first aid kit. If a rash develops, it should be treated at a medical facility as soon as possible. Some individuals are highly allergic to poison ivy, poison sumac, or poison oak; if exposed, they should seek immediate medical help.

15.3. Animals - Rats / Rodents / Raccoons

Care should be taken with respect to rodents. If rodents are noticed, then the CM and Lead SSR should be notified so that the appropriate pest control personnel can be contacted.

There is a wide variety of bacteria, viruses, and diseases associated with rodents and similar animals. While there is potential for bites and attacks, they are rare due to the activity level on a jobsite. Most animals avoid human activity and approach the site only at night.

Any incident involving bites or animal attacks must be reported to the local authorities (Police). Have the patient transported by ambulance to the emergency medical facility for evaluation of the bite/attack. The Lead SSR will initiate a stop-work order pending the investigation by the police or Animal Control.

15.4. Avians - Pigeons / Seagulls

Birds can be a nuisance at a jobsite, causing noise, excrement, and activity around feeding areas. Bird excrement is considered a hazardous substance. There is a wide variety of fungal and viral organisms that reside in bird droppings. These organisms can be spread by direct contact or inhalation. It is important to note that nesting at air intake ports, such as ventilation shafts, can spread fungal spores into buildings, where they are easily inhaled.

Histoplasma capsulatum is a fungus that is found in pigeon excrement. This fungus can cultivate in piles of droppings and emit spores. These spores can be inhaled and cause the respiratory infection “histoplasmosis.” Histoplasmosis exhibits symptoms similar to the flu and can persist for several weeks. A doctor should evaluate any suspected exposure or flu-like symptoms.

Other concerns regarding birds include fleas, ticks, and other parasites. These various insects can be spread when birds clean themselves in water sources, where they can attach to personnel walking by.

Care should also be exercised when pigeon or seagull droppings are encountered. Appropriate PPE, including gloves and facemasks, should be used when handling these materials to avoid direct contact or inhalation. It is important to report any bird colonies or infestations to the Site Superintendent or Lead SSR. A pest control professional with experience in bird control should handle bird infestations.

15.5. Ticks

Ticks may be highly prevalent at the project site during the warmer months. Particular care should be taken to protect personnel. Deer tick nymphs and adults may carry germs that cause Lyme Disease, babesiosis, or human granulocytic anaplasmosis (ehrlichiosis). American dog ticks can carry germs that cause Rocky Mountain spotted fever and tularemia.

Ticks are generally found in wooded or grassy habitats, near the ground. Deer Ticks may be active year-round, but spring, summer, and fall are seasons of high risk. Dog ticks are most active in spring and summer.

Personnel should use appropriate insect repellants including permethrin sprays for clothing and wear light-colored clothing. Personnel should perform regular tick checks.

If ticks are found attached to the skin, they should be removed immediately using a tick removal kit. Wash your hands thoroughly after handling a tick. The Lead SSR should be notified.

15.6. Urban Environments – On-Site Squatters & Encampments

Working in urban environments presents a wide variety of hazards and risks for employees and organizations across many industries. Hazards and risks associated with this work are often not anticipated and can be overlooked in the preplanning stages of projects and tasks.

Charter shall coordinate with local law enforcement (Lee Police Department) before mobilization to assist in safely dispersing and removing folks/squatters on-site. Charter will make efforts to coordinate with any potential outreach programs (occasionally associated with the PD).

If any encampments need to be cleaned up, Charter shall develop a site-specific job safety analysis for that work. Active work areas shall be demarcated by Charter to deter unauthorized visitors. All equipment shall remain locked and secured at the end of each working day. Charter's on-site supervisor shall inspect the site each morning to assess any damage and/or lost or stolen equipment and materials.

16. RECORDKEEPING

The following records and reports will be established and retained by the contractor.

- Accident/Incident/Exposure Reports
- Daily Safety Brief Logs
- Air Monitoring Records
- Employee Training Certificates
- Health and Safety Audit Reports
- Instrumentation Calibration Logs
- Safety Data Sheets
- Logs and reports are provided to the CM by the Contractor daily.
- Equipment Inspection Reports
- Visitor's Log
- HASP Acknowledgement Form

17. PLAN ACKNOWLEDGEMENT

By their signature, the following undersigned certify that this Plan has been read, or otherwise communicated to them. They further certify that they fully understand this plan and will follow its procedures to protect the health and safety of persons entering upon this Site.

Name	Company	Date

APPENDIX A

Health & Safety Organization Personnel Resumes

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EDWARD PRICE, CHST

SAFETY & HEALTH OFFICER (SHO)

Ed is a senior manager with 35 years of construction experience and has been Charter's Health and Safety (H&S) Director for 18 years. His experience, discipline, and attention to detail have led to the quality recognition of Charter's safety program. He has a unique understanding of construction processes and safety from both the compliance and job-site perspective. His careful pre-planning and analysis of project specifications and work plans, results in site-specific Health & Safety Plans that identify job safety analyses for definable features of work, proper personal protective equipment, training and ultimately a safe project work environment. He routinely serves as an alternate Site Safety Officer at active project sites; conducts unannounced health & safety audits; and works closely with Charter's on-site Site Health and Safety Officer to verify each site-specific HASP is being properly implemented.

EDUCATION

BS, Resource Economics, University of New Hampshire

PROFESSIONAL BACKGROUND

Senior Manager/ Health & Safety Director, Charter, 2002 - Present

Operations Manager, Clean Venture, Framingham, MA, 1995 - 2002

Technical Services Manager, Northland Environmental, Providence, RI, 1994 - 1995

Operations Manager, Triumvirate Environmental Boston, MA, 1988 - 1993

LICENSES & CERTIFICATIONS

- Construction Health & Safety Technician #CHST-9381
- OSHA Authorized Construction Safety and Health Trainer #11-105748
- National Safety Council - First Aid Instructor #2130125
- First Aid/CPR/AED Training
- National Grid ISNetworld Safety Compliance Reporting Training
- OSHA 40 Hr Hazardous Waste Operations & Emergency Response Training and 8 Hr Refresher
- OSHA 8 Hr HAZWOPER Supervisor Training
- OSHA 10 Hr & 30 Hr Construction Safety Training
- OSHA Hazard Communication Training
- OSHA #510 Occupational Safety and Health Standards for the Construction Industry Training
- OSHA #3010 Trenching, Excavation and Soil Mechanics
- OSHA #3095 Electrical Standards Training
- OSHA #3110 Fall Arrests System Training
- OSHA #7405 Fall Hazard Awareness for the Construction Industry
- OSHA #7505 Intro to Accident Investigation
- OSHA #7845 Record Keeping Rule Training
- OSHA Training Institute - Safety & Health Specialist Certificate in Construction
- 40 Hr EM385-1-1 Safety Training
- NCS #201 Rigging Techniques/ Inspection Course
- North Respirator Training Certification
- DOT HM 215A HAZ Materials Transportation Training
- DOT 8 Hr Hazardous Waste Training
- Level I - Anti-terrorism Awareness Training
- Incident Command Emergency Response Training
- Asbestos Supervisor License: MA, RI, ME, NH
- Exxon Mobil LPS 8 Hr Training
- Confined Space Entry/Rescue Training
- NFPA Hot Work Safety Certificate Training - #35154



NICK SPAIN

LEAD ON-SITE SITE SAFETY REPRESENTATIVE (LSSR)

Nick has more five years of on-site construction experience as a Lead On-Site Safety Representative (On-Site Health and Safety Officer). Nick supervises all safety aspects of field operations for Charter and subcontractor field personnel on a day-to-day basis. His responsibilities include the recognition, evaluation, monitoring and abatement of hazards to people and the environment. Nick effectively communicates with the Charter Health and Safety Director/SHO (Ed Price, CHST). Nick's attention to detail and collaborative management style has resulted in the creation of positive personal relationships with Charter and subcontractor field employees leading to a strong site safety culture. Nick is a committed safety professional and is currently seeking his Construction Health and Safety Technician (CHST) certification.

EDUCATION

BS, Safety and Occupational Health Sciences, Keene State College

PROFESSIONAL CERTIFICATIONS & TRAINING

OSHA 30 Hr Construction Safety Training

OSHA 40 Hr Hazardous Waste Operations & Emergency Response Training and 8 Hr Refresher

OSHA 8 Hr HAZWOPER

Supervisor Training

USACE Manual EM 385-1-1 40 Hr Health & Safety Training

Hazardous Waste

Operations (29 CFR

1910.120) Competent Person

Personal Protective Equipment (29 CFR

910 Subpart I) Competent Person

FEATURED PROJECT EXPERIENCE

PETERSON PURITAN OU 2 SUPERFUND SITE CUMBERLAND, RI

As the Lead On-Site Safety Representative for the Peterson Puritan Superfund Site project in Cumberland, RI. Nick plays an integral role in the overall safety and success of this high-profile Superfund project. The site is over 55 acres and is a $55M contract that includes Charter self-performing the excavation, placement and grading of 306,000 CY of soil in an on-site 35-acre land fill that includes site restoration and seeding. The work conducted on the Peterson Puritan project also includes establishing a site operations area, removal of surface debris and debris piles, processing concrete rubble, area and the installation of an extensive network of access roads. Nick's commitment to the implementation of the of the site Health and Safety Plan through the diligent monitoring of construction operations has resulted in a safely executed project.

GROTTO AVENUE PAWTUCKET LANDFILL, PAWTUCKET, RI

Nick served as the Lead On-Site Safety Representative for the Grotto Avenue Pawtucket Landfill project. This 28-acre Pawtucket Landfill closure project includes large-scale grading, installation of an engineered cap system, construction of stormwater management controls, and stabilization of surrounding areas.

TIDEWATER FORMER MGP SITE REMEDIATION, PAWTUCKET, RI

Nick served as the Lead On-Site Safety Representative on this project, Charter self-performed this MGP sediment remediation and bulkhead barrier wall construction project. The scope included the installation of a multiple layer cap system as part of the remedy. Charter installed land-side temporary environmental controls; installed barriers and markers to protect existing utilities, wells, and other key features from disturbance. Access roads, decontamination pads, and temporary material storage/processing pads were prepared including associated environmental protection controls as work progressed.

PROFESSIONAL CERTIFICATIONS & TRAINING CONTINUED

Machinery and Machine Guarding (29 CFR 1910 Subpart O) Competent Person

Materials Handling and Storage (29 CFR 1910 Subpart N) Competent Person

Excavation & Trenching Competent Person

Asbestos Supervisor License

Confined Space Entry/Rescue Training

Drug & Alcohol Reasonable Suspicion Training

NUCLEAR METALS SUPERFUND SITE DEMOLITION & REMEDIATION, CONCORD, MA

Nick served as the Lead On-Site Safety Representative for this project. Charter conducted the demolition phase at the former manufacturing facility, which produced depleted uranium products and specialty metal powders within the confines of the 185,000 SF complex. During each phase of the work, there was a risk of exposing radiologically contaminated material due to the vulnerable state of the site infrastructure. Through careful up-front planning, rigorous safety training and monitoring, and collaboration with the client, Nick successfully executed this phase of safety program eliminating potential health and safety risks for the future follow on work.

DYER STREET STATION ABATEMENT AND DEMOLTITION, PROVIDENCE, RI

Nick served as the Lead On-Site Safety Representative. The project included the abatement of asbestos containing materials, removal of interior equipment, demolishing the PCB-impacted AC Building superstructure and substructure to 5 feet below grade, removal of the basement floor slab, backfilling of the basement, and restoring the site.



CAMDEN MURRAY

PROJECT SUPERINTENDENT

Camden Murray is a Site Superintendent at Charter with more than eight years of experience in civil and marine construction. Camden is recognized for his practical problem-solving skills, technical proficiency, and steady leadership in the field. He approaches each project with a focus on planning, safety, and execution, ensuring that work is performed efficiently, accurately, and in alignment with the Owner and Charter's standards for safety and quality.

EDUCATION

BS, Environmental Engineering, University of Rhode Island

PROFESSIONAL CERTIFICATIONS & TRAINING

OSHA 40 Hr HAZWOPER initial Training & 8 Hr Annual Refresher

OSHA 8 Hr HAZWOPER Supervisor

OSHA 10 Hr Construction Safety & Health Training

Merchant Mariner Credential OS-STCW Basic

USACE Construction Quality Management for Contractors Certified

Project Management Professional Certification

EPA's Construction General Permit (CGP) Site Inspector Training Certified

FEATURED PROJECT EXPERIENCE

PETERSON PURITAN OU 2 SUPERFUND SITE, CUMBERLAND, RI*

As the Site Superintendent for the Peterson Puritan Superfund Site project in Cumberland, RI, Camden plays an integral role in coordinating daily operations, supervising crews, and maintaining seamless communication between field teams and project management. The site is over 55 acres and is a $55M contract that includes the excavation, placement and grading of 306,000 CY of soil in an on-site 35-acre land fill that includes site restoration and seeding. The work conducted on the Peterson Puritan project also includes establishing a site operations area, removal of surface debris and debris piles, processing concrete rubble, area and the installation of an extensive network of access roads. Camden's commitment to teamwork and field excellence at the Peterson Puritan Superfund site has resulted in the project being safely and successfully executed.

**Worked with Chris Ryan and Claire Bradford in similar respective roles.*

GROTTO AVENUE PAWTUCKET LANDFILL, PAWTUCKET, RI

Camden has served as the Site Superintendent for the Grotto Avenue Pawtucket Landfill. Charter is leading the closure of the 28-acre Pawtucket Landfill, a long-inactive, unlined municipal landfill located off Grotto Avenue in Pawtucket, RI. The project includes large-scale grading, installation of an engineered cap system, construction of stormwater management controls, and stabilization of surrounding areas. Charter is managing permitting, community engagement, and coordination with the City of Pawtucket and the Rhode Island Department of Environmental Management (RIDEM), while self-performing critical closure activities to maintain control of safety, quality, and schedule

PROFESSIONAL BACKGROUND

AMERICAN OFFSHORE SERVICES – VESSEL SUPERINTENDENT

- Ensured the fleet's operational and technical performance met client's expectations and requirements.
- Analyzed the fleets performance and effectiveness of the planned maintenance system to reduce vessel repairs and downtime.
- Ensured that vessels and crew were operating according to Class, Statutory and National rules and regulations.
- Managed and ensured the efficiency of vessel operations, vessel maintenance, repairs and drydocking.
- Developed and implemented routines and requirements within the company's management system.
- Developed and evaluated the company's supply chain to support fleet and warehouse operations.

PROFESSIONAL BACKGROUND

GREAT LAKES DREDGE & DOCK* – SITE MANAGER / PROJECT ENGINEEER

- Ensured required training is arranged for all crew members and enforce company policy and procedure to ensure a safe worksite.
- Communication with a wide range of stakeholders to ensure a project is completed safely, efficiently, and within specifications.
- Ensured the project and operations were executed in accordance with internal cost and production estimates.
- Verify and review operational instructions and guidance to ensure contractual and regulatory compliance.
- Safely planned all work and logistical functions to avoid any damage to equipment or infrastructure.

**Worked with Claire Bradford in similar respective roles.*

APPENDIX B

Emergency Response Plan

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Plan Title: **01350 Health & Safety Plan**
Appendix B - Emergency Response Plan

Project Title: GE Contract 11 UDF Construction

Prepared For: Arcadis of New York, Inc.
One Lincoln Center
110 West Fayette Street, Suite 300
Syracuse, NY 13202

Prepared By: Charter Contracting Company, LLC
500 Harrison Avenue, Suite 4R
Boston, MA 02118-2439

Contract No.:

Charter No.: 2-1859

Date: 1/22/2026

Revision No.: 00



1/22/2026

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Date



1/22/2026

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1/22/2026

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Date

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1. INTRODUCTION

The purpose of this site-specific Emergency Response Plan (ERP) is to establish in detail the procedures and protocols necessary for protecting workers and the public from unanticipated hazards associated with GE Contract 11 UDF, Lee, MA project. The property is referred to as the ("Site").

Generally, this Project requires Charter to:

1. Mobilization
2. Construction and maintenance of support areas;
3. Daily air monitoring and sampling as required to ensure the health and safety of its employees and subcontractors.
4. Installing and maintaining soil erosion and sedimentation controls,
5. Installing and maintaining temporary stormwater controls
6. Controlling dust, odors, releases of volatile organic compound vapors, and vectors and implementing dust and odor control measures, as needed.
7. Repairing and upgrading existing site access roads and temporary roads
8. Implementing and maintaining traffic control measures.
9. Clearing and grubbing of vegetation.
10. Chipping and grinding of vegetation for on-site placement and/or off-site disposal.
11. Preservation (i.e., handling, stockpiling, and protecting) of select on-site vegetation for re-use in restoration activities.
12. Site preparation (vegetation and debris removal in the gravel pond area, removal of debris piles, installation of erosion and sediment controls);
13. Earthwork for the construction of embankments, berms, site access roads, and stormwater
14. Installation of a multi-layer baseliner system for the waste containment cells;
15. Installation of leachate collection and removal systems (pipes, vaults, pumps) for the waste containment cells;
16. Construction of leachate conveyance and storage systems (force mains, manholes, vaults, and two large above-ground tanks);
17. Construction of stormwater management systems (ditches, culverts, swales, manholes);
18. Installation of utilities (municipal water, hydrants, electric, communications); and
19. Vernal Pool Construction.

Hazards associated with this work may include slip, trip and fall injury, drowning, excavation collapse, weather exposures, struck-by moving equipment, exposure to fugitive dust emissions and chemical exposures potentially above the Permissible Exposure Limit (PEL). Hazards associated with this work may include slip, trip, and fall injury, punctures/lacerations, excavation collapse, weather exposures,

struck-by moving equipment, exposure to fugitive dust emissions, exposure to silica, and chemical exposures potentially above the Permissible Exposure Limit (PEL).

The Site activities required for the execution of the contract will be performed and managed by Charter Contracting Company LLC (Charter).

This ERP is intended to address the activities identified above and those required by contract. The ERP is limited to identification and response to unknown or unplanned conditions associated with the construction and remediation-related activities proposed for the project.

This ERP does not address issues associated with other site activities performed by others that may occur concurrently with this contract. The ERP shall be implemented during ongoing contract work at the Site.

The ERP will be implemented in the event of an unplanned accident or injury, spill or release of a chemical more than its Reportable Quantity, or other environmental incident.

2. ORGANIZATION AND KEY PERSONNEL

2.1. Introduction

Implementation of the comprehensive safety and health program is a key management responsibility. This Emergency Response Plan includes a list of health and safety personnel and a description of their specific responsibilities for implementing the program. Clear lines of authority, consistent with good operating policies and procedures, have been established for enforcing safety compliance. The qualifications of the site safety and health personnel are included in the appendices.

2.2. Lead Site Safety Representative (LSSR) Nicolas Spain

The LSSR will be on-site in the event this plan is implemented when oils or hazardous materials are encountered or when Personal Protective Equipment (PPE) above Modified Level D is required based on-site conditions or monitoring. (Refer to Health and Safety Plan (HASP) for a detailed description of PPE requirements). The LSSR identified for this project has experience working at sites with hazardous materials. Refer to the HASP for the Project Organization Chart and resumes of key health and safety personnel.

The experience of the LSSR includes work at Level B, C and D sites; specialized training in personal and respiratory protective equipment, program implementation, and use of air monitoring instrumentation and methodology; a working knowledge of Federal and State safety and health regulations; current certification in first aid and cardio-pulmonary resuscitation; and 40-hour Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and

Emergency Response Regulations (HAZWOPER) training, current refresher certificates, and medical monitoring approval in addition to supervisory training.

The LSSR monitors work locations for employee health and safety, and documents any employee exposures and/or substance releases that may occur during this project. The LSSR is trained and experienced to be proficient in the proper use and limitations of the equipment that he may be utilizing. The LSSR is responsible for operating the air monitoring equipment, assisting in implementing the ERP, and performing any other duties assigned to him.

The LSSR is empowered to deny access to the site or restrict the presence of any persons (under his/her control), and also has the authority to cease activities on-site if and when conditions present uncontrollable risks to site personnel and off-site receptors. The LSSR shall also be responsible for coordinating, conducting, and documenting any required training activities, performing and maintaining recordkeeping duties, and carrying out any other duties specified by site management.

The LSSR is the main contact for any on-site emergencies. Except in an emergency, the LSSR may modify the approved ERP.

The LSSR will be familiar with matters pertinent to this project and shall assist in implementing the ERP as required. This includes field supervision; maintaining contamination control zones; enforcing safe work practices and decontamination procedures; ensuring proper use of personal protective equipment; and communicating modified safety requirements to site personnel.

2.3. Preconstruction Safety Conference

Prior to the start of construction, Charter conducts a safety conference to discuss the hazards anticipated on the site, training on hazard recognition, response to emergencies, explanation of site activities, purchasing safety supplies, identifying safety personnel, decontamination procedures, levels of PPE required, air monitoring activities, and other topics deemed relevant to the safety of the site workers.

2.4. Site Control

Site control zones will be established to contain potential contamination hazards within the smallest area possible. The LSSR will ensure that each employee has the appropriate PPE for the area or zone in which they will perform work. Only authorized personnel are to be permitted access to the Exclusion Zone and Contamination Reduction Zone. Entrance to these areas is restricted by means of regulated personnel flow. The purpose of this ERP is to establish detailed procedures and protocols to protect workers and the general public from potential hazards encountered during excavation, sampling, handling, and storage of materials.

This section defines the work zone delineations, site communication, and site access control measures to be employed.

2.4.1. Exclusion Zone

The Exclusion Zone (contamination work zone) is the area or areas where contamination is known to exist. These are the areas where exposure to this contamination could pose a risk to on-site workers in the absence of PPE defined for that area. For this project, open excavations containing impacted soil will be identified as Exclusion Zone areas. The location of the Exclusion Zone will be amended based on the actual locations of the encountered impacted material, where the material must be managed, or in the event that other unanticipated contaminated media is encountered.

Special precautions are taken to ensure that pedestrians and non-authorized personnel are not allowed in or near areas where Site operations are occurring. Danger tape and temporary construction fencing are used to delineate the Exclusion Zone around excavation, sampling, and storage areas. A suitable means of securing the area is to be installed around the boundaries of the excavation (e.g., a 4-ft temporary (high visibility) construction fencing). No eating or smoking is allowed anywhere within the limits of the Exclusion Zone.

The required PPE for use by personnel working in or entering the Exclusion Zone is documented in the HASP. Access to the Exclusion Zone is restricted to on-site and contractor personnel who are wearing the proper PPE and who have received the required site training and medical clearance. Workers will sign the logbook in the Support Zone before entering and upon leaving the Exclusion Zone.

2.4.2. Contamination Reduction Zone

The Contamination Reduction Zone is a buffer zone between the Exclusion Zone and the Support Zone, located at the interface between the two. Personnel, equipment, and vehicle decontamination stations, such as washing stations, are located in this area. The Contamination Reduction Zone serves as a decontamination area for personnel, equipment, and vehicles before entering the Support Zone. If necessary, clothing change facilities for reusable PPE are located in the Contamination Reduction Zone. The Contamination Reduction Zone extends approximately 20 feet beyond the Exclusion Zone on one or more sides as required for site access. Access to the Exclusion Zone is to be through the Contamination Reduction Zone. Separate points are marked for entering and exiting the Contamination Reduction Zone so that employees entering do not have to pass through the decontamination area.

2.4.3. Support Zone (Non-Contaminated)

This is the area outside of the Contamination Reduction Zone, where there is no potential for contact with contaminants. The Support Zone includes the following: work/rest area, portable restroom, water service, support operations, radio communications, transportation, and storage facilities. The Support Zone is located outside the limits of the designated exclusion zones and away from areas designated for contaminated soil handling. Eating and drinking of fluids are permitted only in this area and only after site workers have properly decontaminated themselves.

2.4.4. Access and Egress Patterns

Specific movement patterns of both project personnel and equipment through designated site control zones shall be maintained during routine operations at the project site. The following movement pattern is utilized to ensure compliance with this Plan. The movement shall be monitored by the LSSR or other project management personnel.

2.4.5. Access Procedure

- Site personnel are to log-in at the project trailer prior to proceeding on-site.
- Access to the Exclusion Zone and Contamination Reduction Zone is limited to properly trained on-site and subcontractor personnel and CM representatives. Visitors are restricted to the Support Zone, unless approved by the LSSR. These personnel shall have proper protective equipment and have proof of training.
- Personnel proceed to the Exclusion Zone through designated entrance locations that are clearly marked.
- Access to control zones by routine personnel shall be monitored by the LSSR or other on-site project management personnel.
- Heavy equipment accesses the Exclusion Zone through designated equipment routes.

2.4.6. Exiting Procedure

- Personnel shall exit the Exclusion Zone through the designated Contamination Reduction Zone.
- Prior to proceeding from the Contamination Reduction Zone to the Support Zone, personnel are required to undergo designated decontamination activity.
- Once decontamination is complete, site personnel may proceed to the Support Zone prior to leaving the site. Do not reenter the Exclusion Zone or Contamination Reduction Zone.

- Equipment on-site shall proceed from the Exclusion Zone to the Contamination Reduction Zone and undergo appropriate decontamination prior to proceeding to the Support Zone.
- Adherence to these specific procedures shall be monitored by the LSSR.

2.4.7. Site Communication

It is critical to maintain two-way communication on-site at all times to protect on-site employees' safety and expedite decision-making in the event contamination is encountered. A cellular telephone shall be located with the LSSR, in the event emergency services are required. Requests for emergency services will take place through the LSSR/Superintendent.

Verbal communication and hand signals may be used to communicate among workers on the site. Compressed air horns will also play an integral part in the communication process. They will be used to signal the evacuation of a work site in the event of an emergency, such as a spill, release, uncontrolled fire, or explosion. In addition, radio communications must be maintained at all times while working on-site.

The following signals will be used to indicate an emergency situation:

- One long blast repeated three times at five-second intervals - Man down
- Three short blasts repeated three times at five-second intervals - Evacuate site
- Alternating short and long blasts - All clear

In the event of an emergency on-site, the Incident Command System will be implemented. The LSSR shall serve as the Incident Commander and may be replaced on the arrival of the senior member of the responding Fire Department or Police Department. Also, in the event that Charter discovers unknown, unforeseen, sudden, or potentially hazardous conditions, or environmental conditions inconsistent with known existing conditions, Charter shall notify the CM and Owner immediately.

2.4.8. Signs

The Contractor shall post warning signs to guide and direct on-site personnel and visitors. The signs at the job trailer shall be posted in locations approved by the CM and shall be large enough to be visible from a reasonable distance.

- Visitor Signs - Signs shall be posted directing visitors to the project trailer.
- No Smoking - No smoking signs shall be posted in areas of high visibility immediately adjacent to the Exclusion Zones.

2.4.9. Engineering Controls

At this time, there is potential for special engineering controls for dust control on this project. The need for dust suppression will be established through the use of monitoring equipment. Dust suppression measures, including light water sprays, water trucks, and dust suppressants, will be implemented as required to control dust during construction activities and excavation.

2.4.10. Dust Control

Dust Control will be an important issue on this site. The following precautions will be taken to control the release of dust and vapors both on- and off-site:

- Trucks will be covered before leaving the site.
- Trucks will be carefully loaded to prevent spillage of dirt on the ground or on exterior truck bodies.
- Charter is required to perform adequate control of dust in our specific work area during work hours.

2.5. Training And Site Briefing/Education

Charter will present a safety briefing to inform employees and visitors who will be performing work in or entering the Exclusion Zone or Contamination Reduction Zone during field operations. This briefing will cover the special hazards and the procedures to control them. Charter and subcontractor employees, CM, and visitors shall complete this briefing before entering the identified portions of the site. The SSR shall keep records of training for on-site personnel and site visitors. Copies of the training records for workers associated with the project will be made available upon request.

The LSSR will also document safety incidents, including injuries, “near-misses”, and vehicle accidents occurring during the performance of the work. These reports will include at a minimum a description of the incident, parties and/or equipment involved and the date and time of the incident In the event of a safety incident; including injuries, “near-misses” and vehicle accidents occurring during the performance of the work, **onsite personnel will Immediately (within 30 minutes or as soon as possible after the situation has stabilized) verbally report to the Safety Team the occurrence of any and health and safety accidents and incidents. Charter will fully investigate the incident.** Charter Management will report incidents and provide an incident report to the Owner and CM.

2.5.1. Training Requirements

Site personnel who will be entering any of the Exclusion Zone or Contamination Reduction Zone areas once the ERP is in effect will be required to provide proof of having received training that meets the initial 40-hour HAZWOPER and current annual 8-hour refresher training for hazardous waste site workers as described in 29 CFR 1910.120. Site personnel are required to have Hazard Communication Training (HAZCOM) which meets the OSHA Construction Industry requirements detailed in 29 CFR 1926.59.

This plan will go into effect whenever employees are exposed to, or have the potential to be exposed to, a chemical at concentrations that exceed an applicable OSHA Permissible Exposure Limit.

2.5.2. Site Safety and Health Briefing

Personnel covered by this ERP will be required to read and understand this document. Prior to any on-site activity involving the proposed work, on-site personnel and visitors will be required to attend a Site, Safety and Health Briefing from the LSSR or other designated, qualified person. This applies to on-site personnel located within the Exclusion, Contaminant Reduction, and Support Zones who are involved in site work, and to visitors who will enter either the Exclusion Zone or the Contaminant Reduction Zone. Periodic updates will be undertaken by the LSSR when operational or site conditions change or when designated refreshers are so warranted. The topics to be covered in the training include the entire ERP, with emphasis on emergency procedures, restricted-access areas, decontamination methods, and general safety.

Workers shall be informed of locations and directions to locations where emergency medical attention may be received. Directions to the hospital are included in this document.

Ambulance services are available twenty-four hours a day by contacting the Lee Fire Department via the statewide enhanced emergency telephone number 911. Any employee who is seriously injured shall be transported to the hospital by certified/trained EMS personnel and properly equipped EMS vehicles.

3. EMERGENCY EQUIPMENT AND FIRST AID SUPPLIES

3.1. Emergency Medical Treatment/First Aid

First aid will be rendered to any person injured on-site by any individual trained in First Aid/CPR/AED/Universal Precautions. At least two trained people will be on-site at all times during

contract work. First aid kits and an AED will be kept in the project trailer, and a first aid kit will be in each supervisor's or foreman's vehicle. These kits are intended for emergency use.

Following initial treatment, the injured person will then be transported for further examination and/or treatment. The preferred transport method is a professional emergency transportation service; however, when this is not readily available or would result in excessive delay, other transport is authorized. Under no circumstances will injured persons transport themselves to a medical facility for emergency treatment.

3.2. Decontamination

If an injury occurs in an Exclusion Zone, provisions for decontaminating the victim will be made. Decontamination will be conducted at a convenient location upwind of the area where the Emergency Response actions are occurring. However, life-threatening conditions may preclude the use of standard decontamination procedures. In such cases, arrangements will be made with the medical facility and transporter.

The decision to decontaminate a victim is based on the type and severity of the illness or injury, as well as the nature of the contaminant. For some emergency victims, immediate decontamination may be an essential part of lifesaving first aid. For others, decontamination may aggravate the injury or delay life-saving treatment. If decontamination does not interfere with essential treatment, it will be performed and will include a wash, rinse, and/or cut off of protective clothing and equipment.

If decontamination cannot be done, the victim will be wrapped in blankets, plastic, or rubber to reduce contamination of other personnel. Emergency and off-site medical personnel will be alerted to potential contamination. A site person familiar with the incident and the chemicals will be sent if available.

3.3. Emergency Eye Wash Stations

Portable eyewash bottles will be maintained in the office trailer. The locations will be moved to match the work location. The eyewash stations will consist of sealed, labeled bottles of eyewash solution. These bottles will be periodically inspected and replaced if the seal is broken or the contents appear to be dirty or contaminated. Hand-washing stations will be provided in the support area.

4. EMERGENCY PLAN/CONTINGENCY PROCEDURES

4.1. Emergency/Contingency Plan

This section identifies the emergency contingency planning undertaken for operations at the site, and includes further information to be used under emergency conditions such as emergency telephone numbers, routes to emergency medical facilities and emergency signals

The ERP applies to unanticipated personal injuries sustained on the site, fires, explosions, other personnel injuries or the discovery of or contact with hazardous materials that could be detrimental to human health or the environment. The ERP may cover events such as but not limited to:

- Spills or leaks of chemicals or petroleum products are considered to pose imminent and/or substantial hazards. The ERP would be used in conjunction with the Spill Control & Countermeasure Plan.
- Other perceived threats.

4.2. Pre-Emergency Planning/Chain-Of-Command

In the event of an emergency, the LSSR shall implement the Incident Command System. Supervisors will be assigned duties, including waiting for emergency vehicles, counting employees, and directing on-site traffic. The LSSR shall assume the role of the Interim Incident Commander and shall be replaced by the responding senior member of the Fire Department or Police Department. The local Fire and Police officials shall be informed of the nature, type, and scope of the work prior to commencing it. This will be done to make these officials aware of the work and to notify them of the potential need to provide emergency medical services and firefighting capabilities at the site in the event of an emergency.

Charter will conduct periodic emergency response drills during this project.

4.3. Site Evacuation Authority

When conditions warrant site evacuation, the work party will proceed upwind of the work site and notify the LSSR and field office of site conditions. The PM, Site Supervisor, or LSSR has the authority to order an evacuation of the site. The CM shall be notified immediately, or as soon as practically possible.

4.4. Evacuation Procedures

Withdrawal Upwind - When conditions that endanger the safety or health of workers warrant moving away from the work site, the crew will relocate upwind at a distance of approximately 150 feet or farther, as indicated by site monitoring instruments and wind sock(s). This location will be discussed with employees daily. The meeting location will be clearly marked. If possible, this meeting will be held in the Support Zone adjacent to the project facilities.

A signal to evacuate will be given by the LSSR using an air horn, radio, telephone, or similar means capable of relaying the message. Once workers arrive at the site, a “head count” will be taken to ensure everyone is accounted for. During safety briefings, the location will be presented. In the event of withdrawal, the LSSR and a member of the crew (via “buddy system”) may return to the work site to determine if the condition noted is transient or persistent. If persistent levels of air contaminants remain, an alarm should be sounded to notify personnel of the situation and the need to leave the site. The site management will be notified of conditions. This alarm will be given using both a compressed-air horn and portable radios, with a pre-arranged signal, tone, or message.

The following signals will be used to indicate an emergency situation:

- One long blast repeated three times at five-second intervals - Man down
- Three short blasts repeated three times at five-second intervals - Evacuate site
- Alternating short and long blasts - All clear

When site access is restricted and escape is hindered, the crew may be instructed to evacuate the site rather than move upwind, especially if moving upwind would take them away from escape routes. Charter and our subcontractors will have designated "counters" responsible for accounting for employees and visitors during an evacuation.

In the event any workers are not accounted for, the Incident Commander will notify the responding Fire Department, so that a search can be promptly initiated. In no case should any worker go out to initiate a search themselves until the “all clear” signal has been given.

4.5. Natural Gas

IF ENCOUNTERED, natural gas transmission and distribution pipelines will be properly located and marked prior to excavation.

4.6. Critique Of Response

In the event the Incident Command system is implemented, a critique and follow-up will be conducted as soon as practical, and no later than 1 day after the program's implementation. The critique is to identify the strengths and weaknesses of the system in the event of future incidents and to share lessons learned with on-site supervisory personnel. A written report of the incident should be prepared as soon as practical, after the critique meeting. This report will be provided to the Owner and CM.

5. SPILL CONTROL AND COUNTERMEASURES

5.1. Overview

In the event of a spill or release of an oil or hazardous material on the project site, Spill response procedures will be implemented. The LSSR assumes the role of the Incident Commander for the Spill response until relieved by the responding senior member of the Fire or Police Department (if contacted) or the responding environmental contractor.

Trained individuals respond to the release to assess and contain it. The team's role is not to clean up the spill or release, but rather to prevent employee injuries in the area and minimize environmental impact. Spill responders have been identified and will be contacted in the event of a spill.

5.2. Spill Supplies

A supply of containment materials will be stored on-site in the event of a spill or release. At a minimum, these supplies shall include the following: absorbent booms and/or pads; non-sparking hand tools, empty approved metal transfer or overpack drums; absorbent mineral materials, barrier tape/fencing and pylons, appropriate PPE, and air monitoring equipment. It is anticipated that heavy equipment (excavators, front-end loaders, skid steer loaders, or backhoes) will be available on-site to manage spill events. Vacuum trucks, or Vactor trucks, for the recovery of large quantities of liquid waste can be secured from the emergency response subcontractors listed below. Spill supplies will be inspected weekly and documented.

5.3. Spill Response Procedures

On notification of a spill or release, the trained individuals meet upwind of the site to receive their assignments from the Incident Commander and to don required PPE. The team first evaluates the spill or release to determine whether it poses an immediate risk of fire or explosion. The nature and quantity of the materials are identified. Once a plan of action has been implemented, the

team may attempt to contain or stabilize the spill, but not proceed to clean it. Two spill responders have been identified as having the appropriate training and equipment to quickly clean the spill and decontaminate the site. These responders are:

- Clean Harbors, Inc. 800-645-8265
- NRC East/Republic Services Inc. 800-899-4672

5.4. Incident Reporting

In the event that an accident or some other incident meeting the definitions set forth in the HASP such as an explosion, release to groundwater or the environment, or an exposure to toxic chemical levels as described in the MA DEP regulations occurs during the course of the project, the Owner, CM and the MA DEP (if applicable) shall be notified by telephone immediately and receive a written notification within 24-hours. The report shall include the following items:

- Name, organization, telephone number, and location of the Contractor
- Name and title of the reporting individual
- Date and time of accident or incident
- Location of accident or incident
- Brief summary of accident or incident
- Cause of accident or incident
- Casualties (fatalities, disabling injuries) with description
- Medical Treatment administered
- Witness information
- Details of any existing chemical hazard or contamination
- Estimated property damages
- Nature of damage; Impact on contract schedule
- Action taken by Contractor to ensure health and safety
- Other damage or injuries sustained (public or private)

5.5. Emergency Information

Directions to Concentra

193 Woodland Road, Lee, MA

TO

140 Carando Drive, Springfield, MA

*Approximately **50 Miles** from the site*



Get on I-90 E from Woodland Rd and Greylock St
1. Head toward Valley St
2. Continue onto Bradley St
3. Turn right onto East St
4. Turn left onto Bradley St
5. Continue onto Greylock St
6. Turn right onto Fuller St
7. Turn left onto US-20 E/Housatonic St
8. Turn right onto the ramp to I-90 E
9. Use the right lane to merge onto I-90 E via the ramp to Springfield/Boston
Follow I-90 E to Page Blvd in Springfield. Take exit 5from I-291 W
10. Merge onto I-90 E
11. Take exit 51 to merge onto I-291 W toward Springfield
12. Take exit 5 for US-20 E toward Indian Orchard
13. Turn left onto Page Blvd
14. Turn right onto Robbins Rd
15. Turn left onto Cottage St
16. Turn left onto Carando Dr
Destination will be on the right
Concentra Urgent Care
140 Carando Dr, Springfield, MA 01104

Directions to Miriam Hospital

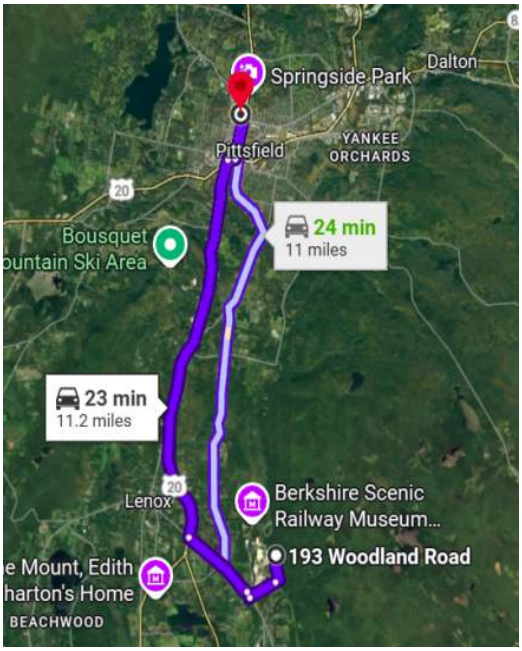
193 Woodland Road, Lee, MA

TO

725 North Street, Pittsfield, MA

*Approximately **11** miles from the site*

193 Woodland Rd,
Lee, MA 01238
Take Walker St to US-20 W/US-7 N in Lenox
1. Head south on Woodland Rd
2. Keep right to continue on Willow Hill Rd
3. Turn right onto Mill St
4. Turn left onto Walker St
5. Turn right onto US-20 W/US-7 N
Continue to follow US-7 N
Pass by Jiffy Lube (on the left in 4.4 mi)
6. Turn right onto Bank Row/East St
Continue to follow East St
7. Turn left onto First St
8. At the traffic circle, take the 3rd exit
Destination will be on the left
Berkshire Medical Ctr
725 North St, Pittsfield, MA 01201



Emergency Contact Numbers

GE Contact 11 UDF, Lee, MA

EMERGENCY Police/Ambulance/Fire/Rescue	911
(Non- Emergency) Lee Police Department	(413) 243-2100
(Non- Emergency) Lee Fire Department	(413) 243-2100
Hospital- Berkshire Medical Center	(413) 447-2000
Physician- Concentra	(413) 746-4006
National Response Center	(800) 424-8802
Poison Control Center	(800) 222-1222
Clean Harbors	(800)-645-8265
RI Digsafe	(888) 344-7233
OSHA- Braintree Area Office	(617) 565-6924
MADEP - Spill Reporting	(401) 537-4533 (401) 222-3070 - 24 HR
Charter Emergency Contact- Ed Price Karen Long	(617) 565-6924 (857) 260-0491
Charter Site Superintendent- Camden Murray	(617) 992 8639
Charter On-Site Project Manager – Claire Bradford	(617) 356-6225
Arcadis Construction Manager	

6. MEDICAL SERVICES

6.1. General Medical Treatment

The name of the hospital facility for Medical Treatment is Berkshire Medical Center, 725 North St., Pittsfield, MA 01201

7. ACTION LEVELS

In the event of an Emergency or Spill incident, direct-reading monitoring equipment will be used to assess the hazard level of an area and to determine, in part, when it is safe to return.

7.1. Action Levels

Instrumentation will include the dosimeter for sound levels, PID for total VOCs (if encountered); a DataRam or equivalent, for particulate; personal air pumps will be used as needed; and a Combustible Gas Indicator equipped with oxygen, lower explosive level, carbon monoxide and hydrogen sulfide sensors. The Action Levels in this HASP will apply to site work throughout the project. Action Levels for direct-reading instruments are provided below.

This section presents requirements for the use of real-time air monitoring instruments during Site activities involving potential for exposure to Site contaminants and excessive sound levels. Personal air pumps are then shipped off-site for laboratory analysis. It establishes the types of instruments to be used, the frequency with which they are to be used, techniques for their use, action levels for upgrading or downgrading protection levels, and methods for instrument maintenance and calibration.

The following action levels, as measured in the breathing zone during work activities, will be in effect during the entire project.

PID Monitor – NMVOC's (Above Background)	
0 ppm – 1 ppm	Level D, engineering controls are implemented. >1 ppm sustained for 5
>10 ppm sustained for 5 minutes.	Upgrade to Level C PPE if at or near PELs*
LEL Monitor	
<10% LEL (ambient atmosphere)	Continue monitoring (Identify source if levels increase)
>10% but <20% LEL (ambient atmosphere)	Stop work and Contact Construction Manager
>20% LEL (ambient atmosphere)	Stop work, evacuate affected areas, and Contact Construction Manager.
Oxygen Monitor	
<19.5% O2	Stop work and evacuate affected area until levels are >19.5% but <25% O2 are measured in ambient air, or >19.5% but <23.5% O2 is measured in a confined space.
>19.5% to 25% (ambient atmosphere)	Acceptable O2 levels for ambient atmosphere continue monitoring.
>19.5% to 23.5% (confined space)	Acceptable O2 levels for ambient atmosphere continue monitoring.
>23.5% (confined space)	Fire/explosion hazard potential, stop work and remove personnel from the space. Contact Construction Manager
Hydrogen Sulfide	
>5 ppm	Stop work and evacuate the affected area. Contact Construction Manager
Particulate Matter (Exclusion Zone Perimeter Readings)	
Particulates Level no visible/<300 ug/m^3	Continue work
Particulates Level visible dust/>300 ug/m^3	Implement engineering controls/dust suppression

Notes: Action Levels presented above for NMVOC's are for 15 – minute sustained readings within the breathing zone.

*Additionally, Level C PPE (full-face or half-face air purifying respirators with organic vapor cartridge/P100 or equivalent), is to be worn when potentially contaminated particulates become airborne.

7.2. Emergency Measurements

Under emergency conditions, the actual concentrations at any given section of the work area may not be known, and the potential for overexposure exists. In this case, a higher available level of protection will be selected when initiating the measurement, and then the level of PPE will be decreased if concentrations are below the thresholds shown above.

7.3. Operation Procedures

The following procedures shall be maintained during routine activity associated with the site control procedures:

- A copy of the HASP shall be maintained on-site.
- Personnel shall be instructed in the contents of the HASP and this Plan.
- Proper delineation of site control zones will be maintained, and signs will be placed in visible locations.
- Copies of access and egress procedures will be posted on the project bulletin board located at the command center.
- Access and exiting routes are contained in this report for both equipment and personnel. They shall also be posted on the project bulletin board located in the Support Zone.
- Procedures for assisting personnel stuck in mud and the location of rescue supplies

Any modifications to the plan, including delineation of work zone boundaries, shall be approved prior to implementation, and personnel shall be briefed on the modification prior to implementation.

APPENDIX C

Confined Space Entry Program

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Confined / Permit Space Procedure

1. PURPOSE

1.1. The purpose of this procedure is to outline Charter Contracting (Charter) Health and Safety (HS) Confined / Permit Space Entry requirements.

1.2. HS Procedures are not intended to supersede or replace any applicable regulatory requirements. In the event of conflict between Charter Procedures and Governmental standards (i.e. country-specific, Federal, State, County, and City regulations, codes, statutes, rules, and orders), those of the governing authority prevail. Where governmental standards are less than those required in the procedure, the operation shall implement the more stringent requirement. Additional or more stringent customer requirements shall be evaluated by the safety team to ensure compliance with all applicable regulatory, customer & Charter requirements.

1.3. Each project team must review and make necessary adjustments to procedures to ensure compliance to regulatory expectations. Appendix A shall be used by the team to input further expectations and Appendix B will be used by the operation.

2. SCOPE

2.1. This document applies to all Charter worksites.

3. DEFINITIONS

Term	Definition
Acceptable Entry Conditions	The conditions that must exist in a permit space to allow entry and to ensure that employees involved can safely enter and work within the space.
Alternate Entry	A permit space with only atmospheric hazards which can be controlled by only using forced air ventilation and atmospheric testing. Requires the partial completion of an entry permit.
Attendant	An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned.
Authorized Entrant	An employee who is properly trained, competent and authorized to enter a permit space.
Blanking or Blinding	The absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Confined Space	A space that: Is large enough and so configured that an employee can bodily enter and perform assigned work; and Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, bins, hoppers, vaults, pits, and excavations are spaces that may have limited means of entry); and Is not designed for continuous employee occupancy.
Double Block and Bleed	The closure of a line, duct, or pipe by closing and locking two in-line valves and by opening and locking a drain or vent valve in the line between the two closed valves.
Emergency	Any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.
Engulfment	The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.
Entry	The action by which a person passes through an opening into a permit space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.
Entry Permit	The written or printed document that is provided by Charter to allow and control entry into a permit space.
Entry Supervisor	The person (such as the foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as necessary.
Field Calibrating	The testing instrument is exposed to calibration gas and the user verifies that the reading is within a predefined amount. Oxygen is calibrated to 21% oxygen in clean ambient air.
Hazardous Atmosphere	An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness.
Immediately Dangerous to Life or Health (IDLH)	Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.
Inerting	The displacement of the atmosphere in a permit space by a non-combustible gas (such as nitrogen) to such an extent that the resulting atmosphere is non-combustible. This procedure produces an IDLH oxygen-deficient atmosphere.
Isolation	The process by which a permit space is removed from service and completely protected

	against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout of all sources of energy; or blocking or disconnecting all mechanical linkages.
Line Breaking	The intentional disconnection of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.
Operations	Fixed or dispersed locations where work is performed.
Oxygen-deficient atmosphere	An atmosphere containing less than 19.5% oxygen by volume.
Oxygen-enriched Atmosphere	An atmosphere containing more than 23.5% oxygen by volume.
Permit Space	A confined space that also has one or more of the following characteristics: Contains or has a potential to contain a hazardous atmosphere, Contains a material that has the potential for engulfing an entrant, Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section, or Contains any other recognized serious safety or health hazard. Serious safety and health hazards include the potential to cause any one of the conditions listed below: Disabling injuries that would prevent self-rescue by the employee Permanently disabling injuries or non-curable conditions Amputation Death Note: The mere presence of physical or mechanical hazards does not require a confined space to be classified as a permit space. The Entry Supervisor or qualified EHS representative must evaluate the hazards and determine whether they meet the criteria above.
Prohibited Condition	Any condition in a permit space that is not allowed by the permit prior to entry or during the period when entry is authorized.
Risk Assessment	A process to identify and evaluate physical, chemical and biological hazards to prospective entrants, and develop the means to control those hazards.
Rescue Service	The personnel designated to rescue employees from permit spaces.

Retrieval System	The equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device appropriately anchored) used for non-entry rescue of persons from permit spaces.
Testing	The process, by which the hazards that may confront entrants of a permit space are identified, evaluated and documented.
Hazard Elimination	Removal of the hazard from the permit space. Methods to eliminate hazards include but are not limited to: line breaking, blanking, physical electrical disconnection such as disconnecting wiring, removal of flowable materials from the space, electrical mechanical LOTO using Charter LOTO Manual, or other similar procedures.
Hazard Mitigation	The use of established procedures which have been determined to be of sufficient reliability to be the basis for potential reclassification of permit spaces to confined (non-permit) spaces, except where prohibited by regulation. Methods accepted for hazard mitigation are strictly limited to those listed under the Hazard Mitigation section of this document. Note: In the US, OSHA has issued interpretive guidance that for flowable hazards; LOTO does NOT constitute elimination of the hazard but is considered Hazard Control. Hazard Control does NOT allow a permit space to be reclassified as a non-permit space.
Hazard Control	The implementation of safety practices and equipment not meeting the definition of Hazard Elimination or Mitigation. These methods are NOT allowed as the basis for reclassification of permit spaces to confined spaces.

4. PROCEDURE

4.1. **Identification/Classification**

4.1.1. Each operation must identify all spaces that meet the definition of a Confined Space and list them on an inventory, detailed using Appendix C or equivalent document.

4.1.2. The Confined spaces identified must then be evaluated to determine if they meet the requirements of a Permit Space.

4.1.3. The inventory shall include the location of the space, its classification (confined or permit) and reasoning for its classification.

4.1.4. Any new spaces that have not been classified (confined or permit) shall be handled as a permit space until reviewed.

4.1.5. The inventory shall be communicated and made readily available to employees.

4.1.6. A space must be evaluated or reevaluated to verify its classification (confined or permit space) where a Management of Change (MOC) identifies a possible change to the space.

4.1.7. Annually, a review of the operations shall be done to verify all spaces have been identified.

4.1.8. If the operation does not identify any confined spaces, then documentation of the assessment must be kept and no written procedure is required.

4.1.9. If the operation has both confined and permit spaces but decides that its employees will not enter permit spaces, the operations must take effective measures to prevent employees from entering. If contractors only are to be used when entering permit spaces, the operation must develop a written procedure that includes the following sections:

4.1.9.1. Scope and Application
Definitions
4.1.9.2. Identification/Classification
Confined Spaces Labeling of
4.1.9.3. Permit Spaces Contractors
Roles and Responsibilities
4.1.9.4. Training (Awareness Only)
4.1.9.5.

4.1.10. If the operation decides that employees will enter permit spaces (Alternate, Reclassification or Entry Permitting) then entire requirements of this procedure must be developed and implemented.

4.1.11. The operation must consult with and make information available, to affected employees regarding the development and implementation of this procedure.

4.2. **Confined Spaces**

4.2.1. Those spaces classified as Confined Spaces, as opposed to permit spaces, have no further work restrictions applied to them and are not covered by any further requirements of this procedure.

4.2.2. If classification of a space as confined space requires entry to complete the evaluation, such entry must be made following permit space entry procedures.

4.3. **Labeling of Permit Spaces**

4.3.1. If permit spaces are present, operations must inform potentially exposed employees of the existence, location of, and the danger posed by the permit spaces. This shall be accomplished by posting danger signs, Appendix D or equivalent, or by any other equally effective means.

4.3.2. Signs must be in the local language(s) such that all affected employees can understand the postings.

4.3.3. Signs shall be maintained in a legible condition.

4.3.4. The signs should contain a warning that a permit is required before entry.

4.3.5. Access points for permit spaces shall be labeled.

4.4. **Permit Space Risk Assessment**

4.4.1. Permit spaces must have a risk assessment completed prior to entering the space. The risk assessment may be completed as:

4.4.1.1. A stand-alone document, Appendix E or equivalent, (Regulatory required in some countries) or

4.4.1.2. Part of the Permit Space Entry process detailed in this procedure.

4.4.2. It is recommended that all known permit spaces receive a stand-alone assessment that is used to assist in the issuing of an entry permit. A Permit Space Risk Assessment Form is provided to assist in completing stand-alone assessments.

4.4.3. Either type of risk assessment must identify the typical work that is performed in the permit space, the specific hazards known or anticipated, and the control measures to be implemented to eliminate or reduce each of the hazards to an acceptable level as well as the emergency arrangements that must be made before work starts.

4.4.4. The stand-alone risk assessment for a space must be developed or re-evaluated if a MOC is implemented that might result in a possible change to the space.

4.5. **Entry - Last Resort**

4.5.1. Entry into permit spaces may only be considered when all other options for completing the task have been explored and deemed infeasible. This shall be documented as part of the Permit Space Entry process detailed in this procedure.

4.5.2. Whenever feasible, work shall be completed remotely, or equipment and procedures must be modified to eliminate the need for employees or contractors to enter any permit space.

4.5.3. Whenever feasible, operations shall design and construct facilities, systems, and equipment that eliminate all permit spaces that could require entry for maintenance, inspection, or testing

4.5.4. Where feasible, work involving permit spaces must be planned so that entry is avoided. Some suggestions for entry avoidance are:

4.5.4.1. Modify the permit space so that entry is not necessary,

4.5.4.2. Modify the permit space so that it no longer meets the definition of a permit space, or

4.5.4.3. Perform the work from the outside the space.

4.6. **Permit Space Entry Options**

4.6.1. Entry requirements for Permit Spaces are dependent upon the hazards and controls measures available. The entry methods include:

4.6.1.1. Alternate Entry,

4.6.1.2. Reclassification, Permit Space Entry, or IDLH Space Precautions

4.6.1.3.

4.6.1.4.

4.7. **Alternate Entry Method**

4.7.1. This entry method can only be used when a permit space has only an actual or potential Atmospheric Hazard and it can be demonstrated that continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry.

4.7.2. Initial atmospheric testing data is required to demonstrate ventilation alone is sufficient. If an employee must enter the space to conduct atmospheric testing, then the Permit Space Entry Method must be followed.

4.7.3. The forced air ventilation must be directed as to ventilate the immediate areas where an employee is or will be present within the space and shall continue until all employees have left the space.

4.7.4. The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space.

4.7.5. There must be no hazardous atmosphere inside the space before any authorized entry.

4.7.6. The Entry Permit, Appendix F or equivalent, must be completed up to the Alternate Entry Section (Attachment D) and must be signed by an entry supervisor and communicated to entry employees

4.8. The atmosphere within the space shall be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere. Any employee who enters the space must be provided with an opportunity to observe the periodic testing

4.9. If a hazardous atmosphere is detected during entry:
- 4.9.1. Each employee shall leave the space immediately
- 4.9.2. The space shall be evaluated to determine how the hazardous atmosphere developed; and
- 4.9.3. Measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place
- 4.9.4. Re-entry into the space must follow Permit Space Entry Procedures

4.10. **Reclassification Entry Method**

4.10.1. If all atmospheric and/or physical/mechanical hazards in the permit space can be eliminated or mitigated (not controlled), the permit space may be reclassified as a Confined Space for the entry.

4.10.2. Methods to eliminate or mitigate hazards are impacted by local regulatory allowances but where allowed by law, Charter's process includes:

4.10.2.1. Under US OSHA rules, "Control" of a hazard is insufficient basis for reclassifying a permit-required confined space as a confined space. In OSHA's view, "Control" is any action to reduce or minimize the risk other than "Elimination." Thus, even the steps identified as "Mitigation" below are insufficient as a basis for reclassification. In order to minimize confusion, we have retained the OSHA definition of "Control" as a means of reducing or managing the hazard that does not allow reclassification. Charter has created a new term – "Mitigate" – that means actions taken to reduce a hazard that, when approved by CEP and properly implemented, is sufficient basis for reclassifying a permit space to a confined space. CEP-approved methods of mitigation are limited to those listed and applies only to those countries where allowed by regulation, and specifically does not apply to US operations.

4.10.2.2. Hazard elimination or mitigation in accordance with this Attachment is required to allow a permit space to be reclassified as a confined space.

4.10.2.3. Elimination -Hazard elimination is removal of the hazard from within, or the ability to affect, the confined space during entry. It includes methods such as the following:

4.10.2.3.1. Line breaking. This requires that a physical "break" or separation of the line be made, such that, it is impossible for materials to flow into the confined space or permit space being worked.

4.10.2.3.2. Blanking. This requires installation of 1 or more "pancake blinds" or flat flanges into a material supply line, such that, material flow is completed blocked. Use of >1 pancake blind, is considered the best practice.

4.10.2.3.3. Electrical-mechanical lockout / tagout (LOTO) in strict accordance with Charter LOTO Manual. Note that if energy storage such as capacitors is part of the system, these must be fully grounded and discharged as part of the LOTO. Physical electrical disconnection, disconnecting wiring, or removing fuses are also acceptable methods.

4.10.2.3.4. Providing engineering controls such as guardrail protected work platforms or locations, as defined in the Charter Fall Protection SOP

4.10.2.3.5. Removal of flowable materials from the space

4.10.2.3.6. Other similar methods that eliminate the hazard(s)

4.10.2.4. Mitigation - Hazard mitigation is establishment of affirmative safety procedures and/or equipment of sufficient rigor and reliability that it may be considered to provide equivalent protection as hazard elimination. Hazard mitigation is limited to:

4.10.2.4.1. LOTO of flowable materials (for example: liquids, gases, or loose particulates) in strict accordance with the Charter LOTO Procedure, including double-block and bleed methods for lines connected to the confined space or permit space.

4.10.2.4.2. Personal fall protection in strict accordance with the Charter Fall Protection SOP>

4.10.3. If it is necessary to enter the permit space to eliminate or mitigate hazards, employees must follow the Permit Space Entry Method. If testing and inspection during that permit entry demonstrate that the hazards within the permit space have been eliminated or mitigated, the entry may be reclassified as a Confined Space for as long as the hazards remain eliminated or mitigated.

4.10.4. If forced air ventilation is required to control atmospheric hazards then reclassification is not allowed and space must be entered using Alternate Entry (if atmospheric hazard is the only hazard) or Permit Space Entry Methods.

4.10.5. The Entry Permit must be completed up to the Reclassification section, must be signed by an Entry Supervisor, and communicated to entry employees.

4.10.6. If hazards are detected during the entry:

4.10.6.1. Each employee in the space shall exit immediately,

4.10.6.2. The space shall be evaluated to determine how the hazards developed,

4.10.6.3. Control measures shall be implemented to protect employees from the hazards before any subsequent entry takes place, and

4.10.6.4. Re-entry into the space must follow Permit Space Entry Method.

4.11. Permit Space Entry Method

4.11.1. Permit Space Entry Procedures typically follow these steps:

4.11.1.1. Notification is made that permit space entry in required

4.11.1.2. Trained Entry Supervisor, Entrant(s) and Attendant(s) are identified
4.11.1.3. Space is prepared for evaluation
4.11.1.4. Entry Supervisor uses Risk Assessment and/or Entry Permit to identify actual or potential hazards, controls and emergency response preparations
4.11.1.5. If IDLH conditions are identified, entry into the space must be reviewed and approved by Director of Safety.

4.11.1.6. Entrant(s) and Attendant implement controls
4.11.1.7. Atmospheric Testing is conducted and determination made if additional controls needed
4.11.1.8. Entry Supervisor, Entrant(s) and Attendant(s) conduct pre-entry briefing to review Atmospheric Testing (Required), Entry Permit (Required) and Risk Assessment (if available)
4.11.1.9. Completed Entry Permit is posted at or near permit space entrance
4.11.1.10. Work begins with Entry Supervisor periodically checking in on the site and ensuring periodic atmospheric testing is being done
4.11.1.11. Once work is completed, Entrant(s) remove all tools, equipment and begins permit space back to normal
4.11.1.12. Entry Supervisor conducts a final review of area to ensure all controls have been removed, required communication made and space is safe to return to normal
4.11.1.13. Entry Supervisor documents on Entry Permit when permit is cancelled and follows locations document control procedure to maintain permit

4.11.2. The following sections have been developed to provide further detail concerning the Permit Space Entry Method:
4.11.2.1. Entry Permit
4.11.2.2. Hazard Identification/Control
4.11.2.3. Atmospheric Testing
4.11.2.4. IDLH Space Precautions
4.11.2.5. Rescue and Emergency Services
4.11.2.6. Contractors

4.12. Entry Permit

4.12.1. The Entry Permit is the tool that identifies and documents safe working conditions during entry into permit spaces with known hazards or with unknown or potentially hazardous atmospheres.

4.12.2. Before each entry into a permit space, the Entry Supervisor must complete an entry permit.

4.12.3. The entry permit guides the Entry Supervisor and workers through a systematic evaluation of the space to be entered. The permit establishes appropriate conditions for entry and work in the space.

4.12.4. The entry permit must contain the following items:
4.12.4.1. The permit space to be entered
4.12.4.2. The purpose of the entry
4.12.4.3. The date and the authorized duration of the entry permit
4.12.4.4. The authorized entrants within the permit space, by name or by such other means (for example, through the use of rosters or tracking systems) as will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space
4.12.4.5. The personnel, by name, currently serving as attendants

4.12.4.6. The individual, by name, currently serving as entry supervisor, with a space for the signature or initials of the entry supervisor who originally authorized entry
4.12.4.7. The hazards of the permit space to be entered
4.12.4.8. The measures used to isolate the permit space and to eliminate or control permit space hazards before entry. NOTE: Those measures can include the lockout of equipment and procedures for purging, inerting, ventilating, and flushing permit spaces
4.12.4.9. The acceptable entry conditions
4.12.4.10. The results of initial and periodic atmospheric testing accompanied by the names or initials of the testers and by an indication of when the tests were performed
4.12.4.11. The rescue and emergency services that can be summoned and the means (such as the equipment to use and the numbers to call) for summoning those services
4.12.4.12. The communication procedures used by authorized entrants and attendants to maintain contact during the entry
4.12.4.13. The equipment required for the entry, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment
4.12.4.14. Any other information whose inclusion is necessary, given the circumstances of the particular permit space, in order to ensure employee safety
4.12.4.15. Any additional permits, such as hot work or customer entry permits, that have been issued to authorize work in the permit space.

4.12.5. An Entry Supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.
4.12.5.1. If an Entry Supervisor is going to serve as an entrant, the Entry Supervisor role must be transferred to another qualified individual remaining outside the space.

4.12.6. The duration of the entry permit may not exceed the time required to complete the assigned task or job identified on the permit and may not exceed one shift (e.g. 8 hrs.). For an entry permit to be renewed, several conditions shall be met before each re-entry into the permit space:
4.12.6.1. Atmospheric testing shall be conducted and the results must be within acceptable limits, and
4.12.6.1.1. If atmospheric test results are not within acceptable limits, precautions to protect entrants against the hazards should be addressed on the permit and should be in place.
4.12.6.2. The Entry Supervisor shall verify that all precautions and other measures called for on the permit are still in place and effective.

4.12.7. Only work originally approved on the permit shall be conducted in the space. A new permit should be issued or the original permit revised and reissued whenever changing work conditions or work activities introduce new hazards into the space.

4.12.8. The permit requirements and the steps taken to fulfill those requirements must be communicated to all employees involved in the operation prior to entry operations.

4.12.9. The completed permit must be posted conspicuously at or near permit space entrance.

4.12.10. Each operation must use a standard Entry Permit for all entries.

4.12.12. When working at a Non-Charter location where the owner/operator completes an entry permit, the Charter entrant must complete a Charter Entry Permit as a means to verify correct entry procedures are being followed. The Charter entrant must observe the atmospheric testing performed by the owner/operator if it is to be used as the initial testing to enter the space, to verify the following:

4.12.12.1. Testing meets the requirements in the Atmospheric Testing section of this procedure,

4.12.12.2. The manufacturer calibration of the instruments used is verified as current, and

4.12.12.3. The field calibration is observed and done correctly

4.12.13. When working at Non-Charter locations, if it is determined that the owner/operator permit space entry procedures do not meet our requirements and/or use of our procedures is denied, entry is prohibited until HS reviews and approves entry procedures that provide equivalent protection to our procedures.

4.12.14. Each operation must retain each cancelled entry permit for at least one year to facilitate the review of the procedure. Any problems encountered during an entry operation must be noted on the entry permit so that appropriate revisions can be made.

4.12.15. Completed entry permits must be periodically reviewed for completeness and accuracy by a person knowledgeable on the requirements of this procedure. It's recommended this review be done no later than 30 days after submittal of completed permit.

4.13. **Hazard Identification/Control**

4.13.1. The following hazards are common in permit spaces:

4.13.1.1. Lack of Oxygen - This can occur because other gases or vapors displace Oxygen or because Oxygen is consumed. Air in spaces that are closed for an extended period may become deficient in oxygen due to oxidation of metals or from biological activity.

4.13.1.2. Oxygen-Enriched Atmospheres - Oxygen content greater than 23 percent by volume increases fire hazard.

4.13.1.3. Flammable or Combustible Atmosphere - Gases, vapors and liquids may accumulate in the space or may be present as residues

4.13.1.4. Electric Shock or Ignition of Flammable/ Combustibles - Portable lights, tools, or associated electrical equipment may cause shock or ignition of gases and vapors.

4.13.1.5. Injury from Mechanical Equipment not initially controlled through LOTO - Pumps, mixers, conveyors, etc., inadvertently activated or unguarded

4.13.1.6. Temperature Extremes - Vessels with steam jackets could rapidly heat to an unsafe temperature and those with cooling or cryogenics could expose entrants to extreme cold. The equipment itself may be designed to have a temperature extreme as well.

4.13.1.7. Exposure to Hazardous Substances - This may result from gradual release of substances from sludge, scale or slow chemical reactions that, over time, allow significant gas or vapor concentrations to develop. Contaminants can also enter from other sources through ducts and piping not initially controlled through LOTO.

4.13.2. Hazards in and around permit spaces must be controlled. Controls include changes in the work processes and/or working environment with the objective of:

4.13.2.1. Eliminating hazards,

4.13.2.2. Reducing hazards below harmful levels, or

4.13.2.3. Preventing the hazards from coming into contact with the workers.

4.13.3. The Hierarchy of Controls should be followed in controlling confined space hazards:
- 4.13.3.1. Engineering controls, such as ventilation to limit exposure to hazards,
- 4.13.3.2. Work practice controls, such as wetting of hazardous dusts, frequent cleaning, LOTO, or
- 4.13.3.3. Use of personal protective equipment such as air purifying or supplied-air respirators.

4.13.4. Any conditions making it unsafe to remove an entrance cover or open an access door or panel must be eliminated before the space is opened.

4.13.5. Once open, the entry point must be promptly guarded by a railing or other temporary barrier that will prevent anyone from falling through the opening. This barrier must protect each employee working in the space from foreign objects entering the space.
- 4.13.5.1. If the opening is located in a traffic area, adequate barriers must be erected.

4.13.6. Means for safe entry and exit must be provided for permit spaces. Each entry and exit point must be evaluated to identify the hazards and select the most effective methods and equipment to enable employees to safely enter and exit the space.

4.13.7. All individuals involved with an entry must be provided with the appropriate equipment to meet the permit space conditions identified. All equipment, as appropriate, must be tested for proper function and integrity prior to use. As required, equipment shall be intrinsically safe. Equipment may include, but not limited to:
- 4.13.7.1. PPE (Coveralls, chemical suits, head covering, hearing protection, respiratory protection, gloves, apron, footwear, or foot protection)
- 4.13.7.2. Ventilation Equipment – as needed to ensure acceptable entry conditions.
- 4.13.7.3. Communication Equipment – as needed to allow communication at all times between entrant and the attendant.
- 4.13.7.4. Lighting – as needed to allow entrant(s) to work safely and to exit the space quickly in an emergency.
- 4.13.7.5. Entry/Egress Equipment – ladders, hoists or other means to enter and exit the space.

4.13.8. To facilitate non-entry rescue, retrieval systems or methods must be used whenever an entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. The Entry Supervisor must make this decision.

4.13.9. Retrieval systems shall meet the following requirements.
- 4.13.9.1. Each entrant shall use a full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, above the entrant's head, or at another point which the Entry Supervisor determines presents a profile small enough for the successful removal of the entrant.
  - 4.13.9.1.1. Wristlets may be used in lieu of the full body harness if Entry Supervisor can demonstrate that the use of a full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.
- 4.13.9.2. The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary.
- 4.13.9.3. A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than 5 feet (1.52 m) deep.

4.13.10. If fall protection is necessary for entry into the space, and the equipment is involved in a fall or a rescue from a top-entry space, the equipment must be taken out of service as required by EHS 13D – Work at Heights Procedure.

4.14. **Atmospheric Testing**

4.14.1. Atmospheric testing is required prior to entry into any permit space to verify that acceptable conditions exist for entry into the space.

4.14.2. If a person must go into the space to conduct the atmospheric testing, the Permit Entry Method (i.e. rescue team, attendant, and entry supervisor) must be in place prior to entering.

4.14.3. The internal atmosphere must be tested with a calibrated, direct-reading instrument for the following, in the order given:
- 4.14.3.1. Oxygen content,
- 4.14.3.2. Combustible gases and vapors,
- 4.14.3.3. Carbon Monoxide, and
- 4.14.3.4. Toxic gases and vapors expected to be present in the space.

4.14.4. Direct-reading instruments must be used for measuring Oxygen, Combustible gasses and vapor, Carbon Monoxide, and permit space specific Toxic gases and vapor testing. The use of detector tubes for atmospheric testing of spaces should only be used when other options are not readily available.

4.14.5. Testing equipment used in specialty areas must be listed or approved for use in such areas. This listing or approval should be from nationally recognized testing laboratories such as Underwriters Laboratories or Factory Mutual Systems.

4.14.6. The atmosphere of a permit space shall be analyzed using equipment of sufficient sensitivity and specificity.

4.14.7. The analysis must identify and evaluate any hazardous atmospheres that may exist or arise, so that appropriate controls can be developed and acceptable entry conditions stipulated for that space. Testing, evaluating and develop appropriate control measures must be done by a person trained in Atmospheric Testing.

4.14.8. Testing results must be documented on the Entry Permit.

4.14.9. The atmosphere must be periodically retested to verify that atmospheric conditions remain within acceptable entry parameters when a potential for a hazardous atmosphere exists.

4.14.10. If the permit space is vacated for any period of time, the atmosphere of the space must be retested before re-entry is permitted.

4.14.11. The atmosphere of a permit space should be considered within acceptable limits whenever the following conditions are maintained:
- 4.14.11.1. Oxygen - 19.5% to 23.5%
- 4.14.11.2. Flammability - less than 10% of the Lower Explosion Limit (LEL), also known as the Lower Flammable Limit (LFL)
- 4.14.11.3. Carbon monoxide - less than 25 ppm (or lower if required by local regulation)

4.14.11.4. Toxic Materials - less than recognized published exposure levels using the established priority of the lowest or most protective limit among the following: ACGIH Threshold Limit Values or local regulatory occupational exposure limits.

4.14.12. Whenever atmospheric testing levels are not within acceptable limits, entry shall be prohibited until appropriate controls are implemented, and re-testing indicates the levels are within acceptable levels or appropriate personal protective equipment is identified and used to protect workers. If this is unable to occur or atmospheric testing levels exceed IDLH levels listed in the *NIOSH Pocket Guide to Chemical Hazards* http://www.cdc.gov/niosh/npg/) or similar reference, the space must be classified as IDLH and those additional precautions must be implemented before entering.

4.14.13. If the source of the contaminant cannot be determined or controlled, corrective actions must be adequate to deal with the worst possible condition in the permit space and continuous atmospheric monitoring must be conducted.

4.14.14. If there is the possibility that the permit space atmosphere can become unacceptable while the work is in progress, the atmosphere should be constantly monitored and procedures and equipment should be provided to allow the employees to quickly and safely exit the space

4.14.15. Testing of spaces with Top Entrances must follow this process:

4.14.15.1. From each entrance, drop the sampling probe of the meter to the bottom of the space. Additionally, use other available openings, which would facilitate air testing for that permit space,

4.14.15.2. Slowly raise the sampling probe, stopping at intervals of three feet (1 meter) to verify that the atmosphere is not contaminated. The rate of sampling should be slowed to accommodate detector response due to the length of the sampling line, and

4.14.15.3. Record atmospheric testing data on the entry permit.

4.14.16. Testing of spaces having a Side or Bottom Entrance must follow this process:

4.14.16.1. From each entrance, move the sampling probe to the opposite side of the space. Use rods, poles or other means to extend the probe to the opposite side of the space,

4.14.16.2. Slowly test all areas inside the permit space. The rate of sampling must be slowed to accommodate detector response due to the length of the sampling line and probe, and

4.14.16.3. Record air testing data on the confined space permit.

4.14.17. All equipment used for atmospheric testing must be maintained according to manufacturer's recommendations and factory calibrated at the required frequency.

4.14.18. All testing equipment must have its calibration checked immediately prior to use. The calibration checks must be performed in accordance with the manufacturer's requirements and should include:

4.14.18.1. Fresh air check (Oxygen)

4.14.18.2. Zero check (CO, LEL, etc.)

4.14.18.3. Span check (LEL, VOCs, CO)

4.14.19. Instrument calibration documentation will be reviewed annually.

4.14.19.1. Instruments failing calibration must not be used, and must be taken out of service and repaired or replaced.

4.15. **IDLH Space Precautions**

4.15.1. Entry into permit spaces containing an IDLH atmosphere is prohibited unless the proposed entry receives prior review and approval from the P&L EHS, and specific entry procedures are established.

4.15.2. Respirators for IDLH atmospheres must be:
- 4.15.2.1. A certified full face piece pressure demand SCBA for a minimum service life of thirty minutes, or
- 4.15.2.2. A combination full face piece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

4.15.3. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

4.15.4. Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the attendant.

4.15.5. The emergency rescue services are on standby outside the permit space.

4.15.6. The emergency rescue operations must be equipped with at least:
- 4.15.6.1. Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and
- 4.15.6.2. Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres.

4.16. **Rescue and Emergency Services**

4.16.1. If permit spaces are to be entered at a location, emergency rescue plans must be developed.

4.16.2. Entry rescue personnel and equipment are required to be able to respond and arrive at the location of the permit space entry whenever the permit space contains hazards capable of causing serious accidents such as those involving falls, suffocation, asphyxiation, electrocution, amputation, or similar serious hazards. When a qualified Entry Supervisor or qualified EHS representative determines that a permit space does not present serious hazards triggering the requirement of 4-minute entry rescue response time, the rationale for this determination must be documented on the Charter Entry Permit. Examples of permit spaces that may not require 4-minute entry rescue response time include:

- 4.16.2.1. **Sewer lift station** with built in power ventilation system considered designed for human occupancy. The definition is clear for those spaces where a known or suspect hazard is considered and eliminated or controlled in the design of a workplace. When hazards are eliminated and/or managed through the application of engineering controls for the safety and health of the humans who will be occupying the space, the employee protective measures, intended by the standard, have been met. Where it can be shown that the manufacturer has considered the hazards of sewage and its by-products in the design of their pump station so humans can work in the space. Design measures such as barrier separation from the sewage, powered ventilation providing a minimum of 20 air changes an hour, automatic-on and timed (ventilation) control, lighting and even optional heating or air conditioning demonstrates that this unit was designed to accommodate the worker who will enter it.

4.16.3. When 4-minute response time is required, on-site rescue teams, off-site local services or a contracted service may be used for entry rescue. Whichever rescue service is selected, they must to able to respond and arrive at the location of the permit space entry within 4 minutes of being called.

4.16.3.1. Appendix H or equivalent must be completed when evaluating off-site or contracted rescue services. This document shall also be used when Charter employees are relying on customer or site owner/ operator entry rescue services.

4.16.4. If an outside rescue service is used, they:

4.16.4.1. Must be made aware of the hazards of the permit spaces,

4.16.4.2. Must have access to comparable permit spaces or afforded the opportunity to practice at the location where they will be doing a possible rescue in order to develop rescue plans, and

4.16.4.3. Conduct an annual drill on-site as part of the agreement.

4.16.5. If the operation selects on-site rescue services, then the following measures must be taken:

4.16.5.1. Provide affected employees with the personal protective equipment (PPE) needed to conduct permit space rescues safely and train affected employees so they are proficient in the use of that PPE, at no cost to those employees,

4.16.5.2. Train affected employees to perform assigned rescue duties to establish proficiency as an authorized entrant,

4.16.5.3. Train affected employees in basic first-aid and cardiopulmonary resuscitation (CPR). At least one member of the rescue team holding CPR certification must be available but it is recommended that at least two available members are CPR certified,

4.16.5.4. Ensure that affected employees practice making permit space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces.

4.16.5.4.1. Representative permit spaces shall, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue are to be performed.

4.16.6. Rescue services must be coordinated ahead of time. Coordination must include contacting the rescue service and alerting them to the entry schedule, and verifying that trained personnel (minimum of 2 or more rescuers other than the Attendant is recommended) and necessary equipment are available during the period of entry, and can respond to the location of the entry within the required 4 minute timeframe.

4.16.7. If permit space has an IDLH condition, rescue services must be on stand-by outside the permit space with necessary rescue equipment.

4.16.8. A method for contacting the emergency and rescue services must be clearly identified on the entry permit and communicated to the Attendant.

4.16.9. If an injured entrant is exposed to a substance for which a Safety Data Sheet (SDS) or other similar written information is required to be kept at the worksite, that SDS or written information shall be made available to the medical facility treating the exposed entrant.

4.17. **Contractors**

4.17.1. A Charter contractor representative is designated for each contractor.
This representative is responsible for the overall safety and health coordination and oversight of the contractor, as well as the interaction of the contractor with Charter employees.

4.17.2. The Charter representative must:

4.17.2.1. Inform the contractor that the workplace contains permit spaces and that entry is allowed only through compliance with a Permit Space Entry Program,

4.17.2.2. Apprise the contractor of the elements, including the hazards identified and the host employer's experience with the space, that make the space in question a permit space. If available, the risk assessment should also be shared,

4.17.2.3. Apprise the contractor of any precautions or procedures that Charter and the host employer have implemented for the protection of employees in or near permit spaces where contractor personnel will be working.

4.17.2.4. Review the permit space program the contractor intends to follow and training certifications for entrants/attendants and rescue team. The Contractor Program Checklist, Appendix I or equivalent, must be used to assist in conducting the review,

4.17.2.5. Coordinate entry operations to ensure the requirements of this procedure are followed when both Charter and contractor personnel will be working in or near permit spaces, and

4.17.2.6. Debrief the contractor at the conclusion of the entry operations to receive feedback regarding the permit space procedure followed and any hazards confronted or created in permit spaces during entry operations.

4.17.2.7. For field service operations, field engineers, field technicians, or sales personnel may be designated as the Charter representative to oversee the contractor as long as they are qualified to fulfill these duties.

4.17.3. Contractor employees involved in permit space entry activities must be trained according to their role and level of responsibility. Training must be in accordance with the applicable regulatory requirements.

4.17.3.1. Contractors are required to submit copies of employee applicable training records (e.g., confined space entry, LOTO, asbestos removal, etc.).

4.17.4. Periodic inspections must be done to verify contractors are complying with entry requirements. When safety-related problems are noted the Charter representative has the authority to stop work until the problems are corrected.

4.17.5. Charter has the right to terminate the contract for safety violations. All cost associated to this termination shall be the responsibility of the contractor. These terms are to be included in all contracts.

4.17.6. Contractors must have their own equipment and calibrated multi-gas meter to perform ongoing air monitoring and during the entry. Contractors should not be using Charter's safety equipment.

4.18. **Auditing and Review**

4.18.1. Targeted inspections of active permit space work activities must be made on a regular basis to verify that procedures are being followed.

4.18.2. Each operation shall conduct an annual audit of their program by completing any required Confined Space Entry Self-Assessment.

4.18.3. A review and update of operations written procedure must take place annually and after:
- 4.18.3.1. There is reason to believe that the measures taken under the permit space program may not protect employees,
- 4.18.3.2. Any unauthorized entry of a permit space,
- 4.18.3.3. The detection of a permit space hazard not covered by the entry permit,
- 4.18.3.4. The detection of a condition prohibited by the entry permit,
- 4.18.3.5. The occurrence of an injury or near-miss during permit entry,
- 4.18.3.6. A change in the use or configuration of a permit space,
- 4.18.3.7. An employee complains about the effectiveness of the procedure, and
- 4.18.3.8. As part of the Health & Safety Framework annual program review.

5. RECORDS

5.1. Records associated to this procedure shall be maintained in accordance with Charter's Document Retention Policy.

6. RESPONSIBILITIES

Role	Description
Safety Team shall:	• Maintain this procedure as necessary. • Support Project Teams as requested.
Site team shall:	• Support Operations in implementing the requirements of this procedure. • Provide technical support as requested.
Superintendents shall:	• Implement the requirements of this procedure. • Train personnel as necessary. • Take appropriate action regarding any violation of this procedure. • Support efforts to reduce permit spaces and the risks associated with them. • Support communicating changes to this procedure to affected employees. • Address, as appropriate, concerns raised regarding this procedure.
Employees shall:	• Complete training as required. • Follow the requirements of this procedure as communicated. • Raise concerns to EHS or Leadership.

7. TRAINING

7.1. All persons providing Permit Space Entry training must have documented training and experience in each specific subject that they present, as approved by the P&L EHS team. An example of a qualified permit space entry instructor would be a qualified Entry Supervisor with good verbal communications skills.

7.2. Each operation must provide Confined Space Awareness Training, MyLearning EHS-190 can be used, to all employees whose work may be affected by confined spaces or entry activities. The training must cover:

7.2.1. The existence of confined and permit spaces in their work areas,
7.2.2. Labeling methods and warnings, and
7.2.3. An understanding of the dangers by those who perform an unauthorized entry.

7.3. Each operation must provide training so that all employees whose work involves dealing with permit spaces (i.e. Entry Supervisors, Entrants, Attendants, Atmospheric Monitoring Personnel, and Emergency Response Personnel) acquire the understanding, knowledge, and skills necessary for the safe performance of their duties. Training must be provided to each affected employee:
7.3.1. Before the employee is first assigned duties,
7.3.2. Before there is a change in assigned duties,
7.3.3. Whenever there is a change in permit space operations that presents a hazard for which an employee has not been trained, and
7.3.4. Whenever the operation has reason to believe either that there are deviations from the permit space entry procedures or that there are inadequacies in the employee's knowledge or use of these procedures.

7.4. Training for Entry Supervisors must include:
7.4.1. Duties and responsibilities as a member of the permit space entry team,
7.4.2. Explanation of the general hazards associated with confined and permit spaces,
7.4.3. Discussion of specific permit space hazards associated with the site, location or operation,
7.4.4. Reason for, proper use, and limitations of PPE and other safety equipment required for entry into permit spaces,
7.4.5. Explanation of permits and other procedural requirements for conducting a permit space entry,
7.4.6. A clear understanding of what conditions would prohibit entry,
7.4.7. Understanding of what emergency equipment/preparations are required and how to respond to emergencies,
7.4.8. Description of how to recognize symptoms of overexposure to probable air contaminants in themselves and co-workers, and method(s) for alerting attendants, and
7.4.9. Other training may be required for the Entry Supervisor if the permit space dictates a need. Other training may include but is not limited to: LOTO Authorized, Electrical Safety, Fall Protection, etc.

Training for Entry Supervisors	Course
Confined Space Entry Supervisor Training	Instrumentation training, Non-Entry Rescue, Summoning Entry Rescue Service, Communication with Entrants

7.5. Training for Atmospheric Testing Personnel must include:
7.5.1. Proper use of the equipment,
7.5.2. Knowledge of calibration,
7.5.3. Knowledge of sampling strategies and techniques,
7.5.4. Knowledge of Occupational Exposure Limits (i.e. TLVs, LELs, UELs, PELs etc.), and
7.5.5. Other training may be required for Atmospheric Testing Personnel if the permit space dictates a need. Other training may include but is not limited to: LOTO Authorized, Electrical Safety, Fall Protection, etc.

Training for Atmospheric Monitoring Personnel	Course
Instrumentation Training	Local responsibility with equipment to be used

7.6. Training for Entrants must include:

7.6.1. Explanation of the general hazards associated with confined and permit spaces,
7.6.2. Discussion of specific permit space hazards associated with the site, location or operation,
7.6.3. Reason for, proper use, and limitations of PPE and other safety equipment required for entry into permit spaces,
7.6.4. Explanation of permits and other procedural requirements for conducting a permit space entry,
7.6.5. Description of how to recognize symptoms of overexposure to probable air contaminants in themselves and co-workers, and method(s) for alerting attendants,
7.6.6. Self-rescue techniques,
7.6.7. Hands-on demonstration of Entry Permitting process and equipment they would use while entering a space (i.e. Harness, life line, Retrieval Device, etc.), and
7.6.8. Other training may be required for the entrant if the permit space dictates a need. Other training may include but is not limited to: LOTO Authorized, Electrical Safety, Fall Protection, etc.

Training for Confined Space Entrants	Course
Confined Space Entry Training	Charter Laborer Training

7.7. Training for Attendants must include:

7.7.1. Explanation of the general hazards associated with confined and permit spaces,
7.7.2. Discussion of specific permit space hazards associated with the site, location or operation,
7.7.3. Reason for, proper use, and limitations of PPE and other safety equipment required for entry into permit spaces,
7.7.4. Explanation of permits and other procedural requirements for conducting a permit space entry,
7.7.5. Description of how to recognize symptoms of overexposure to probable air contaminants by entrants,
7.7.6. Procedures for summoning rescue or other emergency services,
7.7.7. Proper utilization of equipment used for communicating with entry and emergency/rescue personnel,
7.7.8. Non-Entry Rescue procedures, and
7.7.9. Other training may be required for the attendant if the permit space dictates a need. Other training may include but is not limited to: LOTO Authorized, Electrical Safety, Fall Protection, etc.

Training for Confined Space Attendants	Course
Non-Entry Rescue	Local responsibility with equipment to be used
Summoning Entry Rescue Service	Local responsibility based on local procedures
Communication with Entrants	Local responsibility based on methods available
Confined Space Entry Training	Charter Laborer Training

7.8. Training for Emergency Response Personnel must include:

7.8.1. Rescue plan and procedures developed for each type of permit space that are anticipated to be encountered,
7.8.2. Use of emergency rescue equipment,
7.8.3. First aid and CPR techniques,
7.8.4. Work location and permit space configuration to minimize response time,
7.8.5. Initial and annual hands-on demonstration of a simulated rescue to reinforce training, and
7.8.6. Other training may be required for the Emergency Response Personnel if the permit space dictates a need. Other training may include but is not limited to: LOTO Authorized, Electrical Safety, Fall Protection, etc.
7.8.7. Training sessions should be repeated as often as necessary (i.e. annually for those performing rescue infrequently and every 3 years for those performing rescue services frequently) to maintain an acceptable level of personnel competence.

Training for Emergency Response Personnel	
Confined Space Entry Training	
First Aid / CPR	
Use of Emergency Rescue Equipment	Local responsibility with equip to be used

7.9. Refresher training for Entry Supervisors, Air Monitoring Personnel, Entrants, and Attendants is required every two years, or whenever it is found that deviations from established procedures are occurring or employee knowledge about how to execute the procedures is inadequate.

7.10. All training must be documented and tracked to closure using HCSS Skills.

8. APPENDICES

8.1. Appendix A – Charter Specific Information

8.2. Appendix B – Operation Specific Information

8.3. Appendix C – Confined / Permit Space Inventory Form

8.4. Appendix D – Permit Space Signage

8.5. Appendix E – Permit Space Risk Assessment Form

8.6. Appendix F – Permit Space Entry Permit

8.7. Appendix G - Customer Confined Space Program Checklist

8.8. Appendix H – Outside Emergency Response Team Evaluation Form

8.9. Appendix I - Contractor Program Checklist

Appendix A – Charter Specific Information

Appendix B – Operation Specific Information

Confined / Permit Space Procedure

Appendix C – Confined / Permit Space Inventory Form

		Confined Space				Permit Space				
Space Identification	Date Reviewed	Is large enough and so configured that an employee can bodily enter and perform assigned work	Has limited or restricted means for entry or exit	Is not designed for continuous employee occupancy	Is space a Confined Space? (Yes, continue to Permit Space. No, Stop)	Contains or has a potential to contain a hazardous atmosphere	Contains a material that has the potential for engulfing an entrant	Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section	Contains any other recognized SERIOUS safety or health hazard	Is confined space a permit space?

Appendix D – Permit Space Signage



Appendix E – Permit Space Risk Assessment Form

Date Evaluation Performed: _____ Evaluation Performed By: _____

		HAZARDS														Personal Protective Equipment				Rescue Services	
		ATMOSPHERIC						PHYSICAL								All equipment required to enter the space				Describe rescue equipment / services	
Space Identification	Number of Entry Points	Oxygen (deficient/ enrich)	Explosive (Gas/Vapors)	Explosive (Dust)	Carbon Monoxide	Hydrogen Sulfide	Other Toxic Hazards	Mechanical	Electrical	Process Lines (In/Out)	Configuration (entrapment)	Engulfment (solid / liquid)	Temperature Extreme (Hot/Cold)	Fall Hazard (People/Equip/Materials)	Restricted Entry/Exit	Chemical PPE	Respiratory PPE	Other PPE	Describe Other PPE Required (air purifying respirator, SCBA, welding protection, gloves, chemical protection, etc.)	Rescue Equipment (life line, body harness, tripod, man winch, fall arrest unit, radios, etc.)	Off-site Rescue Services

Appendix F – Permit Space Entry Permit

ANY CHANGE IN THE CONFINED SPACES ENVIRONMENT, OR A LACK OF OCCUPANCY, SHALL REQUIRED NEW MONITORING PRIOR TO THE RE-COMMENCEMENT OF WORK.

SPACE TO BE ENTERED:	
PURPOSE OF THE ENTRY:	
DATE PERMIT ISSUED:	AUTHORIZED DURATION OF PERMIT:
ENTRY AS LAST RESORT: DESCRIBE WHY WORK REQUIRES A PERSON TO ENTRY THE PERMIT SPACE VS. CONDUCTING THE WORK USING ANOTHER MEANS?	

SPACE HAZARDS	Y	N		Y	N
ATMOSPHERIC			FALLS FROM HEIGHT		
MECHANICAL			HEAT		
ELECTRICAL			ADJACENT WORK		
CHEMICAL			WORK BEING PERFORMED		
ENGULFMENT			CONFIGURATION		
NOISE			OTHER		
HAZARD CONTROLS	Y	N		Y	N
LOTO			CLEANING AND PURGING		
BLANKING OR HAZARD ELIMINATION			ADDITIONAL WORK PERMITS		
NATURAL VENTILATION			CONTINUOUS AIR MONITORING		
MECHANICAL VENTILATION			OTHER		
EQUIPMENT NEEDED	Y	N		Y	N
GLOVES			AIR MONITOR		
PROTECTIVE CLOTHING			AIR BLOWER		
SAFETY SHOES/BOOTS			FLOOD LIGHTS / FLASHLIGHTS		
HARD HAT			RADIOS / CELL PHONE		
SAFETY GLASSES/GOGGLES/ FACE SHIELD			GFCI		
LADDER			EYE WASH/SHOWER ACCESS		
FIRE EXTINGUISHER			OTHER		
FIRE BLANKETS/SHIELD			OTHER		

ATMOSPHERIC TESTING

MONITORING EQUIPMENT USED	CALIBRATION DATE:	PERSON PERFORMING TESTS:

	SAFE OPER. LIMIT	TESTING TIME / RESULTS	TESTING TIME / RESULTS
OXYGEN (O2)	19.5 - 23.5%		
LOWER FLAMMABILITY LIMIT	< 10%		
CARBON MONOXIDE	< 25 PPM		
OTHER			

ENTRY PERSONNEL

NAME(S) OF ENTRANTS	PERMIT SPACE TRAINING DATE	NAME(S) OF ATTENDANTS	PERMIT SPACE TRAINING DATE

ALTERNATE ENTRY METHOD

ALL INFORMATION REQUIRED ABOVE THIS SECTION MUST BE COMPLETED BEFORE REVIEWING A PERMIT SPACE FOR THE ALTERNATE ENTRY.

DOES SPACE ONLY HAVE ATMOSPHERIC HAZARDS?	Y	N	IF YES, CONTINUE TO NEXT QUESTION. IF NO, MOVE TO RECLASSIFICATION METHOD
IS CONTINUOUS FORCE AIR VENTILATION ADEQUATE?	Y	N	IF YES, CONTINUE TO NEXT QUESTION. IF NO, MOVE TO PERMIT SPACE METHOD.
IS AIR SUPPLY FOR VENTILATION FROM A CLEAN SOURCE?	Y	N	IF YES, CONTINUE TO NEXT QUESTION. IF NO, MOVE TO PERMIT SPACE METHOD.
CAN TESTING BE CONDUCTED FROM OUTSIDE THE SPACE?	Y	N	IF YES, CONTINUE TO NEXT QUESTION. IF NO, MOVE TO PERMIT SPACE METHOD.
HAS TESTING CONFIRMED HAZARD IS CONTROLLED?	Y	N	IF YES, CONTINUE TO NEXT QUESTION. IF NO, MOVE TO RECLASSIFICATION METHOD
WILL PERIODIC ATMOSPHERIC TESTING OCCUR?	Y	N	IF YES, ENTRY SUPERVISOR SIGNS AND WORK BEGINS, IF NO MOVE TO PERMIT SPACE METHOD

BY SIGNING BELOW, I UNDERSTAND THE REQUIREMENTS FOR AN ALTERNATE ENTRY AND HAVE VERIFIED THEY HAVE BEEN ACHIEVED. I ALSO UNDERSTAND THAT NO ATTENDANT OR OTHER CONTROLS ARE REQUIRED FOR THIS SPACE AND ALL INFORMATION ON THIS ENTRY PERMIT HAS BEEN REVIEWED WITH THE ENTRANT(S).

SIGNATURE OF ENTRY SUPERVISOR: _____

IF ALTERNATE ENTRY PROCEDURE USED, STOP FILLING OUT ENTRY PERMIT HERE

RECLASSIFICATION METHOD

ALL INFORMATION REQUIRED ABOVE THIS SECTION MUST BE COMPLETED BEFORE REVIEWING A PERMIT SPACE FOR RE-CLASSIFICATION

CAN HAZARDS BE ELIMINATED FROM OUTSIDE THE SPACE?	Y	N	IF YES, CONTINUE TO NEXT QUESTION. IF NO, MOVE TO PERMIT SPACE METHOD
HAVE ALL HAZARDS BEEN ELIMINATED?	Y	N	IF YES, CONTINUE TO NEXT QUESTION. IF NO, MOVE TO PERMIT SPACE METHOD
FORCED AIR VENTILATION IS NOT NEEDED?	Y	N	IF YES, ENTRY SUPERVISOR SIGNS BELOW AND WORK BEGINS. IF NO, MOVE TO PERMIT SPACE METHOD

BY SIGNING BELOW, I UNDERSTAND THE REQUIREMENTS FOR A RECLASSIFICATION OF A PERMIT SPACE AND HAVE VERIFIED THEY HAVE BEEN ACHIEVED. I ALSO UNDERSTAND THAT NO ATTENDANT OR OTHER CONTROLS ARE REQUIRED FOR THIS SPACE AND ALL INFORMATION LISTED ON THIS ENTRY PERMIT HAS BEEN REVIEWED WITH THE ENTRANT(S).

SIGNATURE OF ENTRY SUPERVISOR: _____

IF RECLASSIFICATION PROCEDURE USED, STOP FILLING OUT ENTRY PERMIT HERE

Confined / Permit Space Procedure

PERMIT SPACE ENTRY METHOD					
ALL INFORMATION REQUIRED ABOVE THIS SECTION MUST BE COMPLETED PRIOR TO COMPLETING PERMIT SPACE PROCEDURES					
SPACE HAZARDS COULD RESULT IN A?	Y	N		Y	N
FALL			DISABLING INJURY THAT COULD PREVENT SELF RESCUE		
AMPUTATION			PERMANENTLY DISABLING INJURY		
SUFFOCATION/ASPHYXIATION			DEATH		
ELECTROCUTION					
IF YOU ANSWER YES TO ANY OF THESE THEN 4 MINUTE RESCUE RESPONSE IS REQUIRED					
RESCUE PREPARATIONS	Y	N		Y	N
OUTSIDE RESPONSE PROVIDER			RESCUE ON STAND-BY		
RESCUE TEAM ON SITE					
RESCUE EQUIPMENT	Y	N		Y	N
LIFELINE			FIRE EXTINGUISHER		
FULL BODY HARNESS			ESCAPE RESPIRATOR		
ANKLETS			CARTRIDGE RESPIRATOR		
WRISTLETS			AIR SUPPLIED RESPIRATOR		
WINCH			SCBA		
TRIPOD			OTHER		
RADIOS / CELL PHONE			OTHER		

COMMUNICATION MEANS BETWEEN ENTRANT/ATTENDANT: _____

EMERGENCY CONTACT NUMBER: _____

IN THE EVENT OF AN EMERGENCY, ATTENDANT MUST:

_____

_____

PRE-ENTRY MEETING CONDUCTED? YES NO

WE HAVE REVIEWED THE WORK AUTHORIZED BY THIS PERMIT AND THE INFORMATION CONTAINED HERE-IN. ALL WRITTEN INSTRUCTIONS, SAFETY PROCEDURES AND EQUIPMENTS HAVE BEEN RECEIVED AND ARE UNDERSTOOD.

	SIGNATURE	DATE
ENTRY SUPERVISOR		
PERMIT ISSUER		
ENTRANT		
ENTRANT		
ATTENDANT		

THIS COMPLETED PERMIT MUST BE POSTED AT THE CONFINED SPACE AND AVAILABLE FOR REVIEW.

POST ENTRY VERIFICATION

THE ENTRY SUPERVISOR MUST REVIEW THE WORK SITE POST EVENT TO ENSURE EQUIPMENT IS BACK IN SAFE CONDITION AND ALL EQUIPMENT / TOOLS HAVE BEEN ACCOUNTED FOR.

TIME ENTRY COMPLETED, AM/PM _____

DATE _____

SIGNATURE ENTRY SUPERVISOR

THIS COMPLETED PERMIT MUST BE KEPT ON FILE FOR 1 YEAR AND MUST BE READILY AVAILABLE FOR INSPECTION/REVIEW	
PERMIT AUDITOR:	**ISSUES FOUND:**

Appendix G - Customer Confined Space Program Checklist

These questions must be asked and answered before any Field Sales/Service employee performs a permit space entry at a customer site to verify that Charter or equivalent procedures will be used. This section of the checklist can and should be done as far in advance as possible so any issues identified can be corrected. Any question that is answered "no" must be reviewed with an EHS professional before any entry can proceed.

Customer Site Name:_____ Reason for Entry:_____

Questions	Guidance	**YES =** Continue with work **NO =** Work cannot proceed until corrective actions taken
Have you reviewed and do you understand Charter's Confined Space Entry Procedure?	Each employee must review their operation specific Confined Space Procedure.	YES NO
If you are required to follow the customers confined space program, have you reviewed it and does it meet the requirements?	This review must ensure the customers program covers all the components of the program. Answer NO to this question if you do not feel knowledgeable enough to do this review.	YES NO
Have you completed the appropriate training for you to enter the permit space?		YES NO
Do you have an attendant who will be watching you and be in constant communication with you during the entry?	You must have an attendant for a permit space entry. The attendant must be knowledgeable of how to notify the rescue team in the event of an emergency.	YES NO
Has the attendant been appropriately trained?	If using Non-Charter employee you must obtain documentation that employee has received confined space training.	YES NO
Is there an entry permit in place that requires the same type of information that the Charter permit does?	The permit must clearly state: o The hazards of the space o How they have been controlled o The atmospheric testing equipment and results o The Emergency Response Procedures for the entry o The required PPE/equipment for entry o The required confined space supervisor signature If the customer is issuing the permit, you must review it and sign off or acknowledge that you agree the space is safe to enter.	YES NO
Are emergency response capabilities clearly communicated, do you understand them, and are they appropriate?	Permit Space rescue typically falls into one of the following categories: o Self-Rescue – Meaning the entrant/attendant notice a concern and the entrant can take him/herself out of the space. Cannot alone be considered adequate rescue. o Non-Entry Rescue – Meaning the attendant uses a mechanical device to lift/pull the entrant out of a space without entering the space. Cannot alone be considered adequate rescue. o Entry Rescue – Means the customer/site either has an on-site or off-site local or contracted rescue team who is capable of entering the space to conduct a rescue. You must confirm with customer that the entry rescue team is able to arrive within 4 minutes of notification. You must discuss with the customer the Entry Rescue plans they have in place and determine if it is adequate.	YES NO
Do you know what Personal Protective Equipment will be needed for entry and do you have it available?	Based off the type of space and the hazards associated with the space, you must evaluate what PPE will be necessary and ensure it is available.	YES NO

Only after all questions above are answered **YES** can authorization be given to proceed.

Name of Employee Completing Form Signature Date

Name of Employee Granting Authorization Signature Date

Appendix H – Outside Emergency Response Team Evaluation Form

This form must be used as a tool to assist in evaluating outsider service providers who will be assigned responsibility for serving as the operations permit space rescue team.

Name of Rescue Provider: _____ Service Provider Contact: _____

Criterion	Yes	No	Required Action
Does the rescue service have trained personnel in sufficient numbers?			
Are the trained personnel available at the time that entry will take place?			
Does the service have the capability to reach the permit space within 4 minutes after notification?			
Is the service equipped to perform the needed rescue services? • Response vehicle(s) • Breathing Equipment • Rescue Litters • Block and tackle • Personal Protective Equipment • First Aid Supplies			
Has the rescue services been made aware of the hazards of the locations permit spaces?			
Have rescue service personnel conducted a visit in order to assure that they are familiar with the location and the permit spaces? (Note: if local government rescue resources have confirmed ability to respond within 4 minutes and decline to visit the space, this should be documented on the entry permit and the entry may proceed)			
Has the service been given an opportunity to examine the space(s) where they may be performing a rescue in order to develop rescue plans and practice rescues?			
Has an annual drill been conducted and is it included as part of the service contract?			

If all questions above have been answered **YES**, then the location can use that company as its permit space rescue provider.

Name of Person Evaluating Provider: _____

Date Evaluation Occurred: _____

Appendix I - Contractor Program Checklist

Before contractors are allowed to perform entries into permit spaces, a review of their written program and training must be done. This checklist must be used to ensure all parts of the program are reviewed. Completed copies of this checklist must be retained for auditing purposes.

Contractor Name: _____

WRITTEN PROGRAM
Does the Contractors written program cover the following topics?

Roles and Responsibilities	YES	NO
Entry Procedures	YES	NO
Hazard Identification Process	YES	NO
Hazard Control Steps	YES	NO
Atmospheric Testing	YES	NO
Rescue Procedures	YES	NO
Employee Training	YES	NO

All areas must have a YES answer before moving ahead. Any NO's must have documented actions taken to ensure the program is acceptable.

TRAINING
Have you reviewed the Contractors training records and do they verify the following training has been completed:

Entry Supervisor/Permit Issuer Training	YES	NO
Entrant Training	YES	NO
Attendant Training	YES	NO
Atmospheric Testing Training	YES	NO
CPR/First Aid Training	YES	NO
Rescue Training	YES	NO

All areas must have a YES answer before moving ahead. Any NO's must have documented actions taken to ensure training is acceptable.

AUTHORIZATION

I have reviewed the contractors program and training records and they meet regulatory requirements.

_____ _____ _____
Name of Approver Signature Date

APPENDIX D

Hotwork SOP

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Hot Work Procedure

1. PURPOSE

1.1. This procedure establishes guidelines, precautions, and work procedures for the Charter Contracting Company (Charter) hot work activities that may present fire hazards from open flame, sparks, or embers, including electrical and gas welding, cutting and grinding operations. This procedure outlines the requirements for permitting and inspection, to establish the proper precautions for the prevention of fires during hot work activities.

1.2. HS Procedures are not intended to supersede or replace any applicable regulatory requirements. In the event of conflict between Charter HS Procedures and Governmental standards (i.e. country-specific, Federal, State, County, and City regulations, codes, statutes, rules, and orders), those of the governing authority prevail. Where governmental standards are less than those required in the procedure, the operation shall implement the more stringent requirement. Additional or more stringent customer requirements shall be evaluated by HS to ensure compliance with all applicable regulatory, customer & Charter requirements.

1.3. Each operation must review and make necessary adjustments to procedures to ensure compliance with regulatory expectations. Appendix A shall be used by the site to input further expectations and Appendix B will be used by the operation.

1.4. Items that need removed from HS Procedures must not be deleted but identified by using the strikethrough feature of Word.

2. SCOPE

2.1. This document applies to operations as defined by the business.

3. DEFINITIONS

Term	Definition
Business	All Charter Work locations
Hot Work	Hot work is any temporary or permanent operation involving open flames or producing heat and/or sparks, including but is not limited to: brazing, cutting, grinding, soldering, torch applied roofing and welding.

Hot Work Procedure

4. PROCEDURE

4.1. Designated Areas

4.1.1. Operations may elect to designate specific areas to be a safe for non-permitted hot work. Designated areas must be approved by the responsible leader and HS professional and detailed on Appendix B.

4.1.2. Designated areas must:

4.1.2.1. Not contain combustible and flammable material within 35 feet of the area,

4.1.2.2. Be free of combustible atmospheres,

4.1.2.3. Be provided with weld curtains or barriers,

4.1.2.4. Have an adequate number and type of fire extinguishing systems available (e.g. fire extinguishers, sprinklers, etc.),and

4.1.2.5. Be clearly marked and identified (e.g., signage, floor markings, etc.)

4.1.3. Operations shall perform hot work activities in a designated area, when practical.

4.1.4. A hot work permit is not required for activities being performed in a designated area except when such hot work is being performed on equipment which may contain or may have contained a flammable gas or liquid.

4.2. Permit Process

4.2.1. When Hot Work shall be performed outside of a designated area, the employee (either Charter or Contractor) must notify a Qualified Hot Work Supervisor, detailed in Appendix B, that a Hot Work Permit is needed.

4.2.2. The employee and Qualified Hot Work Supervisor are responsible for completing the Hot Work Permit or equivalent document. An example of the Hot Work Permit is provided in Appendix B.

4.2.3. The employee and the Qualified Hot Work Supervisor shall inspect the Hot Work Zone to evaluate whether the activity can be safely conducted.

4.2.4. Inspection shall cover all items listed on the permit and include any special procedures where applicable.

4.2.5. All welding or allied process equipment must be erected, installed, assembled, started, operated, used, handled, stored, stopped, inspected,

serviced, tested, cleaned, adjusted, carried, maintained, repaired, and dismantled in accordance with the manufacturer's specifications.

4.2.6. The Qualified Hot Work Supervisor shall perform a combustible gas test before issuing a permit where flammable gases may be present.

4.2.6.1. Work in the area shall be prohibited when the lower explosive limit (LEL) is greater than 10% and/or oxygen content is greater than 21%.

4.2.7. Prior to beginning any hot work activities, all hazards shall be corrected, and special precautions implemented as specified on the permit.

4.2.8. The Qualified Hot Work Supervisor shall verify that all fire suppression systems present in the area are fully operational. If fire suppression systems cannot be operational, additional protective measures shall be put in place.

4.2.9. If a hot works process is performed above an area where a worker may be present, the personnel performing the work must ensure that adequate means are taken to protect a worker below the operation from sparks, debris, and other falling hazards.

4.2.10. Personnel performing the work are responsible for checking the permit to see if it is current, valid, and properly signed. Work shall not begin if any signatures are missing, work/site conditions have changed, or the permit is incomplete or has expired.

4.2.11. The permit shall remain accessible or posted within the job area until all work is completed.

4.2.12. Permitted activities must include a fire watch. They are required to monitor the activity being performed, throughout all break and lunch periods, and for at least 1 hour following the completion of the permit.

4.2.13. The Fire Watch shall have an appropriately rated fire extinguisher that is immediately accessible.

4.2.14. If the Fire Watch observes a potential fire hazard or conditions change, he/she shall notify the personnel conducting the Hot Work activity to stop working and address the situation. The Fire Watch shall notify the Qualified Hot Work Supervisor of the potential hazard and confirm necessary controls were implemented prior to restarting the activity.

4.2.15. The Fire Watch shall respond to a fire within the limits of his/her emergency response training and the capacity of the equipment available (i.e. for incipient stage fires only).

4.2.16. The fire watch shall report all fires and use of the fire extinguisher to the Qualified Hot Work Supervisor as soon as possible.

4.2.17. Following completion of the hot work the area shall remain under surveillance (e.g. guard tours, supervisor in area, etc.) for 3 hours. During the surveillance periodic regular visual checks of the area will be made to ensure that there are no signs of potential fire.

4.2.18. Permits are valid for one shift and one job only. If the permitted activity carries over onto another shift or individual, another permit shall be issued with the same degree of inspection and control as the preceding shift.

4.2.19. Operations must have a process, detailed in Appendix B, to conduct periodic audits of active permitted hot work activities to verify proper execution of the requirements.

4.2.20. Contractors performing hot work shall be advised on the location of flammable materials or hazardous conditions of which they might not be aware, the hot work permitting process, and the fire watch requirements, as part of their pre-job briefing at the.

4.2.21. Charter employees who perform hot work activities at customer sites shall take the necessary steps to understand the customers' requirements. If customers hot work permit procedure is as stringent as the Charter procedure it may be used as a substitute.

Hot Work Procedure

5. RECORDS

5.1. Records shall be maintained in accordance with Corporate Record Retention Policy.

6. RESPONSIBILITIES

Role	Description
Business Leadership/HS shall:	• Update this procedure as necessary • Provide technical support, as required
Sub-Contract Leadership/HS shall:	• Ensure implementation of the procedure • Provide technical support to operations, as required • Review this procedure and Appendix A on a periodic basis and/or as part of the investigation of any hot work incident.
Operations shall:	• Implement the requirements of this procedure • Ensure that all personnel are trained in this procedure and adhere to all of its requirements • Ensure all personnel assigned to perform Hot Work are qualified • Review this procedure and Appendix B on a periodic basis and/or as part of the investigation of any hot work incident.
Employees shall:	• Notify the Qualified Hot Work Supervisor prior to performing hot work activities • Obtain and comply with the Hot Work Permit • Comply with the requirements of this procedure • Communicate concerns to supervisor or HS professional

7. TRAINING

7.1. Personnel responsible for designated aspects (i.e. Qualified Hot Work Supervisor, Welder, & Fire Watch) of this procedure shall be trained to safely perform their duties. Periodic refresher training will be completed as needed.

7.2. HCSS Training Tracker shall be used to identify, schedule and track required training.

8. APPENDICES

8.1. Appendix A –Operation Specific Information

8.2. Appendix B – Hot Work Permit Example

Hot Work Procedure

Appendix A – Operation Specific Information

Name of Qualified Hot Work

Supervisors: Designated Hot

Work Areas:

Area Name:	Description:

HOT WORK PERMIT

Appendix C- FM Hot Work Permit Example

Hot Work Permit Job Information				
Project Name:			Location of Hot Work:	
Permit Authorizing Individual:			Phone:	
Date Permit Issued:			Time Permit Issued:	
Date Permit Expires:			Time Permit Expires:	
Type of hot work to be done (source of ignition):	□ Grinding	□ Cutting	□ Brazing or Soldering	
	□ Welding/Burning	□ Heating	□ Other:	
PPE to be used by person performing hot work:				
Describe the hot work job and materials to be worked on:				
Any special hazards and/or special precautions to be taken:				
Fire Dept. Notification Required? □ Yes □ No		**Name Fire**		

Acknowledgement of Permit Review by Person Performing Work or Crew Supervisor			
Acknowledgement: I participated in the work site preparation, coordinated with the PAI, reviewed this Hot Work Permit and I fully understand the work to be performed and my responsibilities. The person(s) performing the hot work understand(s) that this permit is valid only so long as work conditions existing at the time of issuance do not change. They will stop the work and notify the PAI of any change in work area conditions that adversely affect safety. I or the person(s) performing the work are adequately trained in the safe handling and use of their equipment and applicable regulatory requirements.			
Worker/Supervisor:		**Signature:**	
Company:		**Date:**	

Permit Authorizing Individual (PAI) Authorization			
I completed the site inspection, notified the person performing the work or their crew supervisor about flammable materials or hazardous conditions, which may not be obvious, and verified that the person performing (or directly supervising the crew performing) hot work has reviewed the permit and signed the acknowledgement above. (If no, hot work is not permitted).			
Signature:		**Date:**	
Notice: Post this permit in Hot Work Permit area until permitted operations are complete. Upon completion, return permit to the PAI.			

Acknowledgement			
I understand the nature and location of the hot work to be performed on and, as applicable to the work performed under this hot work permit. Sprinkler/fire suppression systems in the area are operational (if applicable). Personnel in the area affected by the work have been notified. Duct/conveyor systems are properly protected or shut down (if applicable). All appropriate process equipment/piping has been purged, disconnected, and blanked in accordance with Lockout/Tagout procedures.			
Signature:		**Date:**	

Final Inspection (Fire Watch, or PAI if no Fire Watch was required)			
I completed final inspection at the required times after completion of Hot Work and observed no signs of smoldering or			
Signature:		**Date:**	

HOT WORK PERMIT

REQUIRED PRECAUTIONS CHECKLIST

Inspect work area and confirm that applicable precautions have been taken in accordance with NFPA 51B (by PAI after coordination with and setup by person performing hot work; initially and when revalidating):

- □ All sprinkler and/or other fire suppression systems in the Hot Work Permit area operational.
- □ Hot work equipment is in good working condition in accordance with manufacturer's specifications.
- □ Special permission obtained to conduct hot work on metal vessels or piping lined with rubber or plastic.
- □ Persons conducting hot work/fire watch have certificate of fitness from fire department, * when required * (i.e. NYC).
- □ All facility employees or other parties that may be potentially affected by the hot work have been notified.

Requirements Within 35 Feet of Work (Horizontal and Vertical)

- □ Flammable liquids and combustible dust/lint/oil deposits/trash removed or shielded with fire-retardant material.
- □ Flammable vapor sources removed or flammable vapor properly tested and found to be well below the LEL. List readings:
- □ Floors swept clean and trash removed. Combustible flooring properly wetted, wet sanded or shielded.
- □ Personnel protected from electric shock when floors are wet.
- □ Combustible walls, ceilings, partitions or roofing properly shielded. All wall and floor openings and cracks covered.
- □ Covers under work to keep sparks from lower levels and shielding/partitions to protect passer-by.
- □ Other combustible storage material removed or covered with listed or approved materials (welding pads, blankets, or curtains; fire resistant tarpaulins, metal shields, or noncombustible materials.

Work on Walls, Ceilings, or Roofs

- □ Combustibles have been moved away from opposite side. (If no, hot work is not permitted).
- □ No combustible coverings, insulation, or other combustible content.
- □ Danger from conduction of heat to adjacent rooms eliminated.

Work on Enclosed Equipment (Tanks, Containers, Ducts, Dust Collectors, Etc.)

- □ All ducts and conveyor systems that may carry sparks to distant combustible material covered, protected or shut down.
- □ Equipment is cleaned/purged of all combustibles, flammable vapors, liquids, or dusts. (If a flammable vapor source, conduct vapor monitoring). Pressurized vessels, piping, and equipment removed from service, isolated, and vented.

Firewatch

- □ Required for the following: (1) Torch work (2) Combustibles within 35' (3) Combustibles >35', but easily ignited, (4) Wall/floor openings, exposed adjoining areas (above/below/adjacent), concealed combustibles, (5) Conduction through metal can ignite other side (6) Potential for more than a minor fire.
- □ Charged, inspected, operational fire extinguishers of an appropriate type are present.
- □ Fire Watch trained in extinguisher and emergency alarms (fire alarm, telephone, or radio).
- □ Fire Watch is provided during and for a minimum of 60 min. after hot work, including any break activity.

Other Precautions

- □ Work in a confined space requires Confined Space Entry Permit prior to hot work permit approval.
- □ Is continuous atmospheric monitoring, smoke detection or heat detection warranted?
- □ Ample ventilation exists or provisions made for continuous ventilation to remove smoke/vapor from work area.
- □ Process equipment/piping purged, disconnected and blanked in accordance with Lockout/Tagout procedures.
- □ Do conditions require Re-Validation more than every 24 hr.? (choose one) □ 12 hr. □ 8 hr. Other:

APPENDIX E

Fall Prevention Plan

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1. PURPOSE

1.1. The purpose of this procedure is to outline the Charter Contracting Company, LLC's (Charter) Health and Safety (HS) strategy for protecting employees from fall hazards.

1.2. HS Procedures are not intended to supersede or replace any applicable regulatory requirements. In the event of conflict between Charter HS Procedures and Governmental standards (i.e. country-specific, Federal, State, County, and City regulations, codes, statutes, rules, and orders), those of the governing authority prevail. Where governmental standards are less than those required in the procedure, the operation shall implement the more stringent requirement. Additional or more stringent customer requirements shall be evaluated by HS to ensure compliance with all applicable regulatory, customer & Charter requirements.

1.3. Each Site and/or operation must review and make necessary adjustments to procedures to ensure compliance with regulatory expectations. Appendix A shall be used by the Site to input further expectations and Appendix B will be used by the operation.

1.4. Items that need to be removed from HS Procedures must not be deleted but identified by using the strikethrough feature of Word.

2. SCOPE

2.1. This document applies to operations as defined by the business.

2.2. Newly acquired Site's shall comply with this procedure in accordance with a schedule approved by the applicable HS Team and shall follow the timetable outlined by their specific business.

2.3. This procedure shall apply when fall hazards are present for work conducted at unprotected heights of or exceeding four (4) feet (1.2 meters) above the lower level for general industry operations, six (6) feet (1.8 meters) for construction projects/activities, or when work is conducted at unprotected heights where dangerous equipment or processes are located below.

3. DEFINITIONS

Term	Definition
Business	Defined as Charter's work sites/locations

Competent Person	Someone who possesses the skills, knowledge, experience, and judgment to identify existing and predictable hazards in the surroundings or working conditions which are hazardous, or dangerous to employees, and who has the authority to take prompt corrective measures to eliminate them. Must have extensive and demonstrated knowledge of fall protection systems (both active and passive), anchorage points, and safety practices associated with all hazards related to working with fall protection.
Free fall distance	The distance a user falls before a fall protection system begins the arresting (stopping) process.
Site	Fixed or dispersed locations where Charter work is performed
Site	Defined as a component of the Business. (Ex. Thermal or Renewables for PW, Drilling & Surface or Subsea Systems for O&G, Digital Energy or Industrial Solutions for EM.
Unprotected heights	Where there is a potential for a fall to occur and no standard guardrails or similar protection exists.

4. PROCEDURE

4.1. Fall protection hazards will be controlled through 1) comprehensive fall hazards assessments, 2) proper selection, use, and maintenance of fall protection controls, and 3) employee training.

4.2. **Fall Hazard Assessments**

4.2.1. The Site must identify a Competent Person(s), listed on Appendix B, to develop the assessments.

4.2.2. The Competent Person(s) shall assess all work (production, maintenance, etc.) conducted:

4.2.2.1. At unprotected heights of or exceeding four (4) feet (1.2 meters) above the lower level for general industry operations,

4.2.2.2. At unprotected heights of or exceeding six (6) feet (1.8 meters) above the lower level for construction projects/activities, or

4.2.2.3. When work is conducted at unprotected heights where dangerous equipment or processes are located below.

4.2.3. The Competent Person(s) must document fall hazards, controls, and rescue plans by completing a Fall Hazard Assessment, Appendix C or equivalent, for all identified work.

4.2.4. Fall Hazard Assessments must be communicated to affected personnel.

4.3. **Fall Protection Controls**

4.3.1. Controls listed in Fall Hazard Assessments shall be implemented following the hierarchy of controls, whenever feasible.

4.3.2. Hierarchy of controls include:

4.3.2.1. Eliminating the fall hazard by installing engineering systems (i.e. railing systems, relocating equipment to differently locations, etc.),

4.3.2.2. Using scissor and boom lifts,

4.3.2.3. Using fall protection equipment systems (i.e. harness and lanyard systems, life line systems, etc.), and then

4.3.2.4. Using other control methods (i.e. Control Access Zone with safety monitor, ladders, etc.).

4.3.3. <u>Fall Protection – Engineered Systems</u>

4.3.3.1. Railing systems must consist of:

4.3.3.1.1. Top rail – Height of the rail from the floor shall be compliant with local regulation. If no regulation is available, height shall be 42 inches (107 cm).

4.3.3.1.2. Mid rail – Height of the mid-rail shall be compliant with local regulation. If not regulation is available, height shall be 21 inches (53 cm) or midway between the top rail and the floor.

4.3.3.1.3. Toe board – Dimension and installation height shall be compliant with local regulation. If no regulation is available, the board must at least be 4 inches (10 cm) in height and positioned approximately ¼ inch (.6 cm) above the floor. Required for location where objects might fall from one level to another and where people might be exposed

4.3.3.2. Railing system must be installed where required by regulation and, where feasible, on any working surface with an unprotected fall height of 4 feet (1.2 M) or more. For working surfaces where railings are not feasible, other fall protection controls must be implemented.

4.3.3.3. Materials of construction and installation instructions for railings and other engineering systems must be compliant with local regulations.

4.3.3.4. If an operation develops the engineering control internally vs. purchasing from an equipment manufacturer, a qualified engineer must design, oversee the construction, and approve the installation of the control. This process must be documented.

4.3.3.5. Scaffolding system requirements include:

4.3.3.5.1. Erect scaffolds according to applicable standards and designs.

4.3.3.5.2. A competent person shall supervise each scaffold that is erected, altered, relocated, or dismantled. Only experienced and trained workers must perform the work. The competent person also determines the feasibility and safety of providing fall protection for workers who erect or dismantle scaffolding.

4.3.3.5.3. Do not mix scaffold components from different manufacturers unless the components fit together (unmodified) without force and the structural integrity is maintained.

4.3.3.5.4. Erect scaffolds on sound, rigid footing capable of carrying the maximum intended load.

4.3.3.5.5. Do not load scaffolds and scaffold components in excess of their maximum intended load or rated capacity, whichever is less.

4.3.3.5.6. Install standard railings and toe boards on all open sides and ends of platforms more than 10 feet (3 m) in height, except on needle beam scaffolds and floats.

4.3.3.5.6.1. Install standard railings and toe boards on all open sides and ends of platforms on scaffolds 4 – 10 feet (1.2 – 3 m) high, having a minimum dimension in either direction of less than 45 inches (1.14 m).

4.3.3.5.7. Erect scaffolds level and plumb on a firm base.

4.3.3.5.8. Scaffolds and their components, except for wire or fiber rope suspension, shall be capable of supporting 4 times the maximum intended load. Wire or fiber rope used to suspend scaffolds shall be capable of supporting at least 6 times the maximum intended load.

4.3.3.5.9. For planks, use 2-inch (5.1 cm) scaffold grade lumber, laminated wood or manufactured aluminum decking. Lap the planking by a minimum of 12 inches (0.3 m). Secure the planking properly to prevent displacement and sideways movement.

4.3.3.5.9.1. Scaffold planks may extend over end supports by 6 to 12 inches (0.15 to 0.3 m).

4.3.3.5.10. Scaffold platforms and walkways shall measure at least 18 inches (0.46 m) wide.

4.3.3.5.11. Provide overhead protection for employees working on scaffolds who are exposed to falling objects.
Where persons work or pass under a scaffold, install a screen between the toe board and top rail, extended along the entire opening.

4.3.3.5.12. Restrain scaffolding with a height-to-base width (including outrigger supports, if used) ratio of more than 4:1. Place restraints vertically at the horizontal members every 20 feet (6 m) or less. Place restraints at horizontal intervals of no more than 30 feet (9 m).

4.3.3.5.13. Counterweights, if used, shall be made of non-flowable material. Do not use sand, gravel, or similar materials.

4.3.3.5.14. Immediately repair or replace scaffolding or defective parts in scaffolding and accessories.

4.3.3.5.15. Do not erect, use, dismantle, alter, or move scaffolds such that they or any conductive material handled on them might come closer to exposed and energized power lines according to the chart below at a minimum, or in compliance with local standards. Allow the following clearance between scaffolds and power lines:

VOLTAGE	MINIMUM DISTANCE FROM INSULATED LINES
Less than 300 volts	3 feet
300 volts to 50 k volts	10 feet
More than 50 k volts	15 feet plus .4 inches /each 1kv
VOLTAGE	**MINIMUM DISTANCE FROM UNINSULATED LINES**
Less than 50 k volts	10 feet
More than 50 k volts	15 feet plus .4 inches /each 1 kv

4.3.3.5.16. Provide a safe and convenient means of access to the working platform, such as a portable or fixed ladder, ramp, runway or stairway. This does not apply to swinging scaffolds or those with safe and convenient access from adjacent floors. Do not use cross bracing as a means of access.

4.3.3.5.17. Wear personal fall protection connected to an independently secured horizontal or vertical lifeline or building structure when working from a suspended scaffold, boatswains' chair, catenary, float, needle beam scaffold or any scaffold platform not equipped with standard handrails, mid-rails on all open sides, or complete deck.

4.3.3.5.18. Secure swinging loads lifted onto or near scaffolding by a tag line or equivalent measures to control the load.

4.3.3.5.19. Do not change or remove a scaffold unless authorized by the competent person responsible for its erection.

4.3.3.5.20. Do not ride on mobile scaffold. Remove or secure tools or materials on the deck before moving.

4.3.3.5.21. Do not climb on or work from a scaffold handrail or mid-rail. Do not apply rigging to a handrail, mid- rail or scaffold brace.

4.3.3.5.22. Do not alter scaffold members by welding, burning, cutting, drilling, or bending. Do not combine parts and sections of scaffolding made by one manufacturer with those from a different manufacturer.

4.3.3.5.23. Keep scaffold platforms and access ways free of tripping or slipping hazards.

4.3.3.5.24. Do not use scaffolds during storms or high wind.

4.3.3.5.25. Pick up rubbish on scaffolds daily and do not leave tools on scaffolds overnight.

4.3.3.5.26. Do not stockpile or store material on scaffolds.

4.3.3.5.27. Do not use makeshift devices such as, but not limited to, boxes and barrels on scaffold platforms to increase the work level height.

4.3.3.5.28. Employees may use ladders on large area scaffolding to increase work level height if the following conditions are met:

4.3.3.5.28.1. Ladder shall be secured to prevent sideways motion, and

4.3.3.5.28.2. Ladder legs shall be stabilized on the same platform.

4.3.3.5.29. Protect scaffolds from trucks and other vehicles contacting them.

4.3.3.5.30. 4.3.3.5.30. Clear working platforms of ice, snow, and oil before using them.

4.3.3.5.31. Keep scaffolds clean, with no scrap, loose tools, or tangled lines.

4.3.3.5.32. Do not allow open fires upon or near wooden scaffolds or metal scaffolds with flammable components.

4.3.3.5.33. The Site must identify a competent person, listed on Appendix B, to inspect the scaffold after erection, before each shift, and after any event that could affect the structural integrity of the scaffold. The inspection must determine if, as applicable:

4.3.3.5.33.1. Scaffold hardware is not defective, and components are compatible and sufficient,

4.3.3.5.33.2. Standard guardrails and decking are in place,

4.3.3.5.33.3. Wheels on mobile scaffolds are locked.

4.3.3.5.33.4. Ladder in place for proper access,

4.3.3.5.33.5. Locking pins are in place at each joint,

4.3.3.5.33.6. Toe boards are in place,
4.3.3.5.33.7. No damage to hooks on manufactured platforms,
4.3.3.5.33.8. Wooden planks are free of splints, knots and dry rot,
4.3.3.5.33.9. No de-lamination of laminated veneer planks, and

4.3.3.5.33.10. Scaffolds are sturdy, level, and properly placed on support surfaces.

4.3.3.5.34. After the inspection, the competent person must attach a tag indicating the condition of the scaffold. One tagging process indicates: "COMPLETE SCAFFOLD" (Green), "CAUTION, INCOMPLETE SCAFFOLD", "CAUTION" (Yellow), or "DANGER - DO NOT USE" (Yellow).

4.3.4. Fall Protection – Scissor and Boom Lifts

4.3.4.1. Only trained persons may operate.

4.3.4.2. Prior to using a lift, the operator must conduct a documented pre-use inspection of the equipment and the work area, Appendix D or equivalent.

4.3.4.3. The operator must confirm there's a safe area for positioning of the lift as well as identifying the safe zone for the work activity. Potential hazards to review and that must be addressed prior to starting work include:

4.3.4.3.1. Drop-offs, holes, unstable surfaces,
4.3.4.3.2. Slopes, ditches or bumps,
4.3.4.3.3. Debris and floor obstructions,
4.3.4.3.4. Overhead obstructions and power lines,
4.3.4.3.5. Hazardous locations and atmospheres,
4.3.4.3.6. Inadequate surface and support to withstand all load forces imposed by the lift,
4.3.4.3.7. Wind and weather conditions,
4.3.4.3.8. Presence of personnel, or
4.3.4.3.9. Other possible unsafe conditions.

4.3.4.4. Once the safe work zone has been identified, the operator must implement a control (e.g. install barriers, hang warning tape, post signage, use a spotter, etc.) to communicate the zone to others while work is performed.

4.3.4.5. Scissor lifts only - Harness/lanyard/anchorage point shall be required if work requires the use of the scissor lift extension slide or if the operator has to leave the floor of the lift.

4.3.4.6. Boom lifts only – Harness and lanyard must be used at all times while using the lift.

4.3.4.7. Equipment that is owned or controlled by Charter must be included on the Site Preventative Maintenance schedule. Activities to be done and their frequency shall be in accordance with manufacturers' recommendations.

4.3.5. Fall Protection – Equipment Systems

4.3.5.1. Site must provide fall protection equipment (harness, lanyards, lifelines, anchorage points/straps, safety nets, etc.) at no cost to the employee and it shall be appropriate for the task to be performed.

4.3.5.2. Personal Fall Protection systems typically consist of:
- 4.3.5.2.1. A full body harness (use of safety belts is prohibited),
- 4.3.5.2.2. A connecting device (lanyards, self-retracting lifelines, tie-back connections, rope grabs, positioning & restraint assemblies, etc.), and
- 4.3.5.2.3. An anchorage point rated at 5000 lb. per person (typically is either fixed, mobile, or a line system).

4.3.5.3. Personal Fall Protection systems shall be used as instructed by the manufacturer.

4.3.5.4. Full body harnesses must be properly rated and sized to each user.

4.3.5.5. Full body harness must be worn as required by the manufacturer.

4.3.5.6. The competent user of personal fall protection systems must evaluate the equipment recommended from the Fall Hazard Assessment form and evaluate the total fall distance to ensure the controls will engage to minimize injury. Appendix E provides an example.

4.3.5.7. The operation shall make multiple types of connecting devices available. The connecting devices that are used shall be the one that provides the highest level of protection for the employee while safely allowing them to perform their work.

4.3.5.8. Where required to move from one anchorage point to another, operations must use dual lanyards to that the employee is never unprotected and maintains 100% tie off.

4.3.5.9. Connectors (e.g. snap hooks, carabineers, etc.) shall have a two-step operating mechanism to prevent roll- out.

4.3.5.10. All operations must implement a process, defined in Appendix B, to conduct the following inspections for personal fall protection systems:
- 4.3.5.10.1. Pre-Use: All equipment must have a pre-use inspection (does not have to be documented) conducted by the user to ensure the equipment is properly functioning. The inspection must meet expectations defined the manufacturer's recommendations or instructions.

4.3.5.10.2. Periodic: All equipment must have documented periodic inspections. The frequency and items to be included in the inspection shall be in accordance to the manufacturer's recommendations. These inspections must be completed by a competent person (recommend having people trained by equipment manufacturer).

4.3.5.11. Any equipment that fails an inspection or that has been involved in a fall must be removed from service, destroyed or returned to the manufacturer for recertification, and replaced.

4.3.5.12. Sites must have a process, detail in Appendix B, to ensure equipment is clean and maintained in a good working order. Different types of equipment (harnesses with coated hardware or those rated for electrical work, for example) may react differently to cleaning; be sure to read manufacturer information for specific instructions on cleaning.

4.3.5.13. Only a manufacturer-qualified individual shall be allowed to perform repairs on equipment.

4.3.5.14. Site must implement necessary means to store equipment in a clean, dry location, that's protected from UV radiation.

4.3.5.15. Safety Net Systems shall:

4.3.5.15.1. Be used when a fall hazard cannot be eliminated or controlled through use of a personal fall protection system. In these instances, it is permissible to use safety nets as a means of fall protection.

4.3.5.15.2. Safety nets shall be installed as close as practical under the walking or working surface on which employees are working, but in no case more than 30 feet (9.1 meters) below such level.

4.3.5.15.3. Safety nets shall extend outward from the outermost projection of the work surface a minimum of 13 feet (3.9 meters).

4.3.5.15.4. Safety nets shall be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force.

4.3.5.15.5. Defective nets shall not be used. Nets shall be inspected daily for wear, damage, and other deterioration. Nets shall also be inspected after any occurrence that could affect the integrity of the system.

4.3.5.15.6. Materials, scrap pieces, equipment, and tools that have fallen into the safety net shall be removed as soon as possible from the net and at least before the work shift begins.

4.3.5.15.7. The maximum size for each safety net mesh opening shall not exceed 36 square inches nor be longer than 6 inches on any side.

4.3.5.15.8. A drop test of each shall be conducted with a 400-pound sandbag from the highest protected surface at least once every 6 months and whenever the net is relocated. If it is unreasonable to perform drop tests, the employer may certify compliance. The certification record shall include an identification of the net and net installation for which the certification record is being prepared; the date that it was determined that the identified net and net installation were in compliance with the drop test requirement and the signature of the person making the determination and certification. The most recent certification record for each net and net installation shall be available at the jobsite for inspection.

4.3.6. Fall Protection - Other Control Measures

4.3.6.1. Controlled Access Zone (CAZ) and Safety Monitoring System:

4.3.6.1.1. Shall only be used where permitted by local regulation.

4.3.6.1.2. In situations where use of guardrails systems, personal fall arrest systems, or safety net systems is not feasible, a controlled access zone may be established at unprotected or leading edges of a work surface (i.e. roof work).

4.3.6.1.3. A CAZ shall not be used for work activities done on a periodic or on-going basis. If work activities using a CAZ are repeated, a permanent fall protection solution shall be developed.

4.3.6.1.4. Only employees directly involved with the work are allowed to enter this area.

4.3.6.1.5. A safety monitor shall be assigned to the CAZ.

4.3.6.1.6. A written plan, Appendix F or equivalent, shall be established for each CAZ and shall be reviewed by a competent person and the Site HS Representative.

4.3.6.1.7. Safety Monitor shall be performed by an authorized person, via the Restricted Work Authorization process and shall be designated in the written plan.

4.3.6.1.8. The Safety Monitor shall:

- 4.3.6.1.8.1. Be competent to recognize fall hazards.
- 4.3.6.1.8.2. Shall warn the employee when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner.
- 4.3.6.1.8.3. Shall be on the same walking or working surface and within visual sighting distance of the employee being monitored.
- 4.3.6.1.8.4. Shall be close enough to communicate orally with the employee.
- 4.3.6.1.8.5. Shall not have other responsibilities, which could take the monitor's attention from the monitoring function.
- 4.3.6.1.8.6. Not be in a location where mechanical equipment is being used or stored so as to interfere with a safety monitor's ability to observe employees engaged in roofing activities on low- slope roofs.
- 4.3.6.1.8.7. Have authority to direct each employee working in the controlled access zone.

4.3.6.1.9. The CAZ shall be defined by a warning line or by any other means that shall be designated in the written plan.

4.3.6.1.10. The control lines shall be erected not less than 6 feet (1.8 meters) nor more than 25 feet (7.7 meters) from the unprotected or leading edge.

4.3.6.1.11. The control line shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge.

4.3.6.1.12. The control line shall be connected on each side to a guardrail or wall.

4.3.6.1.13. Control lines shall consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions. 4.3.6.1.14. Each line shall be flagged or otherwise clearly marked at not more than 6-foot (1.8 meters) intervals with high-visibility material.

4.3.6.1.15. Each line shall be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches (1 meter) from the walking or working surface and its highest point is not more than 45 inches from the walking or working surface.

4.3.6.1.16. Each line shall have a minimum breaking strength of 200 pounds (0.8kN).

4.3.6.1.17. On floors and roofs where guardrail systems are not in place prior to the beginning work, CAZs shall be enlarged, as necessary, to enclose all points of access, material handling areas, and storage areas.

4.3.6.1.18. On floors and roofs where guardrail systems are in place but need to be removed to allow leading edge work to take place, only that portion of guardrail necessary to accomplish that day's work shall be removed.

4.3.6.2. Ladder Requirements:

4.3.6.2.1. Ladders shall only be used instructed by the manufacturer.

4.3.6.2.2. Ladders shall be of sufficient length so that employees may work while standing below the second rung from the top, or manufacturer's specification. Do not stand on the top two rungs.

4.3.6.2.3. Ladder rungs, cleats and steps must be:

4.3.6.2.3.1. Parallel, level, and uniform,
4.3.6.2.3.2. Spaced 12 inches (0.3 m) apart, maximum, or country equivalent,
4.3.6.2.3.3. ¾ inch (1.9 cm) diameter for metal and 11/8 inch diameter for wood ladders, and 4.3.6.2.3.4. Knurled, dimpled, or coated with skid-resistant material if metal.

4.3.6.2.4. All ladders must be appropriately rated for industrial work environments.

4.3.6.2.5. Use fiberglass or wooden ladders for work near electrical equipment. Aluminum ladders are acceptable for other applications. Verify whether the ladder type is compatible with the hazards and environment.

4.3.6.2.6. Site shall not use ladders to support more than one individual at a time, unless specifically designed to accommodate multiple persons.

4.3.6.2.7. Ladders shall not be loaded beyond the maximum intended load, or the manufacturer's specifications.

4.3.6.2.8. Site may not paint, tie, splice, or fasten ladders together to create longer sections unless specifically designed.

4.3.6.2.9. Must be placed only on stable, firm and level surfaces that can support both the ladder and the load.

4.3.6.2.10. Keep the areas surrounding the top and bottom of the ladder clear of

obstructions. 4.3.6.2.11. Users must always climb with three limbs in contact

with the ladder.

4.3.6.2.12. Users must try to keep their center of gravity between rungs.

4.3.6.2.13. Users must face the ladder while ascending, working from, or

descending. 4.3.6.2.14. Ladders shall receive the following

inspections:

4.3.6.2.14.1. Pre-use – Must be conducted by the user to identify any noticeable issues with the ladder.

4.3.6.2.14.2. Periodic – At a minimum, biannual (twice a year) documented inspections must be done of the operations ladders. Appendix G provides an example form.

4.3.6.2.15. Ladders that fail inspection shall be immediately withdrawn from service, tagged out, and either repaired by manufacturer or destroyed.

4.3.6.2.16. Portable stepladder requirements:

4.3.6.2.16.1. Must be secured to prevent accidental displacement.

4.3.6.2.16.2. User must install an appropriate barricade to keep activities or traffic away.

4.3.6.2.16.3. Must not be placed on unstable bases, such as boxes or barrels, to obtain additional height. 4.3.6.2.16.4. No moving or extending a ladder while occupied.

4.3.6.2.16.5. Must not be placed in front of doorways, unless the doorway is locked, blocked, or guarded.
4.3.6.2.16.6. Must not use stepladders as straight ladders.
4.3.6.2.16.7. Shall not exceed 20 ft. (6 m) without prior review/approval from HS. Site should look at using other fall protection controls (i.e. lifts, scaffolds, etc.) to complete the task.
4.3.6.2.16.8. Do not use in a horizontal position as runways or scaffold.
4.3.6.2.16.9. When using a portable straight ladder to climb onto a roof or platform, the top of the ladder must extend at least 3 feet (1 M) above the roof or platform.
4.3.6.2.16.10. Portable straight ladders shall be equipped with safety feet and positioned to prevent slipping. The ladder must be secured at top(i.e. tied off) and bottom (i.e. tied off or held by a second person) before starting the job.
4.3.6.2.16.11. Position portable at a 4 to 1 pitch such that the horizontal distance from the base to the vertical plane of the support is approximately one-fourth the ladder length (i.e. every 4 feet up, 1 foot out).
4.3.6.2.16.12. Ladders must be returned to their assigned place of storage when work is finished.
4.3.6.2.16.13. Ladders must be stored upright, in a manner that provides ease of access and inspection,
and prevents or minimizes deterioration.

4.3.6.2.17. Rolling stepladder requirements:
4.3.6.2.17.1. Must not use a ladder that has loose rungs, cracked or split side rails, missing rubber foot pads, damaged side rails, or has other visible damage.
4.3.6.2.17.2. Must be equipped with non-skid feet or other mechanism that will prevent a rolling ladder from slipping on a hard, smooth surface.
4.3.6.2.17.3. Only one person on the ladder at a time.
4.3.6.2.17.4. No moving a rolling ladder while someone is on it.
4.3.6.2.17.5. Always apply the rolling ladder breaks prior to gaining access onto the ladder.
4.3.6.2.17.6. Ladders must be returned to their assigned place of storage when work is finished.

4.3.6.2.18. Fixed ladder requirements:
4.3.6.2.18.1. Maintain the perpendicular distances from the centerline of the rungs to the nearest permanent object on the climbing side of the ladder as follows:

4.3.6.2.18.1.1. For a pitch of 76º, 36 inches (0.9 m). 4.3.6.2.18.1.2. For a pitch of 90º, 30 inches (0.76 m).

4.3.6.2.18.2. Maintain a minimum of 4 inches (10.2 cm) from the centerline of the rungs to the nearest permanent object behind the ladder.

4.3.6.2.18.3. Step-across distance from the nearest edge of a ladder to the nearest edge of platform/landing must be between 2½ and 12 inches (6.35 – 30.48 cm).

4.3.6.2.18.4. A rung must be located laterally at the level of the platform or landing served by the ladder.

4.3.6.2.18.5. Side rails must extend at least 3½ feet (1.05 m) above platform/landing.

4.3.6.2.18.6. If it has an unbroken length over 20 feet (6 m), it must be fitted with either a ladder climbing safety device or a cage that meet local regulatory requirements. If not requirement is available, follows:

4.3.6.2.18.6.1. Cages shall extend a minimum of 42 inches (1.07 m) above the top of the platform/landing, unless other protection is provided.

4.3.6.2.18.6.2. Cages shall extend down the ladder to a point not less than 7 ft. (2.1 m) nor more than 8 ft. (2.4 m) above the base of the ladder, with the bottom flared at least 4 inches (10.16 cm).

4.3.6.2.18.6.3. Cages shall extend out between 27 and 28 inches (0.69 – 0.71 m) measured from the centerline of the rungs of the ladder.

4.3.6.2.18.6.4. Cages shall be fitted with vertical bars spaced a maximum of 9½ inches (24.13 cm) center to center along the length of the ladder run.

4.3.6.2.18.7. Ladders exceeding 20 feet (6 m) in height (except on chimneys) must be fitted with a landing platform every 30 feet (9 m) of length and at the end of the ladder. The platform must:

4.3.6.2.18.7.1. Be equipped with railings and toe boards, and

4.3.6.2.18.7.2. Must not be less than 24 inches (0.6 m) wide or 30 inches (0.76 m) in length.

4.4. **Rescue**

4.4.1. Rescue requirements detailed on the Fall Hazard Assessments must consider the following items, as applicable:

4.4.1.1. Procedures for self-rescue or evacuation should a fall occur (in the event the employee is not injured from the fall),

4.4.1.2. Means to rescue suspended workers, assume that worker could be injured and may

require assistance even at lower heights,

4.4.1.3. Means to prevent a prolonged suspension of workers after a fall,

4.4.1.4. Equipment (ladders, aerial lifts, trucks or other equipment) needed to reach hanging workers, and

4.4.1.5. Methods to communicate other internal/external response teams.

4.4.2. Based off the rescue requirements, the operation shall ensure a suitable response team is available (can either be internal or external).

4.4.3. For internal rescue teams, the operation must provide all necessary equipment and training to team members.

4.4.4. If external rescue team is used, the operation must review rescue scenarios with them to ensure they have the necessary equipment and training to respond.

4.4.5. Employees who wear personnel fall protection systems shall be trained in applicable self-rescue procedures as well as the signs and symptoms of suspension trauma and means of minimizing risks.

5. RECORDS

5.1. Associated records shall be maintained in accordance with Charter's Record Retention Policy.

6. RESPONSIBILITIES

Role	Description
Business Leadership / HS shall:	• Maintain this procedure as necessary. • Provide guidance to Site and Site as requested.
Site Leadership / HS shall:	• Support operations in implementing this procedure. • Provide technical support as requested.

Role	Description
Site shall:	• Implement the requirements of this procedure. • Supply required equipment. • Take appropriate actions to when elimination of fall hazards is feasible. • Provide means to inspect fall control equipment. • Train employees as required. • Review and update Appendix B as necessary • Review and take action, as appropriate, to address concerns.
Employees shall:	• Complete training as required. • Conduct pre-use inspections of fall protection systems and equipment as required. • Maintain personal fall protection equipment in good condition • Notify leadership and/or HS of any concerns or issues identified while implementing this procedure.

7. TRAINING

7.1. All employees required to serve as a competent person, use fall protection, operate lifts, use ladders, or support rescue operations must be provided training suitable for their expectations.

7.2. Training must cover any regulatory as well as operation specific requirements. Electronic courses can be used to communicate general expectations on the topics, but alone can't meet all training expectations.

7.3. Competent persons must be trained in the subject (Fall Hazard Assessments, Scaffolds, Safety Nets, etc.) in which they'll be handling.

7.3.1. Fall Protection Competent Person is available to assist in educating persons on Fall Hazard Assessment controls.

7.4. Persons required to operate aerial lifts must be given both classroom and practical training. Classroom must cover specific topics related to the equipment they'll operate and regulatory requirements. Practical training must, at a minimum, cover how to safely inspect, use and respond to emergency situations when operating equipment.

7.4.1. Aerial Lift Safety
7.4.2. Aerial Lift Safety – Refresher
7.4.3. Aerial Lifts Safety Practical

7.5. Persons who use personal fall protection systems must be given both classroom and practical training. Classroom must cover operational and regulatory requirements. Practical training must, at a minimum, cover donning, doffing, inspecting, and using fall protection controls.

7.5.1. Fall Protection Awareness
7.5.2. Fall Protection Awareness – Refresher

7.6. Persons who use ladders must be given classroom and practical training. Classroom must cover operation specific requirements and any regulatory expectations. Practical training must, at a minimum, cover inspecting and using the equipment.

7.6.1. Walking, Working Surfaces, and Ladder Safety
7.6.2. Walking, Working Surfaces, and Ladder Safety - Refresher

7.7. Persons who will be expected to perform rescue activities must be given classroom and practical training. Classroom must cover operation specific requirements and regulatory expectations. Practical training must, at a minimum, cover various response scenarios and how to properly use rescue equipment.

7.8. HCSS Training Tracker shall be used to store training records.

8. APPENDCIES

8.1. Appendix A – Site Specific Information

8.2. Appendix B – Operation Specific Information

8.3. Appendix C – Fall Hazard Assessment Form

8.4. Appendix D – Arial Lift Pre-Use Inspection Form

8.5. Appendix E - Fall Protection System Calculation Form

8.6. Appendix F – Controlled Access Zone Safety Plan Template

8.7. Appendix G – Ladder Inspection Form

Work at Heights Procedure

Appendix A – Site Specific Information

- For a Charter Site, a site specific fall protection and Rescue must be developed, reviewed and personnel conduct training on.

Work at Heights Procedure

Appendix B – Operation Specific Information

Fall Hazard Assessment Competent Person(s):

Scaffolding Competent Person(s):

Personal Fall Protection Equipment Inspection Process:

Personal Fall Protection Equipment Cleaning Process:

Work at Heights Procedure

Appendix C - Fall Hazard Assessment Form

Competent Person:	Date of Evaluation:
Location of Fall Hazard:	
Expected Reasons to access location:	
Estimated Fall Hazard Distance (ft. /M.):	
Control Equipment (Ladder, Harness/Lanyard, Temporary Railing, etc.):	
If required, location of approved anchorage point(s) or system:	
Rescue Procedure:	

Work at Heights Procedure

Appendix D – Arial Lift Pre-Use Inspection Form

Operator Name:				Date:			
Model / Serial #:							
Must be completed prior to using equipment. And items identified as being "Bad" must have appropriate corrective action taken.							
Walk-Around Items	Ok	Bad	NA	Powered Items	Ok	Bad	NA
Tires – condition				Engine – starts/oil pressure			
Hydraulic components – leaks				Battery – charge level			
Data plate – accurate/legible				Gauges / Instruments – meters/warning lights			
Annual Inspection Certification – valid/legible				Boom/Lift arms – raise/lower/extend retract			
Battery tray – opens/closes/latches				Turret rotate			
Turret turntable – gears/lock pins/stops				Drive – forward and reverse			
Counterweight				Steer – left and right			
Cover panels – opens/closes/latches				Platform – tilt/rotate/extend			
Engine – fluids/filters/belts/hoses				Horn			
Batteries – clean/dry/secure/level/caps-cables				Outriggers/stabilizers/pothole protection			
Fuel tank – level				Extendable axles			
Hydraulic oil level				Function-enable (dead man) pedal/switch			
Lights and strobes				Manual / auxiliary controls			
Placards/labels/decals				Safety interlocks			
Boom valley/under platform – leads/debris				Other:			
Accessory plugs and cables				Work Area Inspection	Ok	Bad	NA
Boom/Lift arms – general condition/wear				Drop-off or holes			
Hydraulic cylinders and pin locks				Bumps and floor/ground obstructions			
Articulated joints – wear/cracks				Debris			
Power track – lines/hoses				Overhead obstructions			
Platform – guard rails/toe board/anchorages				Energized power lines			
Weather resistant storage compartment				Hazardous locations			
Appropriate operating manuals				Ground surface and support conditions			
All controls – clearly marked/hold to run				Pedestrian / vehicle traffic			
Other:				Wind and weather conditions			
Other:				Other:			
Safe Zone Controls used:							

Work at Heights Procedure

Describe "Bad" Item:	Corrective Action Taken

Work at Heights Procedure

Appendix E – Fall Protection System Calculation Form

Length of lanyard +	
Lanyard deceleration distance +	
Harness stretch +	1 foot (.3 M)
Distance from back of D-ring to sole of foot +	
Safety factor =	3 feet (1 M)
Total Fall Distance	

Work at Heights Procedure

Appendix F – Controlled Access Zone Safety Plan Template

Requestor:	
Date:	
Job Name:	
Reasons why the use of other fall protection systems are infeasible:	
Control Access Zone Location:	
Control Access Zone Boundary Method:	
Name of Safety Monitor	
Operation Approver (Name/Date):	
HS Approver (Name/Date):	
If conditions change which affect this safety plan, it must be updated/revised to reflect those changes and reapproved.	

Work at Heights Procedure

Appendix G – Ladder Inspection Form

Inspector Name:				Date:			
Serial #:							
Items identified as being "Bad" must have appropriate corrective action taken.							
Rails	Ok	Bad	NA	Ropes	Ok	Bad	NA
Open gouges				Cuts, fraying, wear			
Fractures				Burns, mildew, rot			
Surface cracks				Other:			
Chips				Safety Shoe	Ok	Bad	NA
Scorches & scuffs				Cracks or damage to extrusions			
Weathering, degradation				Worn or dirt filled treads			
Foreign materials – grease, dirt, chemicals				Excessive wear			
Other:				Other:			
Hardware	Ok	Bad	NA	Locks & Pulleys	OK	Bad	NA
Rust – Pins, hooks, locks, etc.				Locks properly engaging			
Looseness				Binding, excessive play			
Broken / damaged				Sharp burrs, edges, nicks			
Deformed, cracked, or gouged				Rotation of keeper			
Missing				Lubrication			
Spreaders-loose or damaged				Other:			
Top cap – loose or damaged							
Other:							
Rungs	Ok	Bad	NA				
Wear & connection							
Bends, deformities, cracks							
Deep gouges or damage							
Other:							

Describe "Bad" Item:	Corrective Action Taken

APPENDIX F

Hearing Conservation Plan

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1910.95
Hearing Conservation Program
Table of Contents

I. Objective
II. Assignment of Responsibility
  A. Management
  B. Employees
III. Procedures
  A. Noise Monitoring
  B. Employee Training
  C. Hearing Protection
  D. Audiograms/Hearing Tests
IV. Attachments
  A. Hearing Conservation Training Log
  B. Record of Hearing Protection Needs

Hearing Conservation Program

I. OBJECTIVE

The objective of the Charter Contracting Company, LLC Hearing Conservation Program is to minimize occupational hearing loss by providing hearing protection, training, and annual hearing tests to all persons working in areas or with equipment that have noise levels equal to or exceeding an eight-hour time-weighted average (TWA) sound limit of 85 dBA (decibels measured on the A scale of a sound level meter). A copy of this program will be maintained by all affected departments. A copy of OSHA's Hearing Conservation Standard, 29 CFR 1910.95, can be obtained from the safety team.

II. ASSIGNMENT OF RESPONSIBILITY

A. Management

1. Use engineering and administrative controls to limit employee exposure.
2. Provide adequate hearing protection for employees.
3. Post signs and warnings in all high noise areas.
4. Conduct noise surveys annually or when new equipment is needed.
5. Conduct annual hearing test for all employees by an Occupational Clinic.
6. Conduct hearing conservation training for all new employees.
7. Conduct annual hearing conservation training for all employees.

B. Employees

1. Use company-issue approved hearing protection in designated high noise areas.
2. Request new hearing protection when needed.
3. Exercise proper care of issued hearing protection.

III. PROCEDURES

A. Noise Monitoring

1. Monitoring for noise exposure levels will be conducted by the SSHO or a member of the safety team. It is the responsibility of the project superintendents to notify SSHO or a member of the safety team when there is a possible need for monitoring. Monitoring will be performed with the use of sound level meters and personal dosimeters at the discretion of SSHO or a member of the safety team.

2. Monitoring will also be conducted whenever there is a change in equipment, process or controls that affect the noise levels. This includes the addition or removal of machinery, alteration in building structure, or substitution of new equipment in place of that previously used. The responsible supervisor must SSHO or a member of the safety team when these types of changes are instituted.

B. Employee Training

1. Affected employees will be required to attend training concerning the proper usage and wearing of hearing protection. The training will be conducted by SSHO or a member of the safety team, or a designated representative, within a month of hire and annually thereafter.

2. Training shall consist of the following components:

a. how noise affects hearing and hearing loss;
b. review of the OSHA hearing protection standard;
c. explanation of audiometric testing;
d. rules and procedures;
e. locations within company property where hearing protection is required; and
f. how to use and care for hearing protectors.

3. Training records will be maintained by SSHO or a member of the safety team (see Attachment A).

C. Hearing Protection

Management, supervisors, and employees shall properly wear the prescribed hearing protection while working or traveling through any area that is designated as a high noise area.

1. Hearing protection will be provided at no cost to employees who perform tasks designated as having a high noise exposure and replaced as necessary. It is the supervisor's responsibility to require employees to wear hearing protection when noise levels reach or exceed 85 dBA. Those employees will have the opportunity to choose from at least two different types of hearing protection.

2. Personal stereo headsets, or iPod, MP3 players or other devices used to listen to music or media," are not approved for hearing protection and are not permitted in any operating area of company property.

3. Signage is required in areas that necessitate hearing protection. It is the responsibility of SSHO or Superintendent to provide signage to the appropriate areas.

4. Preformed earplugs and earmuffs should be washed periodically and stored in a clean area. Foam inserts should be discarded after each use. Hands should be washed before handling preformed earplugs and foam inserts to prevent contaminants from being placed in the ear.

5. SSHO or a member of the safety team will keep a log of the areas or job tasks designated as requiring hearing protection, as well as the personnel affected by this Hearing Conservation Program (see Attachment B).

D. Audiograms/Hearing Tests

1. Employees subject to the Hearing Conservation Program who have time-weighted average (TWA) noise exposures of 85 dBA or greater for an eight (8) hour work shift will be required to have both a baseline and annual audiogram. The audiograms will be provided by Charter with no cost to the employee.

2. The baseline audiogram will be given to an employee within one (1) month before any exposure to high noise levels. Baseline audiograms are conducted during the employees initial physical. Annual audiograms will be performed within one year from the date of the previous audiogram. It is the responsibility of the individual and the safety team to schedule the annual audiogram.

3. If an annual audiogram shows that an employee has suffered a standard threshold shift, the employee will be retested within thirty (30) days of the annual audiogram. If the retest confirms the occurrence of a standard threshold shift, the employee will be notified in writing within twenty-one (21) days of the confirmation. Employees who do experience a standard threshold shift will be refitted with hearing protection and provided more training on the effects of noise.

Attachment A

Hearing Conservation Training Log

Training Date:_____

Topic:_____

Training Conducted by:_____

Employee Name (printed)	Employee Signature	Job Title

Attachment B

Record of Hearing Protection Needs

Charter Contracting Company, LLC **Personnel in Hearing Conservation Program** ***Date***				
Hearing protection is required for and has been issued to the following personnel:				
Employee Name	**Department**	**Job Description/ Equipment Being Used**	**Type of Hearing Protection Issued**	**Date Issued**

APPENDIX G

Fire Prevention Plan

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Plan Title: **01355 Fire Prevention Plan**

Project Title: Contract 11 – Upland Disposal Facility Construction
Housatonic River – Rest of River Remediation Project
Lee, Massachusetts

Prepared For: Arcadis of New York, Inc.
One Lincoln Center
110 West Fayette Street, Suite 300
Syracuse, NY 13202

Prepared By: Charter Contracting Company, LLC
500 Harrison Avenue, Suite 4R
Boston, MA 02118-2439
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Contract No.: To be Determined

Charter No.: 2-1859

Date: 1/15/2026

Revision No.: 00



Claire Bradford, PE, Onsite Project Manager — 1/15/2026 Date
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File: 07 01355 Fire Prevention Plan REV00.docx

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APPENDICES

Appendix A: No appendices included with this plan

1. OBJECTIVE

The purpose of this Fire Prevention Plan is to eliminate the causes of fire, prevent loss of life and property by fire, and to comply with the Occupational Safety and Health Administration's (OSHA) standard on fire prevention, 29 CFR 1910.39, and USACE EM 385-1-1 Section 9 Fire Prevention and Protection. It provides site personnel with information and guidelines to help recognize, report, and control fire hazards. The Fire Prevention Plan aligns with Charter's Health and Safety Plan (HASP) and will be discussed with staff onsite, prior to work commencing.

2. BACKGROUND

Charter Contracting Company, LLC. (Charter) is committed to minimizing the threat of fire to site personnel, visitors, and property. Charter complies with applicable laws, regulations, codes, and good practices pertaining to fire prevention. This Fire Prevention Plan serves to reduce the risk of fires at the project in the following ways:

- Identifies materials that are potential fire hazards and their proper handling and storage procedures.
- Distinguishes potential ignition sources and the proper control procedures of those materials.
- Describes fire protection equipment used to control fire hazards.
- Identifies persons responsible for maintaining the equipment and systems installed to prevent or control ignition of fires.
- Identifies persons responsible for the control and accumulation of flammable or combustible material.
- Describes good housekeeping procedures necessary to ensure the control of accumulated flammable and combustible waste material and residues to avoid a fire emergency.
- Provides training to site personnel about fire hazards to which they may be exposed.

3. ASSIGNMENT OF RESPONSIBILITY

Fire safety is everyone's responsibility. Site personnel are responsible for knowing how to prevent and respond to fires and adhering to company policy regarding fire emergencies.

3.1. Management

Management determines the Charter fire prevention and protection policies. Management provides adequate controls for a safe workplace and equips site personnel with the resources and

training to promote fire prevention and the safest possible response in the event of a fire emergency.

3.2. Plan Administrator

Edward Price, Charter Safety Director, administers the Fire Prevention Plan for Charter and maintains records related to it. The Plan Administrator shall also:

- Develop and administer the Charter fire prevention training program.
- Ensure that fire control equipment and systems are properly maintained.
- Control fuel source hazards.
- Conduct fire risk surveys (see Appendix A) and make recommendations.

3.3. Site Safety & Health Officer

The SSHO for this project is identified as Nick Spain. He is responsible for ensuring site personnel receive appropriate site-specific fire safety training and for notifying the Safety Director when changes in operation increase the risk of fire. Supervisory personnel are also responsible for enforcing Charter's fire prevention and protection policies.

3.4. Site Personnel

Site Personnel are responsible for:

- Completing required training before working without supervision.
- Conducting operations safely to limit the risk of fire.
- Report potential fire hazards to their supervisors.
- Follow fire emergency procedures.

4. PLAN IMPLEMENTATION

4.1. Good Housekeeping

To limit the risk of fires, site personnel shall take the following precautions:

- Minimize the storage of combustible materials.
- Limit driving through tall grass/weeds.
- Dispose of combustible waste in covered, airtight, metal containers.
- Use and store flammable materials in well-ventilated areas away from ignition sources.

- Use only nonflammable cleaning products.
- Keep incompatible (i.e., chemically reactive) substances away from each other.
- Perform “hot work” (i.e., welding or working with an open flame or other ignition sources) in controlled and well-ventilated areas. Perform fire watches as needed.
- Fire extinguishers are accessible in work areas for the duration of the project.
- Keep equipment in good working order (i.e., inspect electrical wiring and appliances regularly and keep motors and machine tools free of dust and grease.
- Ensure that heating units are safeguarded.
- Repair and clean up flammable liquid leaks immediately.
- Keep work areas free of dust, lint, sawdust, scraps, and similar material.
- Do not rely on extension cords if wiring improvements are needed, and take care not to overload circuits with multiple pieces of equipment.
- Ensure that required hot work permits are obtained.
- Turn off electrical equipment when not in use.

4.2. Maintenance

The SSHO ensures that equipment is maintained in accordance with manufacturers' specifications. Charter will also comply with the National Fire Protection Association (NFPA) codes for construction sites. Only properly trained individuals shall perform maintenance work.

The following equipment is subject to the maintenance, inspection, and testing procedures:

- Equipment installed to detect fuel leaks, control heating, and control pressurized systems.
- Portable fire extinguishers
- Demolition equipment
- Excavation equipment
- Construction vehicles

5. TYPES OF HAZARDS

The following sections address the major workplace fire hazards at the project site and the procedures for controlling the hazards.

5.1. Electrical Fire Hazards

Electrical system failures and the misuse of electrical equipment are leading causes of workplace fires. Fires can result from loose ground connections, wiring with frayed insulation, or overloaded fuses, circuits, motors, or outlets.

To prevent electrical fires, site personnel shall:

- Make sure that worn wires are replaced.
- Use only appropriately rated fuses.
- Never use extension cords as substitutes for wiring improvements.
- Use only approved extension cords [i.e., those with the Underwriters Laboratory (UL) or Factory Mutual (FM) label].
- Check wiring in hazardous locations where the risk of fire is especially high.
- Check electrical equipment to ensure that it is either properly grounded or double-insulated.
- Ensure adequate spacing while performing maintenance.

5.2. Portable Heaters

Portable heaters are to be approved by the SSHO before use. Portable heaters are to be equipped with tip-over protection that automatically shuts off the unit when it is tipped beyond its safe operating range. There shall be adequate clearance between the heater and combustible furnishings or other materials when heaters are in use.

5.3. Office Fire Hazards

Fire risks are not limited to Charter's project site. Fires in office spaces have become more likely because of the increased use of electrical equipment, such as computers and fax machines. To prevent office fires, site personnel shall:

- Avoid overloading circuits with office equipment.
- Turn off nonessential electrical equipment at the end of each workday.
- Keep storage areas clear of rubbish.
- Ensure that extension cords are not placed under carpets.
- Ensure that trash and paper set aside for recycling are not allowed to accumulate.
- Cutting, Welding, and Open Flame Work.

The SSHO ensures the following:

- Charter's Hot Work Safety Checklist/Permit has been filled out and reviewed by SSHO before work begins.
- Cutting and welding are done by authorized personnel in designated cutting and welding areas whenever possible.
- Adequate ventilation is provided.
- Torches, regulators, pressure-reducing valves, and manifolds are UL-listed or FM-approved.
- Oxygen-fuel gas systems are equipped with listed and/or approved backflow valves and pressure-relief devices.
- Cutters, welders, and helpers are wearing eye protection and protective clothing, as appropriate.
- Cutting or welding is prohibited in areas where explosive atmospheres of gases, vapors, or dust could develop from residues or accumulations in confined spaces.
- Confined spaces such as tanks are tested to ensure that the atmosphere is not over ten percent of the lower flammable limit before cutting or welding in or on the tank.
- Small tanks, piping, or containers that cannot be entered are cleaned, purged, and tested before cutting or welding on them begins.
- Establish fire watch as needed
- Fire extinguishers are to be readily accessible during hot work

5.4. Flammable and Combustible Materials

The SSHO regularly evaluates the presence of combustible materials at the project site (see Appendix C).

Certain types of substances can ignite at relatively low temperatures or pose a risk of catastrophic explosion if ignited. Such substances obviously require special care and handling.

5.4.1. Class A combustibles.

These include common combustible materials (wood, paper, cloth, rubber, and plastics) that can act as fuel and are found in non-specialized areas such as ground-level storage containers (Connex Boxes).

To handle Class A combustibles safely:

- Dispose of waste daily.
- Keep trash in receptacles with tight-fitting covers (wastebaskets that are emptied every day do not need to be covered).

- Keep work areas clean and free of fuel paths that could allow a fire to spread.
- Keep combustibles away from accidental ignition sources, such as heat- or spark-producing devices.
- Store paper stock in metal cabinets.
- Store rags away from combustibles.
- Do not order excessive amounts of combustibles.
- Make frequent inspections to anticipate fires before they start.

Water, multi-purpose dry chemical (ABC), and halon 1211 are approved fire extinguishing agents for Class A combustibles.

5.4.2. Class B combustibles.

These include flammable and combustible liquids (oils, greases, tars, oil-based paints, and lacquers), flammable gases, and flammable aerosols.

To handle Class B combustibles safely:

- Use only approved pumps, taking suction from the top, to dispense liquids from tanks, drums, barrels, or similar containers (or use approved self-closing valves or faucets).
- Do not dispense Class B flammable liquids into containers unless the nozzle and container are electrically interconnected by contact or by a bonding wire. Either the tank or container must be grounded.
- Store, handle, and use Class B combustibles only in approved locations where vapors are prevented from reaching ignition sources such as heating or electric equipment, open flames, or mechanical or electric sparks.
- Before equipment refueling, the equipment shall be shut down and allowed to cool sufficiently.
- Do not use a flammable liquid as a cleaning agent inside an enclosed space.
- Store flammable liquids in approved flammable storage lockers.
- Do not use, handle, or store Class B combustibles near areas used as exits.
- Do not weld, cut, grind, or use unsafe electrical appliances or equipment near Class B combustibles.
- Do not generate heat, allow an open flame, or smoke within 25 feet of Class B combustibles.

- Know the location of and how to use the nearest portable fire extinguisher rated for Class B fire.

Water should not be used to extinguish Class B fires caused by flammable liquids. Water can cause the burning liquid to spread, worsening the fire. To extinguish a fire caused by flammable liquids, exclude the air around the burning liquid. The following fire-extinguishing agents are approved for Class B combustibles:

- Carbon dioxide
- Multi-purpose dry chemical (ABC)

6. SMOKING

Smoking is prohibited on Charter projects except in designated areas.

7. TRAINING

The SSHO presents basic fire prevention training to site personnel at the project start, when new personnel begin work at the site, and periodically as needed throughout the project. The SSHO maintains documentation of the training, including:

- This Fire Prevention Plan, including how it can be accessed
- Good housekeeping practices
- Proper response and notification in the event of a fire
- Instruction on the use of portable fire extinguishers;
- Location of fire Extinguishers on the project Site
- Recognition of potential fire hazards

Supervisors are responsible for training site personnel on the fire hazards associated with the specific materials and processes to which they are exposed, and for maintaining documentation of the training. The frequency of site personnel training is to be as follows:

- At their initial assignment
- Annually
- When changes in work processes necessitate additional training

8. PROGRAM REVIEW

The Charter Safety Director shall review this Fire Prevention Plan at least annually for necessary changes.

APPENDIX H

Trenching and Excavation Plan

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Excavating & Trenching Procedure

1. PURPOSE

1.1. This procedure outlines Charter Contracting Company' LLC (Charter) HS excavation and trenching guidance.

1.2. HS Procedures are not intended to supersede or replace any applicable regulatory requirements. In the event of conflict between Charter HS Procedures and Governmental standards (i.e., Federal, State, County, and City regulations, codes, statutes, rules, and orders), those of the governing authority prevail. Where governmental standards are less than those required in the procedure, the operation shall implement the more stringent requirement. Additional or more stringent customer requirements shall be evaluated by HS to ensure compliance with all applicable regulatory, customer & Charter requirements.

2. SCOPE

2.1. This document applies to operations as defined by the business.

3. DEFINITIONS

Term	Definition
Business	Defined as Charter Contracting sites and locations
Competent Person	One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
Operations	Fixed or dispersed locations where Charter work is performed

4. PROCEDURE

4.1. Planning

4.1.1. Before beginning work, operations shall review Excavation Operations Procedure if the excavation and trenching work is considered high risk.

4.1.2. If work will involve Subcontractors, operations shall also comply with the requirements of Charter's Subcontractor Safety Procedure.

4.1.3. The Site HS Representative shall review the Contractor checklists with the Responsible Supervisor to determine and discuss potential HS implications. The Responsible Supervisor and the Site HS Representative shall develop a summary of the potential hazards and recommend feasible administrative or engineering controls and training to protect employees and the environment. Employees and the responsible party shall document and track to closure all required actions.

4.1.4. Before beginning excavation, the HS representative shall ensure that a survey is conducted to identify structures next to areas where excavations will take place. A structural engineer can provide information on the stability of a structure and whether it must be supported.

4.1.5. Prior to excavation, efforts must be made to determine whether underground installations (i.e. sewer, telephone, water, electric, etc.) will be encountered. Utility companies shall be contacted and advised of proposed excavation work prior to the start of actual excavation. Work shall not be initiated until clearance/approval is received either directly or indirectly (i.e. no response after the prescribed notifications and waiting period). Review plans for underground works and avoid any marked service locations.

4.1.6. Underground or Buried Service Line: When it is necessary to excavate, drill, or break into ground floor, walls, or other locations where service lines may be embedded, all maps and prints shall be checked for the location of such lines. If lines are suspected in the specific area of excavation, then hand digging or "post holing" shall be done to verify that the excavation area is clear prior to heavy equipment commencing excavation.

4.1.7. The competent person in charge of the work shall determine what is needed to complete a safe excavation job. A soil check shall be a prime factor in determining whether to shore, slope, or step back and how much of this will be required. The soil check shall be made based on the results of at least one visual and at least one manual analysis. A soil check, along with a study of flood level and tidal changes, will also be a factor in determining if a water hazard exists and if a dewatering system is needed.

4.1.8. Sloping and benching support systems shall be in accordance with applicable local regulations.

4.1.9. Operations shall not permit employees to work on slopes or sides above other workers and work in an excavation/trench shall not occur during a rainstorm.

4.1.10. Employees shall avoid working in trenches when installation of shielding or and shoring is taking place.

4.1.11. Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees from hazards posed by water accumulation. The precautions necessary to protect employees adequately will vary by situation but could include special support or shield systems to protect from cave-ins, water removal to control the water level, and use of safety harness and lifeline.

4.1.12. Operations must conduct a pre-job safety meeting with all affected persons to review the excavation plan.

4.1.13. A competent person shall inspect the excavation/trench for deficiencies at least once per shift or as conditions warrant. An example inspection form is provided in Appendix A.

4.1.13.1. If there are any deficiencies noted on the inspection, workers shall not enter the excavation or trench until appropriate corrective action or additional controls have been implemented.

4.1.14. Employees shall report any indication of weakness or unusual conditions promptly to their supervisor or HS professional.

4.2. Safe Work Practices

4.2.1. Employees who work in excavations or trenches shall wear a hard hats and high visibility vest in addition to any other required personal protective equipment.

4.2.2. Support trench sides, especially if: the soil is loose or un-compacted, there are vibrations from neighboring equipment, or spoil from excavations is placed on the side of the trench. Weather conditions can change the condition of the soil by making it heavier or looser, which might lead to collapse.

4.2.2.1. Add support systems where surcharging is likely to happen, for example where buildings, equipment, or site sloping puts extra load on part of the trench wall.

4.2.3. Excavations shall be properly shored, shielded, sloped to the angle of the repose, stepped back, or otherwise supported to eliminate possible exposure to cave in. No one is to enter such excavation until this has been done. The protection shall be sufficient with regard to the specific type of earth being excavated.

4.2.4. Portable trench boxes or sliding trench shields may be used for the protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used they shall be designed,

constructed, and maintained in a manner which will provide protection equal to or greater than the sheeting or shoring required for the trench.

4.2.5. The edges of excavations shall be cleared back at least 2 ft. (.6M) to assure that soil piles and other items will not fall into the trench. If the top of the trench is to be used as a work area or walkway, the soil piles shall be cleared back more than two feet from the open trench.

4.2.6. Place guardrails, toe boards, signs, and barriers alongside the trench to prevent people from falling into the excavations. Open excavations shall be barricaded. Walkways, crosswalks, and roadways shall be provided as needed. Bridging, walkways, etc. shall include a standard guardrail.

4.2.7. Barricades shall be placed to warn others of the opening with special attention to after-work-hour conditions and traffic. Rigid barricade shall be used when excavating next to roadways, sidewalks, driveways, and highly traveled areas. Flashing lights shall be utilized during non-daylight hours where vehicle and equipment traffic is present.

4.2.8. Place exit locations in trenches, such as ladders, stairways, and ramps. Proper access into any trench 4 feet (1.2 m) or more in depth shall be provided and maintained as the job progresses. Access shall be located to assure no more than 25 feet (7.6 m) lateral travel.

4.2.9. Undercuts and overhanging banks shall be removed.

4.2.10. Vehicles may tip over into a trench were the ground is not strong enough to support their weight. Prevent employees from driving vehicles near trench sites. If vehicles shall tip materials into the trench, provide a stop support to prevent the vehicles from rolling backwards into the trench.

4.2.11. Plan vehicle routes at a suitable distance, as determined by the competent person, from the trench.

4.2.12. Employees shall not work near moving parts, such as excavators. Instruct employees on the dangers of walking or working near a moving part. If employees cannot avoid the moving part, place danger signs that indicate the threat of being struck by a moving part.

4.2.13. When unwanted contact is made with a pipe or buried facility, work shall be stopped immediately and emergency response, appropriate to the risk of the situation, shall be taken.

4.2.14. When a pipe or buried facility is exposed, the owner must be notified at least 24 hours prior to backfilling to allow them to inspect the installation.

4.2.15. Warning systems for mobile equipment: When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the equipment operator does not have clear and direct view of the excavation, a warning system shall

be utilized (e.g. barricades, mechanical signals, signal persons, etc.).

5. RECORDS

5.1. Operations shall comply with the expectations outlined in Charter's Document Retention Policy.

6. RESPONSIBILITIES

Role	Description
Business Leadership/HS shall:	• Update this procedure as necessary. • Provide technical guidance as requested.
Site Leadership/HS shall:	• Work with operations to implement this procedure. • Provide technical guidance as requested.
Operations shall:	• Implement the requirements of this procedure as applicable. • Identify competent persons. • Communicate the requirements of this procedure to contractors. • Implement excavation/trench work permit process. • Implement excavation/trench inspection process. • Address concerns as their identified.
Subcontractors & Employees shall:	• Follow the requirements of this procedure. • Raise concerns to supervisor or and HS professional.

7. TRAINING

7.1. Operations shall assign appropriate training to Competent Persons and others who would be expected to implement the requirements of this procedure. The level and amount of training may vary but it must provide personnel adequate instruction to perform their expected duties.

7.2. HCSS application shall be used to schedule and monitor completion of training.

8. APPENDICES

8.1. Appendix A – Excavation/Trench Inspection Form

Appendix A – Excavation/Trench Inspection Form

CHARTER CONTRACTING COMPANY, LLC
CHARTER EXCAVATION AND TRENCHING CHECKLIST

GENERAL INFORMATION

Inspection Date:	1/14/2026	**Created Date:**	1/14/2026 7:19 AM
Job:	Sample	**Inspection Sent:**	1/14/2026 7:21 AM
Location:	Project	**Inspection Received:**	1/14/2026 7:21 AM
Inspection Type:	Karen E Long		
Inspector:	Karen E Long		
Recorded By:			

Notes:
Sample

Summary:
Total Items: 31

EXCAVATION, TRENCHING AND SITE WORK

Daily inspection of condition and excavation, or more often as needed, conducted by a designated competent person. ✔ Passed	
Utilities located and marked prior to digging. Call dig safe by dialing 811 before digging. ✔ Passed	
Utilities clearly marked out and visible ✔ Passed	
Equipment kept away from overhead wires ✔ Passed	
Are the Soil Conditions treated as Type C ✔ Passed	
Are spoils, materials and equipment set back 2' from edge of excavation? ✔ Passed	
Has an Inspection of condition of excavation,after a rain event been conducted by a designated competent person. ✔ Passed	
Employees prohibited from working or walking under suspended loads ✔ Passed	

Employees protected from loose rock or soil ✔ Passed	
Excavation filled in or properly barricaded during and at end of work shifts. ✔ Passed	
Employees prohibited from working on slopes or benches above other employees ✔ Passed	
Ladders or other approved means for proper exit in trenches over 4 feet deep at maximum 25’ travel distance ✔ Passed	
Ladders extend at least 3' above top of excavation ✔ Passed	
Nearby structures, roads and walkways protected (Stability) ✔ Passed	
Proper walkways provided where excavation must be crossed. With hand rails if over 6 feet. ✔ Passed	
Warning system established and used when mobile equipment is operation near edge of excavation ✔ Passed	
Underground utilities and installations are protected and supported ✔ Passed	
Surface encumbrances located and removed or supported ✔ Passed	
Traffic conditions evaluated ✔ Passed	
Trenches over 5’ deep shored, laid back to stable slopes or provided with other protection where hazards of moving ground exist (OSHA 1926.652) ✔ Passed	
Trench protection at least 18” above the top of vertical side ✔ Passed	
Water removed from excavation/trench where accumulated ✔ Passed	
Workers protected from falling loads ✔ Passed	

Employees protected from cave in when entering or exiting the excavation/trench ✔ Passed	
Testing and controls for hazardous atmospheres or where oxygen deficiency exists ✔ Passed	

SUPPORT SYSTEMS

Materials and equipment used based on soil analysis, trench depth and expected loads ✔ Passed	
Protective systems inspected and in good condition ✔ Passed	
Tabulated data available onsite for all protective systems ✔ Passed	
Damaged materials removed from site ✔ Passed	
Protective systems installed without exposing employees to hazards of cave ins, collapses ot struck by ✔ Passed	
Employees are not in shielded area during removal or lateral movement of system ✔ Passed	

APPENDIX I

USCG Float Plan Template

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FLOAT PLAN

INSTRUCTIONS: Complete this plan before you go boating and leave it with a reliable person who can be depended upon to notify the Coast Guard, or other rescue organization, should you not return or check-in as planned. If you have a change of plans after leaving, be sure to notify the person holding your Float Plan. For additional copies of this plan, go to: **www.floatplancentral.org**

nws.cgaux.org

Do NOT file this plan with the U.S. Coast Guard

www.uscgboating.org

VESSEL

IDENTIFICATION:

Name & Home Port_____

Doc/Registration No._____

Year & Make_____

Length _____(ft/M) Type PWR Draft _____(In/CM) Hull Mat. Fiber

Hull Color(s)_____

Prominent Features_____

_____

PROPULSION:

Primary - Type Gas IO No. Eng.____ Fuel Capacity_____(gal/L)

Auxiliary -Type none No. Eng.____ Fuel Capacity_____(gal/L)

TELECOMMUNICATIONS:

Radio Call Sign _____

DSC MMSI No. _____

Radio-1: Type none Ch./Freq. Monitored _____

Radio-2: Type none Ch./Freq. Monitored _____

Cell Phone No. _____

Pager No. _____

NAVIGATION: (Check all on board)

☐ Maps ☐ Charts ☐ Compass ☐ GPS / DGPS

☐ Radar ☐ Loran C ☐ Sounder ☐ _____

SAFETY & SURVIVAL

VISUAL DISTRESS SIGNALS:

☐ Day Only type

☐ Night Only type

☐ Day & Night type

PFDs: (Do not count Type IV devices)

_____ Quantity On Board

AUDIBLE DISTRESS SIGNALS:

☐ Horn / Whistle

☐ Bell

☐ _____

GROUND TACKLE:

☐ Anchor: Line Length_____(ft/M)

OTHER GEAR:

☐ Life boat / Life raft ☐ Flashlight / Searchlight

☐ Dinghy / Skiff ☐ Signal Mirror

☐ Food & Water ☐ Drogue / Sea Anchor

☐ EPIRB none ☐ _____

☐ Foul Weather Gear ☐ _____

PERSONS ON BOARD

OPERATOR: Age M/F Notes (Special medical condition, Can't swim, etc.)

Name _____ ____ ____ _____

Address _____ Has experience: w/Boat ☐ w/Area ☐

City _____ State _____ Zip Code _____ Home phone: _____

Vehicle (Year, Make & Model):_____ Vehicle License No.: _____

Trailer will be parked at:_____ Trailer License No.: _____

PASSENGERS/CREW: Name & Address Age M/F Notes (Special medical condition, Can't swim, etc.)

1. _____ ____ ____ _____
2. _____ ____ ____ _____
3. _____ ____ ____ _____
4. _____ ____ ____ _____
5. _____ ____ ____ _____

Attach "Supplemental Passenger List" if additional passengers or crew on board.

	DATE	TIME	LOCATION	MODE OF TRAVEL	REASON FOR STOP	CHECK-IN TIME
Depart						
Arrive						
Depart						
Arrive						
Depart						
Arrive						
Depart						
Arrive						
Depart						
Arrive						
Depart						
Arrive						

Attach "Supplemental Itinerary" if space for additional destinations is needed.

Contact 1: _____ Phone Number _____

Contact 2: _____ Phone Number _____

If you have a genuine concern for the safety or welfare of any persons on board the Vessel described above, who have not returned or checked-in in a reasonable amount of time, then follow step-by-step instructions on the **Boating Emergency Guide™** included with this plan, or on the World Wide Web at:

www.floatplancentral.org/help/BoatingEmergencyGuide.htm

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BOATING EMERGENCY GUIDE™

You will need the following items before you begin: 1) the **Float Plan** if one was given to you, 2) **Pen** or **Pencil**, 3) Clean sheet of **paper** or **Writing Tablet**, and 4) your local **Telephone Directory**.

Step 1

Do you have a genuine concern for the safety or welfare of any persons on board the Vessel described above, who have not returned or checked-in in a reasonable amount of time?

If YES, then continue with **Step 2**, otherwise **STOP**, no further action is required.

Step 2

Were you given a prepared Float Plan by anyone on board the vessel?

If YES, then continue with **Step 3**, otherwise got to **Step 5**.

Step 3

On the Float Plan, locate the two Contact lines below the Itinerary at the bottom of the Float Plan. Call Contact number 1…

<table>
<tr><th>IF</th><th>THEN</th></tr>
<tr><td>A person answered the phone…</td><td>Take notes during your conversation.
1. Let the person know you are responding to a late return or check-in by the individuals designated on the Float Plan.
2. Determine if the person you are talking to or anyone else at that location, has recently had contact with anyone on the vessel, and when and where that contact occurred.
3. Are you still concerned about the safety or welfare of any persons on board the vessel?
<table>
<tr><th>IF</th><th>THEN</th></tr>
<tr><td>Yes</td><td>Continue with Step 4.</td></tr>
<tr><td>No</td><td>STOP. No further action is required.</td></tr>
</table>
</td></tr>
<tr><td>Otherwise…</td><td>Continue with Step 4.</td></tr>
</table>

Step 4

Call telephone number for Contact number 2…

<table>
<tr><th>IF</th><th>THEN</th></tr>
<tr><td>A person answered the phone…</td><td>Take notes during your conversation.
1. Let the person know you are responding to a late return or check-in by the individuals designated on the Float Plan.
2. Determine if the person you are talking to or anyone else at that location, has recently had contact with anyone on the vessel, and when and where that contact occurred.
3. Are you still concerned about the safety or welfare of any persons on board the vessel?
<table>
<tr><th>IF</th><th>THEN</th></tr>
<tr><td>Yes</td><td>Continue with Step 6.</td></tr>
<tr><td>No</td><td>STOP. No further action is required.</td></tr>
</table>
</td></tr>
<tr><td>Otherwise…</td><td>Continue with Step 6.</td></tr>
</table>

Step 5

Take a moment to jot down the facts you know about each item in the checklist below.

Do NOT speculate. Speculation about a detail may mislead Search And Rescue (SAR) personnel, and add to the overall search and rescue time, adversely affecting the outcome.

- ❑ Period of time the vessel has been overdue.
- ❑ Purpose of the trip or voyage.
- ❑ Description of the Vessel (type, size, color, features, etc.)
- ❑ Vessels departure point and destination.
- ❑ Places the Vessel planned to stop during transit.
- ❑ Navigation equipment on board (such as GPS, Loran C, Radar, Compass, Sounder, etc.)
- ❑ Number of people on board the Vessel, as well as personal habits e.g. dependability, reliability, etc.
- ❑ Was the Vessel already moored, or did a vehicle tow it to the launch point?
- ❑ License plate number and description of the tow vehicle, and/or passenger transport vehicle.
- ❑ Communications equipment on board, including type of radio and frequencies monitored, cellular telephone numbers of any persons on board.
- ❑ Additional points of contact along the vessels planned route.
- ❑ Where there any pending commitments e.g. work, appointments, etc.

Continue with **Step 6**.

Step 6

1. Contact your local Law Enforcement agency (Police or Sheriff).
2. Let the dispatcher know that you are responding to a late return or check-in by the persons on board the vessel.
3. The dispatcher will instruct you from here.

   Note: The dispatcher will provide you with the necessary contact or agency connection *(if one was not provided for you on the Float Plan)* to get a Search And Rescue mission started. This is usually handled this way because it puts you closest to the agency conducting the actual search and rescue, eliminating an unnecessary middleman.

   If the dispatcher would like a follow-up call from you on the outcome of the rescue, they will let you know.

4. Continue with **Step 7**.

Step 7

Be patient… you've done everything you can possibly do for now. It is important to stay off the telephone, so emergency personnel can contact you with additional information and/or questions concerning the search and rescue effort.

STOP--End of Guide

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APPENDIX G

GE's Life Saving Principles

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GE Life Saving Principles

March 2021

GE Life Saving Principles

Content:

1. Introduction
2. Scope
3. Fundamentals
4. Life Saving Principles
    - 4.1. Confined space
    - 4.2. Electrical safety
    - 4.3. Excavation works
    - 4.4. Forklift and material handling
    - 4.5. Hazardous substances
    - 4.6. Infectious Diseases
    - 4.7. Lifting operations
    - 4.8. Lockout Tagout (LOTO)
    - 4.9. Machine safety and powered hand tools
    - 4.10. Motor vehicle
    - 4.11. Radiation safety
    - 4.12. Work at height
    - 4.13. Working with contractors

1. Introduction

1.1 The Life Saving Principles are a set of important working practices to strengthen workplace safety and help protect workers.

1.2 Positive promotion and personal commitment is needed to embrace the Life Saving Principles as accountable employee, supervisor or person in charge:

- Everyone focuses not only on his/her personal safety but also to ensure we are all working in a safe environment.
- ***Everyone who cannot fallow a Life Saving principle is expected to stop work***

1.3 The Life Saving Principles (LSP) reflect the GE EHS Framework requirements. They are not intended to fulfill all regulatory requirements and organizations must continue to follow the highest safety requirements, provided that full compliance with applicable regulatory requirements is achieved.

1.4 The LSP intent is to improve our organization by strengthening our Defenses on High Risk work activities. Deviation from the LSP will be first considered as an opportunity to learn why it made sense to employees to deviate:

- Where we find human errors discipline is not an appropriate response.
- An intentional violation of expected work practices can lead to discipline, but the context of work and the factors that influenced the employee decision would be investigated appropriately to understand context in first instance.

1.5 The LSP should be implemented in their entirety for all businesses.

If one business identifies additional risks that need to be treated as LSP, they can complement the program and will be responsible for developing additional material in alignment with the LSP program (including among others visual communication material, employee booklet…)

2. Scope

2.1. The Life Saving Principles apply to

- All GE employees, contractors, and supervised contract employees
- All organizations owned or controlled by GE, including fixed facilities, distributed workforce (services) & sales operations, projects and office-only locations.

2.2. The responsibility lies within the Business to ensure these expectations and any additional Business expectations are implemented

2.3. If customer requirements differ from this guidance, Life Saving Principles shall be coordinated with customer.

2.4. Each High-Risk Operation is detailed with:

- A unique recognizable icon
- A motto
- Associated “DOs” and “DON’Ts”

3. Fundamentals

There are priorities relating to everyone's safety that will keep everyone safe throughout any high risk activity and that are critical to be observed at any time:

	Perform Hazard Identification and Risk Assessment prior to commencing any High Risk Activities
	Perform High Risk Activities only when authorized: appropriate training given, skills and knowledge demonstrated, and where required, a written permission from responsible manager is given for a limited period of time
	Verify equipment (including but limited to machine, tool, crane) is safe to operate before use and specific procedure (e.g. equipment-specific LOTO procedure) is available
	Be prepared to work as per defined plan (e.g. Lifting plan)
	Use prescribed PPE as required from the Hazard Identification and Risk Assessment review
	Do not perform any activity while tired or under the influence of alcohol, drugs or other substances which may impair one's ability to undertake task safely
	Review and adapt initially planned work process safety when work conditions change significantly from initial instructions or work setup. This includes Stop Work where appropriate.
	Ensure communication to all parties at site when different tasks to be performed by different parties on a same area
	Ensure emergency rescue equipment and plans defined, in place and communicated where appropriate
	Follow GE's travel safety guidelines (TAS) for all business travel

4. Life Saving Principles

High Risk operations – Motto and Icon	Life Saving Principles
Confined Space Obtain authorization and check atmosphere before entering a confined space 	**DO** 1> Only enter a confined space if you are authorized and have a valid signed off permit 2> Only enter a confined space once 3 roles (entrant, attendant and rescuer capability) are clearly assigned and attendant will be present at all times 3> Wear appropriate PPE and have calibrated gas detector/alarm, lighting, means of communication 4> Have emergency equipment in place 5> Know and be prepared to follow rescue plan 6> Monitor ventilation and gas detection before, during and after work 7> Have confined space identified and restrict access at all times **DON'T** 1> Do not enter a confined space unless the atmosphere has been proven to be safe
Electrical Safety Work on de-energized equipment 	**DO** 1> Undertake electrical work as a trained, competent and LOTO authorized individual only - perform LOTO prior to commencing any electrical work, unless not feasible 2> Verify absence of voltage with suitable tool 3> Only work with tools and portable equipment that are insulated, grounded and suitable for the job 4> Make sure that access to energized panels and electrical cabinets is restricted 5> Have electrical emergency plan in place 6> Evaluate the three approach distances prior to starting work (Limited Approach/ Arc Flash / Restricted Approach) and use appropriate PPE **DON T** 1> Do not perform energized electrical work without an approved energized electrical work permit when LOTO is not feasible

Excavation Works

Protect any excavations or floor openings



DO

1> Perform risk assessment and understand underground services before digging (use drawings, safe excavation and locator devices, etc)
2> Acquire an excavation permit
3> Use safe access and egress
4> Test and monitor atmosphere quality
5> Use appropriate sloping, shoring, shielding, support and/or benching systems (for excavation greater than 1.2m/4ft.)
6> Use appropriate barricading and restrict access (for excavation greater than 1.2m/4ft.)
7> Inspect trenches at the start of shift and after any occurrence that could have changed conditions in trench (rain, water ingress....)
8> Maintain general vehicle traffic to be minimum 3m /10 ft. away from excavation

Forklift and material handling

Maintain a safe distance from pedestrians and operating vehicles



DO

1> Be a trained, competent and authorized personnel familiar with the operating instructions
2> Perform a visual inspection before use, report and remove from use, if damaged
3> Check load capacity, make sure forks are lowered when the vehicle is traveling or parked
4> Wear your seat belt at all times and high-visibility garments when required
5> Perform work in segregated area whenever feasible
6> Maintain safe distance from pedestrians and other moving or operating vehicles

DON'T

1> Do not underestimate ground slope or floor opening when operating a vehicle
2> Do not obstruct emergency route or egress points when parking

Hazardous Substances

Identify, understand and control all exposures to hazardous substances



DO

1> Identify substances (liquids, gas, aerosols, solids – including powders and dust) in use and understand associated hazards (e.g. corrosive, combustible, flammable, explosive…)
2> Assess risks and understand safe use process
3> Follow warning signs about hazardous substances
4> Store substances safely (segregate by hazard type and secure access to them)
5> Be trained on exposure limitation and use of PPE
6> Be aware of emergency plan and first aid procedures
7> Follow the emergency response and act accordingly (e.g. spill kit…)

Infectious Diseases

Stay informed – Help prevent the spread of infectious diseases



DO

1>Wash your hands often with soap and water for at least 20 seconds, or use an alcohol-based hand sanitizer
2>Practice physical distancing (6 ft/2m or follow local guidance, whichever is more protective)
3>Use face coverings when you can't physically distance, or as required by government or site policy
4>Regularly clean and disinfect surfaces
5>Cough or sneeze into your elbow or a tissue, immediately throw tissue in trash, then sanitize hands
6>Stay home and contact your manager if you feel unwell

DON'T

1>Do not touch your eyes, nose, or mouth with unwashed hands
2>Do not shake hands, hug, or kiss on the cheek when greeting others
3>Do not go to work if you feel sick

GE Life Saving Principles

Lifting Operations

Follow the Lift Plan, and stay clear of suspended loads



DO
1>Do follow the lift plan
2>Do perform a daily pre-use visual inspection and operational check
3>Do check that load does not exceed equipment load capacity
4>Do only use lifting equipment or accessories for which you have been trained and authorized

DON'T
1>Don't allow yourself or anyone else to be under a suspended load
2>Don't position yourself between the load and a fixed object you could get crushed by
3>Don't use any damaged lifting equipment or accessories

Lockout Tagout (LOTO)

Control hazardous energy



DO
1> Perform LOTO or work on equipment under LOTO only as a LOTO authorized person
2> Consider all potential sources of energy and understand the isolation points that protect you from danger
3> Use only approved LOTO devices as described in the equipment specific LOTO procedure
4> Apply personal LOTO (GROUP LOTO) locks and tags to energy source points of disconnect before performing servicing or maintenance and follow the procedure at all times
5> Verify that all potential stored energy (electrical, thermal, mechanical ...) is discharged, purged or blocked

Machine Safety

Prevent exposure to dangerous parts



DO
1> Only operate, perform set up or maintenance on equipment that has defined safety operating instructions
2> Be trained, familiar and authorized for the equipment and tools that you are working with
3> Inspect and check machinery safety features before use (in particular interlocks, emergency stop, light guards, fixed guards and adjustable guarding)
4> Remove from service any damaged equipment

DON T
1> Do not bypass or remove any guards, shields or interlocks or other safety devices
2> Do not perform maintenance activities on energized machine or equipment unless there is an approved alternate hazardous energy control procedure
3> Do not use any tool or device which have a damaged electrical cord
4> Do not overuse multisocket plug nor allow them hang unsecured

GE Life Saving Principles

Motor Vehicle

Don't be a distracted driver



DO
1>Do wear a seat belt when operating a vehicle
2>Do require all passengers to wear a seat belt
3>Do make sure loads are secure prior to operating a vehicle
4>Do keep a safe distance
5>Do follow established traffic routes, signs, signals, right of way and speed limits

DON'T
1>Don't text while operating a vehicle
2>Don't drive while tired or under the influence of alcohol, drugs or other substances which may impair your ability to drive safely

Radiation Safety

Control exposure to ionizing radiation



DO
1> Follow local rules and procedures
2> Wear and exchange any issued dosimeters (radiation badges)
3> Know emergency procedures and report incidents to the Radiation Safety Officer (or equivalent)
4> Use concepts of ALARA (as low as reasonably achievable) reducing exposure time, increasing distance and maximizing shielding

DON T
1> Do not allow unauthorized individuals to have access to radiation controlled areas or radiation generating equipment
2> Do not perform any activities if any safety devices, radiation detection instruments, or source handling tools are impaired

Work at height

Hook on where there is a risk of falling



DO
1>Do use appropriate personal fall protection
2>Do make sure it is in good condition
3>Do make sure it is attached to a suitable anchor point
4>Do review, understand, and follow the suspension rescue plan
5>Do verify working platforms, fall arrest systems and lanyards are anchored securely

DON'T
1>Don't work on a vertical lifeline if anyone else is on the same line

Working with contractors

Employees and contractors shall apply GE's requirements



DO

1> Verify that GE requirements are known and that hazard identification and risk assessment have been done prior to commencing any High-Risk Operation
2> Be aware of emergency plan and follow it when required
3> Conduct pre-work meeting, clarify processes and verify that only authorized, trained and competent people will perform the job
4> Use prescribed PPE as per risk assessment review
5> Communicate to all parties involved and understand risks when simultaneous operations are to be performed on a same area
6> STOP work if a co-worker or a contractor is working unsafely
7> Inspect, raise deviations to GE EHS procedures or local regulations, correct and explain how to improve
8> Improve and share lessons learned

APPENDIX E
Core Requirements and Technical Standards
(versions indicated on the attachments)

Content Owner: John Franklin (JC.FRANKLIN@ge.com)

Core Requirements (CRs) establish what is expected of operations for key EHS risk topics. They provided a minimum set of core expectations that will be common to all GE operations, but they do not (and cannot) identify everything that needs to be done to manage those EHS risks effectively.

Technical Standards (TSs) are controlled documents and part of the Integrated EHS Operating System (**IEOS**). TSs build in the CRs when additional procedural guidance (how to meet specific requirements) is needed. When no additional information is required beyond the CRs, TSs will not be created. For topics with an existing GE procedure or manual, the new TS replaces the existing requirements.

Both CRs and TSs are written for people managing the risks at the front line (EHS, safety leaders, facility leads etc.).

Note: The CRs and TSs listed below are REQUIRED under the GE Aerospace EHS Expectations	
CORE REQUIREMENTS (alphabetical order)	TECHNICAL STANDARDS (alphabetical order)
Aerial Lifts CR2024 Rev 2 (01/2024)	
Air Program CR1002 Rev 2 (01/2024)	
Aquatic Operations CR2041 Rev 0.2 (01/2024)	
Asbestos (Fixed facilities) CR2028 Rev 2 (07/2023)	
Compliance Assurance CR5007 Rev 2 (01/2024)	
Confined Space CR2009 Rev 2 (01/2024)	Confined Space TS2009 Rev 1.1 (01/2024)
Contract Worker EHS CR2026 Rev 4 (01/2024)	Contract Worker TS2026 Rev 4 (02/28/2024)
Crane & Hoist Operations (Lifting) CR2002 Rev 2 (01/2024)	Crane & Hoist Operations (Lifting) TS2002 Rev 2 (01/2024)
Dangerous Goods Shipping CR1003 Rev 2 (01/2024)	
EHS Data Recording & Reporting CR5016 Rev 2 (01/2024)	EHS Data Recording & Reporting TS5016 Rev 1(01/01/2024)
Electrical Safety CR2003 Rev 3 (01/2024)	Electrical Safety TS2003 Rev 6 (01/2024)
Emergency Preparedness & Response CR5010 Rev 2 (08/2023)	
Ergonomics and Material Handling CR2031 Rev 1 (01/2024)	Ergonomics TS2031 Rev 0 (01/26/2024)
Event Analysis and Learning Process CR5005 Rev 2 (01/2024)	
Excavation Works CR2017 Rev 2 (01/2024)	
Explosion Safety (including Combustible Dust) CR2038 Rev 1 (01/2024)	
Forklift & Material Handling CR2021 Rev 2 (01/2024)	Forklift (including Powered Mobile Equipment) TS2021 Rev 6 (01/2024)
Hazardous Substances CR2018 Rev 2(01/2024)	
Hexavalent Chromium CR2043 Rev 0 (09/2024)	
Highly Hazardous Processes (including PSM/Seveso & VPI) CR2039 Rev 0.2 (01/2024)	
Hot Work CR2020 Rev 2 (01/2024)	
Industrial Hygiene CR2030 Rev 2 (01/2024)	
Ionizing Radiation/Radiation Safety CR2006 Rev 2 (01/2024)	Ionizing Radiation/Radiation Safety TS2006 Rev 2(01/2024)
Line Breaking CR2044 Rev 0 (10/2024)	
Lockout Tagout (LOTO) CR2001 Rev 3 (01/2024)	Lockout Tagout (LOTO) TS2001 Rev 3 (01/2024)
Machine Safety CR2004 Rev 2 (01/2024)	
	Management of Change TS5012 Rev 3 (08/20/2024)
Motor Vehicle Safety CR2013 Rev 2 (01/2024)	
	Office Life Safety Standard TS2005 Rev 1 (01/2024)
Partners EHS Management CR4105 Rev 0.2 (01/2024)	
Personal Protective Equipment (PPE) CR2029 Rev 2 (01/2024)	
PFAS CR2042 Rev 1 (06/12/2024)	PFAS TS2042 (06/12/2024)
Risk Management CR5009 Rev 2 (01/2024)	
Spill/Release Environmental Prevention & Response CR1001 Rev 2 (01/2024)	
Stop Work Expectation CR2023 Rev 0.2 (01/2024)	
Waste Management CR1005 Rev 2 (01/2024)	
Water Program CR1004 Rev 2 (01/2024)	
Work at Height CR2010 Rev 3 (01/2024)	Work at Height TS2010 Rev 3 (01/2024)

Appendix B

Technical Specifications



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. During operation of the Upland Disposal Facility (UDF), the Contractor will perform surveying to track and document fill conditions and progress of remedial consolidation materials placed in the UDF cells.
3. 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. Survey of installed leachate collection and removal pipes, leachate force mains, water mains, electric lines, and geosynthetics anchor trenches.

3. Survey of constructed baseliner surfaces including subgrade, top of soil clay liner, top of granular drainage layers, top of operations layer.

4. Survey of constructed final cover surfaces including top of final cover subbase and final grade (completed topsoil, access roads, drainage features and components).

5. General site work conditions including access roads, drainage features (basins, culverts, stormwater management areas), berms, fences and gates, buildings, tanks, manholes, 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 exiting 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 UDF OPERATIONS FILL PROGRESSION SURVEYING

A. During UDF operations, fill progression surveys shall be conducted at least on an annual basis throughout the operation of the UDF. The annual fill progression survey will be completed at the end of consolidation material placement for the year.

B. Surveys shall verify that the maximum slopes within the cell consolidation areas are not exceeded.

C. Surveys shall be of sufficient detail and definition to allow for evaluation of constructed consolidation material grades with the design grades shown on the Design Drawings.

D. Surveys shall be of sufficient detail and definition to allow for volumetric computations of consolidation material placed.

3.04 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).

3.05 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 02 41 00 – DEMOLITION

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified and required for demolition, removal, and disposal Work.

2. The Work under this Section includes, but is not necessarily limited to:
   a. Demolition and removal of existing materials and equipment as shown or indicated in the Contract Documents. The Work includes demolition of structural concrete, stone and/or concrete foundations, wood and steel framing, walls, doors, windows, structural steel, metals, roofs, masonry, attachments, appurtenances, piping, electrical and mechanical systems and equipment, paving, curbs, sidewalks, gutters, fencing and similar existing facilities.
   b. Demolition and removal of all Underground Facilities underneath, and above-grade piping and utilities in and outside, the building(s) and structures shown or indicated for demolition, unless the Underground Facilities or above-grade facilities are shown or indicated as to remain.
   c. Remove from slabs, foundations, walls, and footings that are to be demolished all utilities and appurtenances embedded in such construction.

3. Demolitions and removals specified under other Sections shall comply with requirements of this Section.

4. Perform demolition Work within areas shown or indicated.

5. Performing all activities associated with demolishing, handling, transporting, and disposing of materials and equipment resulting from demolition at a facility approved by CM that is licensed for disposal of hazardous and demolition waste.

B. Coordination:

1. Review procedures under this and other Sections and coordinate the Work that will be performed with or before demolition and removals.

2. Notify other contractors in advance of demolition and removals Work to provide other contractors with sufficient time for performing work and coordinating items included in their contracts that will be performed before or in conjunction with demolition and removals Work.

C. Related Sections:

1. Section 33 11 00 – Clearing and Grubbing

2. Section 31 22 00 – Grading

D. References:

1. Pre-Demolition HBM Survey Report (Arcadis, May 2025)

1.02 QUALITY ASSURANCE

A. Qualifications:

1. Electrical removals if performed prior to structure demolition: Entity and personnel performing electrical removals shall be electrician qualified to perform electrical construction and electrical work in the jurisdiction where the Site is located.

2. Plumbing removals if performed prior to structure demolition: Entity and personnel performing plumbing removals shall be plumber qualified to perform plumbing construction and plumbing work in the jurisdiction where the Site is located.

B. Regulatory Requirements:

1. Demolition, removal, and disposal Work shall be in accordance with 29 CFR 1926.850 through 29 CFR 1926.860 (Subpart T – Demolition), and all other Laws and Regulations.

2. Comply with requirements of authorities having jurisdiction.

1.03 SUBMITTALS

A. Informational Submittals

1. Procedure Submittal:
   a. Demolition and Removal Plan: 15 days from award of contract, submit plan acceptable to CM for demolition and removal Work, including:
      1) Plan for coordinating shut-offs, capping, temporary services, and continuing utility services, if required.
      2) Other proposed procedures as applicable.
      3) Equipment proposed for use in demolition operations.
      4) Recycling/disposal facility(ies) proposed, including facility owner, facility name, location, and processes. Include copy of appropriate permits and licenses, and compliance status.
      5) Planned demolition operating sequences.
      6) Detailed schedule of demolition Work in accordance with the accepted Work Schedule.
      7) Planned measures and activities for the abatement of hazardous building materials associated with asbestos, lead paint, and universal waste.
      8) Planned oversite and relevant-required monitoring during abatement activities.
      9) Description of the state and federal regulations-requirements to be followed for the abatement of hazardous building materials and universal waste.

2. Notification of Intended Demolition Start: Submit in accordance with Paragraph 3.1.A of this Section.

3. Qualifications Statements:
   a. Name and qualifications of entity performing electrical removals, including copy of licenses required by authorities having jurisdiction.
   b. Name and qualifications of entity performing plumbing removals, including copy of licenses required by authorities having jurisdiction.
   c. Name and qualifications of entity performing hazardous abatement work, including copy of licenses-certifications required by authorities having jurisdiction.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 PREPARATION

A. Protection of Surrounding Areas and Facilities:

1. Perform demolition and removal Work in manner that prevents damage and injury to property, structures, occupants, the public, and facilities. Do not interfere with use of, and free and safe access to and from, structures and properties.

2. Closing or obstructing of roads, drives, sidewalks, and passageways adjacent to the Work is not allowed unless indicated otherwise in the Contract Documents. Conduct the Work with minimum interference to vehicular and pedestrian traffic.

3. Provide temporary barriers, lighting, sidewalk sheds, and other necessary protection.

4. Repair damage to facilities that are to remain, if any.

B. Existing Utilities:

1. Should uncharted or incorrectly charted Underground Facilities be encountered, Contractor shall cooperate with utility owners in keeping adjacent services and facilities in operation.

2. Sanitary Sewer: Before proceeding with demolition, locate and cap all sewer lines and service laterals discharging from the building or structure being demolished.

3. Water Piping: Before proceeding with demolition, locate and cap all potable and non-potable waterlines and service laterals serving the building or structure being demolished.

4. Other Utilities: Before proceeding with demolition, locate and cap as required all other utilities, such as fuel and gas; heating, ventilating, and air conditioning; electric; and communications; and service laterals serving the building or structure being demolished.

5. Shutdown of utility services shall be confirmed with CM prior to commencement of Work.

C. Remediation:

1. Prior to performing demolition Work that disturbs Asbestos, remove and dispose of Asbestos in accordance with applicable state and federal requirements.

2. Prior to performing demolition Work involving lead-based paint, remediate lead in accordance with applicable state and federal requirements.

3.02 DEMOLITION – GENERAL

A. Locate construction equipment used for demolition Work and remove demolished materials and equipment to avoid imposing excessive loading on supporting and adjacent walls, floors, framing, facilities, and Underground Facilities.

B. Pollution Controls:

1. Use water sprinkling, temporary enclosures, and other suitable methods to limit emissions of dust and dirt to lowest practical level. Comply with Section 01 57 05, Temporary Controls, and Laws and Regulations.

2. Do not use water when water may create hazardous or objectionable conditions such as icing, flooding, or pollution.

C. Building or Structure Demolition:

1. Unless otherwise approved by CM, proceed with demolition from top of building or structure to the ground. Complete demolition Work above each floor or tier before disturbing supporting members of lower levels.

2. Demolish stonework, concrete, and masonry in small sections.

3. Remove structural framing members and lower to ground using hoists, cranes, or other suitable methods. Do not throw or drop to the ground.

4. Break up and remove foundations and slabs-on-grade unless otherwise shown or indicated as remaining in place.

D. Demolition of Site Improvements:

1. Fencing, Guardrails, and Bollards: Remove to the limits shown or indicated on the Drawings. Completely remove below-grade posts and concrete.

2. Manholes, Vaults, Chambers, and Handholes: Remove to the limits shown or indicated on the Drawings.

3. Underground Facilities Other than Manholes, Vaults, Chambers, and Handholes: Remove to the extent shown or indicated on the Drawings. Unless otherwise shown or indicated, cap ends of piping to remain in place in accordance with Contractor proposed method.

3.03 STRUCTURAL REMOVALS

A. Remove structures as shown or indicated, unless otherwise directed by CM.

B. Recycling, Disposal, and/or Reuse of Demolition Materials:

1. All concrete, foundation and wall stone, brick, tile, masonry, roofing materials, reinforcing steel, structural metals, miscellaneous metals, plaster, wire mesh, and other items contained in or upon building or structure to be demolished shall be removed, transported, and recycled-disposed of away from the Site, unless otherwise approved by CM.

2. Do not use demolished materials as fill or backfill.

3.04 MECHANICAL REMOVALS

A. Mechanical demolition and removal Work includes dismantling and removing existing piping, ductwork, pumps, equipment, tanks, and appurtenances as shown, indicated, and required for completion of the Work. Mechanical removals include cutting and capping as required for completion of the Work.

B. Demolition and Removals of Piping, Ductwork, and Similar Items:

1. Purge piping and tanks (as applicable) of chemicals or fuel (as applicable) and make safe for removal and capping. Remove to the extent shown or indicated existing process, water, waste and vent, chemical, gas, fuel, and other piping. Remove piping to the nearest solid piping support and provide caps on ends of remaining piping.

2. Caps, Closures, Blind Flanges, and Plugs:
   a. Provide closure pieces, such as blind flanges and caps, where shown or required to complete the Work.
   b. Where used in this Section, the term “cap” means the appropriate type closure for the piping or ductwork being closed, including caps, blind flanges, and other closures.

c. Caps shall be compatible with the piping or ductwork to which the cap is attached, fluid-tight and gastight, and appropriate for the fluid or gas conveyed in the pipe or duct.
d. Unless otherwise shown or indicated, caps shall be mechanically fastened, fused, or welded to pipe or duct. Plug piping with means other than specified in this Section only when so shown or indicated in the Contractor Documents or when allowed by Engineer.

3. When Underground Facilities are altered or removed, properly cut and cap piping left in place, unless otherwise shown or indicated.

4. Remove waste and vent piping, and ductwork to extent shown or indicated, and cap as required.

C. Equipment Demolition and Removals:

1. To the extent shown or indicated, remove existing equipment; pumps; storage tanks; heating, ventilating, and air conditioning equipment; generators; and other equipment.

2. Where required, disassemble equipment to avoid imposing excessive loading on supporting walls, floors, framing, facilities, and Underground Facilities. Disassemble equipment as required for access through and egress from building or structure. Disassembly shall comply with Laws and Regulations. Provide required means to remove equipment from building or structure.

3. Remove control panels and instruments associated with equipment being removed, unless shown or indicated otherwise.

4. Remove fuel appurtenances as applicable, including fuel storage tanks. Dispose of tank contents in accordance with Laws and Regulations.

5. Remove equipment supports as applicable, anchorages, base, grout, and piping. Remove anchorage systems in accordance with the “Structural Removals” Article in this Section. Remove small diameter piping back to header unless otherwise indicated.

3.05 ELECTRICAL REMOVALS

A. Electrical demolition Work includes removing existing transformers, control panels, motors, starters, conduit, cabling, poles and overhead cabling, panelboards, lighting fixtures, switches, and miscellaneous electrical equipment, as required.

B. Disconnect and remove motors, control panels, and other electrical gear as required.

C. Cables in conduits to be removed shall be removed back to the power source or control panel, unless otherwise shown or indicated. Verify the function of each cable before disconnecting and removing.

D. Conduits in Underground Facilities that remain in-place, shall be suitably capped watertight.

E. Existing poles and overhead cables shall be removed as required. Completely remove from the Site poles not owned by electric utility and shown or indicated for removal. Make necessary arrangements with electric utility for removal of utility company’s transformers and metering equipment, if any.

F. Lighting fixtures, wall switches, receptacles, starters, and other miscellaneous electrical equipment shall be removed and properly disposed off-Site as required.

3.06 DISPOSAL OF DEMOLITION DEBRIS

A. Remove from the Site all debris, waste, rubbish, and material resulting from demolition operations and equipment used in demolition Work.

B. Transportation and Disposal:

1. Non-hazardous Material: Properly transport and dispose of non-hazardous demolition debris at appropriate landfill or other suitable location, in accordance with Laws and Regulations. Non-hazardous material does not contain Asbestos, PCBs, Petroleum, Hazardous Waste, Radioactive Material, or other material designated as hazardous in Laws and Regulations.

2. Hazardous Material: When handling and disposal of hazardous materials is included in the Work, properly transport and dispose of hazardous materials in accordance with the Contract Documents and Laws and Regulations.

C. Submit to CM information required in this Section on proposed facility(ies) where demolition material will be recycled, if any. Upon request, CM shall be allowed to visit recycling facility(ies) to verify adequacy and compliance status. During such visits, recycling facility operator shall cooperate and assist CM.

- END OF SECTION -

SECTION 02 71 10 – CHAIN LINK FENCE

PART 1 – GENERAL

1.01 WORK SPECIFIED

A. Installation of new or replacement fence system where shown on the Project Drawings and as specified herein.

B. Following review of this specification, the Contractor shall notify the CM of any alternative specifications, recommendations, and requirements that are applicable and should be considered based on the Contractor's direct experience with similar work.

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. American Society for Testing and Materials (ASTM)

B. Chain Link Fence Manufacturers Institute

1.03 SUBMITTALS

A. Information on fence materials products and installation methods.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Structural and roll-formed shapes may be used in lieu of pipe sections. The structural or roll-formed shapes have a bending strength greater than the pipe section when measured under a 6-foot cantilever load and be galvanized in accordance with ASTM A123.

B. Posts, Rails, and Braces

1. Schedule 40, steel pipe, high strength grade (50,000 psi yield strength) galvanized, in accordance with ASTM A53.
2. Dimensions and Weights (Minimum):

	Outside Dia. (In.)	Weight/ Ft (lbs)
End, Corner, and Pull Posts	2.875	5.79
Line Posts (Heavy Duty)	2.375	3.65
Top Rails and Braces	1.66	2.27
Gate Posts:		
Leaves 6 ft. Wide or Less	2.875	5.79
Leaves over 6 ft., including 13 ft. Wide	4.00	9.11

C. Chain Link Fabric

1. One piece 9-gauge steel wire fabric, width as shown on the Project Drawings, 2-inch mesh galvanized after weaving in accordance with ASTM A392, Class 2.
2. 7'-0" high when installed.

D. Accessories

1. Stretcher bars shall be a minimum of ½" x ¾" steel and attached to posts with heavy steel bands.
2. Tension wire shall be 7-gauge galvanized coil spring steel.

E. Gates

1. Gates shall be of the type indicated on the Project Drawings.
2. Welded fabrication shall be of not less than 1.90-inch O.D. Schedule 40 steel pipe.
    a. Braces and minimum ¾ inch diameter trusses to provide rigidity without sag or twist.
    b. Galvanized after fabrication in accordance with ASTM A120.
3. Locking devices, latches, stops, and other hardware as required for a complete operating gate.
    a. Operate from either side.
4. Fabric of gates shall be the same as chain link fence.

F. Miscellaneous (if applicable as determined by CM)

1. Concrete for footings shall be minimum 3,000 psi (at 28 days) mix.
2. Wire ties or clips shall be minimum of 6 gauge.
    a. Hog rings may be used to tie fabric to tension wire.

PART 3 – EXECUTION

3.01 INSTALLATION

A. General

1. Installation shall be in accordance with ASTM F567, Installation of Chain-Link Fence, unless otherwise modified.

B. Posts

1. Space line posts equidistant at intervals not exceeding 10 feet.
2. Unless otherwise specified by the CM, post holes shall be of a diameter to provide not less than 4 inches of concrete outside the post or 3 times the O.D. of the post and 3 inches below the bottom of the post.

3. Unless otherwise specified by the CM, set plumb and to alignment in concrete base to a depth of:
    a. 36-inches for line post.
    b. 42-inches for pull, corner, and gate posts.
    c. Greater if recommended by fence manufacturer or if required per local building code.
4. Unless otherwise specified by the CM, crown concrete 2 inches above finish grade to shed water.
5. Unless otherwise specified by the CM, concrete shall cure a minimum of 72 hours before further work is done on post.

C. Braces

1. Provide at all ends, gate and in both tangents at pull and corner posts.

D. Top Rails and Tension Wire

1. Attach top rail securely to each gate, corner, pull, and end posts.
    a. Support at each intermediate post to form a continuous brace from end to end.
2. Bottom tension wire shall be taut and 6 inches above finished grade.

E. Fabric

1. Tighten to provide a smooth uniform appearance free from sags.
2. Attach to terminal post using stretcher bars with tension bands to maximum 14-inch intervals or other approved method.
3. Install fabric 2 inches above finished grade.
4. Fasten to line post at intervals not exceeding 14 inches.
5. Fasten to top rail, braces, and tension wire at intervals not exceeding 24 inches.

F. Gates

1. Install true to opening and plumb.
2. Adjust hardware for smooth operation.

G. The area shall be left neat and free of any debris caused by the erection of the fence.

- END OF SECTION -

SECTION 03 00 05 – CONCRETE

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install concrete, reinforcing, and related materials.

2. The Work includes:
   a. Providing concrete consisting of Portland cement, fine and coarse aggregates, water, and approved admixtures; combined, mixed, transported, placed, finished, and cured.
   b. Fabricating and placing reinforcing, including ties and supports.
   c. Design, erection, and removal of formwork.
   d. Building into the concrete all sleeves, frames, anchorage devices, inserts, and other items required to be embedded in concrete.

B. Coordination:

1. Review installation procedures under other Sections and coordinate installation of items to be installed in the concrete Work.

C. Classifications of Concrete:

1. Class “A” concrete shall be steel-reinforced and includes all concrete unless otherwise shown or indicated.

2. Class “B” concrete shall be placed without forms or with simple forms, with little or no reinforcing and includes the following:
   a. Concrete fill.
   b. Duct banks.
   c. Unreinforced encasements.
   d. Curbs and gutters.
   e. Sidewalks.
   f. Thrust blocks.

1.02 REFERENCES

A. Standards referenced in this Section are:

1. ACI 224R, Control of Cracking in Concrete Structures.
2. ACI 301, Specifications for Structural Concrete for Buildings.
3. ACI 304R, Guide for Measuring, Mixing, Transporting and Placing Concrete.
4. ACI 305R, Specification for Hot Weather Concreting.
5. ACI 306R, Cold Weather Concreting.
6. ACI 309R, Guide for Consolidation of Concrete.
7. ACI 318, Building Code Requirements for Structural Concrete and Commentary.
8. ACI 347, Guide to Formwork for Concrete.
9. ACI SP-66, ACI Detailing Manual.
10. ASTM A82/A82M, Specification for Steel Wire, Plain, for Concrete Reinforcement.

11. ASTM A185/A185M, Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
12. ASTM A615/A615M, Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
13. ASTM C31/C31M, Practice for Making and Curing Concrete Test Specimens in the Field.
14. ASTM C33/C33M, Specification for Concrete Aggregates.
15. ASTM C39/C39M, Test Method for Compressive Strength of Cylindrical Concrete Specimens.
16. ASTM C42/C42M, Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
17. ASTM C94/C94M, Specification for Ready-Mixed Concrete.
18. ASTM C138/C138M, Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
19. ASTM C143/C143M, Test Method for Slump of Hydraulic-Cement Concrete.
20. ASTM C150/C150M, Specification for Portland Cement.
21. ASTM C172, Practice for Sampling Freshly Mixed Concrete.
22. ASTM C231, Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
23. ASTM C260, Specification for Air-Entraining Admixtures for Concrete.
24. ASTM C309, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
25. ASTM C494/C494M, Specification for Chemical Admixtures for Concrete.
26. ASTM C579, Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.
27. ASTM C1064/C1064M, Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
28. ASTM D1752, Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
29. ASTM E96/E96M, Test Methods for Water Vapor Transmission of Materials.
30. ASTM E154, Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
31. CRD-C 572, U. S. Army Corps of Engineers Specification for Polyvinylchloride Waterstops.
32. CRSI 1MSP, Manual of Standard Practice.

1.03 QUALITY ASSURANCE

A. Laboratory Trial Batch:

1. Employ independent testing laboratory experienced in design and testing of concrete materials and mixes to perform material evaluation tests and to design concrete mixes.
2. Each concrete mix design specified shall be verified by laboratory trial batch, unless indicated otherwise.

3. Perform the following testing on each trial batch:
   a. Aggregate gradation for fine and coarse aggregates.
   b. Slump.
   c. Air content.
   d. Compressive strength, based on three cylinders each tested at seven days and at 28 days.
4. Submit for each trial batch the following information:
   a. Project identification name and number (if applicable).
   b. Date of test report.
   c. Complete identification of aggregate source of supply.
   d. Tests of aggregates for compliance with the Contract Documents.
   e. Scale weight of each aggregate.
   f. Absorbed water in each aggregate.
   g. Brand, type, and composition of cementitious materials.
   h. Brand, type, and amount of each admixture.
   i. Amounts of water used in trial mixes.
   j. Proportions of each material per cubic yard.
   k. Gross weight and yield per cubic yard of trial mixtures.
   l. Measured slump.
   m. Measured air content.
   n. Compressive strength developed at seven days and 28 days, from not less than three test cylinders cast for each seven day and 28-day test, and for each design mix.

1.04 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
   a. List of concrete materials and concrete mix designs proposed for use. Include results of tests performed to qualify the materials and to establish the mix designs. Do not start laboratory trial batch testing until this submittal is approved by the CM.
   b. Laboratory Trial Batch Reports: Submit laboratory test reports for concrete cylinders, materials, and mix design tests.
   c. Concrete placement drawings showing the location and type of all joints.
   d. Drawings for fabricating, bending, and placing concrete reinforcing. Comply with ACI SP-66. For walls and masonry construction, provide elevations to a minimum scale of 1/4-inch to one foot. Show bar schedules, stirrup spacing, adhesive dowels, splice lengths, diagrams of bent bars, arrangements, and assemblies, as required for fabricating and placing concrete reinforcing.
2. Product Data:
   a. Manufacturer’s specifications with application and installation instructions for proprietary materials and items, including admixtures and bonding agents.
3. Samples:
   a. Samples: Submit samples of materials as specified and as otherwise requested by CM, including names, sources, and descriptions.

B. Informational Submittals: Submit the following:

1. Delivery Tickets: Copies of all delivery tickets for each load of concrete delivered to or mixed at the Site. Each delivery ticket shall contain the information in accordance with ASTM C94/C94M along with project identification name and number (if any), date, mix type, mix time, quantity and amount of water introduced.

2. Site Quality Control Submittals:
    a. Report of testing results for testing of field concrete cylinders for each required time period. Submit within 24 hours after completion of associated test. Test report shall include results of all testing required at time of sampling.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Transportation, Delivery, and Handling:

1. Deliver concrete reinforcing products to Site bundled, tagged, and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings on approved Shop Drawings.

2. Materials used for concrete shall be clean and free from foreign matter during transportation and handling and kept separate until measured and placed into concrete mixer.

3. Implement suitable measures during hauling, piling, and handling to ensure that segregation of coarse and fine aggregate particles does not occur and grading is not affected.

4. Deliver grout materials from manufacturers in unopened containers that bear intact manufacturer labeling.

B. Storage:

1. Store formwork materials above ground on framework or blocking. Cover wood for forms and other accessory materials with protective, waterproof covering. Provide for adequate air circulation or ventilation under cover.

2. Store concrete reinforcing materials to prevent damage and accumulation of dirt and excessive rust. Store on heavy wood blocking so that reinforcing does not come into contact with the ground. Space framework or blocking supports to prevent excessive deformation of stored materials.

3. Store concrete joint materials on platforms or in enclosures or covered to prevent contact with ground and exposure to weather and direct sunlight.

4. For storage of concrete materials, provide bins or platforms with hard, clean surfaces.

PART 2 – PRODUCTS

2.01 CONCRETE MATERIALS

A. Portland Cement – ASTM C150/C150M, Type II.

B. Aggregates – ASTM C33/C33M:

1. Fine Aggregate: Clean, sharp, natural sand free of loam, clay, lumps, and other deleterious substances. Dune sand, bank run sand, and manufactured sand are unacceptable.

2. Coarse Aggregate:
    a. Clean, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter.
    b. Coarse aggregate shall comply with the following:
        1) Crushed stone, processed from natural rock or stone.
        2) Washed gravel, either natural or crushed. Slag, pit gravel, and bank-run gravel are not allowed.
    c. Coarse Aggregate Size: ASTM C33/C33M, Nos. 57 or 67, unless otherwise approved by CM.

C. Water – Clean, potable.

D. Admixtures:

1. Air-Entraining Admixture: ASTM C260.
2. Water-Reducing Admixture: ASTM C494/C494M, Type A.
3. Water Reducing and Set-Adjusting Admixtures: ASTM C494/C494M, Types D and E.
4. High Range Water-Reducing Admixture: ASTM C494/C494M, Type F/G.
5. Use only admixtures that have been tested and approved in the mix designs.
6. Do not use calcium chloride or admixtures containing chloride ions.

2.02 CONCRETE MIX

A. General:

1. Normal weight: 145 pounds per cubic foot.
2. Use air-entraining admixture in all concrete. Provide not less than four percent, nor more than eight percent, entrained air for concrete exposed to freezing and thawing, and provide from three to five percent entrained air for other concrete.

B. Proportioning and Design of Class “A” Concrete Mix:

1. Minimum compressive strength at 28 days: 4,500 psi.
2. Maximum water-cement ratio by weight: 0.42.
3. Minimum cement content: 564 pounds per cubic yard.

C. Proportioning and Design of Class “B” Concrete Mix:

1. Minimum compressive strength at 28 days: 3,000 psi.
2. Maximum water-cement ratio by weight: 0.50.
3. Minimum cement content: 517 pounds per cubic yard.

D. Slump Limits:

1. Proportion and design mixes to result in concrete slump at point of placement of not less than one inch and not more than four inches.
2. When using high-range water reducers, slump prior to addition of admixture shall not exceed three inches. Slump after adding admixture shall not exceed eight inches at point of placement.

E. Adjustment of Concrete Mixes:

1. Concrete mix design adjustments may be requested by Contractor when warranted by characteristics of materials, Site conditions, weather, test results, or other, similar circumstances.
2. Submit for CM’s approval laboratory test data for adjusted concrete mix designs, including compressive strength test results.
3. Implement adjusted mix designs only after CM’s approval.

2.03 FORM MATERIALS

A. Provide form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection. Contractor shall be responsible for designing the formwork system to resist all applied loads including pressures from fluid concrete and construction loads.

B. Smooth Form Surfaces: Acceptable panel-type to provide continuous, straight, smooth, as-cast surfaces in accordance with ACI 301.

C. Unexposed Concrete Surfaces: Material to suit project conditions.

D. Provide 3/4-inch chamfer at all external corners. Chamfer is not required at re-entrant corners unless otherwise shown or indicated.

E. Form Ties:

1. Provide factory-fabricated, removable, or snap-off metal form ties, that prevent form deflection and prevent spalling of concrete surfaces upon removal. Materials used for tying forms are subject to approval of the CM.
2. Unless otherwise shown or indicated, provide ties so that portion remaining within concrete after removal of exterior parts is at least 1.5 inches from outer surface of concrete. Unless otherwise shown or indicated, provide form ties that, upon removal, will leave a uniform, circular hole not larger than one-inch diameter in the concrete surface.
3. Ties for exterior walls, below-grade walls, and walls subject to hydrostatic pressure shall be provided with waterstops.
4. Wire ties are unacceptable.

2.04 REINFORCING MATERIALS

A. Reinforcing Bars – ASTM A615/A615M, Grade 60 deformed bars.

B. Welded Wire Fabric – ASTM A185/A185M.

C. Steel Wire – ASTM A82/A82M.

D. Provide supports for reinforcing including bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing in place.

1. Use wire bar-type supports complying with CRSI MSP1 recommendations, except as specified in this Section. Do not use wood, brick, or other unacceptable materials.
2. For slabs on grade, use precast concrete blocks, four inches square minimum with compressive strength equal to or greater than the surrounding concrete, or supports with sand plates or horizontal runners where base materials will not support chair legs.
3. For all concrete surfaces where legs of supports are in contact with forms, provide supports having either hot-dip galvanized, plastic-protected, or stainless-steel legs in accordance with CRSI MSP1.
4. Provide precast concrete supports over waterproof membranes.

2.05 RELATED MATERIALS

A. Waterstops:

1. PVC Waterstops:
   a. Manufacturers: Provide products of one of the following:
      1) W.R. Meadows, Inc.
      2) Greenstreak Plastic Products Company.
      3) Or equal.
   b. Waterstops shall comply with CRD-C 572. Do not use reclaimed or scrap material.
   c. Minimum Thickness: 3/8-inch.
   d. Provide waterstops with minimum of seven ribs equally spaced at each end on each side with the first rib located at the edge. Each rib shall be minimum 1/8-inch in height.
   e. Construction Joints: Waterstops shall be six-inch wide flat-strip type.
   f. Expansion Joints: Waterstops shall be nine-inch wide centerbulb type.

2. Hydrophilic Waterstops:
   a. Products and Manufacturers: Provide one of the following:
      1) Duroseal Gasket, by BBZ USA, Inc.
      2) Adeka Ultraseal MC-2010M, by Asahi Denka Kogyo K.K.
      3) Hydrotite, by Greenstreak Plastic Products Company.
      4) Or equal.
   b. Hydrophilic waterstop materials shall be bentonite-free and shall expand by minimum of 80 percent of dry volume in the presence of water to form a watertight joint seal without damaging the concrete in which it is cast.
   c. Waterstop material shall be composed of resins and polymers that absorb water and cause a completely reversible and repeatable increase in volume.
   d. Waterstop material shall be dimensionally stable after repeated wet-dry cycles with no deterioration of swelling potential.
   e. Select material in accordance with manufacturer's recommendations for type of liquid to be contained.
   f. Minimum cross-sectional dimensions: 3/16-inch by 3/4-inch.
   g. Location of hydrophilic waterstops shall be as shown or indicated on the Drawings, or where approved by CM.
   h. Hydrophilic Sealant: Shall adhere firmly to concrete, metal, and PVC in dry or damp condition and be indefinitely elastic when cured.
      1) Products and Manufacturers: Provide one of the following:
         a) Duroseal Paste, by BBZ USA, Inc.
         b) Adeka Ultraseal P-201, by Asahi Denka Kogyo K.K.
         c) Hydrotite, by Greenstreak Plastic Products Company.
         d) Or equal.

B. Vapor Retarder:

1. Products and Manufacturers: Provide one of the following:
   a. Stego Wrap 10-mil Vapor Retarder, by Stego Industries LLC.
   b. Griffolyn 10-mil, by Reef Industries.
   c. Moistop Ultra, by Fortifiber Industries.
   d. Or equal.

2. Vapor retarder membrane shall comply with the following.
   a. Water Vapor Transmission Rate, ASTM E96/E96M: 0.04 perms or lower.
   b. Water Vapor Retarder, ASTM E1745: Meets or exceeds Class C.
   c. Thickness of Retarder (plastic), ACI 302 1R: Not less than 10 mils.
   d. Provide accessories by same manufacturer as vapor retarder.

C. Membrane-Forming Curing Compound – ASTM C309, Type I.

D. Epoxy Bonding Agent:

1. Two-component epoxy resin bonding agent.

2. Products and Manufacturers: Provide one of the following:
   a. Sikadur 32, Hi-Mod LPL, by Sika Corporation.
   b. Eucopoxy LPL, by the Euclid Chemical Company.
   c. Or equal.

E. Epoxy-Cement Bonding Agent:

1. Three-component blended epoxy resin-cement bonding agent.

2. Products and Manufacturers: Provide one of the following:
   a. Sika Armatec 110 EpoCem, by Sika Corporation.
   b. Duralprep A.C., by Euclid Chemical Company.
   c. Or equal.

F. Preformed Expansion Joint Filler:

1. Provide preformed expansion joint filler complying with ASTM D1752, Type I (sponge rubber) or Type II (cork).

G. Joint Sealant and Accessories:

1. For joint sealants and accessories used on isolation joints, control joints, and expansion joints, refer to Section 07 92 00, Joint Sealants.

2.06 GROUT

A. Non-Shrink Grout:

1. Pre-packaged, non-metallic, cementitious grout requiring only the addition of water at the Site.

2. Minimum 28-day Compressive Strength: 7,000 psi.

3. Products and Manufacturers: Provide one of the following:
   a. NS Grout by Euclid Chemical Company.
   b. Set Grout by Master Builders, Inc.
   c. NBEC Grout by Five Star Products, Inc.
   d. Or equal.

B. Epoxy Grout:

1. Pre-packaged, non-shrink, non-metallic, 100 percent solids, solvent-free, moisture-insensitive, three-component epoxy grouting system.

2. Minimum Seven-day Compressive Strength: 14,000 psi, when tested in accordance with ASTM C579.

3. Products and Manufacturers: Provide one of the following:
   a. Euco High Strength Grout, by Euclid Chemical Company.
   b. Sikadur 42, Grout Pak, by Sika Corporation.
   c. Five Star Epoxy Grout, by Five Star Products, Inc.
   d. Or equal.

C. Grout Fill:

1. Grout mix shall consist of cement, fine and coarse aggregates, water, and admixtures complying with requirements specified in this Section for similar materials in concrete.

2. Proportion and mix grout fill as follows:
   a. Minimum Cement Content: 564 pounds per cubic yard.
   b. Maximum Water-Cement Ratio: 0.45.
   c. Maximum Coarse Aggregate size: 1/2-inch, unless otherwise indicated.
   d. Minimum 28-day Compressive Strength: 4,000 psi.

PART 3 – EXECUTION

3.01 INSPECTION

A. Contractor shall examine the substrate and the conditions under which the Work will be performed and notify CM in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.02 FORMWORK

A. Construct formwork in accordance with ACI 347 such that concrete members and structures are of correct size, shape, alignment, elevation, and position.

B. Provide openings in formwork to accommodate the Work of other trades. Accurately place and securely support items required to be built into formwork.

C. Clean and adjust forms prior to placing concrete. Apply form release agents or wet forms as required. Re-tighten forms during and after concrete placing, when required, to eliminate cement paste leaks.

D. Removing Formwork:

1. Comply with ACI 301 and ACI 347, except as otherwise indicated in the Contract Documents.

2. Do not remove formwork and shoring until supported concrete members have acquired minimum of 90 percent of specified compressive strength. Results of suitable quality control tests of field-cured specimens may be submitted to CM for review as evidence that concrete has attained sufficient strength for removal of supporting formwork and shoring prior to removal times indicated in the Contract Documents.

3. Removal time for formwork is subject to the CM's acceptance.

4. Repair form tie-holes following in accordance with ACI 301.

3.03 REINFORCING, JOINTS, AND EMBEDDED ITEMS

A. Comply with the applicable recommendations of Laws and Regulations and standards referenced in this Section, including CRSI MSP1, for details and methods of placing and supporting reinforcing.

B. Clean reinforcing to remove loose rust and mill scale, earth, ice, and other materials which act to reduce or destroy bond between reinforcing material and concrete.

C. Position, support, and secure reinforcing against displacement during formwork construction and concrete placing. Locate and support reinforcing by means of metal chairs, runners, bolsters, spacers, and hangers, as required.

1. Place reinforcing to obtain minimum concrete coverages as shown on the Drawings and as required in ACI 318. Arrange, space, and securely tie bars and bar supports together with 16-gage wire to hold reinforcing accurately in position during concrete placing. Set with ties so that twisted ends are directed away from exposed concrete surfaces.

2. Do not secure reinforcing to formwork using wire, nails or other ferrous metal. Metal supports subject to corrosion shall not be in contact with formed or exposed concrete surfaces.

D. Provide sufficient quantity of supports of strength required to carry reinforcing. Do not place reinforcing more than two inches beyond the last leg of continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

E. Splices: Provide standard reinforcing splices by lapping ends, placing bars in contact, and tying tightly with wire. Comply with requirements shown or indicated for minimum lap of spliced bars, as shown on the Drawings.

F. Install welded wire fabric in lengths as long as practical, lapping adjoining sections a minimum of one full mesh.

G. Do not place concrete until reinforcing is inspected and CM indicates that conditions are acceptable for placing concrete. Concrete placed in violation of this paragraph will be rejected. Notify the CM in writing at least two working days prior to proposed concrete placement.

H. Joints:

1. Provide construction, isolation, expansion, and control joints as indicated or required. Locate construction joints so as to not impair the strength and appearance of the structure. Place isolation and control joints in slabs-on-grade to stabilize differential settlement and random cracking.

2. In walls, locate joints at a maximum spacing of 40 feet and approximately 12 feet from corners.

3. In foundation slabs and slabs-on-grade, locate joints at intervals of approximately 40 feet.

4. In mats and structural slabs and beams, locate joints in compliance with ACI 224R.

5. Locations of joints shall be in accordance with the Contract Documents and as approved by CM in the Shop Drawings.

6. Where construction joints are indicated to be roughened, intentionally roughen surfaces of previously placed concrete to amplitude of 1/4-inch.

I. Installation of Embedded Items: Set and build into the Work anchorage devices and embedded items required for other Work that is attached to, or supported by, cast-in-place concrete. Use setting diagrams, templates, and instructions provided under other Sections and, when applicable, other contracts for locating and setting. Refer to Paragraph 1.1.B of this Section. Do not embed in concrete uncoated aluminum items. Where aluminum items are in contact with concrete surfaces, coat aluminum to prevent direct contact with concrete.

J. Adhesive Dowels:

1. Adhesive dowels shall be reinforcing bar dowels set in an adhesive in hole drilled into hardened concrete. Comply with adhesive system manufacturer's installation instructions regarding hole diameter, drilling method, embedment depth required to fully develop required tensile strength, and hole cleaning and preparation instructions. Unless more-stringent standards are required by adhesive system manufacturer, comply with the following.

2. Drill holes to adhesive system manufacturer's recommended diameter and depth to develop required tensile strength. Holes shall not be more than 1/4-inch greater than nominal bar diameter, and hole depth shall not be less than twelve times nominal bar diameter. Hammer-drill holes. Cored holes are not allowed.

3. Embedment depths shall be based on concrete compressive strength of 2,000 psi when embedded in existing concrete, and 4,000 psi when embedded in new concrete.

4. Determine location of existing reinforcing steel in vicinity of proposed holes prior to drilling. Adjust location of holes to be drilled to avoid drilling through or damaging existing reinforcing bars only when approved by CM.

5. Before setting adhesive dowel, hole shall be free of dust and debris using method recommended by adhesive system manufacturer. Hole shall be brushed, with manufacturer-approved brush and blown clean with clean, dry, oil-free compressed air to remove dust and loose particles. Hole shall be dry as defined by adhesive system manufacturer.

6. Inject adhesive into hole through injection system mixing nozzle and necessary extension tubes, placed to bottom of hole. Withdraw discharge end as adhesive is placed but keep end of tube immersed to prevent forming air pockets. Fill hole to depth that ensures that excess material is expelled from hole during dowel placement.

7. Twist dowels during insertion into partially filled hole to guarantee full wetting of bar surface with adhesive. Insert bar slowly to avoid developing air pockets.

3.04 CONCRETE PLACING

A. Site Mixing: Use drum-type batch machine mixer, mixing not less than 1.5 minutes for one cubic yard or smaller capacity. Increase required mixing time by minimum of 15 seconds for each additional cubic yard or fraction thereof.

B. Ready-Mixed Concrete: Comply with ASTM C94/C94M.

C. Concrete Placing:

1. Place concrete in a continuous operation within planned joints or sections in accordance with ACI 304R.

2. Do not begin placing concrete until work of other trades affecting concrete is completed.

3. Wet concrete and subgrade surfaces to saturated surface dry condition immediately prior to placing concrete.

4. Deposit concrete as near its final location as practical to avoid segregation due to re-handling or flowing.

5. Avoid separation of the concrete mixture during transportation and placing. Concrete shall not free-fall for distance greater than four feet during placing.

6. Complete concrete placing within 90 minutes of addition of water to the dry ingredients.

D. Consolidate placed concrete in accordance with ACI 309R using mechanical vibrating equipment supplemented with hand rodding and tamping, such that concrete is worked around placing and other embedded items and into all parts of formwork. Insert and withdraw vibrators vertically at uniformly spaced locations. Do not use vibrators to transport concrete within the formwork. Vibration of formwork or placing is not allowed.

E. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing.

1. In hot weather, comply with ACI 305R.

2. In cold weather, comply with ACI 306R.

3.05 QUALITY OF CONCRETE WORK

A. Make concrete solid, compact, smooth, and free of laitance, cracks, and cold joints.

B. Concrete for liquid-retaining structures and concrete in contact with earth, water, or exposed directly to the elements shall be watertight.

C. Cut out and properly replace to extent directed by CM, or repair to satisfaction of CM, surfaces that contain cracks or voids, are unduly rough, or are in defective in any way. Patches or plastering are unacceptable.

D. Repair, removal, and replacement of defective concrete directed by CM.

3.06 CURING

A. Begin initial curing as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 72 hours. Continue curing by using moisture-retaining cover or membrane-forming curing compound. Cure formed surfaces by moist curing until formwork is removed. Provide protection, as required, to prevent damage to exposed concrete surfaces. Total curing period shall not be less than seven days. Curing methods and materials shall be compatible with scheduled finishes.

3.07 FINISHING

A. Slab Finish:

1. After placing concrete slabs, do not work the surface further until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently. Use a wood float only. Check and level surface plane to a tolerance not exceeding 1/4-inch in ten feet when tested with a ten-foot straightedge placed on the surface at not less than two different angles. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, re-float the surface to a uniform, smooth, granular texture. Slab surfaces shall receive a float finish. Provide additional trowel finishing as required in this Section.

2. After floating, begin first trowel finish operation using power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over the surface.

3. Consolidate concrete surface by the final hand troweling operation. Finish shall be free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8-inch in ten feet when tested with a ten-foot straightedge. Grind smooth surface defects that would telegraph through applied floor covering system.

4. Use trowel finish for the following:
    a. Interior exposed slabs, unless otherwise shown or indicated.
    b. Apply non-slip broom finish, after troweling, to exterior concrete slab and elsewhere as shown.

B. Apply chemical floor hardener to exposed interior concrete floor areas when cured and dry, in accordance with hardener manufacturer's instructions.

C. Formed Finish:

1. Provide smooth form concrete finish at exposed surfaces. Use largest practical form panel sizes to minimize form joints. Exposed surfaces include interior water-contacting surfaces of tanks, whether or not directly visible. All surfaces shall be considered as exposed, unless buried or covered with permanent structural or architectural material. After removing forms, patch form tie holes and defects in accordance with ACI 301. Remove fins exceeding 1/8-inch in height. Where surface will be coated or will receive further treatment, remove all fins flush with concrete surface.

2. Provide rough form finish at all unexposed surfaces. After removing forms, patch form tie holes and defects in accordance with ACI 301. Remove fins exceeding 1/2-inch in height.

3.08 GROUT PLACING

A. Place grout as shown and indicated, and in accordance with grout manufacturer's instructions and recommendations. If grout manufacturer's instructions conflict with the Contract Documents, notify CM and do not proceed until obtaining CM's clarification.

B. Dry packing is not allowed, unless otherwise indicated.

C. Manufacturers of proprietary grout materials shall make available upon 72 hours' notice the services of qualified, full-time, factory-trained employee to aid in ensuring proper use of grout materials at the Site.

D. Placing grout shall comply with temperature and weather limitations described in Article 3.4 of this Section.

3.09 FIELD QUALITY CONTROL

A. Site Testing Services:

1. Contractor shall employ independent testing laboratory to perform field quality control testing for concrete. CM will direct where samples are obtained.

2. Testing laboratory will provide all labor, material, and equipment required for sampling and testing concrete, including: scale, glass tray, cones, rods, molds, air tester, thermometer, and other incidentals required.

3. Contractor shall provide curing and necessary cylinder storage.

B. Quality Control Testing During Construction:

1. Perform sampling and testing for field quality control during concrete placing, as follows:
    a. Sampling Fresh Concrete: ASTM C172.
    b. Slump: ASTM C143/C143M; one test for each concrete load at point of discharge.
    c. Concrete Temperature: ASTM C1064/C1064M; one for every two concrete loads at point of discharge, and when a change in the concrete is observed. Test each load when time from batching to placement exceeds 75 minutes.

d. Air Content: ASTM C231; one for every two concrete loads at point of discharge, and when a change in the concrete is observed.
e. Unit Weight: ASTM C138/C138M; one for every two concrete loads at point of discharge, and when a change in the concrete is observed.
f. Compression Test Specimens:
    1) In accordance with ASTM C31/C31M, make one set of compression cylinders for each 50 cubic yards of concrete, or fraction thereof, of each mix design placed each day. Each set shall be four standard cylinders, unless otherwise directed by CM.
    2) Cast, store, and cure specimens in accordance with ASTM C31/C31M.
g. Compressive Strength Tests:
    1) In accordance with ASTM C39/C39M, one specimen tested at seven days, and three specimens tested at 28 days.
    2) Concrete that does not comply with strength requirements will be considered as defective Work.
h. Submit test results from certified by testing laboratory to CM within 24 hours of completion of test.
i. When there is evidence that strength of in-place concrete does not comply with the Contract Documents, Contractor shall employ the services of concrete testing laboratory to obtain cores from hardened concrete for compressive strength determination. Cores and tests shall comply with ASTM C42/C42M and the following:
    1) Testing of Adhesive Dowels: Contractor will employ testing agency to perform field quality control testing of drilled dowel installations. After adhesive system manufacturer's recommended curing period and prior to placing connecting reinforcing, proof-test for pullout ten percent of adhesive dowels installed. Adhesive dowels shall be tensioned to 60 percent of specified yield strength. Where dowels are located less than six bar diameters from edge of concrete, CM will determine tensile load required for test. If one or more dowels fail, retest all dowels installed for the Work. Dowels that fail shall be reinstalled and retested at Contractor's expense.

- END OF SECTION -

SECTION 22 10 00 – POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, tools, supervision, transportation, and installation equipment necessary for installation of all polyvinyl chloride (PVC) pipe, fittings, and appurtenances as specified herein for the underdrain system and miscellaneous connections, as shown on the Drawings.

B. The Contractor shall be prepared to install PVC pipe and fittings in conjunction with the earthwork and other project components.

C. The work shall include procurement, installation, connection, and testing of all piping.

1.02 WARRANTY

A. The Contractor shall furnish the CM written warranties obtained from the manufacturer and the installer against defects in materials and workmanship in accordance with ASTM D 1785 and ASTM D 2464. Warranty conditions proposed by the manufacturer or installer concerning limits of liability will be evaluated and must be acceptable to the CM.

1.03 SUBMITTALS

A. The Contractor shall submit to the CM for approval within 14 days prior to the start of pipe work, complete, detailed shop drawings of all PVC pipe and fittings, a list of materials to be furnished, and the name of the pipe manufacturer.

B. The Contractor shall submit to the CM the PVC pipe manufacturer's certification of compliance with this Technical Specification.

C. In addition to the certification in Part 1.04 above, the Contractor shall submit to the CM the following documentation from the PVC pipe manufacturer on the raw materials used to manufacture the PVC pipe and fittings:

1. Certificate stating the specific PVC compound, its source, and the information required by ASTM D 1248.
2. Certificate stating that no recycled resin was used in manufacturing the pipe except for a small percentage of resin generated in the pipe Manufacturer's own plant from production using the same new resin as the recycled resin.

PART 2 – PRODUCTS

2.01 POLYVINYL CHLORIDE (PVC) COMPOUND

A. The PVC pipe and fittings shall be manufactured from Type I, Grade 1, PVC conforming to ASTM D 1784 and 1785.

2.02 PVC PIPES AND FITTINGS

A. PVC pipe shall be supplied in standard laying lengths not exceeding 40 feet.

B. PVC pipe shall be furnished perforated, as specified on the Drawings. If pipes are manufactured unperforated and are to be installed perforated, then perforations shall be drilled into the pipe prior to delivery to the site. Perforations shall consist of 0.020-inch width slots, made by the manufacturer. Other methods of perforating pipes may be proposed by the Contractor.

C. PVC pipes and fittings shall be homogeneous throughout and free of visible cracks, holes (other than intentional manufactured perforations), foreign inclusions, or other deleterious effects, and shall be uniform in color, density, melt index, and other physical properties.

D. Fittings at the ends of pipes shall consist of PVC end caps unless indicated otherwise on the Drawings.

E. PVC pipe shall be 4-inch diameter, Schedule 40.

2.03 IDENTIFICATION

The following shall be continuously indent printed on the pipe, or spaced at intervals not exceeding 5 feet:

1. Name and/or trademark of the pipe manufacturer;
2. Nominal pipe size;
3. Schedule;
4. Manufacturing Standard Reference (e.g., ASTM D 1785); and
5. A production code from which the date and place of manufacture can be determined.

2.04 TRANSPORTATION

Transportation of PVC pipe and fittings shall be the responsibility of the Contractor. The Contractor shall be liable for all damage to the PVC pipe and fittings incurred prior to and during transportation to the site.

PART 3 – EXECUTION

3.01 HANDLING AND PLACEMENT

A. The Contractor shall exercise care when transporting, handling and placing PVC pipe and fittings, such that they will not be cut, kinked, twisted, or otherwise damaged.

B. Ropes and fabric or rubber-protected slings and straps shall be used as necessary when handling PVC pipe. Slings, straps, etc. shall not be positioned at joints. Chains, cables, or hooks shall not be inserted into the pipe ends as a means of handling pipe.

C. Pipe or fittings shall not be dropped onto rocky or unprepared ground. Under no circumstances shall pipe or fittings be dropped into trenches or dragged over sharp and cutting objects.

D. PVC pipe shall be stored on clean level ground, preferably turf or sand, free of sharp objects which could damage the pipe. Stacking shall be limited to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperature conditions. Where

necessary, due to ground conditions, the pipe shall be stored on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with the sleeper or between supports. The pipes should be stored out of direct sunlight.

E. The maximum allowable depth of cuts, gouges, or scratches on the exterior surface of PVC pipe or fittings is 10 percent of the wall thickness. The interior of the pipe and fittings shall be free of cuts, gouges, and scratches. Sections of pipe with excessive cuts, gouges, or scratches shall be removed and the ends of the pipe rejoined.

F. Whenever pipe installation activities are not actively in progress, the open end of pipe that has been placed shall be closed using a watertight plug.

3.02 INSTALLATION

A. All PVC pipe and fittings shall be installed in accordance with the manufacturer's instructions.

B. The Contractor shall carefully examine all pipe and fittings for cracks, damage, or defects before installation. Defective materials shall be immediately removed from the site and replaced.

C. The interior of all pipe and fittings shall be inspected, and any foreign material shall be completely removed from the pipe interior before it is moved into final position.

D. Field-cutting of pipes, where required, shall be made with a machine specifically designed for cutting pipe. Cuts shall be carefully made, without damage to pipe or lining, so as to leave a smooth end at right angles to the axis of pipe. Cut ends shall be tapered and sharp edges filed off smooth. Flame cutting will not be allowed.

E. All pipe and fittings shall be laid or placed to the lines and grades shown on the Drawings with bedding and backfill shown on the Drawings and as specified in this Section.

F. No pipe shall be laid until the CM has approved the bedding conditions.

G. No pipe shall be brought into position until the preceding length has been bedded and secured in its final position.

H. Blocking under piping shall not be permitted unless specifically accepted by the CM for special conditions.

I. The Contractor shall provide all necessary adapters and/or connection pieces required when connecting different types and sizes of pipe or when connecting pipe made by different manufacturers.

3.03 JOINTS AND CONNECTIONS

A. Mechanical connections of PVC pipe to auxiliary equipment such as valves, flow meters, pumps, and tanks shall be as described in the section of the specifications that address the auxiliary equipment.

- END OF SECTION -

SECTION 26 05 05 – GENERAL PROVISIONS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. Scope.

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals shown, specified, and required to complete the electrical Work, which includes but is not limited to:
   a. Providing the design and installation of all electrical and control system components and equipment for the leachate pumping, conveyance, storage, and monitoring system(s), infrastructure for future operations office and security trailers, Site lighting, and Site entrance gate system.

2. The scope of Work for this project primarily includes, but is not limited to, the following:
   a. Electrical design and installation of new electrical equipment associated with the leachate removal system within the leachate collection sumps and leachate riser vaults;
   b. Electrical design and installation of new electrical equipment associated with structures for the leachate conveyance system, including leachate riser vaults, leachate junction manholes, leachate conveyance manholes, and the valve house;
   c. Electrical design and installation of new electrical equipment associated with the leachate storage system, including the storage tanks and truck loadout facility;
   d. Electrical design and installation of new electrical equipment within the future operations trailer complex;
   e. Electrical design and installation of new electrical equipment associated with the guard house and motorized site entrance gate;
   f. Electrical design and installation of site roadway lighting fixtures;
   g. Supply and installation of new manual transfer switch and twist-lock generator tap box.
   h. Design and installation of above and underground materials, equipment, and components associated with the project electrical systems including, but not limited to, pole bases/foundations, supports, encasements, pull boxes, junction boxes, conduits, wire conductors, etc.; and
   i. Supply and installation of all equipment as shown on Design Drawing UC-4E Electrical and Communications Site Plan and described in this specification.

B. Coordination.

1. Review installation procedures and schedules for possible work performed by others and coordinate with other contractors as required for the installation of electrical items to be installed with or within formwork, walls, partitions, ceilings, and panels constructed by other contractors.
   a. Furnish as required by other contractors detailed drawings or sketches of the locations of conduits and other built-in items.
   b. Coordinate with other contractors regarding progress of construction where conduits and built-in items will be installed. Install conduits and built-in items in a manner that does not delay Work of other contractors.

2. Coordination and Intent of Design Drawing UC-4E Electrical and Communications Site Plan:
   a. CONTRACTOR to verify the dimensions of equipment and materials furnished to space available at the Site and allocated to the equipment and materials.
   b. The Design Drawing shows the principal elements of the electrical systems and is not intended as a detailed working Drawing. The drawing supplements and complements the Specifications and other Contract Documents relative to principal features of electrical communication systems.
   c. Equipment and devices provided under this Contract shall be properly connected and interconnected with other equipment and devices for successful operation of complete

systems whether all connections and interconnections are specifically mentioned or shown in the Contract Documents.

d. The Design Drawings are provided for the CONTRACTOR's guidance in fulfilling the intent of the Contract Documents. CONTRACTOR shall comply with Laws and Regulations, including safety and electrical codes, and provide materials, equipment, appurtenances, and specialty items necessary for complete and operable systems.

C. Related Sections.

1. Concrete for pads, manholes, duct banks, pole bases and conduit encasement shall comply with Section 03 – Concrete.

2. Excavation and filling associated with buried electrical Work shall comply with Section 31 23 00 – Excavation and Fill.

1.02 QUALITY ASSURANCE

A. Qualifications.

1. Electrical Subcontractor:
   a. Electrical Subcontractor shall have not less than five years' experience installing electrical systems of the types required for the Project.
   b. Electrical Subcontractor shall possess a valid electricians' and contractors' license in the jurisdiction where the Site is located.
   c. Submit the following information for not less than three successful, completed projects: project name and location; year completed; name and contact information for: prime contractor for whom electrical Subcontractor worked, project owner, and the project engineer or architect, including addresses and telephone numbers.

2. Electrical Contractor:
   a. Electrical contractor shall prepare complete point-to-point interconnection wiring diagrams. Diagrams shall identify all external interconnecting wiring associated with new or modified existing equipment.
   b. Qualifications: Electrical Contractor shall be experienced in developing diagrams of the type required and shall have served in a similar wiring coordinator role on a completed project of similar size and complexity to the Project.
   c. Responsibilities:
      1) Develop Design Drawings that include single lines, power, communications, and lighting plans. Design Drawings will also include panel schedules and detail sheets.
      2) Develop Division 26 Specifications and all specifications sections associated with the design and installation of the power and communication systems.
      3) Develop diagrams for performing the Work and to document terminations. Prepare diagrams per this Section.
      4) Use information obtained from approved Shop Drawings and approved CONTRACTOR's other submittals, record drawings, and field inspections as needed to complete the diagrams.

B. Component Supply and Compatibility.

1. Materials and equipment similar to each other shall be from the same manufacturer for uniformity unless otherwise confirmed to be compatible.

C. Regulatory Requirements.

1. CONTRACTOR is responsible for coordinating with Eversource Energy, State, Local, and National regulatory requirements to obtain and pay for all permits, licenses, and inspection fees required to complete the electrical Work.

1.03 SUBMITTALS

A. General.

1. To the extent practical, submit Shop Drawings and other CONTRACTOR submittals for each Specification Section into the smallest number of submittals possible. Do not furnish partial submittals.

2. Review of equipment submittals does not relieve CONTRACTOR of responsibility for providing complete and successfully operating systems.

3. Shop Drawings and other CONTRACTOR submittals shall be submitted in Adobe Portable Document Format (PDF) and shall be searchable.

B. Action Submittals. Submit the following:

1. Shop Drawings:
   a. Internal wiring diagram and drawings indicating all connections to components and numbered terminals for external connections;
   b. Dimensioned plan, section, elevations, and panel layouts showing means for mounting, conduit connection, and grounding;
   c. List of components including manufacturer's name and catalog number (or part number) for each; and
   d. Point-to-point interconnection wiring diagrams.

2. Product Data:
   a. Manufacturer's name and product designation or catalog number;
   b. Electrical ratings;
   c. Manufacturer's technical data and specifications;
   d. Manufacturer's indication of compliance with applicable reference standards; and
   e. Painting and coating systems proposed.

3. Test Procedures: Proposed testing procedures and testing limitations for source quality control testing and field quality control testing.

C. Informational Submittals. Submit the following:

1. Manufacturers' Instructions:
   a. Installation data and instructions; and
   b. Instructions for handling, start-up, and troubleshooting.

2. Source Quality Control Submittals: Results for required shop testing.

3. Field Quality Control Submittals: Results for required field testing.

4. Qualifications:
   a. Electrical Subcontractor; and
   b. Wiring coordinator, including information required of wiring coordinator in Paragraph 1.2.A of this Section.

D. Closeout Submittals. Submit the following:

1. Record Documentation:
   a. System Record Drawings. Include the following:
      1) One-line wiring diagram of the electrical distribution system;
      2) Actual, in-place conduit and cable layouts with schedule of conduit sizes and number, and size of conductors;
      3) Layouts of power and lighting arrangements and the grounding system;

4) Control schematic diagrams, with terminal numbers and control devices identified, for all equipment; and
5) As Built Electrical Drawings.

b. Point-to-Point Interconnection Wiring Diagram Drawings. Include the following:
1) External wiring for each piece of equipment, panel, instrument, other devices & wiring to control stations, lighting panels, and motor controllers;
2) Numbered terminal block identification for each wire termination;
3) Identification of the assigned wire numbers for all interconnections;
4) Identification of wiring by the conduit tag in which the wire is installed;
5) Terminal, junction, and pull boxes through which wiring is routed; and
6) Identification of equipment and the submittal transmittal number for equipment from which wiring requirements and termination information were obtained.

c. Record documents shall indicate final equipment and field installation information.

PART 2 – PRODUCTS

2.01 PERFORMANCE CRITERIA

A. Electrical equipment shall be capable of operating successfully at full-rated load, without failure, with ambient outside air temperature of 20 degrees F to 104 degrees F and an elevation of 2,000 feet above mean sea level. Verify against actual elevation, as shown on the contract drawings, prior to procurement of equipment.

B. Unless specified otherwise, electrical equipment shall have ratings based on 75 degrees C terminations for Low Voltage equipment and 90 degrees C terminations for Medium Voltage equipment.

C. For all equipment to be installed outdoors, provide locking NEMA 4X rated cabinet. On a location-by-location basis, the CONTRACTOR will provide the recommended model and specifications of cabinet to meet various environmental conditions.

D. All cabinets requiring keys will be keyed the same System-wide.

2.02 ELECTRICAL SYSTEMS

A. Leachate Riser Vault Equipment.

1. Electric Unit Heater:
   a. Unit shall be sized for vault building structure shown on the project Design Drawings.
   b. Unit shall maintain a temperature within the vault building of not less than 50 degrees F.
   c. Provide structure interior temperature sensor with remote monitoring via programmable logic controller (PLC)/operator interface terminal (OIT) system.

2. Exhaust Fan:
   a. Unit shall be sized for vault building structure shown on the design drawings.
   b. Unit to provide controlled (automated) interior ventilation of vault structure when temperatures are above 75 degrees F.

3. Interior Light:
   a. Unit shall provide illumination sufficient to allow for access and general maintenance work within the building during day and nighttime hours.
   b. Unit shall be a motion sensor type that activates upon entry of the vault building. Unit shall remain lit for a period following when motion inside the vault building ceases.
   c. Unit shall be an LED type.

4. Exterior Light:
    a. Unit shall provide illumination of vault building exterior at entryway sufficient to allow for visible, safe access to and from the building during nighttime hours.
    b. Unit shall be motion sensor type that activates upon walkup to the vault building. Unit shall remain lit for a period following when motion outside the vault building ceases.
    c. Unit shall be an LED type.
5. Receptacle:
    a. Provide plug-in type electrical service for maintenance tools and equipment.
    b. Receptacles shall be 120V, 20A, duplex, self-test, ground fault circuit interrupter (GFCI) type.
    c. At least one non-dedicated unit shall be provided for general use purposes.
    d. Additional dedicated units shall be provided as required for equipment.
    e. Receptacles shall be located inside the vault building at a standard height above the floor.
6. Submersible Pump with Float Switch:
    a. Float switch shall be compatible with the submersible pump and allow for automated pump activation and shut off in the event of liquid accumulation within the specified manhole.
    b. Pump unit shall be ½ HP, 120V unit.
    c. Pump to utilize integral float switch for pump activation.
7. Leak Detection Sensor:
    a. Unit shall detect any liquid accumulation within the specified manhole located inside the vault building.
    b. Unit shall be connected to leachate management programmable logic controller PLC/OIT system communication line to allow for remote electronic monitoring.
8. Primary Leachate Pump:
    a. Unit shall remove leachate from cell primary leachate collection sump as shown on the design drawings.
    b. Primary pump shall be a Godwin GSP130HH (13 horsepower, 480V, three phase, high head, constant speed) or approved equivalent.
    c. Power supply lines for pump and connections shall allow for removal of pump from riser pipe shown on the design drawings for maintenance purposes.
    d. Primary pump to be connected to leachate management programmable logic controller (PLC)/operator interface terminal (OIT) system communication line to allow for remote electronic monitoring.
9. Secondary Leachate Pump:
    a. Unit shall remove leachate from cell secondary leachate collection sump as shown on the design drawings.
    b. Secondary pump shall be a Godwin GSP80HH (8 horsepower, 480V, three phase, high head, constant speed) or approved equivalent.
    c. Power supply lines for pump and connections shall allow for removal of pump from riser pipe shown on the design drawings for maintenance purposes.
    d. Secondary pump to be connected to leachate management programmable logic controller (PLC)/operator interface terminal (OIT) system communication line to allow for remote electronic monitoring.

B. Valve House Equipment.

1. Electric Unit Heater:
    a. Unit shall be sized for vault building structure shown on the Drawings.
    b. Unit shall maintain a temperature within the vault building of not less than 50 degrees F.
    c. Provide structure interior temperature sensor with remote monitoring via PLC/OIT system.

2. Exhaust Fan:
   a. Unit shall be sized for vault building structure shown on the design drawings.
   b. Unit to provide controlled (automated) interior ventilation of vault structure when temperatures are above 75 degrees F.

3. Interior Light:
   a. Unit shall provide illumination sufficient to allow for access and general maintenance work within the building during day and nighttime hours.
   b. Unit shall be a motion sensor type that activates upon entry of the vault building. Unit shall remain lit for a period following when motion inside the vault building ceases.
   c. Unit shall be an LED type.

4. Exterior Light:
   a. Unit shall provide illumination of vault building exterior at entryway sufficient to allow for visible, safe access to and from the building during nighttime hours.
   b. Unit shall be motion sensor type that activates upon walkup to the vault building. Unit shall remain lit for a period following when motion outside the vault building ceases.
   c. Unit shall be an LED type.

5. Receptacle:
   a. Provide plug-in type electrical service for maintenance tools and equipment.
   b. Receptacles shall be 120V, 20A, duplex, self-test, ground fault circuit interrupter (GFCI) type.
   c. At least one non-dedicated unit shall be provided for general use purposes.
   d. Additional dedicated units shall be provided as required for equipment.
   e. Receptacles shall be located inside the vault building at a standard height above the floor.

6. Submersible Pump with Float Switch:
   a. Float switch shall be compatible with the submersible pump and allow for automated pump activation and shut off in the event of liquid accumulation within the specified manhole.
   b. Pump unit shall be ½ HP, 120V unit.
   c. Pump to utilize integral float switch or pump activation.

7. Leak Detection Sensor:
   a. Unit shall detect any liquid accumulation within the specified manhole located inside the vault building.
   b. Unit shall be connected to leachate management PLC/OIT system communication line to allow for remote electronic monitoring.

8. Truck loading pump
   a. Pump unit (P-400) shall be an end-suction centrifugal pump capable of 300 gallons per minute (gpm) flow at a total dynamic head of 75 feet with stainless steel materials of construction, Teflon or Viton seals, and a 460V, 3-phase TEFC motor appropriate for variable frequency drive operation.

9. Automated (Actuated) Gate Valves
   a. Actuated gate valves shall be non-rising stem design of stainless-steel construction with flanged connections and a square nut operator.
   b. Valve actuators shall be Auma model SA (or equal) multi-turn actuator appropriate for selected actuated gate valves.
   c. Valves to be operated by PLC/OIT system.
   d. Valves shall function in coordination with the truck loadout pump control panel.

C. Leachate Junction Manhole Equipment.

1. Leak Detection Sensor:
   a. Unit shall detect any liquid accumulation within the specified manhole located inside the vault building.
   b. Unit shall be connected to leachate management PLC/OIT system communication line to allow for remote electronic monitoring.

D. Leachate Conveyance Manhole Equipment.

1. Leak Detection Sensor:
   a. Unit shall detect any liquid accumulation within the specified manhole located inside the vault building.
   b. Unit shall be connected to leachate management PLC/OIT system communication line to allow for remote electronic monitoring.

E. Operations Trailer Equipment (7 package trailer units provided by others).

1. HVAC System.
2. Interior Lighting.
3. Exterior Lighting of Entryway.
4. Interior Receptacles (Multiple).
5. Communication Line.

F. Guard House Trailer Equipment (1 package trailer unit provided by others).

1. HVAC System.
2. Interior Lighting.
3. Exterior Lighting of Entryway.
4. Interior Receptacles (Multiple).
5. Communication Line.

G. Motorized Entrance Gate System Equipment.

1. Entrance gate system will be comprised of two separate cantilever electric motorized sliding gate sections, each providing a minimum clear opening width of 22 feet on both the Site inbound and outbound sides of the entrance drives. Dual posts may be used at the center closure point for the received latch fixtures. The ground surface to bottom of gate fencing clearance shall be approximately 4 inches.
2. The system will include a touch pad control panel with a call button and speaker (connected to future guard house trailer unit) to be installed on the inbound drive side of the entrance.
3. The system will include a remote gate opener that activates each drive side gate (to be operated from the future guard house trailer unit).
4. The system will include a subsurface loop detector on the outbound drive side that opens the outbound gate with provision for automatic delayed gate closure following vehicle exit (an optical eye safety device to be installed that prevents unintentional gate closures).

H. Emergency Backup Power System Equipment.

1. Provide 480V service rated manual transfer switch (MTS), and twist-lock generator tap box, sized for the capacity of the electric utility service. MTS and generator tap box shall be installed in a location with adequate space for a portable generator to be connected to provide backup power in the event of an electric utility power failure.

I. Roadway Lighting Equipment.

1. Fixtures shall be pole mounted with cutoff lenses to reduce light pollution to surrounding areas. Provide lighting calculations to determine fixture type, quantities, and locations to provide adequate roadway lighting.

2. Fixtures shall be 480V, and photocell controlled.

3. Poles shall be corrosion-resistant, galvanized steel or aluminum. Wood poles are not acceptable.

2.03 TESTING LABORATORY LABELS

Electrical material and equipment shall bear the label of Underwriters' Laboratories, Inc., or other nationally recognized, independent testing laboratory, where standards have been established and label service applies and approved by the authority having jurisdiction.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine conditions under which 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 Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General.

1. Install materials and equipment in accordance with the Contract Documents, Laws, and Regulations, approved (and accepted, as applicable) Shop Drawings and other CONTRACTOR submittals, and manufacturer’s recommendations.

2. Provide tools and equipment required to trace circuits necessary for proper execution of the Work.

3. Define and identify all wiring, circuit terminations, and equipment to be modified to ensure proper interface of components. The Contract Price includes all costs associated with field services specified for a complete and functional system.

3.3 FIELD QUALITY CONTROL

A. Field Quality Control – General.

1. CONTRACTOR shall hire an independent inspection and testing firm, acceptable to the CM to perform all required on-site construction inspections.

2. Perform field quality control for electrical Work in accordance with the Contract Documents.

B. Site Tests.

1. Prior to requesting certificate of Substantial Completion, demonstrate to CM those electrical systems and electrically operated equipment installed or modified under the Contract operates in accordance with the Contract Documents and operates as required.

C. Perform the following operational tests on electrical systems.

1. Operate power circuits to verify proper operation and connection to electrical systems materials and equipment, including mechanical key-interlocks for circuit breakers.

2. Operate control circuits, including pushbuttons, indicating lights, and similar devices, to verify proper connection and function. Operate all devices, such as pressure switches, flow switches, and similar devices, to verify that shutdowns and control sequences operate as required.

3. Operate lighting systems and receptacle devices to verify proper operation and connections.

D. Manufacturer's Services.

1. Furnish at the Site qualified, factory-trained representative(s) of equipment manufacturers for the services indicated in the Contract Documents.

- END OF SECTION -

SECTION 31 05 05 – CORRUGATED HDPE PIPE

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to install all buried piping and culverts.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before buried piping Work.

C. Related Sections:

1. Section 31 23 05 – Excavation and Fill.

1.02 REFERENCES

A. Standards referenced in this Section are:

1. ASTM F2306 – Standard Specification for 12” to 60” Annular Corrugated Profile Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications.
2. ASTM F2648 – Standard Specification for 2” to 60” Annular Corrugated Profile Wall Polyethylene (PE) Pipe and Fittings for Land Drainage Applications.
3. ASTM D2321- Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and other Gravity-Flow Applications.
4. ASTM D3212 – Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
5. ASTM F477 – Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
6. ASTM F2487 – Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Corrugated High-Density Polyethylene and Polypropylene Pipelines.
7. ASTM F1417 – Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air.
8. ASTM F3058 – Standard Practice for Preliminary Field Testing of Thermoplastic Pipe Joints for Gravity Flow (Non-Pressure) Sewer Lines.
9. AASHTO M252 – Standard Specification for Corrugated Polyethylene Drainage Pipe.

1.03 SUBMITTALS

A. Action Submittals – Submit the following:

1. Shop Drawings:
   a. Full details of piping, joints, and connections to piping, equipment, and appurtenances.
2. Product Data:
   a. Manufacturer’s literature and specifications, as applicable, for products specified in this Section.

B. Informational Submittals – Submit the following:

1. Certificates:
   a. Certificate signed by manufacturer of each product certifying that product conforms to applicable referenced standards.

C. Closeout Submittals – Submit the following:

1. Record Documentation:
   a. Maintain accurate and up-to-date record documents showing modifications made in the field, in accordance with approved submittals, and other Contract modifications relative to buried piping Work. Submittal shall show actual location of all piping Work and appurtenances at same scale as the Drawings.
   b. Show piping with elevations referenced to Project datum and dimensions from permanent structures. For each horizontal bend in piping, include dimensions to at least three permanent structures, when possible. For straight runs of piping provide offset dimensions as required to document piping location.
   c. Include profile drawings with buried piping record documents when the Contract Documents include piping profile drawings.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.
2. Upon delivery inspect pipe and appurtenances for cracking, gouging, chipping, denting, and other damage and immediately remove from Site and replace with acceptable material.

B. Storage:

1. Store materials to allow convenient access for inspection and identification. Store material off ground using pallets, platforms, or other supports. Protect packaged materials from corrosion and deterioration.
2. The inside of pipes shall be kept free of dirt and debris. Store pipe in a manner that provides protection from construction activities.
3. Limit stacking to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperature conditions.
4. Cover stockpiled pipe to protect from ultraviolet degradation.

C. Handling:

1. Handle pipe and accessories carefully in accordance with pipe manufacturer's recommendations. Do not drop or roll material off trucks. Do not drop, roll or skid piping.
2. Avoid unnecessary handling of pipe.
3. Keep pipe interiors free from dirt and foreign matter.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Piping materials are specified in the Buried Piping Schedule at end of this Section.

B. General:

1. Pipe Markings:
   a. Manufacturer shall cast or paint on each length of pipe and each fitting pipe material, diameter, and pressure or thickness class.

PART 3 – EXECUTION

3.01 INSTALLATION

A. General:

1. Install piping as shown, specified, and as recommended by pipe and fittings manufacturer.
2. In event of conflict between manufacturer's recommendations and the Contract Documents, request interpretation from CM before proceeding.
3. CM will observe excavations and bedding prior to laying pipe by CONTRACTOR. Notify CM in advance of excavating, bedding, pipe laying, and backfilling operations.
4. Earthwork is specified in Section 31 23 00 – Excavation and Fill.

B. Bedding Pipe: Bed pipe as specified and in accordance with details on the Construction Drawings.

1. Trench excavation and backfill and bedding materials shall conform to Section 31 23 00 – Excavation and Fill as applicable.
2. Where CM deems existing bedding material unsuitable, remove and replace existing bedding with approved granular material furnished, placed, and compacted in accordance with Section 31 23 00 – Excavation and Fill.
3. Excavate trenches below bottom of pipe by amount shown and indicated in the Contract Documents. Remove loose and unsuitable material from bottom of trench.
4. Carefully and thoroughly compact pipe bedding with vibratory plate tampers.
5. Do not lay pipe until CM approves bedding condition.
6. Do not bring pipe into position until preceding length of pipe has been bedded and secured in its final position.

C. Laying Pipe:

1. Install pipe accurately to line and grade shown and indicated in the Contract Documents, unless otherwise approved by CM. Remove and reinstall pipes that are not installed correctly.
2. Slope piping uniformly between elevations shown.
3. Start laying pipe at lowest point and proceed towards higher elevations, unless otherwise approved by CM.

4. Carefully examine pipe and fittings for cracks, damage, and other defects while suspended above trench before installation. Immediately remove defective materials from the Site and replace with acceptable products.
5. Notify CM in advance of backfilling operations.

D. Jointing Pipe:

1. HDPE Pipe Joints:
   a. Bell and Spigot Joints (Double-Wall Corrugated HDPE Pipe):
      1) Remove all burrs and provide reference mark at correct distance from pipe end. Place mark such that no more than 1/2-inch of machined spigot surface will be visible outside of bell after pipe has been joined.
      2) Clean spigot end and bell thoroughly with soap and water before positioning gasket.
      3) Lubricate spigot groove with manufacturer's recommended lubricant. Thoroughly clean gasket and place in spigot groove starting at bottom, ensuring that gasket fins face backwards toward pipe.
      4) Thoroughly lubricate gasket with pipe manufacturer's recommended lubricant and equalize stretch in gasket by running screwdriver under gasket around its entire circumference three times. Reposition gasket in groove after stretching.
      5) Thoroughly clean and lubricate receiving bell. Align pipe as straight as possible and insert spigot end of pipe carefully into bell until reference mark on spigot is flush with bell.
      6) If mechanical means are used to insert spigot end, protect with wood the end of pipe being pushed, to ensure even distribution of pressure.
   b. Plain-Ended Pipe Joints (Single-Wall Corrugated HDPE Pipe):
      1) Joints for 3- to 24- inch shall be made with split couplings.
      2) Standard connection shall meet the soil-tightness requirements of AASHTO M252 or M294.
   c. For all pipe joints on non-perforated pipes installed with pipe invert slopes equal to or greater than 25 percent, use both split couplers and Mar Mac Polyseal pipe wrap couplers or equivalent joint securing system.

E. Backfilling:

1. Conform to applicable requirements of Section 31 23 00 – Excavation and Fill.
2. Place backfill as Work progresses.
3. Carefully slice backfill by hand under pipe haunches.

3.02 FIELD QUALITY CONTROL

A. General:

1. Test all piping, except as exempted in the Buried Piping Schedule in this Section.
2. Conduct all tests in presence of CM.
3. Remove or protect pipeline-mounted devices that could be damaged by testing.
4. Provide all apparatus and services required for testing.
5. Repair observed leaks and repair pipe that fails to meet acceptance criteria. Retest after repair.

B. Test Schedule:

1. Refer to the Buried Piping Schedule in this Section for type of test required and required test pressure.
2. Unless otherwise specified, required test pressures are at lowest elevation of pipeline segment being tested.
3. For piping not listed in Buried Piping Schedule in this Section:
   a. Hydrostatically test pipe that will convey liquid at a pressure greater than 5 psig.
   b. Use exfiltration testing, low-pressure air testing, or vacuum testing for other piping.
4. Test Pressure:
   a. Use test pressures listed in Buried Piping Schedule in this Section.
   b. If test pressure is not listed in Buried Piping Schedule, or if test is required for piping not listed in the Buried Piping Schedule, test pressure will be based on maximum anticipated sustained operating pressure and methods described in applicable ANSI/AWWA manual or standard that applies to the piping system.

C. Low-Pressure Air Testing:

1. Test for leakage using low pressure air per ASTM F1417.
2. Pipeline leakage testing shall be performed following installation of entire run of each pipe. More frequent testing may be performed at the discretion of the CONTRACTOR.
3. When leakage exceeds the maximum amount specified for the pipe diameter and tested length of pipeline, satisfactory correction, as approved by the CM, shall be made and the testing shall be repeated until passing results are achieved.

3.03 SCHEDULES

A. Schedules listed below, following the “End of Section” designation, are part of this Specification section.

1. Table 1 – Buried Piping Schedule, of this Section.

TABLE 1
BURIED PIPING SCHEDULE

Service	Diameter (inch)	Material	Pressure Class/ Thickness	Test
Stormwater Culvert	Varies (12 inch, 24-inch)	HDPE	Double-Wall Corrugated Exterior, Smooth Interior and Single-Wall Corrugated Exterior-Interior	NR
Final Cover Drainage Layer Collection Pipe	6-inch	HDPE	Perforated Single-Wall Corrugated and Non-Perforated Single-Wall Corrugated	NR

The following abbreviations are used in the Buried Piping Schedule.

A. Material Abbreviations

Material	Abbrev.
High Density Polyethylene	HDPE

B. Test Abbreviations

Test	Abbrev.	Test	Abbrev.
Hydrostatic Test (test pressure in psig)	HYD ( )	No Test Required	NR

- END OF SECTION -

SECTION 31 05 13 – SOILS FOR EARTHWORK

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 soils for construction of components indicated on the Design Drawings.

B. Related Sections:

1. Section 31 05 16.10 – Materials for Earthwork;
2. Section 31 05 16 – Aggregates for Earthwork;
3. Section 31 05 19.13 – Geotextiles for Earthwork;
4. Section 32 91 19.13 – Topsoil Placement and Grading; and
5. Section 35 20 23 – Vegetation Removal and Subaqueous Backfill.

1.02 REFERENCES

A. Reference Standards:

1. The following standards are referenced in this Section:
   a. ASTM 6938 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

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.

PART 2 – PRODUCTS

2.01 MATERIALS

Refer to Section 31 05 16.10 – Materials for Earthwork for material product description.

PART 3 – EXECUTION

3.01 INSPECTION

A. Before applying soils, verify that the underlying geotextiles, if required, are free of tears, holes, wrinkles, and foreign objects, and are securely anchored.

B. Verify that subgrades, 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 soils 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 of unsuitable granular materials. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.02 SUBGRADE PREPARATION

A. Subgrades shall be firm, dense, and thoroughly compacted and consolidated; shall be free from 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 dense graded aggregate. Finished elevation of stabilized subgrades shall not be above subgrade elevations shown.

B. If, in CM's opinion, subgrade becomes softened or mucky because of construction delays, failure to dewater properly, or other cause within Contractor's control, subgrade shall be excavated to firm material, trimmed, and backfilled with dense graded aggregate material at Contractor's expense.

3.03 PLACEMENT OF SOIL FILL MATERIAL

A. Do not allow heavy equipment to operate directly on exposed geotextile. Construct a platform of the granular 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, Contractor will immediately repair such damage.

D. 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. 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.

E. Select and use equipment capable of providing the compaction necessary to achieve the densities specified in Table 1 of specification Section 31 22 00 – Grading.

F. 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:

1. Increase the amount of coverages.
2. Decrease the lift thicknesses.
3. Use different compaction equipment.

G. 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 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.

H. Do not place fill materials when standing water is present on surface of the area where fill will be placed. 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.

I. 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.

J. Repair, at Contractor's expense, observed or measured settlement. Make repairs and replacements, as required, within five days after being so advised by CM.

3.04 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.

B. Contractor shall subcontract with an independent third-party firm to test the in-place density and moisture content of the general fill material, where required by Table 1 in Section 31 22 00 – Grading in accordance with ASTM D-6938.

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 05 13.10 – LOW PERMEABILITY SOIL LINER

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. The Contractor shall furnish all labor, materials, tools, supervision, transportation, and installation equipment necessary for the construction of the low permeability soil liner component of the liner system as specified herein, as shown on the Design Drawings and in accordance with the Project Construction Quality Assurance Plan (CQAP) and this Section. The low permeability soil liner consists of a minimum 12 inches of low permeability clay soil overlain by a geosynthetic clay liner (GCL) on the UDF cell floor (floor baseliner) and the interior perimeter berm sideslope (sideslope baseliner).
2. The Contractor shall be prepared to construct the low permeability soil liner in conjunction with the earthworks and the installation and construction of the other components of the baseliner system.
3. Notwithstanding the prequalification of any material sources for the low permeability soil liner, the Contractor shall be entirely responsible for meeting the requirements of this Section and the material product requirements specified in Section 31 05 16.10 – Materials for Earthwork.
4. The low permeability soil liner material will be furnished by the Contractor from off-site sources. The low permeability soil liner material will be delivered by the Contractor to the on-site stockpile area. The Contractor shall be responsible for loading and transporting the stockpiled material to the cell working area. The Contractor shall have full responsibility for scheduling and coordinating all material deliveries and testing.

B. Related Sections:

1. Section 31 05 13 – Soils for Earthwork.
2. Section 31 05 16.10 – Materials for Earthwork.
3. Section 31 05 19.16 – Geosynthetic Clay Liner.
4. Section 31 22 00 – Grading.
5. Section 31 23 00 – Excavation and Fill.

1.02 REFERENCES

A. Reference Standards:

1. ASTM D1140, Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75 µm) Sieve.
2. 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.”
3. ASTM D1587, Standard Practice for Thin Wall Tube sampling of soils.
4. ASTM D3017, Standard Test Method for Moisture Content by Nuclear Methods.
5. ASTM D4220, Standard Practices for Preserving and Transporting Soil Samples.
6. ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

7. ASTM D5084, Standard Test Method for Measurement of Hydraulic Conductivity of soils.
8. ASTM D6913, Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis.

1.03 SUBMITTALS

A. Informational Submittals:

1. The Contractor shall notify the CM in writing a minimum of 7 days prior to starting construction of the low permeability soil liner. This notice shall state the material to be used, the equipment to be used, the date and time that placement operations will start, and the name of the person in the field who will be in charge of the constructing the low permeability soil liner, and the CM's approval of the material.
2. If work is interrupted for reasons other than inclement weather, the Contractor shall notify the CM a minimum of 24 hours prior to the stoppage and the resumption of work.
3. 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 CONSTRUCTION QUALITY ASSURANCE

A. Construction of the low permeability soil liner will be monitored and tested by the CM as outlined in the CQAP and as shown on Tables 1 and 2 of this Section.

B. The Contractor shall be aware of the activities outlined in the CQAP and shall account for these activities in the construction schedule.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Refer to Refer to Section 31 05 16.10 – Materials for Low Permeability Soil Liner for material product description.

2.02 EQUIPMENT

A. The Contractor shall only use equipment that has been approved by the CM for this work. The Contractor shall submit details of proposed equipment to the CM for approval a minimum of 7 days in advance of the Contractor's intention to bring the equipment to the site.

B. The Contractor shall furnish, operate, and maintain grading equipment as is necessary to produce uniform layers, sections, and smoothness of grade for compaction and drainage.

C. The Contractor shall furnish, operate, and maintain compaction equipment as is necessary to produce the required in-place soil density and moisture content. Low permeability soil liner material shall be placed in loose lifts that result in a compacted lift thickness of approximately 9 inches. Compaction shall be performed using a static padded-foot or sheepsfoot compactor having a minimum weight of 35,000 pounds (lbs). The "foot" of the compactor shall protrude a maximum of six inches and have an area of at least 9 square inches.

D. The Contractor shall furnish, operate, and maintain water tank trucks, pressure distributors, or other equipment designed to apply water uniformly and in controlled quantities to variable surface widths.

E. The Contractor shall furnish, operate, and maintain soil spreading equipment that travels on the material being spread without traveling on the surface of the underlying compacted soil surface layer.

F. The Contractor shall furnish, operate, and maintain miscellaneous equipment such as scarifiers, disks, spring tooth or spike tooth harrows, earth hauling equipment, and other equipment, as necessary for construction of the low permeability soil liner.

PART 3 – EXECUTION

3.01 TEST FILL CONSTRUCTION

A. Purpose and Scope:

1. The Test Fill is intended to establish the placement and compaction procedures to be used to construct the low permeability soil liner in conformance with these specifications. The test fill program will allow all parties (including the CM and Contractor) to:
   a. familiarize themselves with the handling and compaction characteristics of the proposed soil materials;
   b. develop correlations between numbers of passes, soil moisture content, and soil dry density;
   c. develop correlations between moisture content and moisture conditioning requirements; and
   d. develop correlations between moisture content, dry density, and in-place hydraulic conductivity.

B. Foundation Preparation:

1. The Test Fill shall be constructed in a part of the work area designated by the CM.

2. If the Test Fill is not constructed in an area of the cell that has been prepared to receive low permeability soil liner, the area within the limits of the Test Fill shall be cleared and grubbed of all trees, debris, stumps, and any other vegetation. After clearing and grubbing, the area shall be stripped of topsoil and/or organic materials. The surface of the subgrade shall then be proof rolled to identify soft zones, irregularities, and abrupt changes in grade. Areas found unsuitable by proof rolling shall be corrected as described in Section 31 23 00 – Excavation and Fill.

3. No standing water or excessive moisture shall be allowed to accumulate on the surface of the subgrade in the test fill area.

4. Construction of the Test Fill shall not commence until the foundation condition has been examined, documented and approved by the CM.

C. The Test Fill shall be constructed in a rectangular shape to a minimum plan area of 20-feet-wide by 60-feet-long, or larger if approved by the CM. The Test Fill for the 12-inch-thick low permeability soil liner should consist of two lifts of soil. The first lift shall be of uniform thickness with a maximum compacted thickness of 7 inches and an average compacted thickness of 6 inches. The second lift shall also be of uniform thickness with a maximum compacted thickness of 7 inches and an average compacted thickness of 6 inches.

D. The Contractor shall define the target compaction criteria (i.e., range of acceptable moistures and densities) for each lift prior to the start of construction of each lift.

E. Fill Placement:

1. The Test Fill shall be constructed in horizontal lifts in accordance with methods and procedures outlined below. The compaction parameters that will be evaluated during construction of the Test Fill include:
   a. type of compaction equipment;
   b. number of passes of the compaction equipment;
   c. soil moisture content;
   d. soil in-place dry density;
   e. hydraulic conductivity of soil; and
   f. quality control procedures.

2. First Lift:
   a. The placement, compaction, and testing of the soils in the first lift of the Test Fill shall be in accordance with the following requirements:
      1) The Contractor shall, by trial and error, determine the loosely-placed soil thickness that will result in an average compacted lift thickness of 6 inches, and upon determining this, place the first lift of soil.
      2) The soil moisture content shall be adjusted by the Contractor, as required, to meet the moisture content limitations established in Part 2.01 of this section.
      3) The soil shall be compacted by applying two one-way passes using the same compaction equipment intended for the actual construction.
      4) The Contractor will perform in-situ moisture content and dry density tests using ASTM D3017 and ASTM D2922.
      5) The lift shall be further compacted (second sequence) by applying two additional one-way passes with the same construction equipment as for the first two passes;
      6) The testing, sampling, and repair procedures outlined in (iv) above shall be repeated at locations adjacent to the first set of tests.
      7) The lift shall be further compacted (third sequence) by applying two additional one-way passes with the same construction equipment as for the previous passes.
      8) The testing procedures outlined in (iv) above shall be repeated at locations adjacent to the first two sets of tests.
      9) If needed, additional sequences of compaction, testing, sampling, and repair shall be carried out until the specified criteria for compaction are attained; at that point, a final set of two passes shall be carried out, followed by final testing.
      10) When the first lift is completed, the Contractor will collect undisturbed samples as described in Part 3.04(A)(4) of this specification.

3. Subsequent Lifts:
   a. The placement, compaction, and testing of the soils in the second and subsequent lifts of the Test Fill shall be performed in accordance with the following requirements:
      1) The Contractor shall place the second loose soil lift in a thickness which will result in a compacted lift thickness of 6 inches.
      2) The Contractor shall place the final loose soil lift in a thickness which will result in a compacted lift thickness of 6 inches.
      3) The Contractor shall ensure that a good bond exists between the two lifts, and the Contractor will verify that the two lifts are intermixed.
      4) Sequences of compaction, testing, sampling, and repair shall be carried out in a manner identical to the first lift until the specified criteria for compaction are attained.
   b. When the test pad is completed, it shall be removed unless it is within the cell footprint and is approved by the CM for liner construction.

4. Additional Sampling and Laboratory Testing:
    a. The Contractor will obtain and test at least two undisturbed (Shelby tube) samples for hydraulic conductivity testing from each lift of the test fill.
    b. The Contractor shall repair the holes in the test fill in accordance with the procedure outlined in Part 3.04(B) of this specification.
5. The results of the tests performed on the test fill shall be used by the Contractor to propose a compaction procedure (i.e., equipment type and minimum number of passes) for the low permeability soil liner. The Contractor may also modify the target compaction criteria established in Part 3.01 of this specification. The compaction procedure will be reviewed by the CM. At a minimum, five one-way passes of compaction equipment shall be required. Regardless of the approved compaction procedures, the final basis for acceptance of the low permeability soil liner shall be a maximum in-place hydraulic conductivity of 1×10^{-7} cm/sec, as measured in the laboratory for Shelby tubes taken from the low permeability liner material.

3.02 LOW PERMEABILITY SOIL LINER PLACEMENT

A. The low permeability soil liner shall be constructed to the grades, slopes, and elevations shown on the Drawings and as specified in this Section.

B. The low permeability soil liner shall be constructed on a subgrade surface that meets the requirements of specifications Section 31 23 00 – Excavation and Fill and Section 31 22 00 – Grading.

C. The Contractor shall mix the low permeability soil liner material prior to compaction by disc-harrowing or by an approved equivalent method to a homogenous consistency. Soil shall be mixed to reduce the size of any clods to a maximum of 2 inches, to moisture-condition soil (i.e., to mix water into the soil or to dry out soil) and to blend the soil to a homogenous consistency.

D. The Contractor shall use compaction equipment and construction methods based on the results of the Test Fill construction.

E. Low permeability soil liner material shall be compacted to the moisture and density target compaction criteria as determined by the laboratory and test fill programs, which should produce a material having a hydraulic conductivity no greater than 1×10^{-7} cm/sec. However, at least five passes of compaction equipment shall be applied to each lift and soil shall be compacted to at least 90 percent of the modified Proctor maximum dry density. Regardless of conformance of compacted material to the moisture and density compaction criteria determined from the laboratory and test fill programs, the Contractor is responsible for producing a low permeability soil liner that meets the maximum hydraulic conductivity requirement of 1×10^{-7} cm/sec in laboratory testing of undisturbed samples of compacted material.

F. At the beginning of each day's work, the CM will inspect the previously placed low permeability soil liner. The CM may require recompaction and/or watering of the top surface of soil, as necessary, to provide a suitable surface for the next lift.

G. The Contractor will perform testing on the material as described in the CQAP.

H. No low permeability soil liner material shall be placed on a lift which has not been tested and approved by the CM. Should the field tests indicate that the density or moisture content of any layer of low permeability soil liner, or portion thereof, are not within the required dry density or moisture content or does not meet the thickness and grading requirements shown on the

Drawings and as specified in this Section, the particular layer, or portion thereof, shall be reworked by the Contractor.

I. No frozen or thawing low permeability soil liner material shall be placed, spread, or compacted. No low permeability soil liner material shall be placed, spread, or compacted while the underlying soil is frozen or thawing, during unfavorable weather conditions, or during periods of heavy precipitation. Any compacted low permeability soil liner that is frozen or has been frozen and subsequently thawed shall be removed and replaced by the Contractor.

J. The same material and compaction methods as outlined in this section shall be used to replace unacceptable zones detected during execution of the work.

K. The low permeability soil liner surface shall be made smooth and free from ruts or indentations at the end of every working day when precipitation is forecast and/or at the completion of the compaction operations in that area. The Contractor shall compact the top surface of low permeability soil liner placed during the day with a smooth roller to create a smooth surface which will minimize moisture penetration and evaporation. The entire area shall be left in a manner to promote runoff at the end of each day.

3.03 PROTECTION OF WORK

A. The Contractor shall be responsible for protecting all completed work. At the beginning of each workday, the CM will evaluate the previous day's work. If problems are identified, such as ponded water or desiccation cracking, the Contractor shall correct the affected areas. Corrections may include, but are not limited to, regrading of layers, and removal, replacement, and recompaction of layers.

B. The Contractor shall minimize, to the maximum extent feasible, desiccation cracking of low permeability soil liner material. The low permeability soil liner shall be sprinkled with water at least twice daily and more frequently if cracking is observed or if directed by the CM. The Contractor may seal roll the surface of the clay to reduce evaporation. The Contractor may also protect exposed surfaces using light-colored or translucent membranes, such as Visqueen, that will inhibit drying of the material. If significant cracking of the material occurs, in the sole opinion of the CM, the Contractor shall repair the affected area.

C. The low permeability soil liner surface shall be seal-rolled and made smooth and free from ruts or indentations at the end of every working day when precipitation is forecasted and/or at the completion of the compaction operations in that area.

D. Low permeability soil liner material may be placed beginning at the top of the slope and working downward to a distance not less than 20 feet from the non-woven geotextile separator. Low permeability soil liner placement on the baseliner sideslope shall be placed beginning at the bottom of the slope and working upward. All low permeability soil liner material shall be compacted by equipment traveling up and down the slope.

E. The Contractor shall install the overlying baseliner GCL as soon as possible after the placement and compaction of low permeability soil liner has been completed. Completed sections of low permeability soil liner awaiting installation of the overlying GCL that may not be covered for an extended period of time (i.e., more than 48 hours), shall have a temporary protective cover consisting of either a light-colored tarp or a 6-inch minimum thickness of low permeability soil liner material to protect against environmental degradation until such time that the overlying GCL can be placed. If acceptable to the CM, the Contractor may propose to recondition and retest the completed soil liner in lieu of installing a protective cover.

F. The temporary protective cover shall be removed, and the previously placed low permeability soil liner shall be thoroughly inspected prior to placement of any portion of overlying GCL. If soil material was used for temporary cover, that temporary soil shall be removed and the previously placed low permeability soil liner surface shall be recompacted, tested, and the full depth of the soil liner shall be measured to confirm the minimum required 12-inch thickness is provided.

G. No synthetic sealants or other chemical treatments may be applied to the low permeability soil liner material.

H. Before geosynthetic clay membrane liner is installed (to be performed by others), the Contractor shall be responsible for protection of the low permeability soil liner until the material is accepted by the geomembrane installer for its work.

I. The low permeability soil liner shall be placed against temporary ends of previously placed similar material in a manner that provides no cracks or joints, in a manner approved by the CM.

3.04 FIELD QUALITY ASSURANCE

A. The Contractor will perform field quality assurance testing of all low permeability soil liner placement operations. The types and minimum frequencies of quality assurance testing for the low permeability soil liner are outlined below. The Contractor shall take the minimum testing frequencies into account in planning his construction schedule.

1. CQA During Test Fill Construction:
    a. The Contractor will perform testing on the Test Fill as described in Part 3.01(E) of this specification.
    b. The Shelby tubes will be sealed and shipped in accordance with ASTM D4220 or other method approved by the CM to a geotechnical testing laboratory designated by the Contractor.
    c. The Contractor will measure the moisture content and dry density within a 12-inch radius of each Shelby tube sample location.
    d. The independent geotechnical testing laboratory will perform the following tests on the Shelby tube samples:
        1) moisture content in accordance with ASTM D2216;
        2) dry density in accordance with ASTM D2937; and
        3) hydraulic conductivity in accordance with the method and effective confining pressure described in Part 2.01(C) of this specification.
2. The minimum testing frequencies for construction quality evaluation are presented in Table 2, except that hydraulic conductivity tests will be performed on two samples per lift of test fill.
3. Sampling locations will be selected by the CM.
4. Undisturbed low permeability soil liner material samples for laboratory hydraulic conductivity testing will be taken by a Shelby sample tube that is inserted vertically into the low permeability soil liner with a continuous smooth stroke from a hydraulic jack and using stationary construction equipment (such as a backhoe bucket or bulldozer blade) for reaction.
5. A special testing frequency will be used at the discretion of the CM when visual observations of construction performance indicate a potential problem. Additional testing for will be considered when:
    a. the rollers slip during rolling operation;
    b. the lift thickness is greater than specified;
    c. the low permeability soil liner material is at improper and/or variable moisture content;
    d. fewer than the specified number of roller passes are made;
    e. dirt-clogged rollers are used to compact the material;

f. the rollers do not have optimum ballast; or
g. the degree of compaction is doubtful.

6. During construction, the frequency of testing may also be increased by the CM in the following situations:
   a. adverse weather conditions;
   b. breakdown of equipment;
   c. at the start and finish of grading;
   d. if the material fails to meet specifications; or
   e. the work area is reduced.

B. Perforations:

1. Perforations in the low permeability soil liner shall be filled by the Contractor. Perforations that must be filled include, but are not limited to:
   a. nuclear density test probe locations; and
   b. undisturbed sampling locations.

2. Perforations in the low permeability soil liner shall be backfilled with a soil-bentonite (powdered) mixture containing a minimum of 10 percent bentonite. The backfill shall be hand-tamped by the Contractor to the satisfaction of the CM.

C. Defective Areas:

1. If a defective area is discovered in the low permeability soil liner, the Contractor will immediately determine the extent and nature of the defect. If the defect is indicated by an unsatisfactory test result, the Contractor will determine the extent of the defective area by additional tests, observations, a review of records, or other means that the CM deems appropriate. If the defect is related to adverse site conditions, such as overly wet soils or surface desiccation, the Contractor will define the limits and nature of the defect.

2. After the extent and nature of a defect has been determined, the Contractor shall correct the deficiency to the satisfaction of the CM.

3. Additional testing will be performed the Contractor to verify that the defect has been corrected. This additional testing will be performed before any additional work is allowed in the area of deficiency.

3.05 CRITERIA AND TOLERANCE

A. The minimum thickness of the low permeability soil liner shall be 12 inches as demonstrated based on tube sampling thickness measurements and as-built field survey of completed surfaces but may be greater than specified, if approved by the CM.

B. The minimum slopes shall be maintained within ± 5% of the slopes indicated on the Design Drawings (i.e., a 2-percent slope must be constructed to between 1.9 percent and 2.1 percent between any survey grid points).

C. 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.

TABLE 1
MINIMUM TESTING FREQUENCIES
FOR MATERIALS EVALUATION (CONFORMANCE) OF
LOW PERMEABILITY SOIL LINER MATERIAL[1]

TEST METHOD (SEE SECTION 2.01)	MINIMUM TEST FREQUENCY
Natural Moisture Content – ASTM D2216	1 per 1,000 yd^3 (minimum 1 per source) Grain Size Analysis
Gradation (Sieve and Hydrometer) – ASTM D6913 and ASTM D1140	1 per 2,500 yd^3 (minimum 1 per source)
Atterberg Limits – ASTM D4318	1 per 1,000 yd^3 (minimum 1 per source)
Modified Proctor – ASTM D1557	1 per 5,000 yd^3 (minimum 1 test per material type and source)
Hydraulic Conductivity – ASTM D5084	1 per 5,000 yd^3 (minimum 1 set of 3 tests per material type and source)

[1] Tests to be performed by the Contractor on samples of bulk soil collected from material placed in the cell, per the requirements of the CQAP. These tests will be performed in addition to the pre-qualification tests to be performed by the Contractor.

TABLE 2
MINIMUM TESTING FREQUENCIES
LOW PERMEABILITY SOIL LINER[1]
(DURING CONSTRUCTION)

TEST METHOD (SEE SECTIONS 2.01 AND 3.01)	MINIMUM TEST FREQUENCY
Moisture Content – ASTM D3017 (Nuclear Gauge)	1 per 4,750 sf (minimum of 6 per lift)
In-Place Dry Density[2] – ASTM D2922 (Nuclear Gauge)	1 per 4,750 sf (minimum of 6 per lift)
Undisturbed Sampling – ASTM D1587	minimum 1 per acre per lift
Hydraulic Conductivity – ASTM D5084	minimum 1 per acre per lift

[1] Tests are to be performed by the Contractor on in-place compacted material per the requirements of the CQAP.
[2] Verify moisture and density readings from nuclear gauge testing by comparing gauge readings with moisture content and density data obtained from laboratory analysis of Shelby tube samples.

- 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. Granular Drainage Layer;
   e. Sump Backfill;
   f. Filter Stone; and
   g. Final Cover Subbase.

B. Related Sections:

1. Section 31 05 13 – Soils for Earthwork.
2. Section 31 05 16.10 – Materials for Earthwork.
3. Section 31 05 19.13 – Geotextiles for Earthwork.
4. Section 31 22 00 – Grading.
5. Section 31 37 00 – Riprap.
6. 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 a 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. General Soil Fill (Soils for Earthwork);
   b. Low Permeability Soil Liner;
   c. Aggregates;
   d. Riprap; and
   e. Topsoil.

B. Related Sections:

1. Section 31 05 13 – Soils for Earthwork.

2. Section 31 05 13.10 – Low Permeability Soil Liner.

3. Section 31 05 16 – Aggregates for Earthwork.

4. Section 31 37 00 – Riprap.

5. 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).
14. USEPA SW-846 Method 6010, Inductively Coupled Plasma-Atomic Emission Spectrometry.
15. USEPA SW-846 Method 7471, Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique).
16. USEPA SW-846 Method 8081, Organochlorine Pesticides by Gas Chromatography.
17. USEPA SW-846 Method 8082, Polychlorinated Biphenyls (PCBs) by Gas Chromatography.
18. USEPA SW-846 Method 8151, Chlorinated Herbicides by GC Using Methylation or Pentafluorobenzylation Derivatization.
19. USEPA SW-846 Method 8260, Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS).
20. USEPA SW-846 Method 8270, Semi-volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS).
21. USEPA SW-846 Method 9012, Total and Amenable Cyanide (Automated Colorimetric, with Off-Line Distillation).

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.

C. Sampling of soil materials used for construction shall be conducted in accordance with the revised (2023) Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP) or any EPA-approved revision and addenda of that document.

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. General Soil Fill (Soils for Earthwork)

1. General Soil Fill – General soil fill will be used to backfill excavations, as subgrade material for construction of berms and embankments, in construction of the general soil fill layer component of the final cover system, as subgrade material in the vegetative surface restoration areas, for daily and interim soil cover. Material shall be free of rock and gravel larger than three inches (except as noted below) in any dimension, debris, waste, frozen materials, organic material, and other deleterious matter having a gradation in accordance with the following unless otherwise approved by the Engineer:

Sieve Size (Square Opening)	Percentage by Weight Passing Sieve
3–inch	100
No. 200	5-50

2. General fill used for the first lift in construction of the general fill soil layer component of the final cover system (i.e., soil layer placed directly above and in contact with the final cover system geosynthetic drainage composite) shall be free of rock and gravel larger than one inch in any dimension. General soil fill having a particle size no greater than 3 inches will be required for fills specified to be constructed in 6-inch-thick lifts. For general soil fill placement specified to be constructed in 12-inch-thick lifts, the particle size can be up to no greater than 6-inches. See Table 1 in Section 31 22 00 – Grading for lift thickness placement criteria.
3. General soil fill shall be classified as ASTM D2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM, or a combination of these groups and have a liquid limit not greater than 45, and plasticity index not greater than 25.
4. General soil fill used for construction of the general fill soil layer component of the final cover system shall have a permeability no greater than 1 x 10-4 cm/sec per ASTM D5084 unless otherwise approved by the Engineer. Testing for permeability shall be conducted at a moisture content and density that corresponds to required placement criteria in Table 1 of specification Section 31 22 00 – Grading.
5. General soil fill used for construction of the perimeter berm shall be strength tested as follows:
   a. Conduct direct shear testing in accordance with ASTM D3080 to determine the consolidated-drained strength of soils to be placed above existing grades and in subaqueous areas. Strength testing shall be conducted at a moisture content and density that corresponds to required placement criteria in Table 1 of specification Section 31 22 00 – Grading.
   b. Each soil sample for direct shear testing shall be tested at normal loads of 500, 1,000 and 5,000 psf.
   c. For soils placed above existing grade for perimeter berm construction, the direct shear testing shall demonstrate a consolidated-drained shear strength equivalent to a failure envelop defined by a friction angle of 30 degrees.
   d. For soils placed in subaqueous conditions for perimeter berm construction, the direct shear testing shall demonstrate a consolidated-drained shear strength equivalent to a failure envelop defined by a friction angle of 34 degrees.

B. Low Permeability Soil Liner

1. The low permeability soil liner shall consist of relatively homogeneous, fine grained, natural soils that are free of debris, foreign objects, and organics. No material larger than 1 inch in largest dimension, as determined by passing a standard 1-inch sieve, shall be allowed in the upper 6 inches of any low permeability soil layer that will be in contact with the primary or secondary geomembrane layers. The soil shall be classified according to the Unified Soil Classification System (USCS) as either CL or CH material and have a maximum particle size of 1 inch and a maximum of 25 percent gravel size particles. The low permeability soil liner shall have, in accordance with ASTM D 4318, a liquid limit of greater than or equal to 30 and a plasticity index greater than or equal to 10. In addition, testing carried out by the Contractor in conformance with the requirements of the specifications shall demonstrate that the compacted low permeability soil liner material will exhibit an in-place hydraulic conductivity less than or equal to 1.0×10^{-7} centimeters per second (cm/sec).

C. Aggregates for Earthwork:

1. Granular materials shall meet the following gradation criteria unless otherwise approved by the CM:

a. Sand Bedding:

1) The sand bedding material is used for bedding around leachate force main piping, electric conduits, stormwater drainage piping, and water service piping. Sand bedding shall comply with the gradation requirements below.

Sieve Sizes (Square Openings)	Percentage by Weight Passing Sieve
3/8-inch	100
No. 8	60-100

2) Material shall meet the requirements of Section M2.01.6 of the State of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2022.

b. Crushed Stone:

1) Materials used for stormwater basin pilot channels, perimeter ditch lining, and stone check dams will consist of a natural or artificially graded mixture of crushed stone, broken stone or natural or crushed sand complying with the gradation requirements below.

Sieve Sizes (Square Openings)	Percentage by Weight Passing Sieve
1-inch	100
¾-inch	90-100
½-inch	20-55
3/8-inch	0-15
No. 4	0-5

2) Material shall meet the requirements of Section M2.01.4 of the State of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2022.

c. Graded Aggregate:

1) Material 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. Crushed slag is unacceptable.

Sieve Sizes (Square Openings)	Percentage by Weight Passing Sieve
2.5-inch	100
2-inch	95-100
¾-inch	50-75
¼-inch	25-45
No. 40	5-20
No. 100	2-12

2) Material shall meet the requirements for Dense Graded Crushed Stone for Sub-Base in Section M2.01.7-1 of the State of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2022.

d. Granular Drainage Layer:
   1) Material utilized within the granular drainage layers of the primary and secondary liner systems shall be well-graded, clean, durable broken stone or screened gravel complying with the gradation requirements below.

Sieve Sizes (Square Openings)	Percentage by Weight Passing Sieve
1-inch	100
3/4-inch	90-100
1/2 -inch	20-55
3/8-inch	0-15
No. 4	0-5

   2) Material shall be placed with non-woven geotextile as shown on the design drawings.
   3) Material shall meet the requirements of Section M2.01.4 of the State of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2022.

e. Sump Backfill:
   1) Material 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
2.0-inch	100
1.5-inch	90-100
1.0-inch	0-15

   2) Material shall meet the permeability of 4.0×10^{-1} cm/sec or greater.

f. Filter Stone:
   1) Material 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
1½-inch	100
1¼-inch	85-100
¾-inch	10-40
½-inch	0-8

   2) Material shall meet the requirements for Crushed Stone in Section M2.01.3 of the State of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2022.

g. Final Cover Subbase:
   1) Material 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
2-inch	100
¼-inch	25-60
No. 40	5-40
No. 100	0-10

   2) Material is used for the soil layer directly above and in contact with the consolidation material. Material shall be free of rock and gravel larger than one inch in in any dimension.

h. Processed Gravel (for operations areas and access roads surfaces):
   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

D. 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 1 RIPRAP

Size (inches)	Percentage Passing Through Square Openings
9	100
6	50
3	0-10

TYPE 2 RIPRAP

Size (inches)	Percentage Passing Through Square Openings
14	100
9	50
3	0-10

TYPE 3 RIPRAP

Size (inches)	Percentage Passing Through Square Openings
6	100
4	30-50
2	0-10

TYPE 4 RIPRAP

Size (inches)	Percentage Passing Through Square Openings
6	100
3	0

TYPE 5 RIPRAP

Size (inches)	Percentage Passing Through Square Openings
6	100
4-6	30-50
2	0

TYPE 6 RIPRAP

Size (inches)	Percentage Passing Through Square Openings
4	100
1	0-10

3. Acceptance of gradation will be based on visual inspection and submittals accepted by the CM.

E. 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.

F. 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. General Soil Fill (Soils for Earthwork):
    1) Tests:
        a) Gradation in accordance with ASTM D6913 and ASTM D1140;
        b) Moisture/density relationship in accordance with ASTM D1557;
        c) Direct Shear in accordance with ASTM D3080;
        d) Atterberg limits in accordance with ASTM D4318; and
        e) Permeability in accordance with ASTM D5084.
    2) Geotechnical testing shall be completed prior to placement of the material and at a frequency of one per 5,000 CY of imported off-site material.
    3) Geotechnical sample testing results shall be provided to the CM to verify acceptability of the soil materials for on-site use. Material may not be accepted for import until results of chemical analysis are approved by the CM.

b. Low Permeability Soil Liner:
    1) Pre-qualification testing will be performed for the following (a minimum of one set of tests per material source) on each proposed material source:
        a) Moisture/density relationship in accordance with ASTM D698 (standard Proctor);
        b) Moisture/density relationship in accordance with ASTM D1557 (modified Proctor);
        c) Atterberg limits in accordance with ASTM D4318;
        d) Hydraulic Conductivity in accordance with ASTM D5084;
        e) Natural Moisture Content in accordance with ASTM D2216; and
        f) Gradation in accordance with ASTM D6913 and ASTM D1140.
    2) Conformance and construction geotechnical testing is specified in Section 31 05 13.10 – Low Permeability Soil Liner.
    3) The hydraulic conductivity tests shall be performed using a flexible wall permeameter that can apply cell pressure and backpressure (e.g., triaxial cell). At a minimum, hydraulic conductivity tests shall be performed at a water content, dry density, and level of compaction corresponding to the following conditions:
        a) 100% of the maximum modified Proctor dry density at the modified Proctor optimum moisture content;
        b) 95% of the maximum modified Proctor dry density at the modified Proctor optimum moisture content;
        c) 90% of the maximum modified Proctor dry density at the modified Proctor optimum moisture content;
        d) Both 95% and 90% of the maximum modified Proctor dry density at moisture contents on the “line of optimum moisture contents,” which is formed by a line joining the peaks of the modified Proctor and standard Proctor compaction curves;
        e) 90% of the maximum modified Proctor dry density at a moisture content between the modified Proctor optimum moisture content and the line of optimum moisture contents; and
        f) Additional points, as necessary, to adequately define and justify the range of moisture contents and dry densities to which the Contractor intends to compact the material to achieve a hydraulic conductivity of no more than 1 x 10-7 cm/sec.
    4) Hydraulic conductivity tests shall be performed at an effective confining pressure of 5 pounds per square inch (psi).
    5) The results of the hydraulic conductivity tests shall be used by the CM to identify a range of moisture contents and dry densities within which the compacted low permeability soil liner is likely to exhibit a hydraulic conductivity of 1×10^{-7} cm/sec. The CM will review the tests and range of acceptable moisture contents and dry densities. In no event shall the range of acceptable dry densities be less than 90 percent of the maximum modified Proctor dry density. Upon approval by the CM, the range will become the basis for construction testing of the test fill described in

Part 3.01 of this specification. However, regardless of the approved range of compaction criteria, the final basis for acceptance of the low permeability soil liner shall be an in-place hydraulic conductivity of 1×10^{-7} cm/sec, as measured in the laboratory for Shelby tubes taken from the low permeability soil liner material.

6) Final approval of a source for low permeability soil liner will be at the sole discretion of the CM.
7) Geotechnical sample testing results shall be provided to the CM to verify acceptability of the soil materials for on-site use. Material may not be accepted for import until results of chemical analysis are approved by the CM.

c. 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);
      c) Direct shear in accordance with ASTM D3980 (operations and primary/ secondary granular drainage layers only);
      d) Permeability in accordance with ASTM D2434 (operations and primary/ secondary granular drainage layers only); and
      e) Atterberg limits, in accordance with ASTM D4318 (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.
d. 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.
e. 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.
f. 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.
g. All sample test results shall be provided to the CM to verify acceptability of the soil materials for use.
h. 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.
i. 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, sand, gravel, general soil fill). Chemical testing of stone materials (e.g., riprap, cobbles, boulders, granular drainage stone) 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.

B. On-Site Materials: Where required, Contractor shall coordinate, collect, and submit the sample, and pay for laboratory testing of each material, to verify compliance with the Contract Documents.

1. Geotechnical Testing: Contractor shall obtain representative samples of proposed on-site aggregate material for the following tests:
   a. Gradation in accordance with ASTM D6913 and ASTM D1140;
   b. Moisture/density relationship in accordance with ASTM D1557 (dense graded aggregate only);
   c. Permeability in accordance with ASTM D2434 (operations and primary/secondary drainage layers only);
   d. Direct shear in accordance with ASTM D3980 (operations and primary/secondary drainage layers only);
   e. Atterberg limits in accordance with ASTM D4318 (Dense graded aggregate only); and
   f.
2. Geotechnical testing shall be completed prior to placement of the material and at a frequency of one per 5,000 cubic yards of on-site fill material.
3. All sample testing results shall be provided to the Owner and/or Engineer to verify acceptability of the soil materials for on-site use.
4. Contractor shall collect at least two representative samples of each material type for testing.
5. Fill materials will not be allowed for use until accepted by CM.

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 18.16 – GEOSYNTHETIC CLAY LINER

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, tools, supervision, transportation, and installation equipment necessary for the construction of the geosynthetic clay liner (GCL) portion of the primary and secondary soil liners as specified herein, as shown on the Drawings, and in accordance with the CQAP.

B. The Contractor shall be prepared to install the GCL in conjunction with the earthworks and the installation and construction of the other components of the liner system.

C. Notwithstanding the prequalification of any material sources for the GCL, the Contractor shall be entirely responsible for meeting the requirements of this Section.

1.02 RELATED SECTIONS

A. Section 31 05 13.10 – Low Permeability Soil Liner.

B. Section 31 05 19.16 – High Density Polyethylene (HDPE) Geomembrane.

1.03 QUALIFICATIONS

A. The Contractor will contract a manufacturer to supply the GCL. The Manufacturer shall be responsible for the production and delivery of the GCL and shall be a well-established firm with more than two years of experience in the manufacture of GCL. The Manufacturer shall submit a statement to the CM listing:

1. Certified minimum average roll property values of the proposed GCL and the tests used to determine those properties.
2. Production capacity, availability, and projected delivery dates for this project.

B. The Contractor will directly contract a GCL installer.

1.04 SUBMITTALS

A. The Contractor will obtain from the GCL Manufacturer and have available for the CM's review, the following documentation on GCL production prior to the shipment of the GCL rolls.

1. Manufacturing quality control certificates for geotextiles, bentonite clay, and manufacturing process and each shift's production. The certificates shall identify the origin and the manufacturer of the bentonite. The certificates shall be signed by responsible parties employed by the manufacturer (such as the production manager).
2. The quality control certificate shall include:
   a. roll numbers and identification;
   b. sampling procedures; and
   c. results of quality control tests, including a description of the test methods used.
3. Submit results of geotechnical laboratory testing for Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces.
4. Submit results of geotechnical laboratory testing for Internal Shear Strength of GCL.

1.05 DELIVERY HANDLING AND STORAGE

A. Roll Identification:

1. Provide GCL rolls wrapped in relatively impermeable and opaque protective covers and marked or tagged with following information:
   a. Manufacturer's name;
   b. Product identification; and
   c. Shipping lot.
2. Indicate special handling marked on GCL itself, e.g., "This Side Up."
3. Conformance testing to indicate conformance with Specifications.

B. Handle GCL to protect from damage. GCL rolls shall be lifted by inserting a steel bar, capable of supporting the full weight of the roll, through the center core.

C. Store GCL in dry place under roof or other protective cover, protect from moisture by placing on skids, pallets, or dry ground.

D. Damaged GCL shall be removed and replaced.

1.06 CONSTRUCTION QUALITY ASSURANCE

A. The installation of the GCL shall be monitored and tested by the Contractor as outlined in the project Construction Quality Assurance Plan (CQAP).

B. The Contractor shall be aware of the activities outlined in the CQAP and shall account for these CQA activities in the installation schedule.

C. The Contractor shall screen the surface of the GCL following deployment, with a metal detection device capable of detecting broken needles. In the event that broken needles are detected, the Geosynthetics Installer shall repair the GCL in accordance with Part 3.01 E of this specification or replace the entire GCL panel (at the discretion of the CM).

1.07 REFERENCES

A. The following standards are referenced in this Section:

1. ASTM D5321, Standard Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear.
2. ASTM D6243, Standard Test Method for Internal Shear Strength of Geosynthetic Clay Liner by Direct Shear.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Bentoliner; Solmax.

B. Or approved equal.

2.02 GENERAL

A. Except when specifically authorized, do not furnish special run or value-added products.

B. GCL Characteristics:

1. Flexible, layered liner consisting of continuous layer of sodium bentonite sandwiched between primary backing of woven polypropylene mat and cover of nonwoven polyester fabric.
2. GCL shall be of type to maintain integrity during installation, placement, and covering procedures.
3. The bentonite and geotextile composite shall be needle punched to provide high shear resistance and durability.

2.03 GCL PROPERTIES

A. General Properties:

1. Minimum Dimensions: 15 feet by 100 feet.
2. Thickness: 0.24 inches, minimum.
3. Bentonite Mass/Unit Area: 0.75 pounds/square foot (psf) minimum weight.
4. Permeability: 1×10^{-9} centimeters/second (cm/sec) or less at 1 foot head pressure of water.
5. Internal shear strength greater than that defined by $\varphi' = 17$ degrees and $c' = 200$ psf, over the normal stress range of 0-12,000 psf when inundated with water at the test confining pressure.
6. Grab Tensile: 95 lbs. minimum.
7. Puncture: 170 lbs. minimum.
8. Peel Strength: 5 lbs. minimum.

B. Primary Fabric Backing Material:

1. Fabric woven polypropylene fabric, nontoxic, water soluble, nonbiodegradable on one side of bentonite core.
2. Fabric weight: 3.25 oz/sq yd, minimum.
3. Tensile Strength: 70 lbs/in., minimum.
4. Grab Strength: 70 lbs/in., minimum.
5. Mullen Burst Strength: 250 lbs/sq in., minimum.
6. Puncture Strength (5/16 mandril): 75 lbs minimum.
7. Filler Fabric: Nylon.

C. GCL Material:

1. Sodium Bentonite.
2. Mineralogical Composition: 90% montmorillonite minimum by XRD method.
3. Bentonite graded for mat application.

D. Cover Fabric Material:

1. Fabric: 100% nonwoven polyester with open weave to allow for bentonite expansion.
2. Fabric Weight: 7.25 oz sq yd, minimum.

3. Grab Strength: Warp 30 lbs, fill 13.6 lbs.

4. Burst Strength: 35 lbs/sq in.

2.04 GCL TESTING

A. Submit GCL sample and pay for laboratory testing for the following:

1. Interface shear strength of soil-geosynthetic and geosynthetic-geosynthetic interfaces shall be tested in accordance with ASTM D5321 for the following conditions:
   a. For interface shear test, test GCL with materials that will be installed above and below the GCL (i.e., low permeability soil/GCL, GCL/textured HDPE geomembrane, granular drainage soil/GCL, geocomposite/GCL, final cover subbase soil/GCL interfaces).
   b. All specimens and interfaces shall be fully hydrated for at least 24 hours, under 200 psf normal stress.
   c. For Final Cover GCL, tests shall be performed at normal loads of 100, 250, 500 and 1,000 psf.
   d. For Baseliner GCL, tests shall be performed at normal loads of 250, 2,500, 5,000, 10,000 and 15,000 psf.

2. Internal shear strength of GCL shall be tested in accordance with ASTM D6243 for the following conditions:
   a. All specimens and interfaces shall be fully hydrated for at least 24 hours, under 200 psf normal stress.
   b. For Final Cover GCL, tests shall be performed at normal loads of 100, 250, 500 and 1,000 psf.
   c. For Baseliner GCL, tests shall be performed at normal loads of 250, 2,500, 5,000, 10,000 and 15,000 psf.

3. All sample testing results will be provided to the CM to verify acceptability of the material for use.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Site Preparation:

1. Grade and compact subgrade to provide smooth uniform surface. Do not place mat without the Installer's and CM's subgrade approval.

2. Lay mat on prepared subgrade free of particles greater than 1 inch in diameter.

3. Provide grading to allow surface water to be directed away from installation area toward leachate collection sumps.

B. General:

1. Place woven polypropylene side up.

2. Position GCL by pulling roll suspended by inserting heavy duty 3-inch diameter steel pipe with spreader bar (to prevent damage to mat edge) or suspended roll can be backed down slope and across excavation by supporting vehicle.

3. Lay GCL on side slopes perpendicular to base excavation.

4. Anchor GCL by sand bags or tires to prevent shifting of GCL. Do not temporarily anchor by wooden stakes.

5. Lay GCL on base so upstream mat overlaps downstream mat.
6. GCL overlap shall be free of dirt to provide seal.
7. Provide 6-inch minimum GCL overlap each side.
8. Do not install GCL in rain or standing water.
9. After installation, protect GCL from rain and moisture.
10. Do not deploy more GCL than can be covered at the end of the day.
11. Notify CM before placing any geomembrane cover over GCL. Do not cover until CM has approved of the installation and screening for broken needles has been completed.

C. Temporary Mat Cover:

1. In event of rain, immediately cover exposed mat with plastic sheeting or other methods.

D. Mat Cover:

1. Place geomembrane over mat immediately after CM's approval to protect from precipitation.
2. Prevent seam damage or mat slippage during geomembrane placement.
3. Cover mat in forward direction working on previously placed geomembrane.

E. Repairs and Damaged Mat:

1. Repair torn or damaged mat by covering 1-foot minimum overlap on sides.
2. Repair pieces shall be stapled, nailed or glued in position without damaging liner layers.
3. If tear exceeds 10% of width of roll on side slope, remove roll from slope and replace entire roll.
4. Replace damaged liner as required.

3.02 COVER MATERIAL PLACEMENT

A. Place geomembrane in accordance with Section 31 05 19.16.

TABLE 1
BENTONITE MATTING TESTING
FACTORY QUALITY CONTROL (QC) CERTIFICATION AND
QUALITY ASSURANCE (QA) CONFORMANCE TESTING PROTOCOL

Factory QC and QA Conformance Testing Requirements Material – Bentonite Matting				
Specification Property	**Specification Value**	**Test Method**	**MFR Frequency of Testing (QC)**	**Frequency of Testing (QA)**
Bentonite Mass/Unit Area (lb/ft^2) (MARV)	0.75	ASTM D-5261	1/40,000 ft^2	1/100,000 ft^2
Swell Index (ml/2g) (min)	24	ASTM D 5890	1/40,000 ft^2	None required
Moisture Content (%) (maximum)	12	ASTM D-4643-87	1/40,000 ft^2	1/100,000 ft^2
Hydraulic Conductivity (cm/sec) (maximum)	1×10^{-9}	GRI GCL-2	1/100,000 ft^2	1/250,000 ft^2

(MARV) = Minimum average roll value.

- 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 05 13 – Soils for Earthwork.
2. Section 31 23 00 – Excavation and Fill.
3. 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. Non-Woven Geotextile:

1. Non-woven geotextile shall be of needle-punched construction and consist of long-chain polymeric fibers or filaments composed of polypropylene. The non-woven geotextile shall be chemically inert to naturally encountered chemicals, acids, and bases and resist biological degradation.

2. Non-woven geotextile shall be used as a separation layer between dissimilar material types as shown on the Drawings. The non-woven geotextile shall meet GRI GT13 specifications and have the following minimum average roll values (MARVs):

TABLE 1
REQUIREMENTS FOR NON-WOVEN GEOTEXTILE

Property	ASTM Test Method	Units	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

* Minimum Average Roll Value

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.

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

TABLE 2
REQUIREMENTS FOR WOVEN GEOTEXTILE

Property	ASTM Test Method	Units	Value (MARV, Except AOS)*
Permittivity	D4491	sec^{-1}	0.1
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 05 19.16 – GEOMEMBRANES 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 60 mil textured high-density polyethylene (HDPE) geomembrane liner as specified in this section and in accordance with the manufacturer's recommendations/specifications.

B. Related Sections:

1. Section 31 05 19.13 – Geotextiles for Earthwork.
2. Section 31 05 19.26 – Geocomposite for Earthwork.
3. Section 31 22 00 – Grading.

1.02 REFERENCE STANDARDS

A. The following American Society of testing and materials (ASTM) International standards are referenced in this section:

1. D792 – Standard Test Methods for Density and Specific Gravity (Relative Gravity) of Plastics by Displacement.
2. D1004 – Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
3. D1505 – Standard Test Method for Density of Plastics by the Density-Gradient Technique.
4. D1603 – Standard Test Method for Carbon Black Content in Olefin Plastics.
5. D3895 – Standard Test Method for Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry.
6. D4218 – Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique.
7. D4437 – Standard Practice for Non-destructive Testing (NDT) for Determining the Integrity of Seams Used in Joining Flexible Polymeric Sheet Geomembranes.
8. D4833 – Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.
9. D5321 – Standard Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear.
10. D5397 – Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test.
11. D5596 – Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics.
12. D5617 – Standard Test Method for Multi-Axial Tension Test for Geosynthetics.
13. D5721 – Standard Practice for Air-Oven Aging of Polyolefin Geomembranes.

14. D5885 – Standard Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry.
15. D5994 – Standard Test Method for Measuring Core Thickness of Textured Geomembrane.
16. D6693 – Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes.
17. D7466 – Standard Test Method for Measuring the Asperity Height of Textured Geomembrane.

B. The following Geosynthetics Research Institute (GRI) test methods are referenced in this section:

1. GRI GM17 – Test Methods, Test Properties, and Testing Frequencies for Linear High-Density Polyethylene (HDPE) Smooth and Textured Geomembranes.

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. Geomembrane manufacturer shall be a specialist in the manufacture of geomembranes and shall have produced and successfully installed a minimum of five million square feet of geomembrane material.

B. quality assurance/quality control (QA/QC) testing of HDPE geomembrane liner as specified in this section and in accordance with the manufacturer's recommendations/specifications.

1.04 SUBMITTALS

A. The following items shall be submitted no later than 30 days prior to the start of geomembrane installation or 15 days prior proposed to delivery of the first geomembrane shipment, whichever is earliest.

1. The Geomembrane Manufacturer shall submit the following information in writing to the CM:
    a. Corporate background and information.
    b. Manufacturing Quality Control (MQC) Plan.
    c. Manufacturing capabilities, including:
        1) Information on plant size, equipment, personnel, number of shifts per day, and capacity per shift;
        2) Daily production quantity available for this Contract;
        3) Manufacturing quality control procedures; and
        4) List of material properties, including certified test results, attached to which is a geomembrane sample.
    d. A list of at least ten completed facilities for which the Geomembrane Manufacturer has manufactured a minimum of 10,000,000 square feet of polyethylene geomembrane. The following information shall be provided for each facility:
        1) Name, location, and purpose of facility, and date of installation; and
        2) Names of Owner, Project Manager, Engineer, General Contractor, fabricator (if any), and installer.
    e. Type, thickness, and quantity of geomembrane manufactured.
    f. Copies of quality control certificates issued by the resin supplier.
    g. Results of tests conducted by the Geomembrane Manufacturer to verify the quality of the resin used to manufacture the geomembrane rolls assigned to the project.
    h. Certification that no reclaimed polymer is added to the resin during the manufacture of the geomembrane to be used for this project. The use of polymer recycled during the

manufacturing process may be permitted if performed with appropriate cleanliness and if the recycled polymer does not exceed 10% by weight of the total polymer weight.

i. Manufacturing certificates for each shift's production of geomembrane, signed by responsible parties employed by the Geomembrane Manufacturer (such as the production manager), and notarized.
j. Quality control certificates providing the results of the quality control tests outlined in Section 2.03(A) of this Specification.
    1) The quality control certificates shall include:
        a) Roll numbers and identification;
        b) Sampling procedures; and
        c) Results of quality control tests, including descriptions of the test methods used.
k. Written certification that the minimum test values indicated in Section 2.02 of this specification are guaranteed by the manufacturer.
l. Manufacturer’s standard warranty for the geomembrane.
m. Material sample of the geomembrane.
n. Documentation or supporting information for the chemical compatibility of the HDPE liner material with PCB-impacted wastes.

2. The Geosynthetics Installer shall submit the following information in writing to the CM:
    a. Corporate background and information.
    b. Copy of installer's letter of approval or license by the Geomembrane Manufacturer and/or fabricator.
    c. Construction Quality Control (CQC) Plan.
    d. Installation capabilities, including:
        1) Information on equipment and personnel;
        2) Average daily production anticipated for this project;
        3) Quality control procedures; and
        4) Samples of field seams, a certified list of minimum values for seam properties, and the test methods employed.
    e. A list of at least 10 completed facilities, for which the installer has installed a minimum of 5,000,000 square feet of polyethylene geomembrane. The following information shall be provided for each facility:
        1) The name and purpose of the facility, its location, and dates of installation;
        2) The names of the Owner, Project Manager, Engineer, General Contractor, Geomembrane Manufacturer, fabricator (if any), and the name of a contact at the facility who can discuss the project;
        3) Name and qualifications of the installer's supervisor(s);
        4) Thickness and surface area of installed geomembrane;
        5) Type of seaming and type of seaming apparatus used; and
        6) Duration of installation.
    f. Resumes of all personnel who will perform seaming operations on this project, including dates and duration of employment.
    g. Resume of the installation supervisor to be assigned to this project, including dates and duration of employment. The superintendent shall have supervised the installation of a minimum of 2,000,000 square feet of polyethylene geomembrane.
    h. Proposed installation panel layout drawing showing the placement of geomembrane panels, seams and any variances or additional details which deviate from the Construction Drawings.
    i. Installation schedule.
    j. The name and qualifications of the proposed laboratory that will be responsible for laboratory testing of destructive seam samples.

3. The Contractor shall submit the following information in writing to the CM prior to installation of the geomembrane:
    a. Certification that the field-delivered geomembrane has not been damaged due to improper transportation, handling, or storage; and
    b. Certification that the surface on which the geomembrane is to be installed is acceptable to both the CM and the Contractor. The certification is subject to review and approval or rejection by the CM.
4. The Contractor shall submit results of geotechnical testing for Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces in accordance with Part 2.03(C) of this specification prior to shipping any rolls of geomembrane.
5. The Geomembrane Manufacturer's test results shall be submitted by the Contractor to the CM for review, prior to shipping any rolls of geomembrane.
6. The Contractor shall submit results of conformance test results test results in accordance with Part 2.03(B) of this specification.
7. The Contractor shall submit results of field destructive and non-destructive seam testing accordance with Part 2.03(C) of this specification.
8. The Contractor shall submit information the specifies how the planned construction equipment for initial placement of soil materials immediately above the liners will comply with the allowable ground pressure limits Part 3.04(C).

B. During installation, the Geosynthetics Installer shall submit the following information to the CM:
    1. Certification that the surface on which the geomembrane is to be installed is acceptable to both the CM and the Contractor. The certification is subject to the review and approval or rejection by the CM.
    2. Daily field logs documenting the work being performed, personnel involved, general working conditions, and any problems encountered or anticipated on the project.
    3. Field quality control documentation (i.e., trial seam tests, destructive tests, non-destructive tests, etc.).
    4. A Certificate of Calibration less than 12 months old for the field tensiometer referenced in Section 3.03(H) of this Specification.

C. Geomembrane lot and roll number of field-delivered material.

D. Upon completion of the installation, the Geosynthetics Installer shall be responsible for the timely submission of the following:
    1. Geomembrane installation certification.
    2. As-built panel layout diagram.
    3. Warranty from Geomembrane Manufacturer/Installer as specified in Section 1.05 of this Specification.

1.05 WARRANTY

A. The geomembrane manufacturer and geosynthetics installer shall furnish a standard written warranty against defects in material and workmanship. warranty duration and conditions concerning limits of liability will be evaluated and must be acceptable to the CM.

1.06 REFERENCES

A. The following standards are referenced in this section:

1. ASTM D5321, Standard Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Solmax Geosynthetics.

B. AGRU America, Inc.

C. Poly-Flex, Inc.

D. Approved equal.

2.02 MATERIALS

A. Polyethylene Geomembrane Resin:

1. The resin shall comply with the following HDPE specified properties:
   a. Specific Gravity: 0.97 g/ml, maximum (ASTM D792 Method B, or ASTM D1505); and
   b. Melt Index: 1.0 g/10-minute, maximum (ASTM D1238 Condition E 190 ˚C, 2.16 kg).

2. Resin shall be virgin material with no more than 10% rework (by weight). Rework material shall be of the same formulation as parent material. No post-consumer resin shall be added to the formulation.

B. HDPE Geomembrane:

1. HDPE Geomembrane material shall be HDPE geomembrane textured on both sides and meet the following minimum specification values listed in Table 1 below and as listed in GRI GM13.

TABLE 1
REQUIREMENTS FOR HDPE GEOMEMBRANE

Property	Test Method	Specification Limit 60 mil Textured
Density (min.)	ASTM D1505/D792	0.940 g/cc
Carbon Black Content	ASTM D1603 (3) /D4218	2.0 – 3.0%
Carbon Black Dispersion	ASTM D5596	9 of 10 views in category 1 or 2 1 of 10 views in category 3
Thickness (nominal) Thickness (min. avg.) lowest individual 8 of 10 values lowest individual of 10 values	ASTM D5994	60 mil 57 mil 54 mil 51 mil
Tensile Strength at Break (min.)	ASTM D6693 Type IV	126 lb/in
Elongation at Break (min.)		100%
Tear Resistance (min.)	ASTM D1004	42 lbs

Property	Test Method	Specification Limit
		60 mil Textured
Asperity Height	ASTM D7466	16 mil
Puncture Resistance (min.)	ASTM D4833	90 lbs

2. In addition to the property values listed in Table 1 of this specification, the geomembrane shall:
   a. Contain a maximum of 1% (by weight) of additives, fillers, or extenders (not including carbon black);
   b. Be free of striations, pinholes, or bubbles on the surface or in the interior;
   c. Be produced so as to be free of holes, blisters, undispersed raw materials, or any sign of contamination by foreign matter; and
   d. Be manufactured in a single layer (thinner layers shall not be welded together to produce the final required thickness) and have a uniform textured appearance on both sides.

C. Welding Material:

1. The resin used in the welding material shall be identical to the liner material.

2. All welding materials shall be of a type recommended and supplied by the Geomembrane Manufacturer and shall be delivered in the original sealed containers, each with an indelible label bearing the brand name, Geomembrane Manufacturer's mark number, and complete directions as to proper storage.

D. Fabrication:

1. The geomembrane shall be delivered to the site in rolls or as factory panels. A factory panel is comprised of one or more rolls that have been seamed together in a factory.

2. Labels on each geomembrane roll shall identify the following information:
   a. Name of Geomembrane Manufacturer;
   b. Product identification;
   c. Roll number and dimensions;
   d. Batch number;
   e. Thickness of the material; and
   f. Directions to unroll the material.

2.03 GEOMEMBRANE TESTING REQUIREMENTS

A. Geomembrane Manufacturer’s Quality Control Testing:

1. Polyethylene Geomembrane Resin:
   a. The Geomembrane Manufacturer shall sample and test the resin to demonstrate that the resin complies with this Specification. The Geomembrane Manufacturer shall certify in writing that the resin meets this Specification and shall be held liable for any non-compliance.
   b. Geomembrane material manufactured from non-complying resin will be rejected and replaced with acceptable geomembrane.

2. HDPE Geomembrane:
   a. The Geomembrane Manufacturer shall continuously monitor the geomembrane during the manufacturing process for inclusions, bubbles, or other defects. No geomembrane that exhibits any defects will be accepted.

b. The Geomembrane Manufacturer shall continuously monitor the geomembrane thickness during the manufacturing process. No geomembrane that fails to meet the specified minimum thickness will be accepted.
c. The Geomembrane Manufacturer shall sample and test the geomembrane, in accordance with the MQC Plan to demonstrate that its properties conform to the values specified in Table 2 of this specification.
    1) Samples shall be taken across the entire width of the roll.
    2) At a minimum, the following manufacturing quality control tests shall be performed:

TABLE 2
MANUFACTURING QUALITY CONTROL TESTS

Test	Procedure
Thickness	ASTM D5994
Density	ASTM D1505/ ASTM D 792
Break Strength	ASTM D6693 Type IV
Break Elongation	ASTM D6693
Tear Resistance	ASTM D1004
Puncture Resistance	ASTM D4833
Carbon Black Content	ASTM D1603
Carbon Black Dispersion	ASTM D5596
Axi-Symmetric Break Resistance Strain	ASTM D5617
Asperity Height	ASTM D7466
Oxidative Induction Time (OIT)	ASTM D3895/ ASTM D5885
Oven Aging at 85°C	ASTM D5721/ ASTM D3895/ ASTM D5885
UV Resistance	ASTM D5885

d. Any geomembrane sample that does not comply with this Specification will be rejected by the CM.
e. If a roll of geomembrane is rejected, the Geomembrane Manufacturer shall sample and test each roll manufactured in the same batch or at the same time as the failing roll. Sampling and testing of rolls shall continue until a pattern of acceptable test results is established.
f. The Contractor shall replace any rejected rolls.
g. Additional testing may be performed at the Geomembrane Manufacturer's discretion and expense, to identify the non-complying rolls more closely and/or to qualify individual rolls.

3. The Geomembrane Manufacturer’s test results shall be submitted by the Contractor to the CM for review, prior to shipping any rolls of geomembrane.

B. Conformance Testing:

1. Prior to installation, samples of delivered geomembrane shall be taken and shipped to a third-party testing laboratory (i.e. the Conformance Testing Laboratory approved by the CM), for conformance testing independent of the manufacturer’s testing. Unless otherwise specified, the samples shall be taken at a minimum frequency of one sample per 100,000 square feet with a minimum of one sample per lot of material delivered to the site (regardless of the dates of manufacturing or delivery dates). At least one sample shall also be obtained from geomembrane rolls representing each resin production batch.

2. Samples shall be at least 3 feet long by the roll width and shall not include the first 3 feet of any roll.
3. Conformance testing shall be the responsibility of the Contractor.
4. The Contractor shall plan for and accommodate whatever timeframe may be required in obtaining the samples for conformance testing.
5. At a minimum, the following conformance tests shall be performed:

TABLE 3
CONFORMANCE TESTS

Test	Procedure
Thickness	ASTM D5994
Density	ASTM D1505/ ASTM D 792
Break Strength	ASTM D6693 Type IV
Break Elongation	ASTM D6693
Tear Resistance	ASTM D1004
Puncture Resistance	ASTM D4833
Carbon Black Content	ASTM D1603
Carbon Black Dispersion	ASTM D5596
Asperity Height	ASTM D7466

6. Prior to installation, the CM shall review the conformance test results against the material properties required by Table A of this specification. Non-conforming material will be rejected and bracketed from subsequent rolls from the same product batch.
7. If geomembrane material is rejected due to failing conformance test results, the Contractor shall be responsible for conducting any additional material testing and replacement of materials as necessary.

C. Interface Friction/Direct Shear Testing:

1. Prior to installation, samples of delivered geomembrane shall be taken and shipped to the Contractor's geosynthetics laboratory for interface friction/direct shear testing.
2. Samples shall be at least 3 feet long by the roll width and shall not include the first 3 feet of any roll.
3. Interface friction/direct shear testing shall be conducted on the following interfaces:
   a. Geosynthetic Clay Liner/textured HDPE geomembrane.
   b. Textured HDPE geomembrane/geocomposite.
   c. All specimens and interfaces shall be fully hydrated for at least 24 hours, under 200 psf normal.
   d. For Final Cover Geomembrane, tests shall be performed at normal loads of 250, 500 and 1,000 psf.
   e. For Baseliner Geomembrane, tests shall be performed at normal loads of 250, 2,500, 5,000, 10,000 and 15,000 psf.
4. Soil samples of on-site materials shall be collected by the Contractor in coordination with the CM for interface friction/direct shear testing.

5. The minimum friction angle for each interface listed in Part 2.03(C)(3) of this specification shall be as follows:
    a. For Final Cover Geomembrane, 25.5 degrees for peak strength and 20.6 for residual strength.
    b. For Baseliner Geomembrane, 23 degrees for peak strength and 13 degrees for residual strength.
6. Contractor shall submit required test samples and pay for interface friction/direct shear testing.
7. The CM shall review the results of the interface friction/direct shear test:
    a. If the CM determines that the proposed geomembrane will provide adequate slope stability, and the geomembrane rolls meet all other specifications, the geomembrane rolls shall be accepted.
    b. If the CM determines that the proposed geomembrane will not provide adequate slope stability, the geomembrane rolls shall not be accepted.
        1) The Contractor shall be responsible for removing all unacceptable geomembrane rolls from the site and replacing them with acceptable material.

D. Procedures for Determining Geomembrane Roll Test Failures:

1. For test results reported in both machine and cross direction, results from each direction shall be compared to the acceptable specifications to determine acceptance.
2. For test methods requiring multiple samples, the criteria in Table 1 of this specification shall be met based on average results of multiple specimen tests.
3. The following procedures shall be used for interpreting results:
    a. If the test results meet the specification values provided in Table 1 of this specification, then the roll, batch and entire shipment, if applicable, shall be accepted provided the requirements of Section 2.03(A) of this specification are met.
    b. If the test results do not meet the specification values provided in Table 1 of this specification, then the roll and batch shall be retested by the Contractor. For retesting, two additional tests shall be performed:
        1) If both retest values meet the specification values, then the roll and batch shall be accepted.
        2) If one additional test fails, then the roll and batch shall be rejected without further recourse:
            a) The CM may request the Contractor to obtain samples from other rolls within the batch. Based on the test results from these samples, the CM may choose to accept a portion of the batch while rejecting the remainder.
            b) If retesting does not result in passing test results as defined above, or if there is any other non-conformity with the material Specifications, then the geomembrane rolls shall be removed from the site. Once removed from the site, these same rolls shall not be resubmitted for use.
            c) The Contractor shall be responsible for removing all non-conforming geomembrane rolls from the site and replacing with acceptable material.

2.04 TRANSPORTATION

A. Transportation of the geomembrane shall be the responsibility of the Geomembrane Manufacturer. The Geomembrane Manufacturer shall be liable for all damages to the materials incurred prior to and during transportation to the site.

2.05 HANDLING AND STORAGE

A. Handling, storage, and care of the geomembrane prior to and following installation at the site, is the responsibility of the Contractor. The Contractor shall be liable for all damages to the materials incurred prior to final acceptance of the final cover system.

B. The Contractor shall be responsible for storage of the geomembrane at the site. During storage, the geomembrane shall be protected from excessive heat or cold, puncture, cutting, or other damaging or deleterious conditions. The geomembrane shall be stored in accordance with any additional requirements of the Geomembrane Manufacturer.

PART 3 – EXECUTION

3.01 EARTHWORK

A. Surface Preparation:

1. The Geosynthetics Installer shall provide certification in writing that the surface on which the geomembrane will be installed is acceptable. The surface shall be free of stones, litter, organic matter, irregularities, protrusion, loose soil, and any abrupt changes in grade that could damage the geosynthetic. The certification of acceptance shall be given to the CM prior to commencement of geomembrane installation.
2. Special care shall be taken to maintain the prepared soil surface.
3. No geomembrane shall be placed onto an area which has been softened by precipitation or which has cracked due to desiccation. The soil surface shall be observed daily to evaluate the effects of desiccation cracking and/or softening on the integrity of the soil liner.
4. Any damage to the soil surface caused by installation activities shall be repaired at the Geosynthetics Installer's expense.
5. The Geosynthetics Installer shall be responsible for dewatering areas that have been accepted for geomembrane deployment, including anchor trenches.

B. Geosynthetics Anchor Trench:

1. The anchor trench shall be excavated prior to geomembrane placement to the lines, grades, and configuration shown on the Construction Drawings.
2. No loose soil shall be allowed in the anchor trench beneath the geomembrane.
3. The anchor trench shall be backfilled and compacted after the geosynthetics have been installed in the trench. Care shall be taken when backfilling the trenches to prevent any damage to the geomembrane.
4. Corners where the geomembrane adjoins the trench shall be slightly rounded to avoid sharp bends in the geomembrane.

3.02 GEOMEMBRANE DEPLOYMENT

A. Layout Drawings: The Geosynthetics Installer shall produce layout drawings prior to geomembrane deployment. These drawings shall indicate the geomembrane configuration, dimensions, details, locations of seams, etc. Field seams shall be differentiated from factory seams (if any) on the drawings. Field seams shall be oriented up or down slope and not across slope. The layout drawings must be approved by the CM prior to the installation of any geomembrane. The layout drawings, as modified and/or approved by the CM shall become part of the Project Documents.

B. Field Panel Identification:

1. A geomembrane field panel is defined as follows:
   a. If the geomembrane is not fabricated into factory panels, a field panel is a roll or a portion of roll cut in the field.
   b. If the geomembrane is fabricated into factory panels, a field panel is a factory panel or a portion of factory panel cut in the field.
2. Each field panel must be given an identification code (number or letter-number). This identification code shall be agreed upon by the Contractor and Geosynthetics Installer. The field panel identification code shall be related, through a table or chart, to the original resin, and the constituent rolls and factory panels.

C. Field Panel Placement:

1. Field panels shall be installed as approved or modified at the location and positions indicated in the layout drawings.
2. Field panels shall be placed one at a time, and each field panel shall be seamed to adjacent panels the same day that it is placed.
3. Geomembranes shall not be placed when the ambient temperature is below 32˚F, unless otherwise authorized by the CM.
4. Geomembranes shall not be placed during any precipitation, in the presence of excessive moisture (e.g., fog, dew), in an area of ponded water, or in the presence of winds exceeding 20 miles per hour.
5. The Geosynthetics Installer shall employ placement methods consistent with the following:
   a. No vehicular traffic shall be allowed on the geomembrane.
   b. Equipment used shall not damage the geomembrane by handling, trafficking, leakage of hydrocarbons, or other means.
   c. Personnel working on the geomembrane shall not smoke, wear damaging shoes, or engage in other activities which could damage the geomembrane.
   d. The method used to unroll the panels shall not scratch or crimp the geomembrane and shall not damage the supporting soil.
   e. The prepared surface underlying the geomembrane shall not be allowed to deteriorate after acceptance of the surface and shall remain acceptable up to the time of geomembrane placement.
   f. The method used to place the panels shall minimize wrinkles (especially differential wrinkles between adjacent panels).
   g. Temporary loads and/or anchors (e.g., sand bags, tires) not likely to damage the geomembrane may be placed on the geomembrane to prevent uplift by wind (in high winds, continuous loading is recommended along panel edges to minimize the risk of wind flow under the panels).
6. Any field panel or portion thereof that becomes seriously damaged (torn, twisted, or crimped) shall be replaced with new material. Less serious damage may be repaired at the CM's sole discretion. Damaged panels or portions of damaged panels that have been rejected shall be removed from the work area.

3.03 FIELD SEAMING

A. Seam Layout: In general, seams shall be oriented parallel to the line of maximum slope, i.e., oriented down, not across, the slope. In corners and at odd-shaped geometric locations, the number of field seams shall be minimized. No horizontal seam shall be made within 5 feet of any toe of the slope, except where approved by the CM. No seams shall be located in an area of potential stress concentration, as defined by the CM.

B. Personnel: All personnel performing seaming operations shall be qualified as indicated in Section 1.04(C)(3) of this specification. No seaming shall be performed unless a "master seamer" is present.

C. Weather Conditions for Seaming:

1. Seaming shall not be attempted at ambient temperatures below 32˚F or above 104˚F or when wind velocity exceeds 20 miles per hour. At ambient temperatures between 32˚F and 50˚F, seaming shall be allowed if the geomembrane is preheated either by the sun or a hot air device, and if there is no excessive cooling from wind. At ambient temperatures above 50˚F, no preheating will be required. In all cases, the geomembrane shall be dry and protected from excessive wind.

2. If the Geosynthetics Installer wishes to use methods that may allow seaming at ambient temperatures below 32˚F or above 104˚F, he shall demonstrate that the seam so produced is equivalent to those produced under normally approved conditions, and that the overall quality of the geomembrane is not adversely affected. In addition, an addendum to the Contract between the Contractor and the Geosynthetics Installer shall be required. The addendum shall specifically state that the seaming procedure does not cause any physical or chemical modification to the geomembrane that will generate any short or long term damage to the geomembrane.

3. To minimize geomembrane contraction stresses, seaming should ideally be carried out in the morning and late evening when the geomembrane is relatively contracted and during the middle of the day if overcast conditions prevail. If the geomembrane must be seamed in the middle of a sunny day, the Geosynthetics Installer shall ensure that the panels to be seamed are at the same temperature and that there is sufficient slack in the geomembrane to prevent the generation of excessive stresses or trampolining when the geomembrane contracts as cooler temperatures prevail. The required amount of slack shall be determined by the Geosynthetics Installer, and it should not be so much so as to cause significant wrinkling of the geomembrane. If trampolining of the geomembrane is observed, the Geosynthetics Installer will be required to make repairs so that the problem is eliminated.

4. Ambient temperatures shall be measured 6 inches above the geomembrane surface.

D. Overlapping and Temporary Bonding:

1. Geomembrane panels shall be overlapped a minimum of 3 inches for extrusion welding and 5 inches for fusion welding, but in any event, sufficient overlap shall be provided to allow peel tests to be performed on the seam.

2. The procedure used to temporarily bond adjacent panels together shall not damage the geomembrane. The temperature of the air at the nozzle of spot welding apparatus shall be controlled such that the geomembrane is not damaged.

3. No solvent or adhesive shall be used unless the product has been approved in writing by the CM. Samples of any proposed solvent or adhesive shall be submitted to the CM for evaluation.

E. Seam Preparation:

1. Prior to seaming, the seam area shall be cleaned and made free of moisture, dust, dirt, debris of any kind, and foreign material.

2. If seam overlap grinding is required, the process shall be completed according to the Geomembrane Manufacturer's instructions within one hour of the seaming operation and in a manner that does not damage the geomembrane. The grind depth shall not exceed 10% of the geomembrane thickness. Grinding marks shall not appear beyond 0.25 inch of the extrudate after it is placed.

3. Seams shall be aligned with the fewest possible number of wrinkles and "fishmouths".

F. General Seaming Requirements:

1. Seaming shall extend to the outside edge of panels to be placed in the anchor trench.
2. If required, a firm substrate shall be provided by using a flat board, a conveyor belt, or similar hard surface, directly under the seam overlap to achieve proper support.
3. If seaming operations are carried out at night, adequate illumination shall be provided by the Geosynthetics Installer for performing seaming activities.
4. Fishmouths or wrinkles at the seam overlaps shall be cut along the ridge of the wrinkle to achieve a flat overlap. The cut fishmouths or wrinkles shall be seamed where possible; any portion where the overlap is inadequate shall then be patched with an oval or round patch of the same geomembrane that extends a minimum of 6 inches beyond the cut in all directions.

G. Seaming Process:

1. Approved processes for field seaming are extrusion welding and fusion welding. Seaming equipment shall be operated in a manner that does not cause damage to the geomembrane. Only apparatus that the CM has specifically approved by make and model shall be used. Proposed alternate seaming processes shall be documented and submitted to the CM.
2. Extrusion Equipment and Procedures:
   a. The Geosynthetics Installer shall maintain at least one spare operable extrusion seaming apparatus on-site at all times.
   b. Extrusion welding apparatus shall be equipped with gauges giving the temperature in the apparatus and at the nozzle.
   c. Prior to beginning a seam, the extruder shall be purged until all heat-degraded extrudate has been removed from the barrel. Whenever the extruder is stopped, the barrel shall be purged of all heat-degraded extrudate.
   d. The Geosynthetics Installer shall provide documentation regarding the extrudate to the CM and shall certify that the extrudate is compatible with the specifications and consists of the same resins as the geomembrane.
   e. The electric generator used for power supply to the welding machines shall be placed outside the area to be lined or mounted on soft tires such that no damage occurs to the geomembrane. The electric generator shall be equipped with a grounding rod that is driven into the ground outside the lined area. A smooth insulating plate or fabric shall be placed beneath the hot welding apparatus after use.
3. Fusion Equipment and Procedures:
   a. The Geosynthetics Installer shall maintain at least one spare operable seaming apparatus on-site at all times.
   b. Fusion-welding apparatus shall be automated vehicular-mounted devices equipped with gauges that show the instantaneous temperatures and pressures of the machine.
   c. The edges of cross seams shall be abraded to a smooth incline (top and bottom) prior to welding.
   d. A movable protective layer may be used directly below each geomembrane overlap to be seamed to prevent the buildup of moisture between the sheets.
   e. The electric generator used for power supply to the welding machines shall be placed outside the area to be lined or mounted on soft tires such that no damage occurs to the geomembrane. A smooth insulating plate or fabric shall be placed beneath the hot welding apparatus after use.

H. Trial Seams:

1. Trial seams shall be made prior to production seaming by all seamers and by all equipment to be used during production seaming. The trial seams shall be made on fragment pieces of geomembrane to verify that seaming conditions are adequate. Such trial seams shall be

made at the beginning of each seaming period and at least once every five hours for each seaming apparatus used that day. Also, each seamer shall make at least one trial seam each day. Trial seams shall be made under the same conditions as actual seams. The trial seam sample shall be at least 5 feet long by 1-foot wide (after seaming) with the seam centered lengthwise. Seam overlap shall be as specified in Section 3.03(D) of this Specification.

2. Two adjoining specimens, each 1-inch wide, shall be cut from the trial seam sample by the Geosynthetics Installer. The specimens shall be tested in shear and peel, respectively, using a field tensiometer, and the specimen shall fail by film tear bond rather than in the seam. If a specimen fails, the entire operation shall be repeated. If the additional specimen fails, the seaming apparatus or seamer shall not be accepted and shall not be used for seaming until the deficiencies are corrected and two consecutive successful trial seams are achieved.

3. The trial seams shall meet the required strength values shown in Table 2 of this specification.

I. Non-Destructive Seam Continuity Testing:

1. The Geosynthetics Installer shall non-destructively test all field seams over their full length using a vacuum test, air pressure test (for double fusion seams only), or other approved method. Continuity testing shall be carried out as the seaming work progresses, not at the completion of all field seaming. The installer shall complete any required repairs in accordance with Section 3.03(K) of this Specification. The following procedures shall apply to locations where seams cannot be non-destructively tested:
   a. If the seam is accessible to testing equipment prior to final installation, the seam shall be non-destructively tested prior to final installation.
   b. If the seam cannot be tested prior to final installation, the seaming operations must be observed in their entirety by the CM for uniformity and completeness.

2. Vacuum Testing:
   a. The equipment shall comprise the following:
      1) A vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft neoprene gasket attached to the bottom, port hole or valve assembly, and a vacuum gauge;
      2) A steel vacuum tank and pump assembly equipped with a pressure controller and pipe connections;
      3) A rubber pressure/vacuum hose with fittings and connections;
      4) A bucket and applicator; and
      5) A soapy solution.
   b. The following procedures shall be followed:
      1) Energize the vacuum pump and reduce the tank pressure to approximately 5 pounds per square inch (psi) gauge.
      2) Wet a strip of geomembrane seam having an area larger than the vacuum box assembly with the soapy solution.
      3) Place the box over the wetted area.
      4) Close the bleed valve and open the vacuum valve.
      5) Ensure that a leak tight seal is created.
      6) Examine the geomembrane through the viewing window for the presence of soap bubbles for not less than 10 seconds.
      7) If no bubbles appear after 10 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum 3 inches overlap, and repeat the process.
      8) All areas where soap bubbles appear shall be marked with a marker that will not damage the geomembrane and repaired in accordance with Section 3.03(K) of this Specification.

3. Air Pressure Testing (For Double Fusion Seams Only):
    a. The following procedures are applicable to those processes which produce a double seam with an enclosed space.
    b. The equipment shall comprise the following:
        1) An air pump (manual or motor driven), equipped with a pressure gauge, capable of generating and sustaining a pressure between 25 and 30 psi, mounted on a cushion to protect the geomembrane;
        2) A rubber hose with fittings and connections; and
        3) A sharp hollow needle or other, approved pressure feed device.
    c. The following procedures shall be followed:
        1) Seal both ends of the seam to be tested.
        2) Insert needle or other, approved pressure feed device, into the channel created by the fusion weld.
        3) Insert a protective cushion between the air pump and the geomembrane.
        4) Energize the air pump to a pressure between 25 and 30 psi, close valve, allow two minutes for pressure to stabilize, and sustain the pressure for not less than five minutes.
        5) If loss of pressure exceeds 4 psi, or if the pressure does not stabilize, locate faulty area and repair in accordance with Section 3.03(K) of this Specification.
        6) Cut opposite end to verify continuity of seam, remove needle, or other approved pressure feed device, and seal repair in accordance with Section 3.03(K) of this Specification.

J. Destructive Testing:

1. Destructive seam tests shall be performed on samples collected from selected locations to evaluate seam strength and integrity. Destructive testing shall be carried out as the seaming work progresses, not at the completion of all field seaming.

2. The destructive seam tests shall meet the required strength values shown in Table 31 05 19.16 B below:

TABLE 4
HDPE TEXTURED GEOMEMBRANE SEAM TESTING

Item	Test Method	Frequency	Requirement
Shear Strength	ASTM D6392	1/500 feet (maximum)[1]	120 lb/in (minimum)
Peel Strength	ASTM D6392	1/500 feet (maximum)[1]	Fusion – 91 lb/in (minimum) Extrusion – 78 lb/in (minimum)

Notes:
1. For fusion welded seams, frequency is based on welding device footage; for extrusion welded seams, frequency is based on operator footage.
2. Minimum test values based on current manufacturers specifications and may change based on future manufacturers guaranteed minimum test values. List Locus of Break in laboratory test results.

3. Sampling:
    a. Destructive test samples shall be collected at a minimum frequency of one test location per day per seaming crew or seaming machine at least every 500 feet of seam length (not including repairs). Test locations shall be determined during seaming, and may be prompted by suspicion of excess crystallinity, contamination, offset seams, or any other potential cause of imperfect seaming. The CM will be responsible for choosing the locations. The Geosynthetics Installer shall not be informed in advance of the locations where the seam samples will be taken. The CM reserves the right to increase the sampling frequency.

b. Samples shall be cut by the Geosynthetics Installer at the locations designated by the CM as the seaming progresses in order to obtain laboratory test results before the geomembrane is covered by another material. All holes in the geomembrane resulting from the destructive seam sampling shall be immediately repaired in accordance with the repair procedures described in Section 3.03(K) of this Specification. The continuity of the new seams in the repaired areas shall be tested according to Section 3.03(I) of this Specification.
c. Two strips, 1-inch wide and 12 inches long with the seam centered parallel to the width, shall be taken. The strips shall be spaced a clear distance of 42 inches apart. These samples shall be tested in the field in accordance with Section 3.03(J)(3) of this Specification. If these samples pass the field test, a laboratory sample shall be taken. The laboratory sample shall be at least 1-foot wide by 42 inches long with the seam centered lengthwise. The sample shall be cut into three parts and distributed as follows:
    1) One 1-foot-long portion to the Geosynthetics Installer for field testing;
    2) One 1.5-foot-long portion to the Contractor for laboratory testing; and
    3) One 1-foot-long portion to the CM for archival storage.

4. Field Testing: The two 1-inch-wide strips shall be tested in the field using the field by tensiometer for peel and shear respectively. If any field test sample fails to pass, then the procedures outlined in Section 3.03(K) of this Specification shall be followed.

5. Laboratory Testing: Samples shall be tested in the laboratory in accordance with the methodology of ASTM D6392. Perform peel testing for dual hot wedge fusion welds on the inside and outside tracks.
    a. Each destructive seam sample shall be tested for the following:
        1) Shear strength, expressed in pounds per inch (ppi), when tested in general accordance with ASTM D6392; and
        2) Peel strength, expressed in ppi, when tested in general accordance with ASTM D6392.
    b. The testing laboratory shall report the following values, along with the mean and standard deviations where appropriate, for each sample tested in shear:
        1) Maximum tension in pounds per square inch;
        2) Elongation at break (up to a tested maximum of 100%); and
        3) The locus of failure.
    c. The testing laboratory shall report the following values, along with the mean and standard deviations where appropriate, for each sample tested in peel:
        1) Maximum tension in pounds per square inch;
        2) Seam separation (expressed as percent of original seam area); and
        3) The locus of failure.
    d. Retesting of seams, because of failure to meet any or all of the specifications, may be performed at the sole discretion of the CM.

6. Destructive Test Failure:
    a. The following procedures shall apply whenever a sample fails a destructive test, whether the test is conducted by the Contractor’s laboratory, the Geosynthetics Installer's laboratory, or by a field tensiometer. The Geosynthetics Installer shall have two options, as described in b and c below.
    b. The Geosynthetics Installer can reconstruct the seam (e.g., remove the old seam and re-seam) between any two passed test locations.
    c. The Geosynthetics Installer can trace the welding path to an intermediate location, a minimum of 10 feet from the location of the failed test (in each direction) and take a small sample for an additional field test at each location. If these additional samples pass the tests, then full laboratory samples shall be taken. If these laboratory samples pass the tests, then the seam shall be reconstructed between these locations. If either sample fails, then the process shall be repeated to establish the zone in which the

seam should be reconstructed. In any case, all acceptable seams must be bounded by two locations from which samples passing laboratory destructive tests have been taken. In cases where the length of reconstructed seam exceeds 150 feet, a destructive sample taken from within the reconstructed zone must pass destructive testing. Whenever a sample fails, the CM may require additional tests for seams that were formed by the same seamer and/or seaming apparatus or seamed during the same time shift.

K. Defects and Repairs:

1. All seams and non-seam areas of the geomembrane will be examined by the CM for evidence of defects, holes, blisters, undispersed raw materials and any sign of contamination by foreign matter. The surface of the geomembrane shall be clean at the time of examination. The geomembrane surface shall be swept or washed by the Geosynthetics Installer if surface contamination inhibits examination. The Geosynthetics Installer shall ensure that this examination of the geomembrane precedes any seaming of that section.

2. Each suspect location, both in seam and non-seam areas, shall be non-destructively tested using the methods described Section 3.3(I) of this Specification, as appropriate. Each location which fails non-destructive testing shall be marked by the CM and repaired by the Geosynthetics Installer. Work shall not proceed with any materials which will cover repaired locations until laboratory test results with passing values are available.

3. When seaming of a geomembrane is completed (or when seaming of a large area of a geomembrane is completed) and prior to placing overlying materials, the CM shall identify all excessive geomembrane wrinkles. The Geosynthetics Installer shall cut and re-seam all wrinkles so identified. The seams thus produced shall be tested like any other seams.

4. Repair Procedures:
   a. Any portion of the geomembrane exhibiting a flaw, or failing a destructive or non-destructive test, shall be repaired by the Geosynthetics Installer. Several repair procedures are specified below. The final decision as to the appropriate repair procedure shall be agreed upon between the CM and the Geosynthetics Installer. The procedures available include:
      1) Patching, used to repair large holes, tears, undispersed raw materials, and contamination by foreign matter;
      2) Abrading and re-seaming, used to repair small sections of extruded seams;
      3) Spot seaming, used to repair small tears, pinholes, or other minor, localized flaws;
      4) Capping, used to repair long lengths of failed seams; and
      5) Removing bad seam and replacing it with a strip of new material seamed into place (used with long lengths of fusion seams).
   b. In addition, the following shall be satisfied:
      1) Surfaces of the geomembrane to be repaired shall be abraded no more than one hour prior to the repair.
      2) All surfaces must be clean and dry at the time of repair.
      3) All seaming equipment used in repair procedures must be approved by the CM.
      4) The repair procedures, materials, and techniques shall be approved in advance for the specific repair by the CM and Geosynthetics Installer.
      5) Patches or caps shall extend at least 6 inches beyond the edge of the defect, and all corners of patches shall be rounded with a radius of at least 3 inches.
      6) The geomembrane below large caps shall be appropriately cut to avoid water or gas collection between the two sheets.

5. Each repair shall be numbered and logged and shall be non-destructively tested using the methods described in Section 3.03(I) of this Specification, as appropriate. Repairs which pass the non-destructive test shall be taken as an indication of an adequate repair. Failed

tests will require the repair to be redone and retested until a passing test result is achieved. At the discretion of the CM, destructive testing may be required on large caps.

3.04 MATERIALS IN CONTACT WITH THE LINER

A. The Geosynthetics Installer shall take all necessary precautions to ensure that the geomembrane is not damaged during its installation or during the installation of other components of the final cover system or by other construction activities. Installation on rough surfaces shall be performed carefully. If approved by the CM, additional loosely placed geotextile sections may be used by the Geosynthetics Installer to protect the geomembrane.

B. No granular materials shall be placed directly on the geomembrane at any time. A geotextile cushion shall be installed between aggregate and any geomembrane.

C. Equipment shall not be driven directly on the geomembrane. A minimum of 12 inches of fill shall be in place before operation of any equipment is allowed. Unless otherwise specified by the CM, all equipment operating on materials overlying the geomembrane 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

D. In heavily trafficked areas such as access ramps, and in areas trafficked by rubber tire vehicles, the thickness of overlying compacted fill shall be at least 3 feet.

E. Installation of the geomembrane in sump areas, and connection of the geomembrane to appurtenances shall be made according to these Specifications and as shown on the Construction Drawings. Extreme care shall be taken while seaming around sumps and appurtenances (where applicable), since neither non-destructive nor destructive testing may be feasible in these areas. The Geosynthetics Installer shall ensure that the geomembrane has not been visibly damaged while making connections to sumps and appurtenances. Because of the difficulty of vacuum testing seams in the sump area, fusion seams should be made at all possible locations in the sump.

3.05 GEOMEMBRANE ACCEPTANCE

A. The Geosynthetics Installer shall retain all ownership and responsibility for the geomembrane until accepted by the CM.

B. The geomembrane will not be accepted by the CM until all of the following conditions are met:

1. The installation is finished.
2. All documentation of installation is completed including the Contractor’s final report.
3. Verification of the adequacy of all field seams and repairs, including associated testing, is complete.
4. Written certification documents shall be provided by the Geosynthetics Installer. Also, record drawings, certified by the Geosynthetics Installer and signed and sealed by a Professional Surveyor, shall be provided.

3.06 PRODUCT PROTECTION

A. The Contractor shall use all means necessary to protect all prior work and all materials and completed work of other Sections.

B. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the CM.

- END OF SECTION -

SECTION 31 05 19.20 – GEOELECTRIC LEAK LOCATION SURVEY

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. Requirements for performance of a geomembrane leak location survey using electrical methods for post-geomembrane installation performance for the secondary and primary geomembrane, baseliner components of the landfill cells.

B. Leak Location survey shall be conducted after water or earth materials are placed over the geomembrane liner to detect leaks resulting from installation defects and construction damage caused during placement of the overlying layers.

C. The optimum performance of a geomembrane leak location survey using electrical methods requires the conductive media above and below the geomembrane to be electrically isolated from each other except through the leaks being located in the geomembrane. It is also necessary to have a continuous electrically conducting pathway through an electrically conducting material above the geomembrane, through the leaks, and through an electrically conducting media under the geomembrane. Specifically, the conductive media must have some moisture.

D. GEOSYNTHETICS INSTALLER shall be aware of the leak detection activities outlined herein and shall account for these activities in the construction schedule.

1.02 REFERENCES

A. ASTM D7007 – Standard Practices for Locating Leaks in Geomembranes Covered with Water or Earth Materials.

1.03 SUBMITTALS

A. The LEAK LOCATION CONTRACTOR shall submit a Leak Location Survey Work Plan to the CM for approval prior to commencement of the leak location survey. The Leak Location Survey Work Plan shall include:

1. Qualifications of the proposed LEAK LOCATION CONTRACTOR including the number of years the LEAK LOCATION CONTRACTOR has performed the proposed survey method.
2. Resumes of proposed on-site supervisors.
3. Required site preparations.
4. Estimated duration of survey.
5. Quality control and field calibration procedures.
6. A list of projects demonstrating the qualifications and experience where the proposed Leak Location Contractor and leak location supervisor have met the requirements of paragraph 2.01 of this specification.
7. Sample of a final report (per ASTM D7007) provided by the Leak Location Contractor following the completion of the survey.

PART 2 – PRODUCTS

2.01 LEAK LOCATION CONTRACTOR AND SUPERVISOR QUALIFICATIONS

A. The LEAK LOCATION CONTRACTOR shall have qualifications and experience in conducting the proposed survey method including having tested a minimum of 5,000,000 square feet of geomembrane liner within the previous three years. In addition, the leak location surveys must be supervised by a professional or technician with a minimum of three years and 5,000,000 square feet of liner testing experience using the proposed leak location survey method. The leak location supervisor must be on-site full-time during the performance of the leak location survey.

PART 3 – EXECUTION

3.01 INFORMATION REQUIRED

A. The GEOSYNTHETICS INSTALLER shall provide the LEAK LOCATION CONTRACTOR with drawings showing:

1. A Site Plan of the area to be leak location tested (including test limits).
2. Details of any liner penetrations.
3. Any structures and obstructions above the liner.
4. Any electrical equipment above the primary liner.

3.02 SITE PREPARATION

A. The GEOSYNTHETICS INSTALLER will identify actions required by the LEAK LOCATION CONTRACTOR to prepare the site for the leak location survey, including means to make electrical contact with the conductive material under the geomembrane. Specifically, bare copper wires shall be installed under the secondary geomembrane (i.e., over the secondary geosynthetic clay liner) to test the secondary geomembrane layer of the baseliner system and under the geosynthetic clay liner between the secondary and primary geomembranes to test the primary geomembrane layer of the baseliner system. The bare copper wires shall be 10AWG or heavier. The bare copper wires shall be placed perpendicular to the machine direction of the overlying geosynthetic material. Four wires shall be spaced at 1/8, 3/8, 5/8, and 7/8 of the relevant dimension of the cell (+/- 25 feet.) The wires shall exit from between the geomembranes at both edges of the cell, remain exposed until after the leak location survey, not contact earth ground, and remain accessible to Leak Location Contractor. LEAK LOCATION CONTRACTOR shall be responsible for determining the placement of any electrodes needed for the leak location survey and the locations shall be depicted on the subgrade grading plan and submitted to the CM for review and record keeping purposes.

B. EARTHWORK CONTRACTOR shall ensure that the earth materials above and below the secondary and primary geomembranes contain sufficient moisture to conduct a leak location survey. For the landfill baseliner, the geocomposites placed on the geomembrane must be moist, either from a rainfall, from excess moisture in the granular material, or by wetting the area with the equivalent of 0.1 inch of water (2,700 gallons/acre) immediately prior to installing the earth materials on the geocomposites. Also, the granular layer must have some moisture. Adequate moisture is indicated when the material appears to be darker than the dry surface material. If the surface of the granular layer is dry, water must be sprayed on the granular layer immediately prior to the leak location survey, or the dry surface soil can be scraped from a narrow path along the survey lines.

C. GEOSYNTHETICS INSTALLER shall provide electrical isolation between the material above and below the geomembranes. This will be the case if the primary and secondary geomembrane are welded together. Any conducting penetrations through the geomembranes such as metal pipes or concrete structures should also be isolated using complete insulating coatings.

3.03 EXECUTION

A. LEAK LOCATION CONTRACTOR shall inspect the site prior to commencing the survey to ensure all site preparations are completed and the site conditions are appropriate for conducting the leak location survey.

B. Any discrepancy in the required site preparation described above or in the Leak Location Survey Work Plan shall be reported to the GEOSYNTHETICS INSTALLER and/or EARTHWORK CONTRACTOR for corrective or appropriate action.

C. After the geocomposite and granular layer is placed on the geomembrane, conduct a leak location survey on the earth materials using the procedures for surveys with earth materials covering the geomembrane described in the latest version of ASTM Standard D7007 except use a 12-mm-diameter actual or artificial leak. This larger size is because the earth materials on the geomembrane are thicker than usual.

D. LEAK LOCATION CONTRACTOR shall inform the CM and mark the locations of all identified or indicated leaks with flags, spray paint, or written coordinates.

E. In addition, any leaks that are found must be exposed by GEOSYNTHETICS INSTALLER and isolated from the materials covering the geomembrane. Then additional leak location measurements shall be made on the two closest leak location survey lines to determine if additional leaks are in the vicinity. If an additional leak is found, this process shall be repeated.

3.04 REPORTING

A. The Leak Location Contractor shall provide a written report within 14 calendar days of completion of the leak location survey field work as described in ASTM D7007. The written report shall be submitted to CM for review.

- END OF SECTION -

SECTION 31 05 19.26 – GEOCOMPOSITE FOR EARTHWORK

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Providing all labor, materials, tools, and equipment necessary to furnish and install geocomposite where specified in the Design Drawings.

B. Related Sections:

1. Section 31 05 13 – Soil for Earthwork.
2. Section 31 05 19.13 – Geomembranes for Earthwork.
3. Section 31 22 00 – Grading.

1.02 REFERENCE STANDARDS

A. The following American Society of Testing and Materials (ASTM) International standards are referenced in this section:

1. D1238 – Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
2. D1505 – Standard Test Method for Density of Plastics by the Density-Gradient Technique.
3. D1603 – Standard Test Method for Carbon Black Content in Olefin Plastics.
4. D1777 – Standard Test Method for Thickness of Textile Materials.
5. D3776 – Standard Test Methods for Mass per Unit Area (Weight) of Fabric.
6. D4491 – Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
7. D4533 – Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
8. D4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
9. D4716 – Standard Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
10. D4751 – Standard Test Method for Determining Apparent Opening Size of a Geotextile.
11. D4833 – Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.
12. D5199 – Standard Test Method for Measuring Thickness of Geotextiles and Geomembranes.
13. D5261 – Standard Test Method for Measuring Mass per Unit Area of Geotextiles.
14. D5321 – Standard Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear.
15. D7005 – Standard Test Method for Determining the Bond Strength (Ply Adhesion) of Geocomposites.
16. F904 – Standard Test Method for Comparison of Bond Strength or Ply Adhesion of Similar Laminates Made from Flexible Materials.

B. The following Geosynthetic Research Institute (GRI) test method is referenced in this section:

1. GRI GC7 – Determination of Adhesion and Bond Strength of Geocomposites.

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. Geocomposite manufacturer shall be a specialist in the manufacture of geocomposites and shall have produced and successfully installed a minimum of five million square feet of geocomposite material.

B. Quality Assurance/Quality Control (QA/QC) testing of geocomposite as specified in this section and in accordance with the manufacturer's recommendations/specifications.

1.04 SUBMITTALS

A. The following items shall be submitted no later than 30 days prior to the start of geocomposite installation or 15 days prior proposed to delivery of the first geocomposite shipment, whichever is earliest.

1. Manufacturer's data for the geocomposite including physical properties and roll size.
2. The origin (supplier's name and production plant) and identification (brand name and number) of the geotextile and geonet used to fabricate the geocomposite.
3. Material sample of geocomposite.
4. Manufacturer's installation procedures and specifications.
5. Manufacturer's Quality Assurance/Quality Control (QA/QC) program.
6. Written certification that the minimum test values provided under Part 2.02 of this section are guaranteed by the Manufacturer.
7. Contractor's proposed transportation, handling, and storage techniques for the geocomposite.
8. Shop drawings depicting installation details, a panel layout diagram, and a description of proposed installation techniques for the geocomposite.

B. The Contractor shall submit results of conformance test results test results in accordance with Part 2.02(B) of this specification.

C. The Contractor shall submit results of geotechnical testing for Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces in accordance with Part 2.02(C) of this specification.

D. During Installation, the Geosynthetics Installer shall submit the following information to the CM:

1. Contractor's written certification (provided prior to the installation of the geocomposite) that the field-delivered geocomposite has not been damaged due to improper transportation, handling, or storage.
2. Contractor's written certification (provided prior to the installation of the geocomposite) that the surface on which the geocomposite is to be installed is acceptable to both the

CM and the Contractor. The certification is subject to the review and approval or rejection by the CM.

3. Daily field logs documenting the work being performed, personnel involved, general working conditions, and any problems encountered or anticipated on the project.

4. All personnel performing installation shall be qualified by previous experience.

E. Upon completion of the installation, the Geosynthetics Installer shall be responsible for the timely submission of the following:

1. Quality Control (QC) certificates (signed by a responsible party employed by the Manufacturer) for the geocomposite, which identify the sections of field-delivered material they represent. The QC certificates shall include lot and roll identification numbers, testing procedures, and results of QC tests. At a minimum, results shall be given in accordance with the Technical Drawings and Specifications for:
   a. Unit Weight of geotextile component (ASTM D5261);
   b. Thickness of geonet component (ASTM D1777);
   c. Geotextile-Geonet ply adhesion (ASTM D7005/F904/GRI GC7); and
   d. Transmissivity (ASTM D4716).

2. QC tests for the above-listed properties shall be performed in accordance with the Manufacturer's QA/QC program.

3. Contractor's written certification that the field-delivered material meets the Manufacturer's specifications. The Contractor shall also provide the lot and roll identification numbers for the field-delivered material.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. AGRU America, Inc.

B. TENAX.

C. SKAPS Industries.

D. Approved equal.

2.02 MATERIALS

A. The geocomposite shall be comprised of a high-density polyethylene (HDPE) drainage net composited with two, 8 oz/yd^2 non-woven geotextiles. The geotextiles shall be heat bonded to both sides of the drainage net.

1. The drainage net to be used in the composite shall be a profiled mesh made by extruding two sets of high-density strands together to form a diamond shaped, three-dimensional net to provide planar fluid flow. The drainage net shall be made of HDPE containing carbon black, antioxidants, and heat stabilizers that shall be manufactured from resin provided from one resin supplier.

2. The geotextile shall be a non-woven, needle punched polymeric material.

B. Geocomposite material may be acceptable for use provided the selected product meets the above-described requirements and the following minimum test values:

1. Drainage Net:

Property	Test Method	Unit of Measure	Minimum Test Value
Specific Gravity	ASTM D1505	g/cm^3	0.94
Melt Flow Index	ASTM D1238 – Condition E	g/10 min.	0.3 maximum
Carbon Black Content	ASTM D1603	%	2.0 – 3.0

2. Geotextile:

Property	Test Method	Unit of Measure	Minimum Test Value
Grab Tensile	ASTM D4632	lbs	158
Grab Elongation	ASTM D4632	%	50
Puncture	ASTM D4833	lbs	56
Trapezoidal Tear	ASTM D4533	lbs	56
Burst Strength	ASTM D3786	lbs	189
Permittivity	ASTM D4491	sec^{-1}	1.3
Apparent Opening Size	ASTM D4751	mm	< 0.25

3. Composited Materials for Baseliner System:

Property	Test Method	Unit of Measure	Minimum Test Value
Transmissivity	ASTM D4716*	m^2/s	2.51×10^{-3} (0.10 gradient, minimal load condition) 9.00×10^{-4} (0.10 gradient, full-buildout condition) 6.06×10^{-4} (0.33 gradient, sideslope)
Ply Adhesion	ASTM D7005/F904 GRI GC7	lb/in width	0.5

* Conformance transmissivity test method to be performed with the following modifications:

Substrate Material:	60-mil textured HDPE geomembrane on top of 6 steel plate
Superstrate Material:	6 inches of representative drainage layer soil
Applied Normal Compressive Load:	3,000 lbs/ft^2 (0.10 gradient, minimal load condition) 14,000 lbs/ft^2 (0.10 gradient, full-buildout condition) 13,000 lbs/ft^2 (0.33 gradient, sideslope)
Seating Time:	100 hours (minimum)
Hydraulic Gradient:	0.1 or 0.33

Two tests to be performed on each material requiring testing. The first test shall be run in the machine direction (i.e., roll direction). The second test shall be run in transverse direction (i.e., perpendicular to roll length).

4. Composited Materials for Final Cover System:

Property	Test Method	Unit of Measure	Minimum Test Value
Transmissivity	ASTM D4716*	m^2/s	2.30×10^{-3} (0.10 gradient), 3.10×10^{-4} (0.33 gradient)
Ply Adhesion	ASTM D7005/F904 GRI GC7	lb/in width	0.5

* Conformance transmissivity test method to be performed with the following modifications:

Substrate Material:	60-mil textured HDPE geomembrane on top of steel plate
Superstrate Material:	6 inches of representative general soil fill
Applied Normal Compressive Load:	2,000 lbs/ft^2 (0.10 gradient) and 2,000 lbs/ft^2 (0.33 gradient)
Seating Time:	100 hours (minimum)
Hydraulic Gradient:	0.1 or 0.33

Two tests to be performed on each material requiring testing. The first test shall be run in the machine direction (i.e., roll direction). The second test shall be run in transverse direction (i.e., perpendicular to roll length).

5. Conformance testing, including testing of alternative materials, shall be performed by the Contractor.

6. Conformance test results will be reviewed by the CM. The material shall either be accepted or rejected by the CM based on the results of the conformance testing. Deployment of the geocomposite shall not commence until the CM has determined that the material is acceptable. If the Contractor has reason to believe that failing tests may be the result of the Construction Quality Assurance (CQA) Laboratory incorrectly conducting the tests, the Contractor may request that the sample in question be retested by the CQA Laboratory with a technical representative of the Manufacturer present during the testing. This retesting shall be done by the Contractor. Alternatively, the Contractor may have the sample retested at two different approved CQA Laboratories. If both laboratories produce passing results, the material may be accepted at the discretion of the CM. If both laboratories do not produce passing results, then the original CQA Laboratory's test results will be accepted. The use of these procedures for dealing with failed test results is subject to the approval of the CM.

7. If a test result is not in conformance with a required minimum test value, all material from the lot represented by the failing test shall be considered out of specification and rejected. Alternatively, at the option of the CM, additional conformance test samples may be taken to "bracket" the portion of the lot not meeting specification (note that this procedure is valid only when all rolls in the lot are consecutively produced and numbered from one manufacturing line). To isolate the out-of-specification material, additional samples must be taken from rolls that have roll numbers immediately adjacent to the roll that was sampled and failed. If both of the additional tests pass, the roll that represents the initial failed test and the roll manufactured immediately after that roll (next larger roll number) will be rejected. If one or both of the additional tests fail, then the entire lot will be rejected, or the procedure repeated with two additional tests that bracket a greater number of rolls within the lot. The additional conformance test samples will be collected

by the Contractor and submitted to the same CQA laboratory that was used for the original conformance testing.

C. Interface shear strength soil-geosynthetic and geosynthetic-geosynthetic interfaces shall be tested in accordance with ASTM D5321 for the following conditions:

1. For interface shear test, test geocomposite with materials which will be installed above and below the geocomposite (i.e., textured HDPE geomembrane/geocomposite, geocomposite/granular drainage soi interfaces).
2. All specimens and interfaces shall be fully hydrated for at least 24 hours, under 200 psf normal stress.
3. For Final Cover Geocomposite, tests shall be performed at normal loads of 250, 500 and 1,000 psf.
4. For Baseliner Geocomposite, tests shall be performed at normal loads of 250, 2,500, 5,000, 10,000 and 15,000 psf.
5. The minimum friction angle for each interface listed in Part 2.02(C) of this specification shall be as follows:
   a. For Final Cover Geomembrane, 25.5 degrees for peak strength and 20.6 for residual strength; and
   b. For Baseliner Geomembrane, 23 degrees for peak strength and 13 degrees for residual strength.
6. Interface shear testing, including testing of alternative materials, shall be performed by the Contractor.
7. All sample testing results will be provided to the CM to verify acceptability of the material for use.

2.03 DELIVERY, STORAGE, AND HANDLING

A. The geocomposite shall be packaged and shipped by appropriate means so as to prevent damage. Geocomposite rolls will be wrapped in relatively opaque and watertight plastic to prevent damage during shipping and storage. Geocomposite rolls that have been delivered to the job site will be unloaded and stored in their original, unopened wrappers in a secure, dry area, and protected from weathering. Materials shall be delivered only after the required submittals have been received and approved by the CM.

B. The geocomposite shall be furnished in rolls marked or tagged with the following information:

1. Manufacturer's Name.
2. Product Identification.
3. Lot/Batch Number.
4. Roll Number.
5. Roll Dimensions.

C. The geocomposite shall be stored in an area approved by the CM that prevents damage to the product or packaging.

D. The geocomposite shall be kept clean and free from dirt, dust, mud, and any other debris.

E. Any geocomposite found to be damaged shall be replaced with new material.

2.04 QUALITY ASSURANCE

A. The field-delivered material shall meet the specification values according to the Manufacturer's specification sheet and meet or exceed the requirements in this specification.

B. The Manufacturer shall have developed and shall adhere to its own QA program in the manufacture of the geocomposite.

PART 3 – EXECUTION

3.01 PREPARATION

A. The areas designated for placement of geocomposite shall be free from any deleterious material.

B. If the geocomposite is not clean before installation, it shall be washed by the Contractor until accepted by the CM.

C. Prior to installation of any geocomposite, the CM and the Contractor must both concur that the underlying geomembrane is acceptable. This will necessitate review of all QA/QC testing for the geomembrane by the CM and the Contractor. The Contractor shall submit written verification that both the CM and the Contractor agree that the underlying geomembrane is acceptable as specified in Section 1.04A.B.2. of this specification.

3.02 INSTALLATION

A. Geocomposite shall be installed at locations shown on the Design Drawings.

B. Adjacent rolls shall be installed so that the geonet component will have a minimum overlap of 4 inches.

C. The geonet shall be tied with plastic fasteners every 5 feet along the slope and every 6 inches on butt seams and in the anchor trenches.

D. The geotextiles shall be continuously sewn using a polymeric thread with chemical and ultraviolet resistance properties equal to or exceeding those of the geotextile.

E. The geocomposite shall be unrolled downslope, keeping the net in slight tension to minimize wrinkles and folds.

F. If a tri-planar material is used, it must be installed in the appropriate flow direction.

G. Adequate loading shall be placed to prevent uplift by wind.

H. Holes or tears in the geocomposite shall be repaired in accordance with the Manufacturer's recommendations.

I. Any portion of the geocomposite exhibiting a flaw shall be repaired. Prior to acceptance of the geocomposite, the Installer shall locate and repair all damaged areas as directed by the CM.

- 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 01572 – Construction Environmental Restrictions and Controls Temporary Controls.
2. 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.
3. Contractors plan to meet Work restrictions for endangered species described in Part 1.06 Conservation Measures of Section 01140 – Work Restrictions.
4. Submittal will not include provisions for Work to be performed under Contract 11 associated with clearing and removal of pond-related vegetation.

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 remedial limits and support areas (i.e., soil/sediment removal areas, staging areas, access roads, consolidation areas, and as indicated in the Contract Documents, unless otherwise shown or indicated. 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 UDF construction 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 05 13 – Soils for Earthwork.
2. Section 31 11 00 – Clearing and Grubbing.
3. Section 31 05 16 – Aggregates for Earthwork.
4. 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
Excavated Subgrade – Existing Undisturbed Soils (final grade for stormwater basins and SMAs)	Not Applicable	None (equipment tracking associated with excavation grading only)
General Fill – Non-Structural Fills	12	Compacted with tracked equipment or other appropriately sized equipment (minimum 3 passes)
General Fill – Structural Fills (berms, embankments, operations and staging areas)	6 or 12[1]	90% (ASTM D1557) 1 test per lift per 5,000 square feet
Aggregate Fill – Subbase (paved roads, buildings, manholes)	6	95% (ASTM D1557) 1 test per lift per 1,000 square feet
Aggregate Fill – Subbase (storage tanks)	6	Per Tank Manufacturer Specifications
Aggregate Fill – Access Road, Operations and Staging Areas	12	Compact by appropriate-sized roller equipment (minimum three passes) and proof rolling
Sand – Pipe Bedding	6	90% (ASTM D1557) 1 test per 500 linear feet of trench
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

[1] Lift thickness for structural fills to be determined in coordination with the CM based on the configuration of the fill and the type and size of compaction equipment proposed by the Contractor for use in constructing the fill.

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 01500 – Temporary Facilities and Controls.
2. Section 31 05 13 – Soils for Earthwork.
3. Section 31 05 16 – Aggregates for Earthwork.
4. 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. ANSI/AISC 360, Specification for Structural Steel Buildings.
2. ASTM D6913, Standard Test Methods for Particle-Size Distribution (Gradation) of Soils using Sieve Analysis.

3. ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 [600 kN-m/m3]).
4. ASTM D1140, Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75 µm) Sieve.
5. ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
6. ASTM D6938, Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
7. ASTM E329, Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
8. USEPA SW-846 Method 6010, Inductively Coupled Plasma-Atomic Emission Spectrometry.
9. USEPA SW-846 Method 7471, Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique).
10. USEPA SW-846 Method 8081, Organochlorine Pesticides by Gas Chromatography.
11. USEPA SW-846 Method 8082, Polychlorinated Biphenyls (PCBs) by Gas Chromatography.
12. USEPA SW-846 Method 8151, Chlorinated Herbicides by GC Using Methylation or Pentafluorobenzylation Derivatization.
13. USEPA SW-846 Method 8260, Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS).
14. USEPA SW-846 Method 8270, Semivolatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS).
15. USEPA SW-846 Method 9012, Total and Amenable Cyanide (Automated Colorimetric, with Off-Line Distillation).

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 of 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

A. None – See Sections 31 05 13 – Soils for Earthwork and 31 05 16 – Aggregates 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 Section 01500 – Temporary Facilities and Controls.

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: Comply with 1 57 00 – Temporary Controls.

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 affect 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. For UDF Construction (Contract 11), 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 32 92 00 – Turfs and Grasses.

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 for UDF Construction (Contract 11):

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 for UDF construction (includes the applicable substantive requirements specified for the National Pollutant Discharge Elimination System Construction General Permit) and for UDF operations (includes the applicable substantive requirements specified for the Multi-Sector General Permit Sector L).

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 (Contract 11):

1. Contractor to prepare a Site-specific SWPPP for UDF Construction 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 36 00 – WIRE MESH GABIONS AND GABION MATTRESSES

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 gabions, gabion mattresses, and reno mattress.
2. Extent of gabions, gabion mattresses, and reno mattress are 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 gabions.

C. Related Sections:

1. Section 31 05 19.13 – Geotextiles for Earthwork.
2. Section 31 11 00 – Clearing and Grubbing.
3. Section 31 23 00 – Excavation and Fill.

1.02 REFERENCE STANDARDS

A. The following standards are referenced in this Section:

1. ASTM C127, Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
2. A641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
3. A975 Standard Specification for Double-Twisted Hexagonal Mesh Gabions and Revet Mattresses (Metallic-Coated Steel Wire or Metallic-Coated Steel Wire with Polyvinyl Chloride (PVC) Coating).
4. A193 Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Reference Specifications: Comply with applicable requirements of the MassDOT Standard Specifications.

1.04 SUBMITTALS

A. Informational Submittals:

1. Product Data: Manufacturer’s catalog cuts, specifications and installation instructions for wire mesh gabions.
2. Shop Drawings: Layout drawings showing the dimensions and elevations of the gabions and the locations they are to be installed, Drawings shall include details of basket connections, geogrid and geotextile placement.

3. Particle-size distribution of all proposed rock fill for gabions.
4. Proposed sources of rock fill for gabions.
5. Samples reports of type materials. Test reports shall include, but not be limited to, particle size distribution and soundness test.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Gabions:

1. Material:
   a. Gabions and gabion mattresses shall be manufactured of double twisted wire mesh with a non-raveling mesh made by twisting continuous pairs of wires through three half turns to form a hexagonal-shaped opening. Wire mesh shall be zinc coated with the coating weight conforming to the requirements of ASTM A641, Class III soft temper coating.
   b. The minimum strength requirements of the mesh, selvedge wire to mesh connection, panel to panel connection, and punch test shall be as shown in Table 31 36 00 A.

TABLE 1

Property	Test Method	Gabions (lb/ft)
Mesh Tensile Strength (parallel to twist)	ASTM A975	3,500
Mesh Tensile Strength (perpendicular to twist)	ASTM A975	1,800
Connection to Selvedges	ASTM A975	1,400
Panel to Panel Strength	ASTM A975	1,400
Punch Test	ASTM A975	6,000

B. Gabion Mattress Fill:

1. Material:
   a. Rock used to fill gabions and stone cover fill shall be hard; durable; angular in shape; resistant to weathering and water action; free from overburden, spoil, shale, and organic material; and shall meet the gradation requirements for the type specified. Neither breadth nor thickness of a single stone should be less than one-third its length. Rounded stone or boulders shall be approved by the CM. Shale and stone with shale seams shall not be acceptable. Rock and stone shall meet the following requirements:
      1) Freeze-Thaw Test: A maximum of 10 percent loss, by weight, after 25 cycles of freezing and thawing.
      2) Magnesium Sulfate Soundness Test: A maximum 10% weight loss, by weight, after 10 cycles of the magnesium sulfate soundness test.
      3) The size of rocks to fill gabions are to be within the 3 to 6 inches. The rock shall be large enough to prevent individual pieces from passing through the mesh openings. The rock shall have a minimum density of 155 pounds/cubic foot. The rock size limits may allow for a variation of 5% oversize rock or 5% undersize rock, or both.
   b. Acceptance of rock gradation will be based on visual inspection and submittals accepted by CM.

2.02 SOURCE QUALITY CONTROL

A. Rock Source: Provide rock fill from a MassDOT-permitted mine, pit, or quarry. Source shall be approved by MassDOT for furnishing aggregates for MassDOT projects.

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. 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.

B. Remove all soft or spongy material to depth shown or indicated on the Drawings or as directed by CM, and replace with acceptable material. Excavation, removal of unsuitable material if any, and backfilling shall comply with Section 31 23 00. Materials used for backfill of gabions and gabion mattresses shall comply with the requirements of Section 31 37 00 – Riprap. Placing of geosynthetics, where required, shall comply with Section 31 05 19.13 – Geotextile for Earthwork.

3.03 INSTALLATION

A. Gabion Mattress Placement:

1. Areas to be protected by gabions shall be properly prepared to be free of brush, topsoil, trees, stumps, and other objectionable material and shall be dressed to a smooth surface. All soft material under the gabions shall be removed and replaced with acceptable material and compacted.
2. Erect the sides, ends and diaphragms of each unit and ensure that all panels are in the correct position. Connect each gabion unit by binding all vertical edges with wire ties spaced 6 inches on center, or with a continuous piece of connecting wire stitched around the vertical edges with coils approximately every 4 inches.
3. Set gabions to line and grade in conformance with the indicated details.
4. Place gabions in tension prior to filling with stone to achieve alignment and compaction. Wire all adjacent courses together in the same manner as described for assembly.
5. Fill gabions by careful placement of stones along all visible faces to assure alignment and to minimize bulges and voids.
6. Close lid and secure with wire ties.

- 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 32 92 00, Turfs and Grasses.
4. 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 12 00 – FLEXIBLE PAVING

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. The Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install flexible, hot-mix, hot-laid, asphalt concrete pavement.

2. The Work includes:
   a. Preparation for installing flexible pavements, such as saw-cutting, milling where required, cleaning, and other preparation;
   b. Providing asphalt concrete paving materials;
   c. Providing tack coat material;
   d. Providing pavement markings, if required; and
   e. Providing quality controls and testing.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate.

C. Related Sections:

1. Section 31 05 13 – Soils for Earthwork.
2. Section 31 05 16 – Aggregates for Earthwork.
3. Section 31 23 05 – Excavation and Fill.

1.02 REFERENCES

A. Standards referenced in this Section are:

1. Massachusetts Department of Transportation (MassDOT):
   a. Standard Specifications for Highways and Bridges, 2022.
2. American Society for Testing and Materials, (ASTM):
   a. D2950 – Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods.

1.03 QUALITY ASSURANCE

A. Qualifications:

1. Asphalt Concrete Production Facility:
   a. Production facility for asphalt concrete, tack coat materials, and other bitumastic materials shall be certified by the Massachusetts Department of Transportation for furnishing such materials for highways.
2. Contractor's Testing Laboratory:
   a. Retain the services of independent testing laboratory to perform testing and determine compliance with the Contract Documents of the materials provided under this Section.
   b. Do not employ the same laboratory hired by CM for field quality control testing under the "Field Quality Control" Article of this Section.

c. Testing laboratory shall be experienced in the types of testing required.
d. Selection of testing laboratory is subject to the CM's acceptance.

B. Regulatory Requirements:

1. Reference Specifications and Details:
a. Comply with applicable requirements of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2022.

1.04 SUBMITTALS

A. Action Submittals: Submit the following.

1. Shop Drawings:
a. Submit the proposed asphalt concrete mix design for each asphalt concrete material, and other bituminous materials, required under this Section, providing complete data on materials, including location in the Work, source, material content and percentages, temperatures, and all other pertinent data. Indicate proportion of bituminous material from reclaimed asphalt pavement.
b. Proposed gradation for each aggregate to be used in flexible paving. Submit gradation test results for the same material furnished on a previous project. Indicate the proportion of reclaimed asphalt pavement.

2. Product Data:
a. Manufacturer’s complete product data on all pavement marking materials proposed for use, including product literature, specifications, and recommended application techniques and other installation data.

B. Informational Submittals: Submit the following:

1. Quality Assurance Test Data Submittals and Source Quality Control Submittals:
a. Submit for quality assurance tests and source quality control tests required.

2. Delivery Tickets:
a. Submit copy of delivery ticket for each load of asphalt concrete, tack coat materials, and other materials obtained from asphalt concrete production facility, signed by Contractor.

3. Field Quality Control Submittals:
a. Submit results of required field quality control testing.

1.05 SITE CONDITIONS

A. Weather Limitations:

1. Temperature:
a. For surface course paving or other pavement courses in lifts less than two inches thick, temperature of surface on which pavement is to be placed shall be 50 degrees F or greater.

2. Prohibitions:
a. Do not place flexible paving materials when weather is foggy or during precipitation.
b. Do not place flexible paving materials when the base on which the material will be placed contains moisture in excess of optimum.
c. Place flexible paving materials only when Construction Manager (CM) concurs that weather conditions are suitable.

PART 2 – PRODUCTS

2.01 SYSTEM PERFORMANCE

A. System Description:

1. Provide subbase course of the thickness shown or indicated, in accordance with Section 31 23 00 – Excavation and Fill.

2. Flexible Pavement Courses:
   a. Provide the flexible pavement courses indicated below:
      1) Binder Course: 4 inches compacted thickness; and
      2) Surface Course (Wearing Course or Top Course): 2 inches compacted thickness.

2.02 ASPHALT CONCRETE MIXES

A. Asphalt Concrete Mixtures: Provide the following materials designed and manufactured in accordance with reference specifications indicated in Article 1.3 of this Section.

1. Binder Course: HMA S0.375 superpave mix complying with Section M3.01.1 of State of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2022.

2. Surface Course (Wearing Course, Top Course): HMA S0.375 superpave mix complying with Section M3.06.1 of State of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2022.

2.03 BITUMINOUS MATERIALS

A. Bituminous Materials for Asphalt Concrete:

1. Bituminous materials for asphalt concrete shall comply with the reference specifications indicated in Article 1.3 of this Section, for the asphalt concrete mixes specified.

B. Tack Coat:

1. Tack coat shall be emulsified asphalt.

2. Provide tack coat complying with ASTM D977, Type RS-1 or RSH-1.

2.04 AGGREGATES IN FLEXIBLE PAVEMENTS

A. Aggregates for Asphalt Concrete – General:

1. Aggregate materials used in flexible pavement shall be in accordance with the reference specifications indicated in Article 1.3 of this Section, for the asphalt concrete mix designs indicated.

B. Reclaimed Asphalt Pavement (RAP):

1. Processed material obtained by milling or full depth removal of existing asphalt concrete pavement may be used as aggregate in asphalt concrete base course and binder course.

2. Maximum proportion of RAP in the asphalt concrete provided shall comply with requirements of the reference specifications indicated in Article 1.3 of this Section.

PART 3 – EXECUTION

3.01 INSPECTION

A. Examine the subbase and base on which flexible paving will be installed. 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.

B. Do not place materials on subgrades, or subbase that is muddy or has water thereon.

3.02 PREPARATION

A. Preparation – Before starting installation of flexible paving, perform the following:

1. Grade Control: Establish and maintain throughout flexible paving installation the required lines and grades, including crown and cross-slope for each asphalt concrete course during construction operations.

2. Prepare subgrade and provide subbase for flexible pavement in accordance with Section 31 23 00 – Excavation and Fill. Before installing flexible pavement, obtain CM's concurrence that subgrade and subbase are suitable for installing flexible pavement.

3. Provide appropriate maintenance and protection of traffic measures during placement of pavement.

4. Provide tack coat as indicated in Article 3.03 of this Section.

3.03 INSTALLATION OF FLEXIBLE PAVING

A. General:

1. Provide final pavement surfaces of uniform texture, at required grades and cross-sections.

2. Construct roadways to the lines, grades, and typical sections shown or indicated.

B. Installation of Asphalt Concrete:

1. Asphalt concrete mixture shall be transported to the site of paving and placed as soon as possible after mixing.

2. Placement of each asphalt concrete course shall be completed over the full width of the section under construction during each day's paving operations.

3. Spread and finish asphalt concrete courses by means of self-propelled mechanical spreading and finishing equipment. Compacted thickness of layers placed shall not exceed 150 percent of specified thickness unless approved in writing by the CM.

4. Compaction:
   a. Rollers:
      1) Use sufficient rolling equipment to satisfactorily compact and finish the quantity of asphalt concrete placed. There shall be not less than two rollers on the Project at all times. When acceptable to CM, one of the rollers may be a pneumatic-tire roller.
      2) During rolling operations, roller speed shall not exceed three miles per hour. When sufficient number of rollers is not available, reduce the quantity of asphalt concrete placed to accommodate the available rollers' speed.

3) Required rollers shall be at the Site, in acceptable operating condition, prior to placing of asphalt concrete.
4) Use of vibratory rollers in lieu of steel-wheeled rollers is acceptable, however when thickness of asphalt concrete is one-inch or less, rolling shall be in the static mode.

b. Rolling of initially placed asphalt concrete material, or breakdown rolling, shall begin as soon as the asphalt concrete mixture will bear the roller without undue displacement.
c. Rolling shall be longitudinal, overlapping on successive trips by not less than one-half roller rear wheel width, and not more than three-quarters of roller rear wheel width. Alternate trips of the roller shall be of slightly different lengths.
d. At all times, roller motion shall be slow enough to avoid displacing the asphalt concrete.
e. Operate rollers continuously from breakdown of laid asphalt concrete through finish rolling.
f. Perform finish rolling using a steel-wheeled roller or a vibratory steel-wheel roller operating in the static mode.
g. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.
h. At each location not accessible to roller, thoroughly compact asphalt concrete with tampers and finish, where necessary, with a hot smoothing iron to provide uniform, smooth layer over the entire area so compacted.

5. Each compacted asphalt concrete course shall be within plus or minus 1/4-inch of the indicated thickness.

C. Construction Joints:

1. Construction joints shall be made in such a manner as to ensure a neat junction, thorough compaction, and bond throughout.

2. Provide a transverse joint extending over the full width of the strip being laid and at right angles to its centerline at end of each workday and at other times when the placement of hot-mix asphalt concrete will be suspended for a period of time that will allow asphalt concrete mixture to chill.

3. Thoroughly compact by rolling the forward end of a freshly laid strip of asphalt concrete before the asphalt concrete mixture becomes chilled. When the Work is resumed, the end shall be cut vertically for the full depth of the layer.

D. Joining of Pavements:

1. When pavement is to join existing or previously laid pavement, the existing or previously laid pavement shall be neatly and carefully edged to allow for overlapping and feathering of the subsequent course of asphalt concrete material.

2. Where new pavement is to meet existing pavement, the existing pavement shall be sawcut and notched.

3. Where new pavement will meet existing asphalt pavement, remove existing pavement 12 inches onto undisturbed existing pavement course at edges where new pavement will meet existing pavement.

4. Tack Coat:
a. Provide tack coat material at the following locations:
1) At edges where new pavement will connect to existing or previously installed pavement.
2) On surface of existing or previously installed pavement course over which new pavement will be installed, prior to placement of the subsequent pavement course.

Tack coat may be deleted when a succeeding layer of asphalt pavement is being applied over a freshly placed asphalt pavement course that has been subjected to very little or no traffic, with approval of CM.

3) Where new pavement will abut curbing, concrete gutters, drainage structures and frames, manhole cover frames, valve boxes, and similar items.

b. Tack Coat Installation: Install tack coat immediately prior to installing pavement. Place pavement while tack coat is wet. Apply tack coat in accordance with reference specification indicated in Article 1.3 of this Section.

E. Curing:

1. Do not allow traffic onto pavement until directed by CM. Traffic will not be allowed on new asphalt concrete pavement until surface temperature is less than 140 degrees F.

F. Defective Pavement Work:

1. When directed by CM, remove, and replace defective flexible paving Work. Cut out such areas of defective pavement and fill with fresh asphalt concrete materials, compacted to required density.

3.04 FIELD QUALITY CONTROL

A. Asphalt Concrete Mix Temperature: Measure temperature at time of placement, record, and submit to CM.

B. Surface Smoothness:

1. Test finished surface of each flexible paving course for smoothness, using a ten-foot straightedge applied parallel to and at right angles to centerline of paved areas.

2. Check surfaced areas at intervals as directed by CM.

3. Surfaces will be acceptable relative to smoothness when measurements are equal to or less than the following:
   a. Binder Course: 3/8-inch vertical in ten feet horizontal;
   b. Surface Course (Wearing Course): 1/4-inch vertical in ten feet horizontal; and
   c. Surfaces will be acceptable when variance is equal to or less than 1/4-inch from the template.

4. The surface of asphalt curbing shall be tested with a ten-foot straightedge, and any variation from a true line exceeding 1/4 inch shall be satisfactorily corrected.

5. Elevation: Finished surface of pavement shall be within plus or minus 1/2-inch of elevations shown or indicated.

C. Density:

1. Test Method: ASTM D2950 nuclear method; test one sample every 1,000 square yards of pavement. Test for each asphalt concrete course installed.

2. In addition, compare density of in-place flexible paving materials against laboratory specimen or certificates on same asphalt pavement mixture, using nuclear density device.

3. Criteria for Acceptance: Density of in-place asphalt pavement material shall be not less than 90 percent of the recorded laboratory specimen or certificate density. Density shall be not greater than 98 percent.

3.05 ADJUSTING

A. Pavement Adjustment:

1. Repair or replace in manner acceptable to CM areas of pavement that are observed to pond or collect water.

3.06 CLEANING

A. Cleaning: After completing the paving operations, clean surfaces of excess or spilled bituminous materials, excess asphalt concrete, and foreign matter.

3.07 PROTECTION

A. Protect finished pavement until pavement has become properly hardened and cool.

B. Cover openings of drainage structures, manholes, valve boxes, and similar items in the paved area until permanent coverings are provided.

- 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 -

SECTION 33 05 05 – BURIED WATER PIPE

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to install and test all buried piping, fittings, and specials associated with fire hydrant waterline piping. The Work includes the following:
   a. All types and sizes of buried piping, except where buried piping installations are specified under other Sections.
   b. Unless otherwise shown or specified, this Section includes all buried piping Work required, beginning at the outside face of structures or structure foundations, including piping beneath structures, and extending away from structures.
   c. Work on or affecting existing buried piping.
   d. Installation of all jointing and gasket materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, cathodic protection, and other Work required for a complete, buried piping installation.
   e. Supports, restraints, and thrust blocks.
   g. Field quality control, including testing.
   h. Cleaning and disinfecting.
   i. Incorporation of valves, meters, and special items shown or specified into piping systems in accordance with the Contract Documents and as required.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before buried piping Work.

C. Related Sections:

1. Section 40 05 53 – Hydrants.
2. Section 03 00 05 – Concrete.
3. Section 31 23 00 – Excavation and Fill.

1.02 REFERENCES

A. Standards referenced in this Section are:

1. American Society for Non-Destructive Testing (ASNT), ASNT-TC-1A, Recommended Practice, Personnel Qualification, and Certification in Non-destructive Testing.
2. ASTM B32, Specification for Solder Metal.
3. ASTM D2321, Practice for Underground Installation of Thermoplastic Pipe for Sewers and other Gravity-Flow Applications.
4. ASTM D2774, Practice for Underground Installation of Thermoplastic Pressure Piping.
5. ASTM D4174, Practice for Cleaning, Flushing and Purification of Petroleum Fluid Hydraulic Systems.

6. ASTM F1417, Test Method for Installation Acceptance of Plastic Gravity Sewer Lines using Low-Pressure Air.
7. ASTM F2164, Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure.
8. ANSI/AWWA C105, Polyethylene Encasement for Ductile-Iron Pipe Systems.
9. ANSI/AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
10. ANSI/AWWA C206, Field Welding of Steel Water Pipe.
11. ANSI/AWWA C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.
12. ANSI/AWWA C605, Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
13. ANSI/AWWA C606, Grooved and Shouldered Joints.
14. ANSI/AWWA C651, Disinfecting Water Mains.
15. AWWA M23, PVC Pipe – Design and Installation.
16. AWWA M41, Ductile-Iron Pipe and Fittings.
17. AWWA M55, PE Pipe – Design and Installation.
18. ASCE 37, Design and Construction of Sanitary and Storm Sewers.
19. Chlorine Institute, Inc., Piping Systems for Dry Chlorine, Pamphlet No. 6.
20. NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements and recommendations of authorities having jurisdiction over the Work, including:
   a. Town of Lee, Massachusetts for road opening authorization;
   b. Town of Lenox, Massachusetts for water line connections; and
   c. Berkshire County.
2. Obtain required permits for Work in roads, rights-of-way, and other areas of the Work.

1.04 SUBMITTALS

A. Action Submittals – Submit the following:

1. Shop Drawings:
   a. Laying schedules for concrete pipe and piping with restrained joints; and
   b. Details of piping, specials, joints, harnessing and thrust blocks, and connections to piping, structures, equipment, and appurtenances.
2. Product Data:
   a. Manufacturer's literature and specifications, as applicable, for products specified in this Section.
3. Testing Procedures:
   a. Submit proposed testing procedures, methods, apparatus, and sequencing. Obtain the CM's approval prior to commencing testing.

B. Informational Submittals – Submit the following:

1. Certificates:
   a. Certificate signed by manufacturer of each product certifying that product conforms to applicable referenced standards.
2. Field Quality Control Submittals:
   a. Results of each specified field quality control test.

C. Closeout Submittals – Submit the following:

1. Record Documentation:
   a. Maintain accurate and up-to-date record documents showing modifications made in the field, in accordance with approved submittals, and other Contract modifications relative to buried piping Work. Submittal shall show actual location of all piping Work and appurtenances at same scale as the Drawings.
   b. Show piping with elevations referenced to Project datum and dimensions from permanent structures. For each horizontal bend in piping, include dimensions to at least three permanent structures, when possible. For straight runs of piping provide offset dimensions as required to document piping location.
   c. Include profile drawings with buried piping record documents when the Contract Documents include piping profile drawings.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.
2. Upon delivery inspect pipe and appurtenances for cracking, gouging, chipping, denting, and other damage and immediately remove from Site and replace with acceptable material.

B. Storage:

1. Store materials to allow convenient access for inspection and identification. Store material off ground using pallets, platforms, or other supports. Protect packaged materials from corrosion and deterioration.
2. Pipe and fittings other than PVC and CPVC may be stored outdoors without cover. Cover PVC and CPVC pipe and fittings stored outdoors.

C. Handling:

1. Handle pipe, fittings, specials, and accessories carefully in accordance with pipe manufacturer's recommendations. Do not drop or roll material off trucks. Do not drop, roll or skid piping.
2. Avoid unnecessary handling of pipe.
3. Keep pipe interiors free from dirt and foreign matter.
4. Protect interior linings and exterior coatings of pipe and fittings from damage. Replace pipe and fittings with damaged lining regardless of cause of damage.

PART 2 – PRODUCTS

2.01 MATERIALS

A. General:

1. Pipe Markings:
   a. Manufacturer shall cast or paint on each length of pipe and each fitting pipe material, diameter, and pressure or thickness class.

2.02 BURIED PIPING IDENTIFICATION

A. Polyethylene Underground Warning Tape for Metallic Pipelines:

1. Tracer tape shall be of inert, acid- and alkali-resistant, polyethylene, four mils thick, six inches wide, suitable for direct burial. Tape shall be capable of stretching to twice its original length.

2. Message shall read, “CAUTION [insert customized name of pipe service, i.e., “POTABLE WATER”, “SANITARY SEWER”, “CHLORINE GAS”, “PIPE BURIED BELOW” [or other service as appropriate, as indicated in the Buried Pipe Schedule at the end of this Section], with bold letters approximately two inches high. Messages shall be printed at maximum intervals of two feet.

3. Manufacturer – Provide products of one of the following:
   a. Brady Corporation;
   b. Seton Identification Products;
   c. Marking Services, Inc.;
   d. Or equal.

B. Detectable Underground Warning Tape for Non-Metallic Pipelines:

1. Tape shall be of inert, acid- and alkali-resistant, polyethylene, five mils thick, six inches wide, with aluminum backing, and have 15,000 psi tensile strength and 80 percent elongation capability. Tape shall be suitable for direct burial.

2. Message shall read, “CAUTION [insert customized name of pipe service, i.e., “POTABLE WATER”, “SANITARY SEWER”, “CHLORINE GAS” “PIPE BURIED BELOW”, or other appropriate service, with bold letters approximately two inches high. Messages shall be printed at maximum intervals of two feet.

3. Manufacturer: Provide products of one of the following:
   a. Brady Corporation;
   b. Seton Identification Products;
   c. Marking Services, Inc.;
   d. Or equal.

PART 3 – EXECUTION

3.01 INSTALLATION

A. General:

1. Install piping as shown, specified, and as recommended by pipe and fittings manufacturer.

2. In event of conflict between manufacturer’s recommendations and the Contract Documents, request interpretation from the CM before proceeding.

3. The CM will observe excavations and bedding prior to laying pipe by Contractor. Notify the CM in advance of excavating, bedding, pipe laying, and backfilling operations.
4. Minimum cover over buried piping shall be 4 feet, unless otherwise shown or approved by the CM.
5. Earthwork is specified in Section 31 22 00 – Grading.
6. Excavation more than that required or shown, and that is not authorized by the CM shall be filled by the Contractor with granular material furnished, placed, and compacted in accordance with Section 31 22 00 – Grading.
7. Comply with NFPA 24 for "Outside Protection", where applicable to water piping systems used for fire protection.

B. Separation of Sewers and Potable Water Piping:

1. Horizontal Separation:
   a. Where possible, existing, and proposed potable water mains and service lines, and sanitary, combined, and storm sewers shall be separated horizontally by clear distance of at least ten feet.
   b. If local conditions preclude the specified clear horizontal separation, installation will be allowed if potable water main is in separate trench or on undistributed earth shelf on one side of sewer and with bottom of potable water main at least 18 inches above top of sewer.
   c. Exception:
      1) Where it is not possible to provide minimum horizontal separation described above, construct potable water main of cement-lined ductile iron pipe with restrained push-on joint or restrained mechanical joint pipe complying with public water supply design standards of authority having jurisdiction. Hydrostatically test water main and sewer as specified in this Section prior to backfilling. Hydrostatic test pressure at crossing shall be at least 150 psi.
2. Vertical Separation:
   a. Provide minimum vertical distance of 18 inches between outside of potable water main and outside of sewer when sewer crosses over potable water main.
   b. Center a section of potable water main pipe at least 17.5 feet long over sewer so that sewer joints are equidistant from potable water main joints.
   c. Provide adequate structural support where potable water main crosses under sewer. At minimum, provide compacted select backfill for ten feet on each side of crossing.
   d. Exceptions:
      1) Where it is not possible to provide minimum vertical separation described above, construct potable water main of cement-lined ductile iron pipe with restrained push-on joint or restrained mechanical joint pipe. Hydrostatically test water main and sewer as specified in this Section, prior to backfilling. Hydrostatic test pressure at crossing shall be at least 150 psi.
      2) Encase either potable water main or sewer in watertight carrier pipe extending ten feet on each side of crossing, measured perpendicular to potable water main.

C. Plugs:

1. Temporarily plug installed pipe at end of each day of work or other interruption of pipe installation to prevent entry of animals, liquids, and persons into pipe, and entrance or insertion of deleterious materials into pipe.
2. Install standard plugs in bells at dead ends, tees, and crosses. Cap spigot and plain ends.

3. Fully secure and block plugs, caps, and bulkheads installed for testing to withstand specified test pressure.

4. Where plugging is required for phasing of the Work or subsequent connection of piping, install watertight, permanent type plugs, caps, or bulkhead acceptable to the CM.

D. Bedding Pipe: Bed pipe as specified and in accordance with details on the Drawings.

1. Trench excavation and backfill, and bedding materials shall conform to Section 31 05 16 – Aggregates for Earthwork, as applicable.

2. Where the CM deems existing bedding material unsuitable, remove and replace existing bedding with approved granular material furnished, placed, and compacted in accordance with Section 31 22 00 – Grading. Payment for additional excavation and providing granular material will be made under the unit price payment items in the Contract.

3. Where pipe is installed in rock excavation, provide minimum of three inches of granular bedding material underneath pipe smaller than four-inch nominal diameter, and minimum of six inches of granular bedding material underneath pipes four-inch nominal diameter and larger.

4. Excavate trenches below bottom of pipe by amount shown and indicated in the Contract Documents. Remove loose and unsuitable material from bottom of trench.

5. Carefully and thoroughly compact pipe bedding with handheld pneumatic compactors.

6. Do not lay pipe until the CM approves bedding condition.

7. Do not bring pipe into position until preceding length of pipe has been bedded and secured in its final position.

E. Laying Pipe:

1. Conform to manufacturer's instructions and requirements of standards and manuals listed below, as applicable:
   a. Ductile Iron Pipe: ANSI/AWWA C600, ANSI/AWWA C105, AWWA M41;
   b. Steel Pipe: ANSI/AWWA C206, AWWA M11; and
   c. Thermoplastic Pipe: ASTM D2321, ASTM D2774, ANSI/AWWA C605, AWWA M23, AWWA M45, AWWA, M55.

2. Install pipe accurately to line and grade shown and indicated in the Contract Documents, unless otherwise approved by the CM. Remove and reinstall pipes that are not installed correctly.

3. Slope piping uniformly between elevations shown.

4. Keep groundwater level in trench at least 24 inches below bottom of pipe before laying pipe. Do not lay pipe in water. Maintain dry trench conditions until jointing and backfilling are complete. Keep clean and protect interiors of pipe, fittings, valves, and appurtenances.

5. Start laying pipe at lowest point and proceed towards higher elevations, unless otherwise approved by the CM.

6. Place bell and spigot-type pipe so that bells face the direction of laying, unless otherwise approved by the CM.

7. Excavate around joints in bedding and lay pipe so that pipe barrel bears uniformly on trench bottom.

8. Deflections at joints shall not exceed 75 percent of amount allowed by pipe manufacturer, unless otherwise approved by the CM.

9. For PVC and CPVC piping with solvent welded joints, 2.5-inch diameter and smaller, and copper tubing, snake piping in trench to compensate for thermal expansion and contraction.
10. Carefully examine pipe, fittings, valves, and specials for cracks, damage, and other defects while suspended above trench before installation. Immediately remove defective materials from the Site and replace with acceptable products.
11. Inspect interior of all pipe, fittings, valves, and specials and completely remove all dirt, gravel, sand, debris, and other foreign material from pipe interior and joint recesses before pipe and appurtenances are moved into excavation. Bell and spigot-type mating surfaces shall be thoroughly wire brushed, and wiped clean and dry immediately before pipe is laid.
12. Field cut pipe, where required, with machine specially designed for cutting the type of pipe being installed. Make cuts carefully, without damage to pipe, coating or lining, and with smooth end at right angles to axis of pipe. Cut ends on push-on joint type pipe shall be tapered and sharp edges filed off smooth. Do not flame-cut pipe.
13. Do not place blocking under pipe, unless specifically approved by the CM for special conditions.
14. Touch up protective coatings in manner satisfactory to the CM prior to backfilling.
15. Notify the CM in advance of backfilling operations.
16. On steep slopes, take measures acceptable to the CM to prevent movement of pipe during installation.
17. Thrust Restraint: Where required, provide thrust restraint conforming to Article 3.3 of this Section and as shown in the Contract Documents.
18. Exercise care to avoid flotation when installing pipe in cast-in-place concrete, and in locations with high groundwater.

F. Jointing Pipe:

1. Ductile Iron Mechanical Joint Pipe:
   a. Immediately before making joint, wipe clean the socket, plain end, and adjacent areas. Taper cut ends and file off sharp edges to provide smooth surface.
   b. Lubricate plain ends and gasket with soapy water or manufacturer's recommended pipe lubricant, in accordance with ANSI/AWWA C111, just prior to slipping gasket onto plain end of the joint assembly.
   c. Place gland on plain end with lip extension toward the plain end, followed by gasket with narrow edge of gasket toward plain end.
   d. Insert plain end of pipe into socket and press gasket firmly and evenly into gasket recess. Keep joint straight during assembly.
   e. Push gland toward socket and center gland around pipe with gland lip against gasket.
   f. Insert bolts and hand-tighten nuts.
   g. If deflection is required, make deflection after joint assembly and prior to tightening bolts. Alternately tighten bolts approximately 180 degrees apart to seat gasket evenly. Bolt torque shall be as follows:

Pipe Diameter (inches)	Bolt Diameter (inches)	Range of Torque (ft-lbs)
3	5/8	45 to 60
4 to 24	3/4	75 to 90
30 to 36	1	100 to 120
42 to 48	1.25	120 to 150

h. Bolts and nuts, except those of stainless steel, shall be coated with two coats, minimum dry film thickness of eight mils each, of high build solids epoxy or bituminous coating manufactured by Tnemec, or equal.
i. Restrained mechanical joints shall be as required for Ductile Iron Process Pipe.

2. Ductile Iron Push-On Joint Pipe:
   a. Prior to assembling joints, thoroughly clean with wire brush the last eight inches of exterior surface of spigot and interior surface of bell, except where joints are lined or coated with a protective lining or coating.
   b. Wipe clean rubber gaskets and flex gaskets until resilient. Conform to manufacturer's instructions for procedures to ensure gasket resiliency when assembling joints in cold weather.
   c. Insert gasket into joint recess and smooth out entire circumference of gasket to remove bulges and to prevent interference with proper entry of spigot of entering pipe.
   d. Immediately prior to joint assembly, apply thin film of pipe manufacturer's recommended lubricant to surface of gasket that will come in contact with entering spigot end of pipe, or apply a thin film of lubricant to outside of spigot of entering pipe.
   e. For assembly, center spigot in pipe bell and push pipe forward until spigot just makes contact with rubber gasket. After gasket is compressed and before pipe is pushed or pulled in the rest of the way, carefully check gasket for proper position around the full circumference of joint. Final assembly shall be made by forcing spigot end of entering pipe past gasket until spigot makes contact with base of the bell. When more than a reasonable amount of force is required to assemble the joint, remove spigot end of pipe to verify proper positioning of gasket. Do not use gaskets that have been scored or otherwise damaged.
   f. Maintain an adequate supply of gaskets and joint lubricant at the Site when pipe jointing operations are in progress.

3. Ductile Iron Proprietary Joints:
   a. Install pipe that utilizes proprietary joints for restraint specified in accordance with manufacturer's instructions.

4. Ductile Iron Flanged Joints:
   a. Assemble flanged joints using ring-type gaskets, thickness as recommended by pipe manufacturer but not less than 1/8-inch thick, for raised face flanges. Use full face gaskets for flat face flanges, unless otherwise approved by the CM or recommended by pipe manufacturer. Gaskets shall be suitable for service intended in accordance with manufacturer's ratings and instructions. Gaskets shall be properly centered.
   b. Bolts shall be tightened as recommended by the manufacturer in sequence that ensures equal distribution of bolt loads.
   c. Length of bolts shall be uniform. Bolts shall not project beyond the nut more than 1/4-inch when fully tightened. Bolts shall not fall short of the nut when fully taken up. Ends of bolts shall be machine cut and neatly rounded. Do not use washers.
   d. Prior to assembly, lubricate bolt threads and gasket faces.
   e. After assembly, coat all bolts and nuts, except those of stainless steel, with two coats, minimum dry film thickness of eight mils each, of high-build epoxy or bituminous coating manufactured by Tnemec, or equal.

5. Steel Pipe Joints:
   a. Joints in steel pipe shall be bell and spigot when so specified for steel water pipe in accordance with AWWA C200, or butt welded or lap welded joints, except that mechanical couplings~~,~~ or flanged connections shall be provided at connections to valves, meters, and similar equipment.
   b. Welding shall conform to ANSI/AWWA C206. When butt-welding or lap welding joints, weld pipe 36-inch diameter and larger both inside and outside of pipe.

c. Field welded lap joints shall have fillet welds both inside and outside. Outside weld may be seal weld.
d. After welding, coat the joint and surrounding damaged or uncoated area with same coating and thickness as shop-applied coating.
e. Where flanged connections or couplings are provided, flanges, couplings, bolts, and nuts, except when stainless steel, shall be coated with two coats, minimum dry film thickness of eight-mils each, of high-build epoxy or bituminous coating manufactured by Tnemec, or equal.
f. Welds shall be free from embedded scale and slag and shall have tensile strength across weld not less than thinnest of connected sections.
g. Welds shall be watertight.
h. Provide cathodic protection at steel pipe joints as specified in this Section.

6. Mechanical Coupling Joints:
   a. Mechanical couplings include: sleeve-type flexible couplings, split flexible couplings, ANSI/AWWA C606 grooved or shouldered end couplings, plasticized PVC couplings, and other mechanical couplings.
   b. Prior to installing and assembling mechanical couplings, thoroughly clean joint ends with wire brush to remove foreign matter.
   c. For mechanical couplings that incorporate gaskets, after cleaning apply lubricant to rubber gasket or inside of coupling housing and to joint ends. After lubrication, install gasket around joint end of previously installed piece and mate joint end of subsequent piece to installed piece. Position gasket and place coupling housing around gasket and over grooved or shouldered joint ends. Insert bolts and install nuts tightly by hand. Tighten bolts uniformly to produce an equal pressure on all parts of housing. When housing clamps meet metal to metal, joint is complete and further tightening is not required.
   d. For plasticized PVC couplings, loosen the stainless steel clamping bands and remove clamps from coupling. Slide coupling over plain ends of pipes to be joined without using lubricants. Place clamps over each end of coupling at grooved section and tighten with torque wrench to torque recommended by manufacturer.

7. HDPE Pipe Joints:
   a. Bell and Spigot Joints:
      1) Remove all burrs and provide reference mark at correct distance from pipe end. Place mark such that no more than 1/2-inch of machined spigot surface will be visible outside of bell after pipe has been joined.
      2) Clean spigot end and bell thoroughly with soap and water before positioning gasket.
      3) Lubricate spigot groove with manufacturer's recommended lubricant. Thoroughly clean gasket and place in spigot groove starting at bottom, ensuring that gasket fins face backwards toward pipe.
      4) Thoroughly lubricate gasket with pipe manufacturer's recommended lubricant and equalize stretch in gasket by running screwdriver under gasket around its entire circumference three times. Reposition gasket in groove after stretching.
      5) Thoroughly clean and lubricate receiving bell. Align pipe as straight as possible and insert spigot end of pipe carefully into bell until reference mark on spigot is flush with bell.
      6) If mechanical means are used to insert spigot end, protect with wood the end of pipe being pushed, to ensure even distribution of pressure.
   b. Butt Fusion Welded Joints:
      1) Install joints in accordance with manufacturer's instructions using hydraulic butt fusion machine or manual machine equipped with torque wrench. Equipment shall be able to achieve and maintain heating tool temperature range of 400 to 450 degrees F and an interface pressure of 60 to 90 psi.
      2) Clean interior and exterior of pipe and fitting ends with clean, dry, lint-free cloth.

3) Align ends to be joined in the fusion machine without forcing ends into alignment. Adjust alignment as necessary and tighten clamps to prevent slippage.
4) Place facing tool between ends to be joined and face them to provide clean, smooth, parallel mating surface. If stops are present, face ends down to the stops. Remove all shavings after facing without touching ends.
5) Re-check alignment of ends and check for slippage against fusion pressure. There shall be no detectable gaps between ends. Align outside diameters.
6) Heating tool shall maintain pipe manufacture's recommended temperature range. Place the tool between ends to be joined. Move ends against heating tool to achieve full contact. Hold ends against heating tool without force until the following melt bead size is formed:

Pipe Diameter (inches)	Required Melt Bead Size (inches)
2 to 4	1/8 to 3/16
4 to 12	3/16 to 1/4
12 to 24	1/4 to 7/16
24 to 54	7/16 to 9/16

7) Upon forming proper melt bead size, quickly separate ends and remove heating tool. Quickly inspect melted ends and bring ends together applying joining force recommended by manufacturer, using 60 to 90 psi interfacial pressure to form double bead rolled over surface of pipe on both ends.
8) Hold joining force against ends until joint is cool to the touch. Cooling period shall be 30 to 90 seconds per inch of pipe diameter. Heavier wall thicknesses may require longer cooling times as recommended by pipe manufacturer.
9) Upon completing joint, inspect to verify double bead has been formed on both sides, uniformly rounded and consistent in size all around joint. Remove faulty joints and re-joint.

G. Backfilling:

1. Conform to applicable requirements of Section 31 22 00 – Grading.
2. Place backfill as Work progresses. Backfill by hand and use power tampers until pipe is covered by at least one foot of backfill.

H. Connections to Valves and Hydrants:

1. Install valves and hydrants as shown and indicated in the Contract Documents.
2. Conform to applicable requirements of Section 40 05 53 – Hydrants.
3. Provide suitable adapters when valves or hydrants and piping have different joint types.
4. Provide thrust restraint at all hydrants and at valves located at pipeline terminations.

I. Transitions from One Type of Pipe to Another:

1. Provide necessary adapters, specials, and connection pieces required when connecting different types and sizes of pipe or connecting pipe made by different manufacturers.

J. Closures:

1. Provide closure pieces shown or required to complete the Work.

3.02 TRACER TAPE INSTALLATION

A. Polyethylene Underground Warning Tape for Metallic Pipelines:

1. Provide polyethylene tracer tape for buried metallic piping, which includes pipe that is steel, ductile iron, cast iron, concrete, copper, and corrugated metal.
2. Provide tracer tape 12 to 18 inches below finished grade, above and parallel to buried pipe.
3. For pipelines buried eight feet or greater below finished grade, provide second line of magnetic tracer tape 2.5 feet above crown of buried pipe, aligned along pipe centerline.
4. Tape shall be spread flat with message side up before backfilling.

B. Detectable Underground Warning Tape for Non-Metallic Pipelines:

1. Provide polyethylene tracer tape with aluminum backing for buried, non-metallic piping, which includes pipe that is PVC, CPVC, polyethylene, HDPE, FRP, ABS, and vitrified clay.
2. Provide magnetic tracer tape 12 to 18 inches below finished grade, above and parallel to buried pipe.
3. For pipelines buried eight feet or greater below finished grade, provide second line of magnetic tracer tape 2.5 feet above crown of buried pipe, aligned along the pipe centerline.
4. Tape shall be spread flat with message side up before backfilling.

3.03 THRUST RESTRAINT

A. Provide thrust restraint on pressure piping systems where shown or indicated in the Contract Documents.

B. Thrust restraint may be accomplished by using restrained pipe joints, concrete thrust blocks, or harnessing buried pipe. Thrust restraints shall be designed for axial thrust exerted by test pressure specified in the Buried Piping Schedule at the end of this Section.

C. Place concrete thrust blocks against undisturbed soil. Where undisturbed soil does not exist, or for projects where the Site consists of backfill material, thrust restraint shall be provided by restrained pipe joints.

D. Restrained Pipe Joints:

1. Pipe joints shall be restrained by means suitable for the type of pipe being installed.
   a. Ductile Iron, Push-on Joints and Mechanical Joints: Restrain with proprietary restrained joint system as required for Ductile Iron Process Pipe; lugs and tie rods; or other joint restraint systems approved by the CM.
   b. Thermoplastic and HDPE Joints: Where bell and spigot-type or other non-restrained joints are utilized, provide tie rods across joint or other suitable joint restraint system, subject to the approval of the CM.

E. Concrete Thrust Blocks:

1. Provide concrete thrust blocks on pressure piping at changes in alignment of 15 degrees or more, at tees, plugs and caps, and where shown or indicated in the Contract Documents. Construct thrust blocks of Class B concrete, conforming to 03 11 00, Concrete Forming, if applicable.

2. Install thrust blocks against undisturbed soil. Place concrete so that pipe and fitting joints are accessible for repair.

3. Concrete thrust block size shall be as shown on the Design Drawings or as approved by the CM.

3.04 WORK AFFECTING EXISTING PIPING

A. Location of Existing Underground Facilities:

1. Locations of existing Underground Facilities shown on the Design Drawings should be considered approximate.

2. Determine the true location of existing Underground Facilities to which connections are to be made, crossed, and that could be disturbed, and determine location of Underground Facilities that could be disturbed during excavation and backfilling operations, or that may be affected by the Work.

B. Taking Existing Pipelines and Underground Facilities Out of Service:

1. Notify the CM in writing prior to taking pipeline or Underground Facilities out of service. Shutdown notification shall be provided in advance of the shutdown.

C. Work on Existing Pipelines or Underground Facilities:

1. Cut or tap piping or Underground Facilities as shown or required with machines specifically designed for cutting or tapping pipelines or Underground Facilities, as applicable.
   a. For tapping the Town of Lenox watermain, engage a qualified Contractor with 5-years or more of successful large-pipe tapping experience.

2. Install temporary plugs to prevent entry of mud, dirt, water, and debris into pipe.

3. Provide necessary adapters, sleeves, fittings, pipe, and appurtenances required to complete the Work.

3.05 FIELD QUALITY CONTROL

A. General:

1. Test all piping, except as exempted in the Buried Piping Schedule in this Section.

2. When authorities having jurisdiction are to witness tests, notify the CM and authorities having jurisdiction in writing at least 48 hours in advance of testing.

3. Conduct all tests in presence of the CM.

4. Remove or protect pipeline-mounted devices that could be damaged by testing.

5. Provide all apparatus and services required for testing, including:
   a. Test pumps, compressors, hoses, calibrated gages, meters, test containers, valves, fittings, and temporary pumping systems; and
   b. Temporary bulkheads, bracing, blocking, and thrust restraints.

6. Provide air if an air test is required, power if pumping is required, and gases if gases are required.

7. The Contractor will provide fluid required for hydrostatic testing. The Contractor shall provide means to convey fluid for hydrostatic testing into piping being tested. The Contractor shall provide fluid for other types of testing required.

8. Repair observed leaks and repair pipe that fails to meet acceptance criteria. Retest after repair.

9. Unless otherwise specified, testing shall include existing piping systems that connect with new piping system. Test existing pipe to nearest valve. Piping not installed by the Contractor and that fails the test shall be repaired upon authorization of the CM. Unless otherwise included in the Work, repair of existing piping or Underground Facilities will be paid as extra Work.

B. Test Schedule:

1. Refer to the Buried Piping Schedule in this Section for type of test required and required test pressure.

2. Unless otherwise specified, required test pressures are at lowest elevation of pipeline segment being tested.

3. For piping not listed in Buried Piping Schedule in this Section:
   a. Hydrostatically test pipe that will convey liquid at a pressure greater than five psig. Provide process air pipe test for pipe that will convey air or gas under pressure or vacuum, except chlorine gas, which requires separate test.
   b. Use exfiltration testing, low-pressure air testing, or vacuum testing for other piping.
   c. Disinfect for bacteriological testing piping that conveys potable water.

4. Test Pressure:
   a. Use test pressures listed in Buried Piping Schedule in this Section.
   b. If test pressure is not listed in Buried Piping Schedule, or if test is required for piping not listed in the Buried Piping Schedule, test pressure will be determined by the CM based on maximum anticipated sustained operating pressure and methods described in applicable ANSI/AWWA manual or standard that applies to the piping system.

C. Hydrostatic Testing:

1. Preparation for Testing:
   a. For thermoplastic pipe and fiberglass pipe, follow procedures described in Section 7 of ANSI/AWWA Standard C605.
   b. For HDPE pipe, follow procedures described in ASTM F2164. Test duration, including time to pressurize, time for initial expansion, time at test pressure, and time to depressurize, shall not exceed eight hours. If re-testing of a test section or pipeline is required, at least eight hours shall elapse between tests.
   c. For steel pipe, follow procedures described in ANSI/AWWA Manual M11. Wetting period is not required for pipe that is not cement-lined.
   d. For other piping follow procedures described in ANSI/AWWA Manual M9, except that minimum wetting period required immediately prior to testing for asbestos cement pipe shall be 24 hours rather than the 48 hours prescribed for concrete pipe. Wetting period is not required for pipe that is not cement mortar-lined.
   e. Prior to testing, ensure that adequate thrust protection is in place and joints are properly installed.

2. Test Procedure:
   a. Fill pipeline slowly to minimize air entrapment and surge pressures. Fill rate shall not exceed one foot of pipe length per second in pipe being tested.
   b. Expel air from pipe as required. Obtain approval of the CM prior to tapping pipe for expelling air.
   c. Examine exposed joints and valves and make repairs to eliminate visible leakage.
   d. After specified wetting period, add fluid as required to pressurize line to required test pressure. Maintain test pressure for a stabilization period of ten minutes before beginning test.

e. HDPE Pipe: After filling pipeline, gradually pressurize pipe to test pressure and maintain required test pressure for three hours for pipe to expand. During expansion, add fluid to maintain required test pressure. Begin timed test period after expansion period and other requirements are met.
f. Timed test period shall not begin until after pipe has been filled, exposed to required wetting period, air has been expelled, and pressure stabilized.
g. Timed Test Period: After stabilization period, maintain test pressure for at least two hours. During timed testing period, add fluid as required to maintain pressure within five psig of required test pressure. For HDPE pipe, after three-hour expansion phase, reduce test pressure by ten psig and do not add liquid. Test pressure shall then remain steady for one hour, indicating no leakage.
h. Pump from test container to maintain test pressure. Measure volume of fluid pumped from test container and record on test report. Record pressure at test pump at 15-minute intervals for duration of test.

3. Allowable Leakage Rates: Leakage is defined as the quantity of fluid supplied to pipe segment being tested to maintain pressure within five psi of test pressure during timed test period. Allowable leakage rates for piping are:
   a. No Leakage: Pipe with flanged, welded, fused, threaded, soldered, or brazed joints.
   b. Rates based on formula or table in ANSI/AWWA Manual M41 or as otherwise may be required by town water authority:
      1) Metal and fiberglass pipe joined with rubber gaskets as sealing members, including the following joint types:
         a) Bell and spigot and push-on joints;
         b) Mechanical joints;
         c) Bolted sleeve type couplings; and
         d) Grooved and shouldered couplings.
   c. Rates based on make-up allowance in ANSI/AWWA Manual M9:
      1) Prestressed concrete cylinder pipe and other types of concrete pipe joined with O-ring rubber gasket sealing members.
   d. Rates based on formula or table in ANSI/AWWA C605:
      1) Plastic pipe joined with O-ring gasket sealing members.
   e. Rates based on formula or table in ANSI/AWWA C603:
      1) Asbestos-cement pipe.

D. Examination of Welds:

1. Personnel performing examination of welds shall be qualified to at least Level II in accordance with ASNT SNT-TC-1A.

2. Conform to ASME Boiler and Pressure Vessel Code Section V and applicable articles for examination of welds.

3. Visually examine all welds, Category D Fluid Service, in conformance with ASME B31.3.

4. Examine at least ten percent of welds using liquid penetrant examination.

5. If defect is detected, all welds shall be examined by liquid penetrant examination.

6. At conclusion of liquid penetrant examination, remove penetrant test materials by flushing, washing, or wiping clean with applicable solvents.

E. Bacteriological Testing:

1. Bacteriological testing for potable water lines, finished water lines, and other piping in accordance with the Buried Piping Schedule, is specified in Article 3.6 of this Section.

3.06 CLEANING AND DISINFECTION

A. Cleaning, General – Clean pipe systems as follows:

1. Thoroughly clean all piping, including flushing with water, dry air, or inert gas as required, in manner approved by the CM, prior to placing in service. Flush chlorine solution and sodium hypochlorite piping with water.

2. Piping 24-inch diameter and larger shall be inspected from inside and debris, dirt and foreign matter removed.

3. For piping that requires disinfection and has not been kept clean during storage or installation, swab each section individually before installation with five percent sodium hypochlorite solution.

B. Disinfection:

1. Disinfect all potable and finished water piping.

2. Suggested procedure for accomplishing complete and satisfactory disinfection is specified below. Other procedures may be considered for acceptance by the CM.
   a. Prior to disinfection, clean piping as specified and flush thoroughly.
   b. Conform to procedures described in ANSI/AWWA C651. Use continuous feed method of disinfecting unless alternative method is acceptable to the CM.

3. Water for initial flushing, testing, and disinfection to be furnished by the Contractor. The Contractor shall provide all temporary piping, hose, valves, appurtenances, and services required. Water required for disinfection will be provided by the Contractor.

4. Chlorine shall be provided by the Contractor.

5. Bacteriologic tests will be performed by the Contractor. Certified test laboratory report will be provided to the CM.

6. Chlorine concentration in water entering the piping shall be between 50 and 100 ppm, such that minimum residual concentration of 25 mg/L remains after 24-hour retention period. Disinfect piping and all related components. Repeat as necessary to provide complete disinfection.

7. After required retention period, flush chlorinated water to closed drain line, unless otherwise acceptable to the CM. Properly dispose of chlorinated water in accordance with Laws and Regulations. Do not discharge chlorinated water to storm sewers, ditches, or overland.

- END OF SECTION -

SECTION 33 05 33 – HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install all high density polyethylene (HDPE) pipe, fittings, and appurtenances as specified herein, and as shown on the Design Drawings.
2. Pipe in this section is designated for use with installation of the leachate collection and conveyance system piping.
3. Contractor shall be prepared to install HDPE pipe and fittings in conjunction with the earthwork and other components of the liner and leachate collection and conveyance systems.
4. The work shall include procurement, installation, connection, and testing of all piping, fittings, and appurtenances.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D638 – Standard Test Method for Tensile Properties of Plastics.
2. ASTM D790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
3. ASTM D1238 – Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
4. ASTM D1248 – Standard Specification for Polyethylene Plastics Extrusion Materials for Wires and Cables.
5. ASTM D1505 or ASTM D792 – Standard Test Method for Density of Plastics by the Density-Gradient Technique.
6. ASTM D1693 – Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics.
7. ASTM D2122 – Standard Method of Determining Dimensions of Thermoplastic Pipe and Fittings.
8. ASTM D2412 – Standard Test Method for Determining External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
9. ASTM D2837 – Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.
10. ASTM D3350 – Standard Specification for Polyethylene Plastic Pipe and Fittings Materials.
11. ASTM D3261 – Standard Specification for Butt Heat Fusion of Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
12. ASTM F714 – Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

1.03 SUBMITTALS

A. The Contractor shall submit to the CM for approval within 14 days prior to the start of pipe work, complete, detailed shop drawings of all HDPE pipe and fittings, a list of materials to be furnished, and the name of the pipe manufacturer.

B. The Contractor shall submit to the CM the PVC pipe manufacturer's certification of compliance with this Technical Specification.

C. Manufactures data on pipe sizes, material type, pipe joint fabrication requirements.

D. Results of Manufacturer's tests with shipment of materials, with 2 additional copies of such test results furnished to the CM. Any additional required testing not performed by the Manufacturer shall be performed by the Contractor.

E. If Manufacturer's test data are inadequate or unavailable, the CM reserves right to require cores drilled for compressive strength tests. Such tests shall be performed by the Contractor.

F. Manufacturing data listing stock density, melt flow, flexural modulus, tensile strength, and coloration.

1.04 QUALITY ASSURANCE

A. Source Quality Control:

1. Conduct tests by the CM approved testing agency to determine the following:
   a. Pipe dimensions:
      1) Average outside diameter;
      2) Average inside diameter; and
      3) Minimum and average wall thickness.
   b. Pipe flattening:
      1) Deflect pipe to 40% deflection.
      2) Remove load and examine specimen for evaluation of splitting, cracking, or breaking.
2. Test reports shall show results of tests and conformance to ASTM requirements.
3. The CM must confirm that all manufacturer's piping certifications have provided testing to confirm that the required design parameters are met.
4. The CM will randomly verify the pipe characteristics by measurement of the piping wall thickness and perforation hole diameter and spacing.

PART 2 – PRODUCTS

2.01 PHYSICAL PROPERTIES OF PIPE COMPOUND

A. Density of PE base resin: ASTM D1505 or ASTM D792, not less than 0.947 to 0.955 gm/cu cm.

B. Melt Index: ASTM D1238, Condition E, not greater than 0.15 gms/10 min.

C. Flexural Modulus: ASTM D790, 110,000 to less than 160,000 psi.

D. Tensile Strength at Yield: ASTM D638, 3,500 to less than 4,000 psi.

E. Environmental Stress Crack Resistance (ESCR): ASTM D1693 – Condition C, 500 minimum based on PENT test.

F. Hydrostatic Design Basis: ASTM D2837, 1,600 psi at 23^0C.

2.02 PIPE

A. Manufacturers:

1. Chevron Phillips Chemical, Performance Pipe.
2. Or equal.

B. High performance, high molecular weight, high density polyethylene pipe.

C. ASTM D1248 (Type III, Class C, Category 5, P34).

D. ASTM D3350, minimum cell classification value PE 445574C.

E. Marking: Intervals of 5 ft. or less.

1. Manufacturer's name or trademark.
2. Nominal pipe size.
3. HDPE cell classification, ASTM D3350.
4. Legend: 1000 Industrial pipe SDR (number).
5. ASTM D1248.
6. Extrusion date, period of manufacture or lot number.

F. Dimensions:

HDPE PIPE DIMENSIONS (inches) for SDR 7.3
(Cell Leachate Collection, Cleanout Extension, Sump, and Side Riser Pipes)

Nominal Size	Nominal OD	Approx. ID	Minimum Wall	Nominal Weight lbs/ft
2-in.	2.375	1.686	0.325	0.92
3-in.	3.500	2.485	0.479	1.99
4-in.	4.500	3.194	0.616	3.29
6-in.	6.625	4.700	0.908	7.12
8-in.	8.625	6.119	1.182	12.07
10-in.	10.750	7.627	1.473	18.75
12-in.	12.750	9.046	1.747	26.38
24-in.	24.000	17.029	3.288	93.48

HDPE PIPE DIMENSIONS (inches) for SDR 21
(Leachate Conveyance Pipes, Internal Piping within Riser Vaults and Valve House)

Nominal Size	Nominal OD	Approx. ID	Minimum Wall	Nominal Weight lbs/ft
2-in.	2.375	---	---	---
3-in.	3.500	---	---	---
4-in.	4.500	4.13	0.173	1.03
6-in.	6.625	6.08	0.255	2.24
8-in.	8.625	7.92	0.332	3.80
10-in.	10.750	9.87	0.413	5.90
12-in.	12.750	11.71	0.490	8.30
24-in.	24.000	22.04	0.923	29.42
30-in.	30.000	27.55	1.154	45.98
36-in.	34.000	33.06	1.385	66.22

2.03 FITTINGS

A. Molded from polyethylene compound having cell classification equal to or exceeding compound used in pipe to ensure compatibility of polyethylene resins.

B. Be or same manufacture as pipe being provided.

C. Flange Joints:

1. 150-lb stainless steel manufacturer-installed backup flanges as recommended by manufacturer.
2. Stainless steel bolts.
3. Flanges and bolt patterns as specified by manufacturer.
4. Surface weld joints to seal edges.
5. Seal riser joints within 80 mil HDPE boot welded and clamped to riser.
6. Stainless steel boot clamps.
7. Gaskets shall be full-face.
8. Gasket material shall be Viton or Teflon.

D. Markings:

1. Manufacturer’s name of trademark.
2. Nominal size.
3. Material designation “HDPE.”
4. ASTM D1248.

E. Valves:

1. Ball valves shall be PVC True Union ball valves.
2. Check valves shall be PVC True Union check valves.
3. Ball valves shall be lever-operated type.

F. Couplings:

1. Couplings shall be Camlock 316 Stainless Steel.

G. Pressure Gauges:

1. Pressure gauges shall be 2-inch (face size) stainless steel body.
2. Pressure gauges shall be liquid filled type, non-fogging.
3. Pressure gauges shall have a maximum top range reading of 160 psi.

2.04 LINER PENETRATION BOOTS

A. Minimum in accordance with dimensions indicated on Drawings.

B. Construction from 80 mil HDPE flexible membrane, with manufacturer's recommendations. Clamp each boot to riser with stainless steel boot clamps, which will remain in-place after boot is welded to riser. Exposed edges of boot shall be filet welded to prevent moisture from penetrating between HDPE surfaces.

2.05 HIGH DENSITY POLYETHYLENE (HDPE) FLATSTOCK

A. Manufacturers:

1. Chevron Phillips Chemical.
2. Or equal.

B. High performance, high molecular weight, sheet stock.

C. Provide sizes and thickness indicated on the Drawings.

D. Conform to resin quality of pipe stock and liner stock.

E. Round cut edges to minimize potential for liner damage during installation.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Trench, backfill, and compact in accordance with the Design Drawings and specifications.

B. Welded Joints:

1. Weld in accordance with manufacturer's recommendation for butt fusion methods.
2. Butt fusion equipment used in joining procedures shall be capable of meeting conditions recommended by pipe manufacturer, including, but not limited to, temperature requirements, alignment, and fusion pressures.
3. Extrusion welding may be allowed as a secondary method for joining containment piping where butt fusion welding is not practical, but only where approved by the CM in writing.

C. Mechanical Jointing:

1. Use on riser pipe sections.

2. Butt fuse fabricated flange adapters to pipe.
3. Connect slip-on stainless steel backup flanges with stainless steel bolts.
4. Weld HDPE adapters to provide watertight fit. Fit mechanical jointing on risers with protective HDPE boots clamped and bolted to riser.
5. Clamp boot to riser with boot clamps to remain in-place after boot is welded to riser.
6. Filet weld exposed edges of boot to prevent moisture from penetrating between HDPE surfaces.

3.02 FIELD QUALITY CONTROL

A. Pipe may be rejected for failure to conform to specifications or the following:
   1. Fractures or cracks passing through pipe wall, except single crack not exceeding 2 in. in length at either end of pipe which could be cut off and discarded. Pipes within one shipment will be rejected if defects exist in more than 5% of shipment of delivery.
   2. Cracks sufficient to impair strength, durability or serviceability of pipe.
   3. Defects indicating improper proportioning, mixing, and molding.
   4. Damaged ends, where such damage prevents making satisfactory joint.

B. Acceptance of fittings, stubs or other specially fabricated pipe sections shall be based on visual inspection at job site and documentation they conform to these Specifications.

C. The leachate collection pipes along the centerline of the primary and secondary leachate collection systems shall be placed directly on the geocomposite drainage layer. There shall be no requirement for tolerance regarding achievement of design grade and shimming is not required.

3.03 PRESSURE TESTING

A. Test in accordance with ASTM F2164.

B. Pressure testing is not required for the perforated leachate collection pipe and solid leachate side riser pipe extending from cell sumps to cell vaults.

- END OF SECTION -

SECTION 33 49 00 – PRECAST STRUCTURES

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish, install, and test precast concrete storm drainage structures.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with or before manholes.

C. Related Sections:

1. Section 31 23 00 – Excavation and Fill.

1.02 REFERENCE STANDARDS

A. The following standards are referenced in this Section:

1. ANSI A14.3, American National Standard for Ladders, Fixed, Safety Requirements.
2. ASTM A48/A48M, Standard Specification for Gray Iron Castings.
3. ASTM C32, Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale).
4. ASTM C144, Standard Specification for Aggregate for Masonry Mortar.
5. ASTM C150/C150M, Standard Specification for Portland Cement.
6. ASTM C207, Standard Specification for Hydrated Lime for Masonry Purposes.
7. ASTM C443, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
8. ASTM C478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
9. ASTM C923, Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
10. ASTM C1107/C1107M, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

1.03 QUALITY ASSURANCE

A. 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, Occupational Safety and Health Standards.
2. Comply with requirements and recommendations of authorities having jurisdiction over the Work.
3. Obtain required permits for Work in roads, rights-of-way, and other areas of the Work.

1.04 SUBMITTALS

A. Action Submittals:

1. Shop Drawings – Submit drawings showing design and construction details for the following:
   a. Precast concrete structures, including details of joints between the bases and riser sections and stubs or openings for connections;
   b. Access entry steps; and
   c. Cast iron frames and covers.
2. Product Data – Submit manufacturer's data and specifications for the following:
   a. Resilient pipe connectors and corrugated pipe adapter; and
   b. Cast iron frames and covers.

B. Closeout Submittals:

1. Record Documentation:
   a. Maintain accurate and up-to-date record documents showing modifications made in the field, in accordance with approved submittals, and other Contract modifications relative to Work. Submittal shall show actual location of all completed Work and appurtenances at same scale as the Drawings.
   b. Show structure(s) with rim and invert elevations referenced to Project datum.

PART 2 – PRODUCTS

2.01 PRECAST CONCRETE

A. Except where otherwise specified, precast structure components shall consist of reinforced concrete pipe sections especially designed for structure construction and manufactured in accordance with ASTM C478, except as modified herein.

B. Precast, reinforced concrete structure bases, riser sections, flat slab tops, and other components shall be manufactured by wet cast methods only, using forms that will provide smooth surfaces free from irregularities, honeycombing, or other imperfections.

C. Joints between structure components shall be bell-and-spigot-type, employing a single, continuous rubber O-ring gasket complying with ASTM C443. The circumferential and longitudinal steel reinforcement shall extend into the bell and spigot ends of the joint without breaking the continuity of the steel.

D. All precast structure components shall be of approved design and of sufficient strength to withstand the loads imposed upon them. They shall be designed for a minimum earth cover loading of 130 pounds per cubic foot, AASHTO H-20 wheel loadings, and an allowance of 30 percent in roadways and 15 percent in rights-of-way for impact. Precast structure bases shall have two cages of reinforcing steel in their walls, each of the area equal to that required in the riser sections. Wall thickness shall be not less than five inches. Concrete flat slab tops shall be not less than six inches thick.

E. Lifting holes, if used in structure components, shall be tapered, and no more than two holes shall be cast in each section. Tapered, solid rubber plugs shall be furnished to seal the lifting holes. Lifting holes shall be made to be sealed by plugs driven from the outside face of the section only.

F. The point of intersection of the sewer pipe centerlines shall be marked with a 1/4-inch diameter steel pin firmly enclosed in the floor of each structure base and protruding approximately one inch above the finished floor of the base.

G. Mark date of manufacture and name or trademark of manufacturer on inside of barrel.

H. The barrel of the structure shall be constructed of various lengths of riser pipe manufactured in increments of one foot to provide the correct height with the fewest joints. Openings in the barrel of the structures for sewer or drop connections will not be permitted closer than one foot from the nearest joint. Special structure base or riser sections shall be furnished as necessary to meet this requirement.

I. Pipe openings shall be precast, or machine cored. Provide resilient pipe connector and corrugated pipe adapter complying with ASTM C923 for each opening. Connectors shall be flexible and watertight.

J. A precast flat slab top shall be provided at the top of the structure barrel to receive the cast iron frame and cover.

K. Structure steps shall conform to the requirements of 29 CFR 1910.27 and ANSI A14.3. Vertical separation of steps shall be uniform at maximum of 12 inches on centers. Steps shall project evenly from structure walls.

2.02 FRAMES AND COVERS

A. Cast iron 24-inch diameter frames and covers shall be provided for the “closed” manhole cover types and cast iron 30-inch square frames and grates shall be provided for the “open” manhole cover types identified in the Design Drawings. Frames and covers shall be designed for AASHTO H20 wheel loadings.

1. Castings: ASTM A48/A48M, Class No. 30B. Provide castings of uniform quality, free from pouring faults, sponginess, cracks, blowholes, and other defects in positions affecting their strength.

2. Identification: The words “STORM SEWER” shall be cast integrally in center of cover in raised letters.

3. Manufacturers – Provide products of one of the following:
   a. East Jordan Iron Works, Inc.;
   b. Neenah Foundry Company;
   c. Or equal.

2.03 RELATED MATERIALS

A. Aggregate Bedding Material for Structures: Pipe bedding material in accordance with Section 31 23 00 – Excavation and Fill, unless otherwise shown or indicated.

B. Non-Shrink Grout: ASTM C1107/C1107M.

1. Pre-packaged, non-metallic, cementitious grout requiring only the addition of water at the Site.

2. Minimum Compressive Strength at 28 Days: 7,000 psi.

3. Product and Manufacturer – Provide one of the following:
   a. NS Grout by Euclid Chemical Company;
   b. Set Grout by Master Builders, Inc.;
   c. NBEC Grout by Five Star Products, Inc.;
   d. Or equal.

C. Grade Rings: ASTM C478.

D. Brick: ASTM C32, Grade MS.

E. Mortar: Mortar shall be composed of Portland cement, hydrated lime, and sand, in which the volume of sand shall not exceed three times the sum of the volumes of cement and lime.

1. Portland Cement: ASTM C150/C150M, Type II.
2. Hydrated Lime: ASTM C207, Type S.
3. Sand: ASTM C144, except that 100 percent of the sand shall pass the No. 8 sieve.

PART 3 – EXECUTION

3.01 INSPECTION

A. Verify Site conditions, including locations, invert elevations, materials, and dimensions of existing piping to which connections are to be made, before ordering precast structures.

B. 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 INSTALLATION

A. Precast Structure Bases:

1. Install precast bases on not less than 12-inch layer of aggregate bedding material placed and compacted in accordance with Section 31 23 00. Precast bases shall be set at the proper grade and carefully leveled and aligned.

B. Precast Structure Sections:

1. Install sections, joints, and gaskets in accordance with manufacturer's recommendations.
2. Set sections vertical with steps and sections in true alignment. All joints shall be sealed inside and out with non-shrink grout and troweled smooth to the contour of the wall surface. Raised or rough joint finishes will not be accepted.
3. Lifting holes shall be sealed tight with a solid rubber plug driven into the hole from the outside of the barrel and the remaining void filled with 1:2 cement-sand mortar.

C. Structure Channels:

1. All invert channels through structures shall be constructed of Class "A" concrete in accordance with Section 03 00 05.
   a. Accurately shape invert to a semi-circular bottom conforming to inside of connecting pipes, and steel-trowel finish to a smooth, dense surface.
   b. Make changes in size and grade gradually.
   c. Make changes in direction of entering sewer and branches to a true curve of as large a radius as structure size will permit.
   d. Benches shall be built up to the heights shown or as directed by CM and shall be given a uniform float finish. Care shall be taken to slope all benches for proper drainage to the invert channel.

D. Grade Rings:

1. Grade rings or brick stacks shall be used for all precast structures and structures, where required. Stacks or grade rings shall be a maximum of 12 inches in height, constructed on the flat slab or conical top on which the structure frame and cover shall be placed. The

height of the brick stack or grade rings shall be such as required to bring the structure frame to the proper grade.

2. Each grade ring or brick course shall be laid in a full bed of mortar and shall be thoroughly bonded.

3. Brick shall be satisfactorily wet when being laid and each brick shall be laid in mortar so as to form full bed, end, and side joints in one operation. The joints shall not be wider than 3/8 inch, except when the bricks are laid radially, in which case the narrowest part of the joint shall not exceed 1/4 inch. Masonry work shall be kept moist for a period of three days after completion, and precautions shall be taken to prevent freezing during cold weather.

4. The outside of brick stacks and grade rings shall be neatly plastered with 1/2 inch of cement mortar as the Work progresses.

3.03 GRADING AT STRUCTURES

A. All structures and structures in unpaved areas shall be built, as shown or directed by CM, to an elevation higher than the original ground. The ground surface shall be graded to drain away from the structure. Fill shall be placed around structures to the level of the upper rim of the structure frame, and the surface evenly sloped and graded to the existing surrounding ground, unless otherwise shown or directed by CM. The slope shall be covered with a minimum of four inches of topsoil, seeded, and maintained until a satisfactory growth of grass is obtained.

B. Structures in paved areas shall be constructed to meet the final surface grade. In paved areas, all structures shall be 1/2 inch below final wearing surfaces. Structures shall not project above finished roadway pavements to prevent damage from snowplows.

C. Contractor shall be solely responsible for the proper height of all structures and structures necessary to reach the final grade at all locations. Contractor is cautioned that CM's review of Shop Drawings for structure components will be general in nature and Contractor shall provide an adequate supply of random length precast structure riser sections to adjust any structure to meet field conditions for final grading.

- END OF SECTION -

SECTION 35 20 23 – VEGETATION REMOVAL AND SUBAQUEOUS BACKFILL

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work Specified:

1. Provide all supervision, labor, materials, tools, equipment, accessories, and appurtenances necessary to perform vegetation removal, backfill, and related Work.
2. Vegetation removal and subaqueous backfill is planned for the gravel pond (the Pond) located adjacent to the western boundary of the Site. Earthwork within the Pond will include the removal of vegetation and other deleterious debris that may exist within the pond and in the areas surrounding the pond where filling is specified and subsequent placement of fill materials to reach finished grade elevations as specified in the Design Drawings.

B. Related Specifications:

1. Section 01 57 05 – Temporary Controls.
2. Section 02 21 00 – Surveys.
3. Section 31 11 00 – Clearing and Grubbing.

1.02 REFERENCES

A. Not Used.

1.03 QUALITY ASSURANCE

A. Applicable Codes, Standard, and Specifications:

1. Laws and Regulations applying to the Work under this Section include, but are not limited to, the following:
   a. 29 CFR 1910, Occupational Safety and Health Standards;
   b. 29 CFR 1926, Safety and Health Regulations for Construction; and
   c. 49 CFR 171.8, Transportation, Definitions and Abbreviations.
2. Comply with applicable provisions and recommendations of the following:
   a. Recommendations of the National Institute of Occupational Safety and Health (NIOSH).
3. Obtain required permits and approvals for excavation and fill Work, including work permits from right-of-way owners.
4. Comply with requirements of authorities having jurisdiction.
5. Whenever there is a conflict or overlap of the above reference, the most stringent provision shall be applicable.

1.04 SUBMITTALS

A. Submit a plan acceptable to CM within 30 days from award of contract, that that details the means and methods to perform the following Contractor activities associated with Pond vegetation and debris removal, including:

1. Management (pumping and discharging) of water existing within the Pond at the time of construction as required to facilitate vegetation and debris removal.
2. Removal and clearing of vegetation (e.g., plants, shrubs, trees, etc.) within the area of the Pond that is subject to backfilling based on the design plans and specifications.
3. Removal and clearing of phragmites within the area of the Pond that is subject to backfilling based on the design plans and specifications.
4. Removal of deleterious debris (e.g., vegetation root zone material, construction debris, other deleterious material).
5. Handling and staging of removed materials at an on-site location to be determined in coordination with the CM (if on-site staging is necessary prior to or as part of material disposition).
6. Material handling and staging of Phragmites to be conducted in a manner that minimizes the potential of spreading viable seed, stolon, or rhizome material of the invasive species to site areas that are not already impacted by Phragmite growth.
7. Final disposition of the removed materials proposed by the Contractor in coordination with the CM.

B. Submit a plan acceptable to the CM within 30 days of award of contract, that describes the means and methods to perform the following Contractor activities associated with Pond backfilling, including:

1. Management (i.e., pumping and discharging of water to the adjacent pond) of water existing within the Pond at the time of construction as required to facilitate backfilling.
2. Backfilling of the Pond as described within the area of the Pond that is subject to backfilling based on the design plans and specifications and using the materials in Section 2.01(A) of this specification. Include the possible use of additional materials that may be proposed by the Contractor to facilitate the subaqueous backfilling work.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Backfill:

1. Reuse of site soils obtained from on-site excavations shall be used for Pond filling. Coarse, self-compacting, granular materials shall be used for initial placement in the Pond (i.e., to approximately one-foot above pond-water elevation at time of construction). Selection of on-site soils for Pond filling to be determined in coordination with the CM.

PART 3 – EXECUTION

3.01 VEGETATION REMOVAL

A. No vegetation removal activities may be initiated without the approval of the CM.

B. Prior to the start of vegetation removal, the Contractor must install and operate a temporary hydraulic bypass/pump to remove water to the maximum extent practicable in order to complete the specified Work. Water removed from Pond by temporary bypass/pump to be discharged to adjacent gravel pond.

C. Prior to the start of backfill within the Pond, perform the removal of vegetation and any debris along the shorelines and within the Pond, as necessary, to complete the Work.

D. Cleared vegetation and debris shall be managed in accordance with specification Section 31 11 00 – Clearing and Grubbing.

3.02 BACKFILLING

A. Prior to backfilling work, standard siltation controls shall be established to minimize silt migration to the adjacent pond and re-suspension of the adjacent pond's sediment as water is re-located either by pumping or overland flow.

B. Backfill shall not be placed until all removal activities have been completed. The Pond backfill area shall be reviewed and approved by the CM prior to placement of backfill materials.

C. The Pond areas shall be backfilled as follows:

1. The initial backfill placement shall be comprised of coarse, self-compacting material to approximately one-foot above the water surface elevation at the time of construction.
2. The completed initial backfill placement surface shall be dynamically compacted to ensure adequate placement densities have been achieved. The Contractor shall propose the type of dynamic compaction to be employed which will be reviewed by the CM prior to use.
3. Backfill materials shall be placed and compacted to the grades shown on the Design Drawings and as specified in the Contract Documents.

D. Survey control shall be maintained throughout backfill placement activities and be utilized to confirm the horizontal and vertical extents of placement have been achieved in accordance with Section 02 21 00 – Surveys.

- END OF SECTION -

SECTION 40 05 53 – HYDRANTS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install process valves, four-inch diameter and larger, and appurtenances, complete and operational.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate installation of items that must be installed with or before process valves Work.

C. Related Sections:

1. Section 33 05 05, Buried Piping Installation.

1.02 REFERENCES

A. Standards referenced in this Section are listed below:

1. American Bearing Manufacturers Association (ABMA).
2. ANSI B16.1, Cast-Iron Pipe Flanges and Flanged Fittings.
3. ANSI B16.34, Valves-Flanged, Threaded and Welding end. (ASME B16.34).
4. ANSI/NSF 61 Drinking Water Components – Health Effects.
5. API STD 594, Check Valves, Flanged Lug, Wafer and Butt-Welding.
6. API STD 598, Valve Inspection and Testing.
7. ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
8. ASTM A536, Specification for Ductile Iron Castings.
9. ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
10. AWWA C500, Metal-Seated Gate Valves for Water Supply Service.
11. AWWA C502, Dry-Barrel Fire Hydrants.
12. AWWA C509, Resilient-Seated Gate Valves for Water Supply Service.
13. AWWA C550, Protective Interior Coatings for Valves and Hydrants.
14. FS TT-C-494, Coating Compound, Bituminous, Solvent Type, Acid-Resistant.

1.03 QUALITY ASSURANCE

A. Manufacturer’s Qualifications:

1. Manufacturer shall have minimum of five years of experience producing substantially similar materials and equipment to that required and be able to provide evidence of at least five installations in satisfactory operation for at least five years.

B. Component Supply and Compatibility:

1. Obtain each type of equipment and appurtenances included in this Section, regardless of the component manufacturer, from a single manufacturer of the type of process valve. For each type of valve, do not furnish valves of more than one manufacturer.

2. Supplier of each type of equipment specified shall review and approve or prepare all Shop Drawings and other submittals for all components associated with the type of process valve Supplier is furnishing.

3. Components shall be suitable for use in the specified service conditions. Components shall be integrated into the overall assembly by the process valve manufacturer.

1.04 SUBMITTALS

A. Action Submittals – Submit the following:

1. Shop Drawings:
   a. Installation drawings showing orientation of valve in both plan and elevation view. Drawings shall clearly identify valve and its appurtenances, including controls, actuators, valve stems, and other components. Show dimensions of valves and appurtenances in relation to piping and structural and architectural components, where applicable.

2. Product Data:
   a. Product data sheets.
   b. Complete catalog information, including dimensions, weight, specifications, and identification of materials of construction of all parts.
   c. Corrosion resistance information to confirm suitability of valve materials for the application. Furnish information on chemical resistance of elastomers from elastomer manufacturer.
   d. Cv values and hydraulic head loss curves.

3. Testing Plans:
   a. Submit plan for shop testing of each valve for which shop testing is specified, including testing plan's and test facility's limitations proposed.

B. Informational Submittals – Submit the following:

1. Certificates:
   a. Certificates of compliance with referenced standards, where applicable, including those of AWWA, NSF, and others required by CM.

2. Manufacturer Instructions:
   a. Submit manufacturer's instructions for handling, storing, and installing valves and appurtenances. Provide templates and setting drawings for valves and appurtenances that require anchor bolts or similar anchorages.

3. Source Quality Control Submittals:
   a. Submit copies of shop test results and inspection data, certified by manufacturer.

4. Field Quality Control Submittals:
   a. Submit results of field tests required.

5. Supplier's Reports:
   a. When requested by CM, submit written report of results of each visit to Site by Supplier's serviceman, including purpose and time of visit, tasks performed, and results obtained.

6. Qualifications Statements:
   a. When requested by CM, submit manufacturer's qualifications demonstrating compliance with the Specifications, including list of existing installations with contact names and telephone number(s) for each.

C. Closeout Submittals: Submit the following:

1. Operations and Maintenance Data:
   a. Furnish operation and maintenance manuals.
   b. Furnish in operations and maintenance manuals complete nameplate data for each valve and electric actuator.

D. Maintenance Material Submittals: Submit the following:

1. Spare Parts, Extra Stock Materials, and Tools:
   a. Spare Parts and Extra Stock Materials: Furnish as specified for each valve type.
   b. Tools: Furnish two sets of special tools (excluding metric tools, if applicable) for each size and type of valve furnished.

1.05 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling, and Unloading:

1. Deliver materials and equipment to Site to ensure uninterrupted progress of the Work. Deliver anchorage products that are to be embedded in concrete in ample time to prevent delaying the Work.

2. Inspect boxes, crates, and packages upon delivery to Site and notify CM in writing of loss or damage to materials and equipment. Promptly remedy loss and damage to new condition in accordance with manufacturer's instructions.

3. Conform to Section 01 65 00, Product Delivery Requirements, if applicable.

B. Storage and Protection:

1. Keep products off ground using pallets, platforms, or other supports. Store equipment in covered storage and prevent condensation and damage by extreme temperatures. Store in accordance with manufacturer's recommendations. Protect steel, packaged materials, and electronics from corrosion and deterioration.

2. Conform to Section 01 66 00, Product Storage and Handling Requirements, if applicable.

PART 2 – PRODUCTS

2.01 GENERAL

A. Valves, General:

1. Provide each valve with manufacturer's name and rated pressure cast in raised letters on valve body.

2. Provide valves with brass or Type 316 stainless steel nameplate attached with Type 316 stainless steel screws. Nameplates shall have engraved letters displaying the following minimum information:
   a. Valve size;
   b. Pressure and temperature ratings;
   c. Application (other than water and wastewater);
   d. Date of manufacture; and
   e. Manufacturer's name.

3. Provide valves to turn clockwise to close, unless otherwise specified.

4. Provide valves with permanent markings for direction to open.

5. Manually operated valves, with or without extension stems, shall require not more than 40-pound pull on manual operator to open or close valve against specified criteria. Gear actuator and valve components shall be able to withstand minimum pull of 200 pounds on manual operator and input torque of 300-foot pounds to actuator nut. Manual operators include handwheel, chainwheel, crank, lever, and T-handle wrench.

B. Valve Materials:

1. Valve materials shall be suitable for the associated valve's service or application, as shown.

2. Protect wetted parts from galvanic corrosion caused by contact of different metals.

3. Wetted components and wetted surfaces of valves used with potable water or water that will be treated to become potable shall conform to ANSI/NSF 61.

4. Clean and descale fabricated stainless-steel items in accordance with ASTM A380 and the following:
   a. Passivate all stainless steel welded fabricated items after manufacture by immersing in pickling solution of six percent nitric acid and three percent hydrofluoric acid. Temperature and detention time shall be sufficient for removing oxidation and ferrous contamination without etching surface. Perform complete neutralizing operation by immersing in trisodium phosphate rinse followed by clean water wash.
   b. Scrub welds with same pickling solution or pickling paste and clean with stainless steel wire brushes or by grinding with non-metallic abrasive tools to remove weld discoloration, and then neutralize and wash clean.

2.02 RESILIENT-SEATED GATE VALVES

A. Manufacturers: Provide products of one of the following:

1. M&H Valve Company.

2. US Pipe and Foundry.

3. Or equal.

B. General:

1. Provide valves conforming to AWWA C509 and as specified in this Section.

2. Sizes: Four-inch through 12-inch diameter, 16-inch and 20-inch diameter.

3. Type:
   a. Provide non-rising stem (NRS) valves for buried service.
   b. For interior and exposed service, provide outside screw and yoke (OS&Y) rising-stem valves, unless otherwise specified.
   c. Provide position indicators for NRS valves used in exposed service.

4. Minimum Rated Working Pressure:
   a. Valves 12-inch Diameter and Smaller: 200 psig; and
   b. Valves 16-inch and 20-inch Diameter: 150 psig.

5. Maximum Fluid Temperature: 150 degrees F.

6. Provide valves with fully encapsulated resilient wedges, unless otherwise specified.

C. Materials of Construction: Shall conform to AWWA C509 and shall be as follows:

1. Valve Body, Bonnet, and Stuffing Box: Cast-iron.
2. Wedge: Cast-iron, symmetrically and fully encapsulated with molded rubber having minimum 1/8-inch thickness.
3. Stem: Manganese bronze.
4. Rubber Items: Buna-N or other synthetic rubber suitable for the application.
5. Internal and external bolting and other hardware including pins, set screws, plug, studs, bolts, nuts, and washers shall be Type 316 stainless steel.

D. Interior Coating:

1. Valves shall be coated inside. Steel, cast-iron, and ductile iron surfaces, except machined surfaces, shall be epoxy coated in accordance with AWWA C550.

E. Testing:

1. Test valves in valve manufacturer's shop in accordance with AWWA C509.

F. Gear Actuators for Manually Operated Valves:

1. Provide valves with gear actuators conforming to AWWA C500.
2. Size gear actuators for the following maximum differential pressures.

2.03 FIRE HYDRANTS

A. Products and Manufacturers – Provide one of the following:

1. Mueller, Model: Super Centurion.
2. Kennedy, Model: Guardian K81D.
3. Or equal.

B. General:

1. Provide fire hydrants conforming to AWWA C502, Underwriters' Laboratories-listed and Factory Mutual approved, and as specified herein.
2. Rated Working Pressure: 175 psig, minimum.
3. Rated Hydrostatic Test Pressure: 400 psig, minimum.
4. Length of Bury: as shown on the Design Drawings.

C. Construction:

1. Type: Three-way fire hydrants with two hose nozzles and one pumper nozzle.
2. Nozzles:
   a. Provide one 4.5-inch diameter pumper nozzle and two 2.5-inch diameter hose nozzles with NFPA threads.
   b. Nozzles shall be O-ring sealed, threaded, and retained with stainless steel locks. Nozzles shall be field replaceable.

3. Main Valve and Drainage Assembly:
    a. Opening: 5.25-inch diameter.
    b. Main valve shall be compression type provided with upper and lower metal plates and lower valve plate nut.
    c. Barrel drainage shall be through dual drain valves. Opening and closing of main valve shall cause force-flush of dual drain ports.
    d. Main valve seat ring shall be easily replaceable from above-ground.
4. Provide an oil filled reservoir for lubrication of stem threads and bearing surfaces. Oil shall be U.S. Food and Drug Administration approved and ANSI/NSF 61-listed, and shall flow freely in temperature range of -60 to 158 degrees F.
5. Provide traffic flange in barrel and safety coupling in stem.
6. Inlet Connection: Six-inch diameter mechanical joint, restrained.

D. Materials of Construction: Materials of construction shall conform to the requirements of AWWA C502 and shall be as follows:

1. Upper and Lower Barrels, Shoe, and Bonnet: Cast-iron.
2. Stem and Accessories:
    a. Upper and Lower Stems: Steel;
    b. Operating Nut: Bronze; and
    c. Safety Coupling: Stainless steel.
3. Nozzles:
    a. Pumper and Hose Nozzles: Bronze;
    b. Nozzle Caps: Cast-iron; and
    c. Cap Chains: Steel.
4. Main Valve Assembly:
    a. Main Valve: Rubber;
    b. Upper Valve Plate: Bronze; and
    c. Lower Valve Plate and Nut: Cast-iron.
5. Drain Valves:
    a. Drain Ring Housing: Cast-iron; and
    b. Drain Ring: Bronze.
6. O-ring Gaskets: Rubber.
7. External Assembly Bolts: Steel.
8. Internal Pins and Other Hardware: Stainless steel, ASTM A276.

E. Testing:

1. Test each fire hydrant in manufacturer’s shop in conformance with AWWA C502.

F. Interior Coating:

1. Hydrants shall be coated on the interior. Steel, cast-iron, and ductile iron surfaces, except machined surfaces, shall be epoxy coated in accordance with AWWA C550.

G. Exterior Painting:

1. Below- and above-ground painting shall be as specified under Article 2.27 of this Section and Article 2.28 of this Section.

2.04 APPURTENANCES FOR BURIED METALLIC VALVES

A. Wrench Nuts:

1. Provide wrench nuts on buried valves of nominal two-inch size, in accordance with AWWA C500.
2. Arrow indicating direction of opening the valve shall be cast on the nut along with the word “OPEN.”
3. Material: Ductile iron or cast-iron.
4. Secure nut to stem by mechanical means.

B. Extension Stems for Non-Rising Stem Gate Valves and Quarter-turn Buried Valves:

1. Provide extension stems to bring operating nut to six inches below valve box cover.
2. Materials of Stems and Stem Couplings: Type 316 stainless steel.
3. Maximum Slenderness Ratio (L/R): 100.
4. Provide top nut and bottom coupling of ductile iron or cast-iron with pins and set screws of Type 316 stainless steel.

C. Valve Boxes:

1. Valve boxes shall be as indicated and as required.
2. Type: Heavy-duty, suitable for highway loading, two-piece telescopic, and adjustable. Lower section shall enclose valve operating nut and stuffing box and rest on valve bonnet.
3. Material: Cast-iron or ductile iron.
4. Coating: Two coats of asphalt varnish conforming to FS TT-C-494.
5. Marking: As required for service.

2.05 TOOLS, LUBRICANTS, AND SPARE PARTS

A. Provide the following T-handle operating wrenches for buried valves:

1. Length of T-Handle Operating Wrench: Provide 2-foot minimum height above finish grade.
2. Quantity: 1.

B. Lubricants: For valves, actuators, and appurtenances requiring lubricants, provide suitable lubricants for initial operation and for first year of use following Substantial Completion. Lubricants for equipment associated with conveying potable water or water that will be treated to become potable shall be food-grade and ANSI/NSF 61-listed.

C. Tools, spare parts, and maintenance materials shall conform with Section 01 78 43, Spare Parts and Extra Materials.

2.06 PAINTING OF EXPOSED VALVES, HYDRANTS, AND APPURTENANCES

A. Exterior steel, cast-iron, and ductile iron surfaces, except machined surfaces of exposed valves and appurtenances, shall be finish painted in manufacturer’s shop. Surface preparation, priming, finish painting, and field touch-up painting shall conform to Section 09 91 00, Painting, if applicable.

2.07 PAINTING OF BURIED VALVES

A. Exterior steel, cast-iron, and ductile iron surfaces, except machined or bearing surfaces of buried valves, shall be painted in valve manufacturer's shop with two coats of asphalt varnish conforming to FS TT-C 494.

PART 3 – EXECUTION

3.01 INSPECTION

A. Examine conditions under which materials and equipment are to be installed and notify CM in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General:

1. Install valves and appurtenances in accordance with:
   a. Supplier's instructions and the Contract Documents;
   b. Requirements of applicable AWWA standards; and
   c. Applicable requirements of Section 33 05 05, Buried Piping Installation.
2. Install valves plumb and level. Install all valves to be free from distortion and strain caused by misaligned piping, equipment, and other causes.
3. Position swing check valves and butterfly valves so that, when valve is fully open, valve disc does not conflict with piping system elements upstream and downstream of valve.

B. Exposed Valves:

1. Provide supports for large or heavy valves and appurtenances as shown or required to prevent strain on adjoining piping.
2. Operators:
   a. Install valves so that operating handwheels or levers can be conveniently turned from operating floor without interfering with access to other valves, piping, structure, and equipment, and as approved by CM.
   b. Avoid placing operators at angles to floors or walls.
   c. Orient chain operators out of the way of walking areas.
   d. Install valves so that indicator arrows are visible from floor level.
   e. For motor-operated valves located lower than five feet above operating floor, orient motor actuator to allow convenient access to pushbuttons and handwheel.
3. Floor Stands and Stems:
   a. Install floor stands as shown and as recommended by manufacturer.
   b. Provide lateral restraints for extension bonnets and extension stems as shown and as recommended by manufacturer.
   c. Provide sleeves where operating stems pass through floor. Extend sleeves two inches above floor.

C. Buried Valves:

1. Install valve boxes plumb and centered, with soil carefully tamped to a lateral distance of four feet on all sides of box, or to undisturbed trench face if less than four feet.
2. Provide flexible coupling next to each buried valve.

3.03 FIELD QUALITY CONTROL

A. Field Tests:

1. Adjust all parts and components as required to provide correct operation of valves.
2. Conduct functional field test on each valve in presence of CM to demonstrate that each valve operates correctly.
3. Verify satisfactory operation and controls of motor operated valves.
4. Demonstrate satisfactory opening and closing of valves at specified criteria requiring not more than 40 pounds effort on manual actuators.
5. Test ten percent of valves of each type by applying 200 pounds effort on manual operators. There shall be no damage to gear actuator or valve.

- END OF SECTION -

SECTION 46 01 00.10 – CELL SLCS TESTING AND MONITORING

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Contractor shall perform testing and monitoring of the cell secondary leachate collection system (SLCS) to evaluate the functionality of the cell sump and to demonstrate the integrity of the baseliner system and its ability to minimize the occurrence of leachate in the SLCS and meet the action rate (AR) requirements for the UDF cells as defined in Section 2.3 of Appendix B to the UDF Revised Final Design Plan (Arcadis 2024).
2. Contractor shall furnish all labor, materials, equipment, measurement devices, tools, and supervision necessary to perform and complete testing and monitoring of the cell SLCS as specified in this Section.
3. All testing and monitoring shall be conducted for the duration needed to obtain the information required for regulatory approval of the cell SLCS.
4. Pumping and monitoring of the cell SLCS sump shall be conducted as described in this Section.
5. Monitoring of the cell primary leachate collection system (PLCS) sump shall be conducted as described in this Section.
6. Contractor shall provide electrical supply source, if necessary, to perform the required testing and monitoring of the cell SLCS.
7. Contractor shall provide water, if necessary, to perform the required testing and monitoring of the cell SLCS.
8. When testing and monitoring of the cell SLCS have been completed, the Contractor shall remove all equipment and materials used for testing and monitoring that are not considered permanent features of the cell SLCS.

B. Coordination:

1. All testing and monitoring work performed by the Contractor shall be conducted in coordination with the CM.
2. Contractor shall document and record all work performed in conjunction with the cell SLCS testing and monitoring, including monitoring of the cell PLCS, and submit such documentation to the CM.
3. Contractor shall document and record all data for the testing and monitoring of the cell SLCS and PLCS and submit such documentation to the CM.
4. Testing and monitoring of the cell SLCS must be completed to the satisfaction of the CM before concluding the cell SLCS testing and monitoring work.

1.02 SUBMITTALS

A. Contractor shall prepare and submit to the CM for approval, a Plan that details how testing and monitoring of the cell SLCS will be performed as specified in this Section. At a minimum, the Plan shall include information on the following:

1. Electrical power source necessary to conduct testing and monitoring (may include temporary source supplied by the Contractor, if necessary).
2. Water source (potable) and application of water, if necessary, as described in this Section.
3. Pumps, hoses, level measurement devices, flow meters, valves, connections.
4. Means and methods for management of water pumped from the SLCS and PLCS (i.e., discharge location, flow dissipation, erosion control).
5. Procedures for pumping water from the cell PLCS and SCLC sumps.
6. Procedures for measuring and monitoring water levels in the PLCS and SLCS sumps, measuring water volumes pumped from the PLCS and SLCS sumps.
7. Process for tracking, documenting, and recording activities and data associated with testing and monitoring of the cell SLCS as specified in this Section.

B. Contractor shall submit documentation associated with testing and monitoring as described in this Section.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 INITIAL DRAWDOWN PERIOD PUMPING

A. Pumping of water accumulated in the SLCS sump shall be conducted to the extent needed to fully evacuate (dewater) the SLCS sump:

1. This may require several consecutive days of pumping to complete water removal.
2. The volume of water pumped for each pumping event will be measured (in gallons).
3. The date, pumping start-finish times, volume pumped, and any comments pertaining to the event will be recorded.
4. Results will be submitted to the CM for review and approval that will allow for commencing with the monitoring.

3.02 TESTING AND MONITORING PERIOD PUMPING

A. Pumping of water accumulated in the SLCS sump performed after CM approval of initial drawdown period pumping results shall include the following activities:

1. Continuous pumping will be performed during each pumping event until accumulated water in the SLCS sump has been removed for that event (additional discontinuous pumping events on the same date will not be necessary or performed).
2. Pump rate for removal of water from the cell SLCS sump will be low enough to allow for drainage and collection of water within the secondary leachate collection system piping upgradient of the cell sump.
3. The water volume pumped for each pumping event will be measured (in gallons).

4. The SLCS and PLCS sump water levels will be measured prior to pumping of the SLCS (in inches).
5. The date, pumping start-finish times, volume pumped, water levels measured, and any comments pertaining to the SLCS pumping event will be recorded.
6. The date of monitoring and any comments pertaining to the PLCS pumping event will be recorded.
7. The monitoring period will include at least three precipitation events significant enough to result in stormwater runoff within the cell.
8. In the event that there is a lack of significant precipitation during the initial 30-day monitoring timeframe, the Contractor will determine alternative methods for introducing water into the PLCS that may include manually applying water spray over the lined cell area. Contractor will coordinate with the CM to determine if alternative water application is needed. This determination will include review of water levels measured in the PLCS sump to assess if sufficient water levels existing in the primary liner system to satisfy the SLCS testing and monitoring requirements.

B. The timeframe required for the monitoring period shall be a minimum of 30 days after which monitoring will continue until the observed flow rate to the SLCS sump drops to one-half the AR for the UDF as defined in Section 2.3 of Appendix B to the UDF Revised Final Design Plan.

C. All water removed from the SLCS during the initial drawdown period and monitoring period events will be discharged to the UDF stormwater drainage system since that pumped water will not have been in contact with consolidation materials. If an alternative discharge location is determined by the Contractor to be more efficient, the Contractor shall notify the CM of the alternative location. All pumped water discharge locations shall be coordinated with and approved by the CM prior to their use.

3.03 DOCUMENTATION OF TESTING AND MONITORING DATA

A. Data obtained from the initial drawdown and monitoring period pumping events shall be tabulated in a spreadsheet (includes SLCS, PLCS, precipitation events).

1. Documentation shall include the following information for the SLCS:
   a. Date of pumping event;
   b. Pumping start-finish times;
   c. Volume of water pumped during event (in gallons);
   d. Cumulative volume of water pumped (in gallons);
   e. Water levels measured; and
   f. Comments pertaining to the SLCS pumping event will be recorded.
2. Documentation shall include the following information for the PLCS:
   a. Dates monitored;
   b. Water levels measured; and
   c. Comments pertaining to the PLCS.
3. Documentation shall include the following information for precipitation:
   a. Date of precipitation event; and
   b. Precipitation amount (in inches of rainfall as determined from the on-site weather station).
4. Documentation for alternative water application shall include:
   a. Water source;
   b. Application method; and
   c. Water volume applied and date.

3.04 CALCULATION OF MONITORED FLOW RATE OF CELL SLCS

A. Calculation of the monitored flow rate for the cell SLCS shall be performed by dividing the volume of water pumped from the SLCS for a given pumping event by the constructed cell area (in acres) that captures water in the cell baseliner system and divided by the number of days (or the number of hours divided by 24) since the previous pumping event ended. Calculation results shall be reported in gallons per acre per day (GPAD).

B. The acceptable flow rate to the cell SLCS sump as determined during the testing and monitored period shall be is in conformance with the AR for the UDF as defined in Section 2.3 of Appendix B to the UDF Revised Final Design Plan.

C. In the event that the results of the cell SLCS flow rate testing and monitoring do not meet the requirements for the cell AR, the Contractor shall coordinate with the CM to determine an appropriate action needed to achieve conformance with the AR for the cell SLCS.

- END OF SECTION -

Appendix C

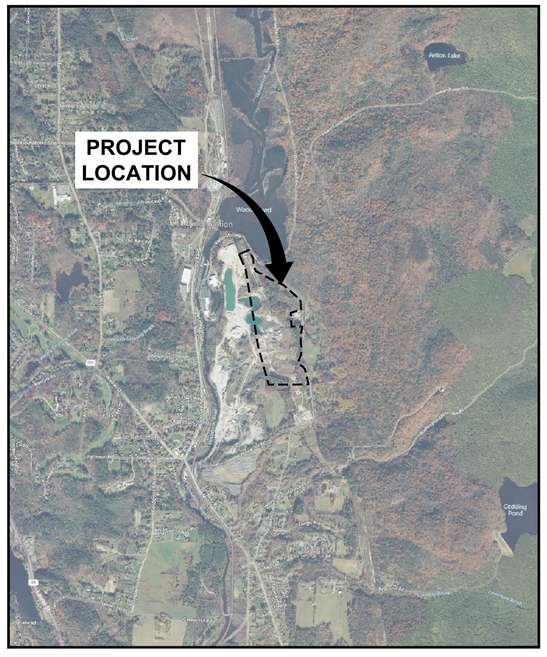
Design Drawings

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XREFS: IMAGES:
AECOM_1c-black_rgb.bmp
Arcadis Logo BW.PNG
GE-Image.jpg

DESIGN DRAWINGS

GE-PITTSFIELD/HOUSATONIC RIVER SITE UPLAND DISPOSAL FACILITY CONTRACT 11 - UDF CONSTRUCTION

UDF CONSTRUCTION (UC)



LOCATION MAP
0 2000' 4000'
GRAPHIC SCALE

AREA LOCATION
MASSACHUSETTS

DATE ISSUED / DATE REVISED

DECEMBER 2025

LEE, MASSACHUSETTS
BERKSHIRE COUNTY

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

COMMONWEALTH OF MASSACHUSETTS
MARK O. GRAVELDING
CIVIL
No. 42980
REGISTERED PROFESSIONAL ENGINEER

ARCADIS U.S., INC.

AECOM

INDEX TO DRAWINGS

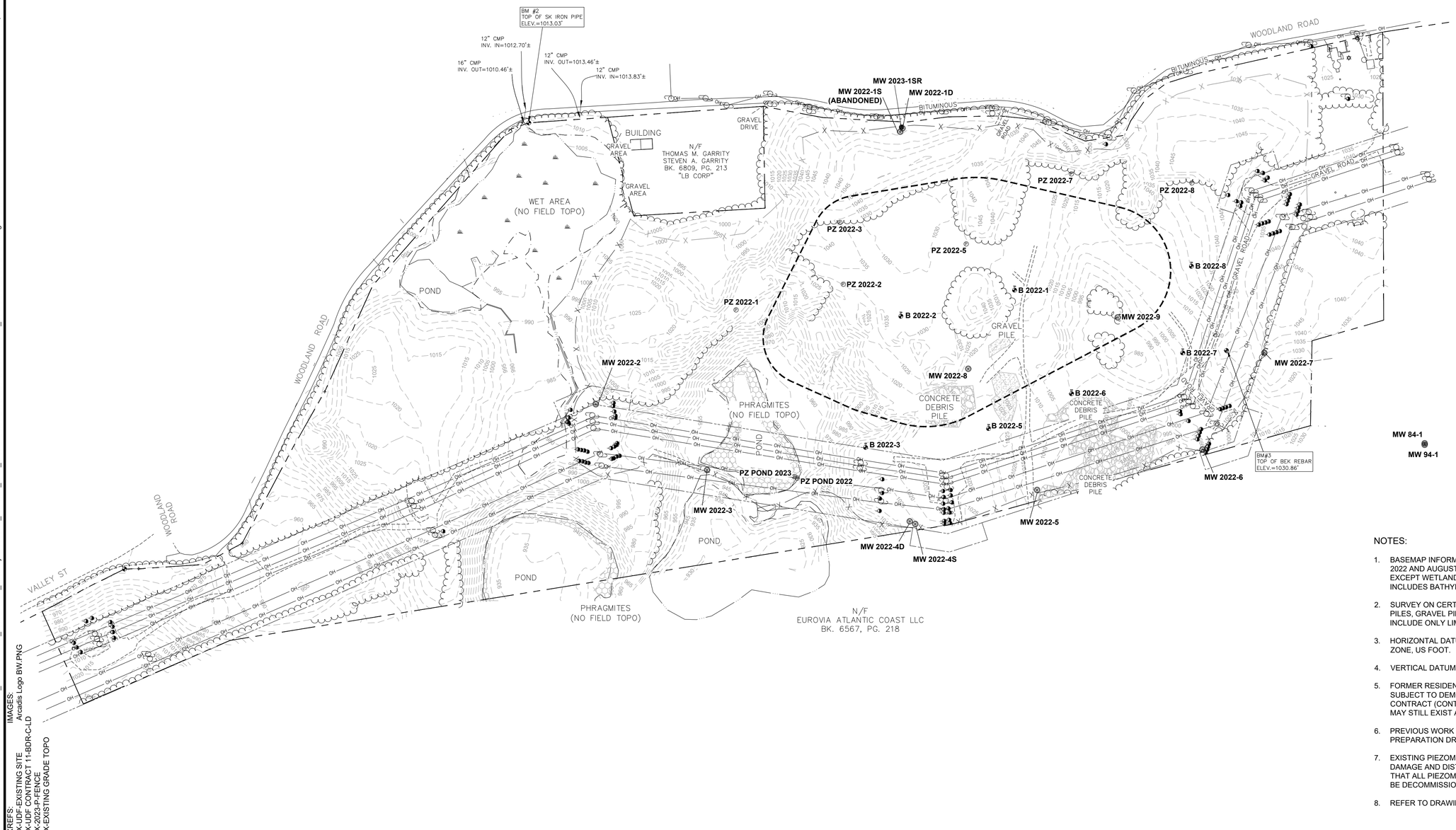
ARCADIS DESIGN DRAWINGS

COVER

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AECOM DESIGN DRAWINGS

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EXISTING FEATURES LEGEND

- REBAR FOUND
- IRON PIN FOUND
- CONCRETE BOUND FOUND
- GRANITE BOUND FOUND
- BENCH MARK
- LAMP POST
- UTILITY POLE
- GUY WIRE
- MW 2022-2 — MONITORING WELL (SEE NOTE 7)
- PZ 2022-8 — PIEZOMETER (SEE NOTE 7)
- B 2022-8 — SOIL BORING
- WET AREA
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- EDGE OF WATER
- EDGE OF WETLAND
- STONEWALL
- OVERHEAD WIRES
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- ELEVATION CONTOUR (5-FOOT INTERVAL)
- MW 84-1 / MW 94-1 — EVERSOURCE RIGHT- OF-WAY
- UPLAND DISPOSAL FACILITY (UDF) LIMITS OF CONSOLIDATED MATERIAL
- UDF SECURITY FENCE

NOTES:

1. BASEMAP INFORMATION BASED ON A FIELD SURVEYS CONDUCTED IN MAY/JUNE, 2022 AND AUGUST, 2023 BY HILL-ENGINEERS, ARCHITECTS, PLANNERS, INC. EXCEPT WETLAND LIMITS WHICH WERE PROVIDED BY AECOM. MAPPING ALSO INCLUDES BATHYMETRY SURVEY WITHIN POND AREAS.
2. SURVEY ON CERTAIN PORTIONS OF THE PARCEL (E.G., SLOPED AREAS, DEBRIS PILES, GRAVEL PILES, SUBMERGED LAND, AND HEAVY VEGETATION AREAS) MAY INCLUDE ONLY LIMITED SURVEY INFORMATION DUE TO ACCESS LIMITATIONS.
3. HORIZONTAL DATUM IS NSRS 2007 MASSACHUSETTS STATE PLANE, MAINLAND ZONE, US FOOT.
4. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
5. FORMER RESIDENTIAL DWELLING AND RELATED STRUCTURES-FEATURES ARE SUBJECT TO DEMOLITION AND OFF-SITE DISPOSITION UNDER SEPARATE PROJECT CONTRACT (CONTRACT 10). CERTAIN BURIED AND UNDERGROUND FEATURES MAY STILL EXIST AND ARE NOT SHOWN.
6. PREVIOUS WORK COMPLETED AT SITE IS SHOWN ON CONTRACT 10 - UDF SITE PREPARATION DRAWINGS.
7. EXISTING PIEZOMETERS AND MONITORING WELLS TO BE PROTECTED FROM DAMAGE AND DISTURBANCE DURING CONSTRUCTION ACTIVITIES. IT IS NOTED THAT ALL PIEZOMETERS AND MONITORING WELLS MW 2022-8 AND MW 2022-9 WILL BE DECOMMISSIONED BY OTHERS PRIOR TO UDF CONSTRUCTION ACTIVITIES.
8. REFER TO DRAWING UC-39 FOR ADDITIONAL VERNAL POOL INFORMATION.

C:\Users\CSHillIDC\ACCDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\UDF CONTRACT 11_01-OVERALL SITE PLN.dwg LAYOUT: UC-1 SAVED: 6/12/2025 1:49 PM BY: HILL, CHRISTIAN

XREFS:
X-UDF-EXISTING SITE
X-UDF CONTRACT 11-BDR-C-LD
X-2023-P-FENCE
X-EXISTING GRADE TOPO

IMAGES:
Arcadis Logo BW.PNG

150' 0 150' 300'
1"=150'

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.: 42983
State: MA | Date Signed: | Project Mgr.: DK
Designed by: BMS | Drawn by: KLS | Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

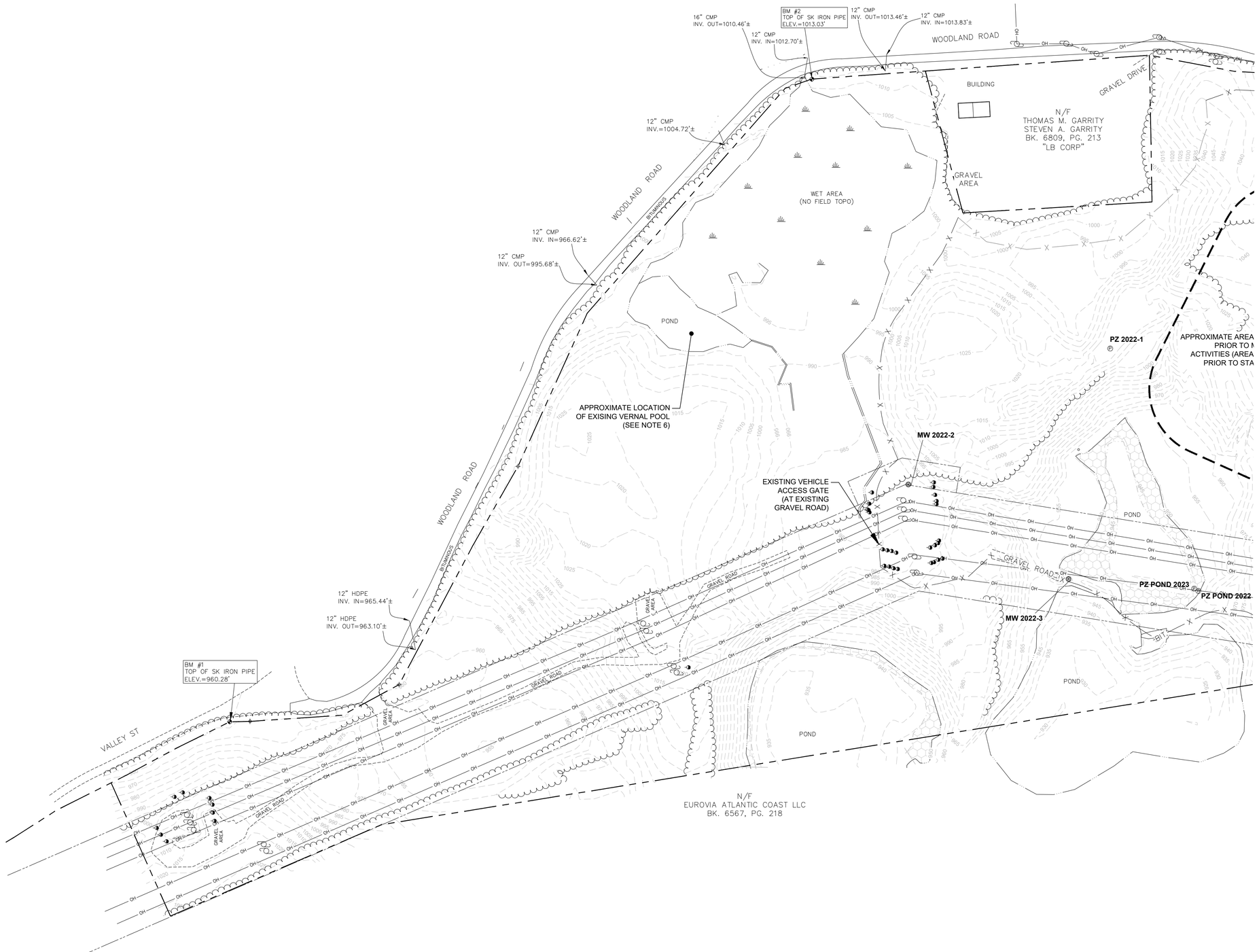
OVERALL SITE PLAN

CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No.: 30223149.3000
Date: DECEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-1



EXISTING FEATURES LEGEND

- REBAR FOUND
- IRON PIN FOUND
- CONCRETE BOUND FOUND
- GRANITE BOUND FOUND
- BENCH MARK
- LAMP POST
- UTILITY POLE
- GUY WIRE
- MW 2022-2 — MONITORING WELL (SEE NOTE 5)
- PZ 2022-8 — PIEZOMETER (SEE NOTE 5)
- B 2022-8 — SOIL BORING
- WET AREA
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- EDGE OF WATER
- STONEWALL
- OVERHEAD WIRES
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- ELEVATION CONTOUR (5-FOOT INTERVAL)
- UDF SECURITY FENCE
- EVERSOURCE RIGHT-OF-WAY
- UDF LIMITS OF CONSOLIDATED MATERIAL

NOTES:

1. BASEMAP INFORMATION BASED ON A FIELD SURVEYS CONDUCTED IN MAY/JUNE, 2022 AND AUGUST, 2023 BY HILL-ENGINEERS, ARCHITECTS, PLANNERS, INC. EXCEPT WETLAND LIMITS WHICH WERE PROVIDED BY AECOM. MAPPING ALSO INCLUDES BATHYMETRY SURVEY WITHIN POND AREAS.
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8. PREVIOUS WORK COMPLETED AT SITE IS SHOWN SHOWN ON CONTRACT 10 - UDF SITE PREPARATION DRAWINGS.

C:\Users\CSHill\DOCACCDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DW\UDF CONTRACT 11_02-EXIST CONDITIONS.dwg LAYOUT: UC-2A SAVED: 7/2/2025 4:43 PM BY: HILL, CHRISTIAN
XREFS:
IMAGES:
Arcadis Logo BW.PNG
X-UDF-EXISTING SITE
X-UDF CONTRACT 11-BDR-C-LD
X-EXISTING GRADE TOPO

100' 0 100' 200'
1"=100'

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

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Professional Engineer's Name: **MARK O. GRAVELDING**
Professional Engineer's No.: 42983
State: MA | Date Signed: | Project Mgr.: DK
Designed by: BMS | Drawn by: KLS | Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

EXISTING CONDITIONS PLAN (NORTH)

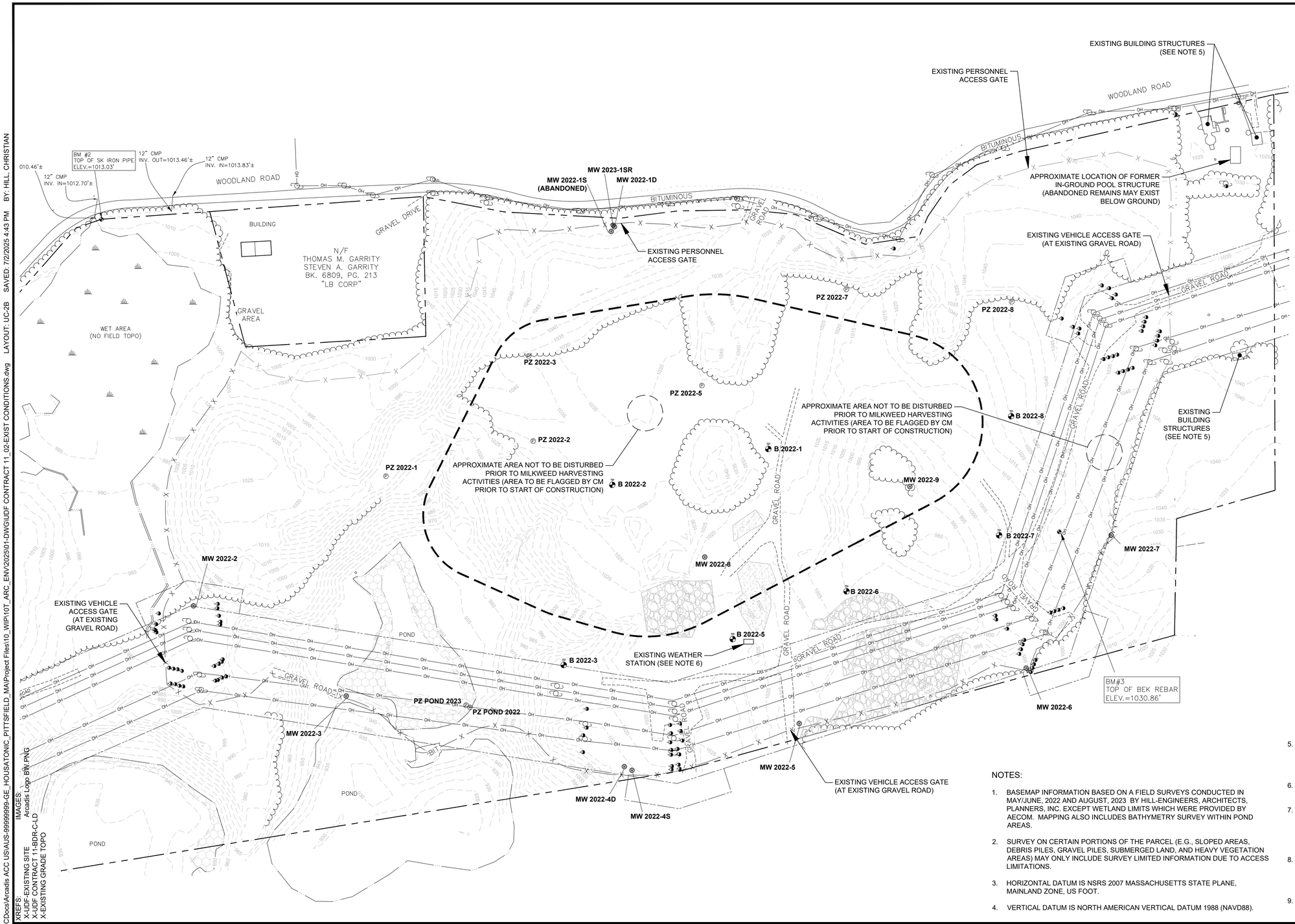
CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No.
30223149.3000

Date
DECEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-2A



EXISTING FEATURES LEGEND

- REBAR FOUND
- IRON PIN FOUND
- CONCRETE BOUND FOUND
- GRANITE BOUND FOUND
- BENCH MARK
- LAMP POST
- UTILITY POLE
- GUY WIRE
- MW 2022-2 — MONITORING WELL (SEE NOTE 7)
- PZ 2022-8 — PIEZOMETER (SEE NOTE 7)
- B 2022-8 — SOIL BORING
- WET AREA
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- EDGE OF WATER
- STONEWALL
- OH — OH — OVERHEAD WIRES
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- 1010 — ELEVATION CONTOUR (5-FOOT INTERVAL)
- X — X — UDF SECURITY FENCE
- EVERSOURCE RIGHT-OF-WAY
- UDF LIMITS OF CONSOLIDATED MATERIAL

NOTES:

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6. EXISTING WEATHER STATION AND CHAIN LINK FENCE ENCLOSURE TO BE RELOCATED WHERE SHOWN ON DRAWING UC-3B)
7. EXISTING PIEZOMETERS AND MONITORING WELLS TO BE PROTECTED FROM DAMAGE AND DISTURBANCE DURING CONSTRUCTION ACTIVITIES. IT IS NOTED THAT ALL PIEZOMETERS AND MONITORING WELLS MW 2022-8 AND MW 2022-9 WILL BE DECOMMISSIONED BY OTHERS PRIOR TO UDF CONSTRUCTION ACTIVITIES.
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XREFS:
X-UDF-EXISTING SITE
X-UDF CONTRACT 11-BDR-C-LD
X-EXISTING GRADE TOPO

IMAGES:
Arcadis Logo BW.PNG

100' 0 100' 200'
1"=100'

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Professional Engineer's Name: MARK O. GRAVELDING
Professional Engineer's No.: 42983

State	Date Signed	Project Mgr.
MA		DK
Designed by: BMS	Drawn by: KLS	Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
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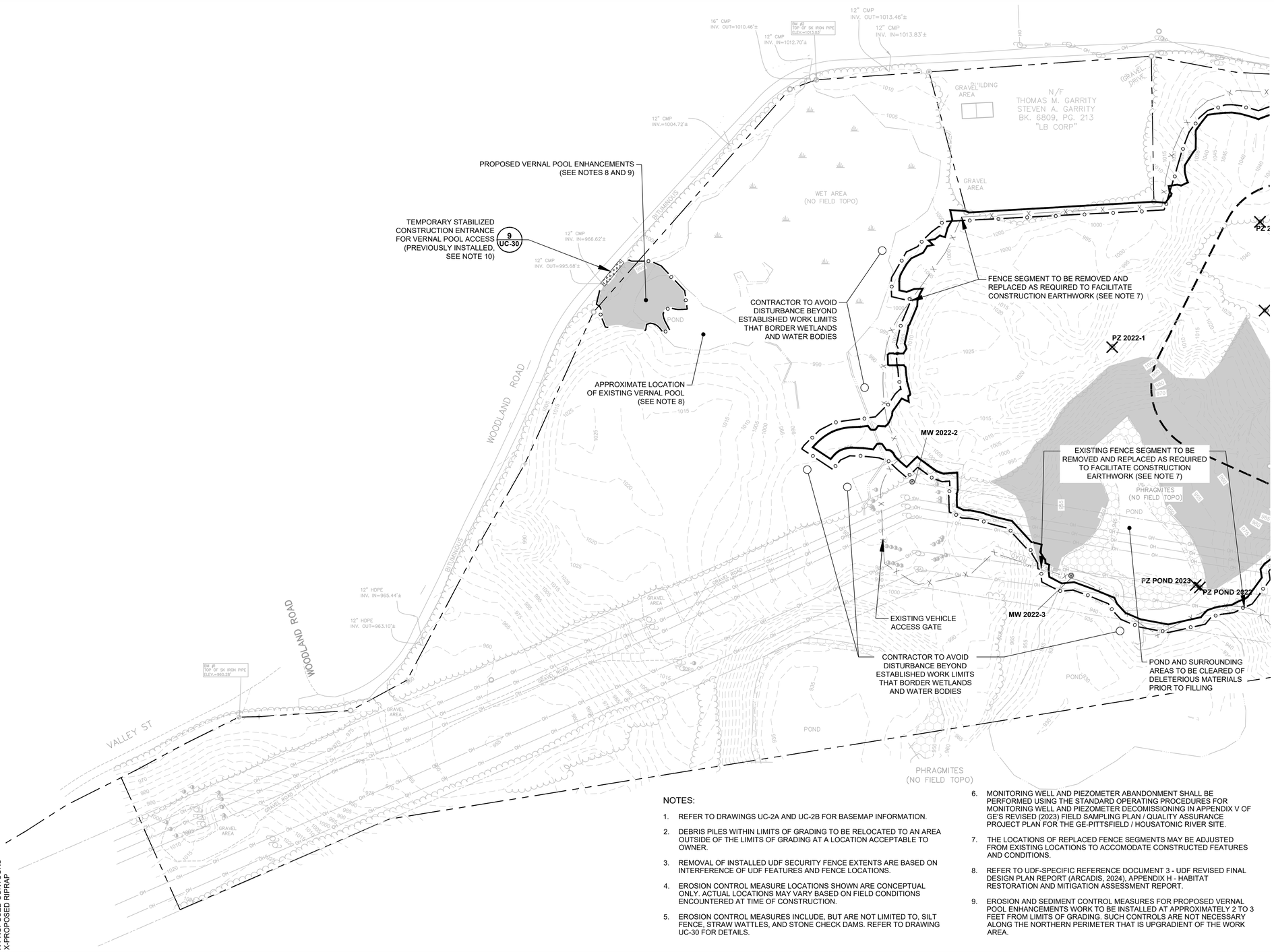
EXISTING CONDITIONS PLAN (SOUTH)

CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No.: 30223149.3000
Date: DECEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-2B



EXISTING FEATURES LEGEND

- REBAR FOUND
- IRON PIN FOUND
- CONCRETE BOUND FOUND
- GRANITE BOUND FOUND
- BENCH MARK
- UTILITY POLE
- LAMP POST
- GUY WIRE
- MW 2022-2 — MONITORING WELL
- PZ 2022-8 — PIEZOMETER
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- WET AREA
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- EDGE OF WATER
- STONEWALL
- OH — OVERHEAD WIRES
- EVERSOURCE RIGHT-OF-WAY
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- X — X — INSTALLED UDF SECURITY FENCE

DESIGN FEATURES LEGEND

- CLEARING LIMITS AND EROSION CONTROL MEASURE (SEE NOTES 4 AND 5)
- APPROXIMATE LIMITS OF GRADING
- UDF LIMITS OF CONSOLIDATED MATERIAL
- ABANDONED MONITORING WELL/PIEZOMETER
- APPROXIMATE TREE AND BRUSH CLEARING AREA (SEE NOTE 11)

XREFS:
X-UDF-EXISTING SITE
X-UDF CONTRACT 11-BDR-C-LD
X-2024-P-FENCE
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS
X-PROPOSED RIPRAP
IMAGES:
Arcadis Logo BW.PNG

NOTES:

1. REFER TO DRAWINGS UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. DEBRIS PILES WITHIN LIMITS OF GRADING TO BE RELOCATED TO AN AREA OUTSIDE OF THE LIMITS OF GRADING AT A LOCATION ACCEPTABLE TO OWNER.
3. REMOVAL OF INSTALLED UDF SECURITY FENCE EXTENTS ARE BASED ON INTERFERENCE OF UDF FEATURES AND FENCE LOCATIONS.
4. EROSION CONTROL MEASURE LOCATIONS SHOWN ARE CONCEPTUAL ONLY. ACTUAL LOCATIONS MAY VARY BASED ON FIELD CONDITIONS ENCOUNTERED AT TIME OF CONSTRUCTION.
5. EROSION CONTROL MEASURES INCLUDE, BUT ARE NOT LIMITED TO, SILT FENCE, STRAW WATTLES, AND STONE CHECK DAMS. REFER TO DRAWING UC-30 FOR DETAILS.
6. MONITORING WELL AND PIEZOMETER ABANDONMENT SHALL BE PERFORMED USING THE STANDARD OPERATING PROCEDURES FOR MONITORING WELL AND PIEZOMETER DECOMISSIONING IN APPENDIX V OF GE'S REVISED (2023) FIELD SAMPLING PLAN / QUALITY ASSURANCE PROJECT PLAN FOR THE GE-PITTSFIELD / HOUSATONIC RIVER SITE.
7. THE LOCATIONS OF REPLACED FENCE SEGMENTS MAY BE ADJUSTED FROM EXISTING LOCATIONS TO ACCOMODATE CONSTRUCTED FEATURES AND CONDITIONS.
8. REFER TO UDF-SPECIFIC REFERENCE DOCUMENT 3 - UDF REVISED FINAL DESIGN PLAN REPORT (ARCADIS, 2024), APPENDIX H - HABITAT RESTORATION AND MITIGATION ASSESSMENT REPORT.
9. EROSION AND SEDIMENT CONTROL MEASURES FOR PROPOSED VERNAL POOL ENHANCEMENTS WORK TO BE INSTALLED AT APPROXIMATELY 2 TO 3 FEET FROM LIMITS OF GRADING. SUCH CONTROLS ARE NOT NECESSARY ALONG THE NORTHERN PERIMETER THAT IS UPGRADIENT OF THE WORK AREA.
10. CONFIGURATION OF TEMPORARY STABILIZED CONSTRUCTION ENTRANCE FOR VERNAL POOL ACCESS SHALL BE THE MINIMUM NECESSARY TO FACILITATE CONSTRUCTION WORK FOR THE PROPOSED VERNAL POOL ENHANCEMENTS AND WILL AVOID ENCROACHMENT OF DELINEATED WETLAND AREAS AND TREES. EXACT LOCATION AND EXTENT TO BE DETERMINED IN COORDINATION WITH THE CM.
11. ALL WORK IN VICINITY OF POWER LINE RIGHT-OF-WAY AND ASSOCIATED POWER LINE EQUIPMENT TO BE CONDUCTED IN ACCORDANCE WITH EVERSOURCE LICENSE AGREEMENTS WITH GE.
12. TREE AND BRUSH CLEARING SHALL BE CONDUCTED WITHIN GE PROPERTY BOUNDARY ONLY. NO CLEARING WILL BE ALLOWED OUTSIDE OF GE PROPERTY WITHOUT CM APPROVAL. TREE AND BRUSH CLEARING LIMITS TO BE ESTABLISHED BY THE CONTRACTOR THEN JOINTLY REVIEWED IN THE FIELD BY THE CONTRACTOR AND CM PRIOR TO COMMENCING ANY CLEARING WORK. CLEARING LIMITS MAY BE ADJUSTED BY CM IN CONSIDERATION OF EXISTING AND PROPOSED SITE CONDITIONS. VEGETATION CLEARING SHALL NOT BE CONDUCTED BEFORE NOVEMBER 1 OR LATER THAN MARCH 31, UNLESS OTHERWISE APPROVED BY CM IN ADVANCE OF CLEARING. THIS INCLUDES REMOVAL OF TREE AND BRUSH CLUSTERS THAT MAY BE IN RANDOM AREAS OUTSIDE BUT IN CLOSE PROXIMITY TO THE CLEARING LIMITS SHOWN.

100' 0 100' 200'
1"=100'

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Designed by: BMS	Drawn by: KLS	Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE ● LEE, MASSACHUSETTS

UPLAND DISPOSAL FACILITY

SITE PREPARATION PLAN (NORTH)

CONTRACT 11 - UDF CONSTRUCTION

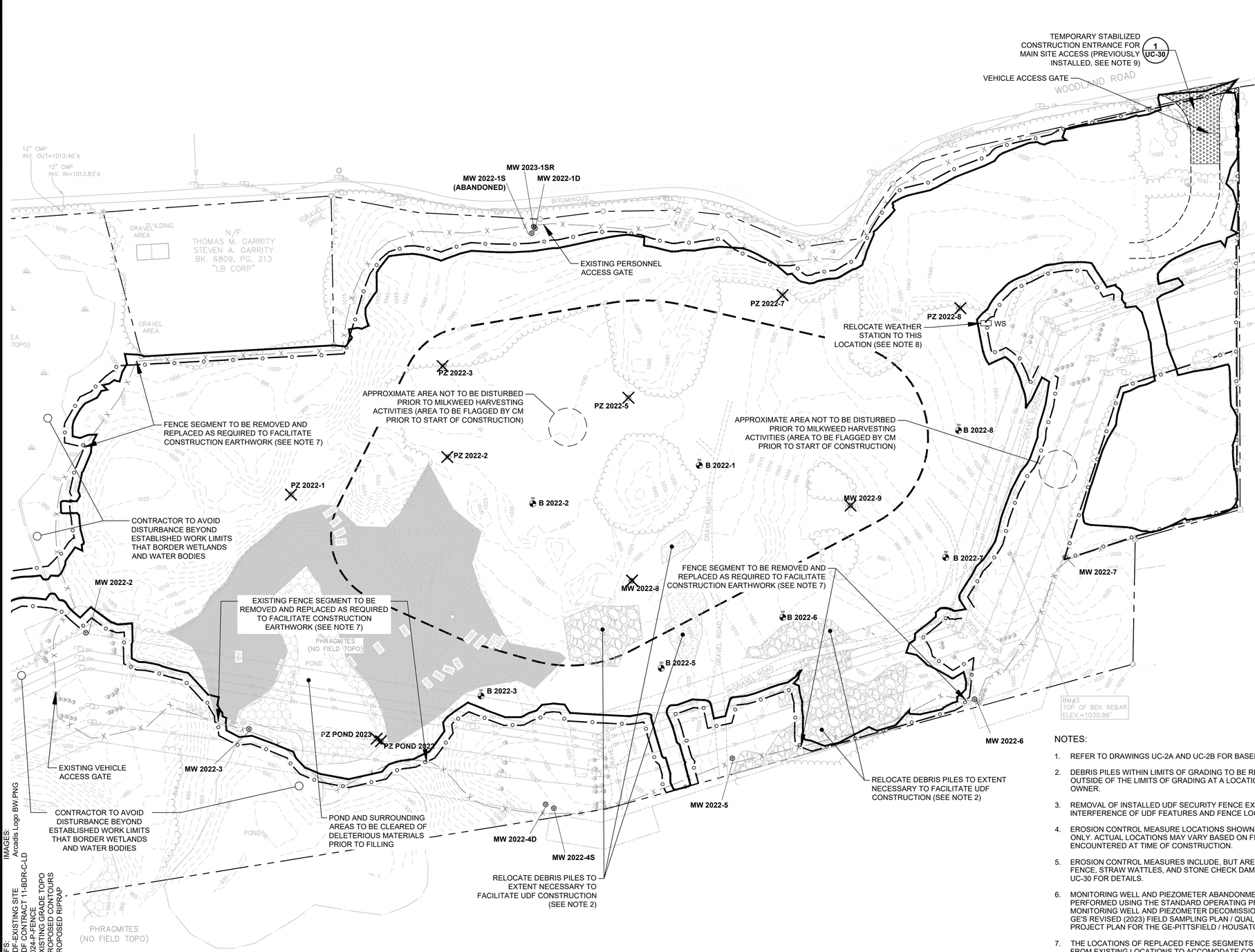
ARCADIS Project No. 30223149.3000

Date DECEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-3A

C:\Users\CSHILL\DOCS\ACCDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\UDF CONTRACT 11_03-SITE PREP PLAN_recover.dwg LAYOUT: UC-3A SAVED: 12/29/2025 12:14 PM BY: HILL, CHRISTIAN



EXISTING FEATURES LEGEND

- REBAR FOUND
- IRON PIN FOUND
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- CONCRETE DEBRIS PILE
- GRAVEL PILE
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DESIGN FEATURES LEGEND

- CLEARING LIMITS AND EROSION CONTROL MEASURE (SEE NOTES 4 AND 5)
- APPROXIMATE LIMITS OF GRADING
- UDF LIMITS OF CONSOLIDATED MATERIAL
- ABANDONED MONITORING WELL/PIEZOMETER
- APPROXIMATE TREE AND BRUSH CLEARING AREA (SEE NOTE 11)

NOTES:

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5. EROSION CONTROL MEASURES INCLUDE, BUT ARE NOT LIMITED TO, SILT FENCE, STRAW WATTLES, AND STONE CHECK DAMS. REFER TO DRAWING UC-30 FOR DETAILS.
6. MONITORING WELL AND PIEZOMETER ABANDONMENT SHALL BE PERFORMED USING THE STANDARD OPERATING PROCEDURES FOR MONITORING WELL AND PIEZOMETER DECOMMISSIONING IN APPENDIX V OF GE'S REVISED (2023) FIELD SAMPLING PLAN / QUALITY ASSURANCE PROJECT PLAN FOR THE GE-PITTSFIELD / HOUSATONIC RIVER SITE.
7. THE LOCATIONS OF REPLACED FENCE SEGMENTS MAY BE ADJUSTED FROM EXISTING LOCATIONS TO ACCOMODATE CONSTRUCTED FEATURES AND CONDITIONS.
8. LOCATION FOR RELOCATED WEATHER STATION FENCE ENCLOSURE TO BE OUTSIDE LIMITS OF UDF EARTHWORK AND AWAY FROM ABOVE/BELOW GROUND EVERSOURCE EQUIPMENT. CONTRACTOR IDENTIFIED LOCATION TO BE REVIEWED WITH GE PRIOR TO RELOCATION. RELOCATION TO INCLUDE REMOVAL AND REUSE OF EXISTING CHAIN LINK FENCE ENCLOSURE AND WEATHER STATION MOUNTING POST (INSTALL NEW POSTS AS NEEDED), AND REMOVAL AND REMOUNTING OF WEATHER STATION UNIT ON POST. CONFIGURATION OF RELOCATED WEATHER STATION FACILITIES TO BE CONSISTENT WITH EXISTING CONFIGURATION (ACCESS GATE POSITION TO ALLOW FOR UNOBSTRUCTED AND SAFE ENTRY/EXIT). CARE WILL BE TAKEN TO AVOID DAMAGE OF WEATHER STATION UNIT DURING RELOCATION WORK.
9. PREVIOUSLY INSTALLED TEMPORARY STABILIZED CONSTRUCTION ENTRANCE FOR MAIN SITE ACCESS TO BE MAINTAINED AS SHOWN IN DETAIL 1 ON DRAWING UC-30.
10. ALL WORK IN VICINITY OF POWER LINE RIGHT-OF-WAY AND ASSOCIATED POWER LINE EQUIPMENT TO BE CONDUCTED IN ACCORDANCE WITH EVERSOURCE LICENSE AGREEMENTS WITH GE.
11. TREE AND BRUSH CLEARING SHALL BE CONDUCTED WITHIN GE PROPERTY BOUNDARY ONLY. NO CLEARING WILL BE ALLOWED OUTSIDE OF GE PROPERTY WITHOUT CM APPROVAL. TREE AND BRUSH CLEARING LIMITS TO BE ESTABLISHED BY THE CONTRACTOR THEN JOINTLY REVIEWED IN THE FIELD BY THE CONTRACTOR AND CM PRIOR TO COMMENCING ANY CLEARING WORK. CLEARING LIMITS MAY BE ADJUSTED BY CM IN CONSIDERATION OF EXISTING AND PROPOSED SITE CONDITIONS. VEGETATION CLEARING SHALL NOT BE CONDUCTED BEFORE NOVEMBER 1 OR LATER THAN MARCH 31, UNLESS OTHERWISE APPROVED BY CM IN ADVANCE OF CLEARING. THIS INCLUDES REMOVAL OF TREE AND BRUSH CLUSTERS THAT MAY BE IN RANDOM AREAS OUTSIDE BUT IN CLOSE PROXIMITY TO THE CLEARING LIMITS SHOWN.

XREFS:
IMAGES: Arcadis Logo BW.PNG
X-UDF-EXISTING SITE
X-UDF CONTRACT 11-BDR-C-LD
X-2024-P-FENCE
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS
X-PROPOSED RIPRAP

C:\Users\CSHILL\DC\ACCDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\UDF CONTRACT 11_03-SITE PREP PLAN_recover.dwg LAYOUT: UC-3B SAVED: 12/29/2025 12:14 PM BY: HILL, CHRISTIAN

100' 0 100' 200'
1"=100'

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REUSED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

Professional Engineer's Name	MARK O. GRAVELDING	
Professional Engineer's No.	42983	
State	MA	
Date Signed		
Project Mgr.	DK	
Designed by	BMS	
Drawn by	KLS	
Checked by	PHB	

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS

UPLAND DISPOSAL FACILITY

SITE PREPARATION PLAN (SOUTH)

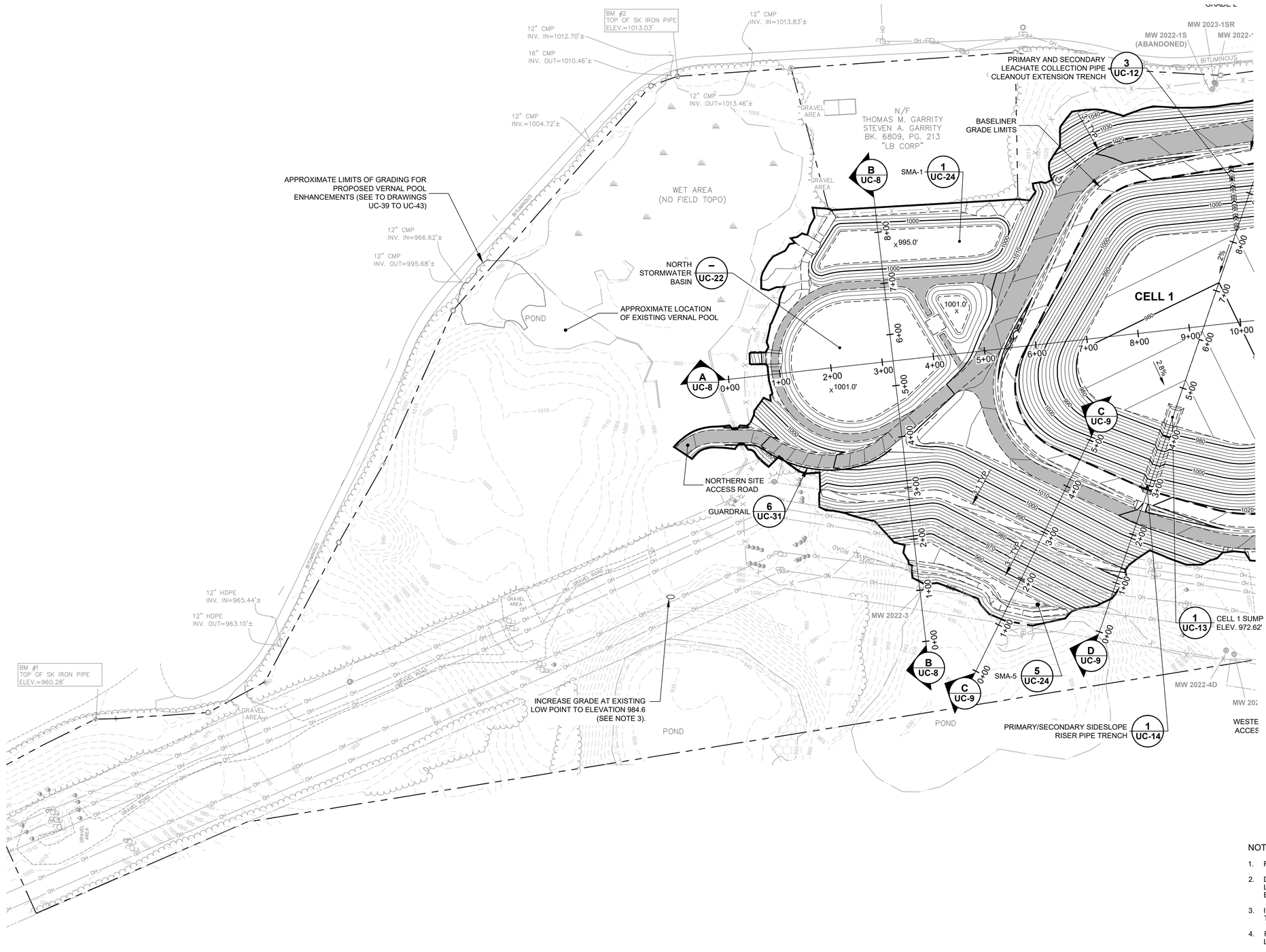
CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No. 30223149.3000

Date DECEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-3B



EXISTING FEATURES LEGEND

- REBAR FOUND
- IRON PIN FOUND
- CONCRETE BOUND FOUND
- GRANITE BOUND FOUND
- BENCH MARK
- UTILITY POLE
- LAMP POST
- GUY WIRE
- MW 2022-2 — MONITORING WELL
- PZ 2022-8 — PIEZOMETER
- B 2022-8 — SOIL BORING
- WET AREA
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- EDGE OF WATER
- STONEWALL
- OH — OVERHEAD WIRES
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- 1010 — ELEVATION CONTOUR (5-FOOT INTERVAL)
- EVERSOURCE RIGHT-OF-WAY

DESIGN FEATURES LEGEND

- ELEVATION GRADE BREAK
- 1020 — INDEX ELEVATION CONTOUR (10-FOOT INTERVAL, SEE NOTE 2)
- INTERMEDIATE ELEVATION CONTOUR (2-FOOT INTERVAL, SEE NOTE 2)
- X — X — UDF SECURITY FENCE AND GATE (MODIFIED AS SHOWN ON SHEET UC-3A)
- UDF LIMITS OF CONSOLIDATED MATERIAL
- APPROXIMATE LIMITS OF GRADING
- SMA — STORMWATER MANAGEMENT AREA
- DETAIL/SECTION REFERENCE NUMBER
- DRAWING REFERENCE NUMBER
- OPERATIONS AREA/ ACCESS ROAD — 4 / UC-32
- x 1101.7' — SPOT ELEVATION
- GUARDRAIL
- WS — WEATHER STATION

NOTES:

1. REFER TO DRAWING UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. DESIGN ELEVATIONS SHOWN WITHIN BASELINER GRADE LIMITS REPRESENT LINER SYSTEM SUBGRADE ELEVATIONS. DESIGN ELEVATIONS SHOWN OUTSIDE BASELINER GRADE LIMITS REPRESENT FINAL GRADE ELEVATIONS.
3. INCREASE LOW POINT GRADE USING COMPACTED TOPSOIL AND INSTALL TEMPORARY EROSION CONTROL MAT.
4. REFER TO DRAWINGS UC-3A AND UC-3B FOR FENCE REMOVAL- REPLACEMENT LOCATIONS AS REQUIRED TO FACILITATE CONSTRUCTION EARTHWORK.

C:\Users\CSHill\DC\ACCDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\UDF CONTRACT 11_04-A-B-INITIAL SITE GRADING PLN S&N.dwg LAYOUT: UC-4A SAVED: 12/16/2025 9:45 AM BY: HILL, CHRISTIAN

XREFS:
IMAGES:
X-UDF-EXISTING SITE
X-2024-P-FENCE
X-UDF CONTRACT 11-BDR-C-LD
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS-CONTRACT 11
X-PROPOSED RIPRAP
Arcadis Logo BW.PNG

100' 0 100' 200'
1"=100'

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REUSED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

Professional Engineer's Name: **MARK O. GRAVELDING**
Professional Engineer's No.: 42983
State: MA | Date Signed | Project Mgr.: DK
Designed by: BMS | Drawn by: KLS | Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

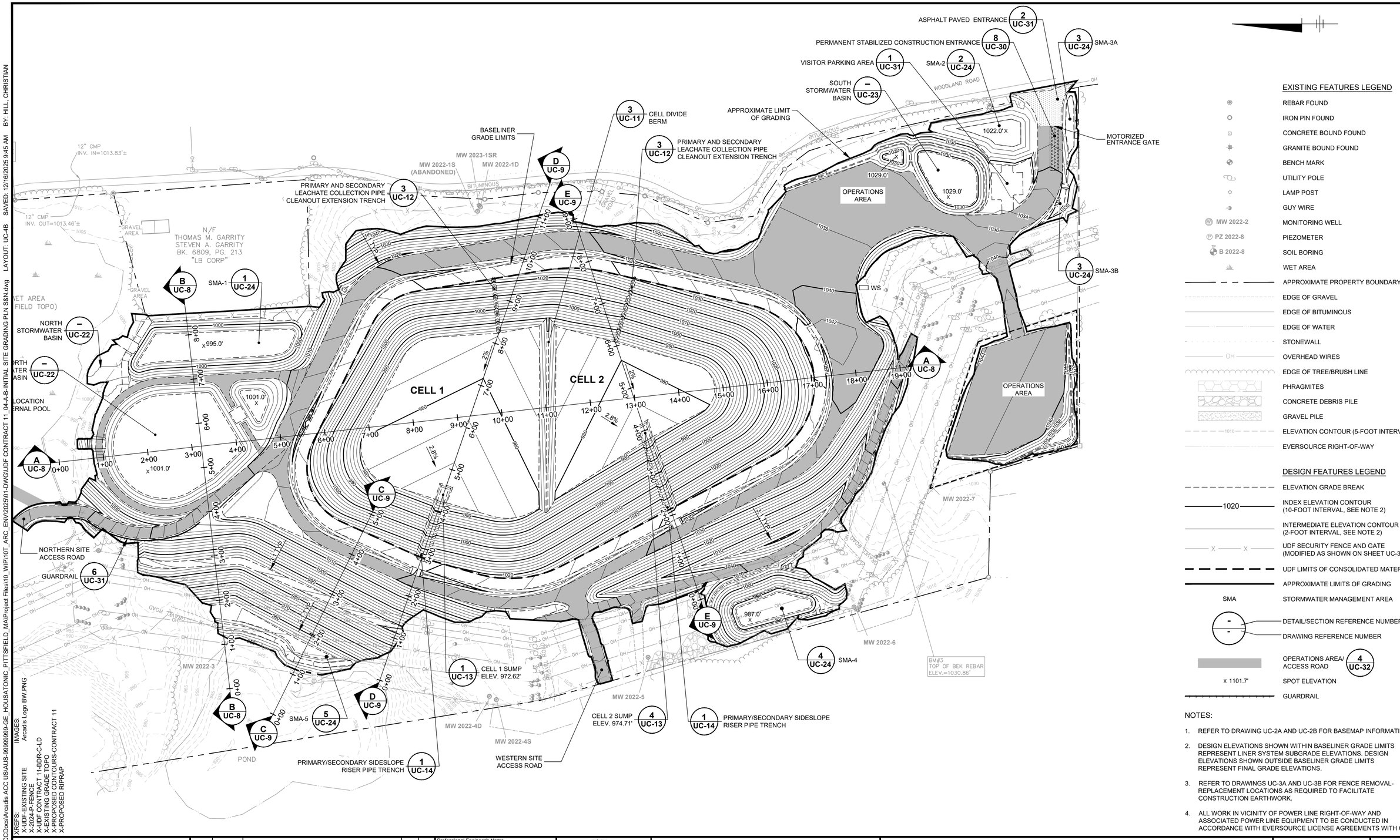
INITIAL SITE GRADING PLAN (NORTH)

CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No.: 30223149.3000
Date: DECEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-4A



C:\Users\CSHill\DC\ACCDocs\Arcadis ACC USA\US-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\UDF CONTRACT 11_04-A-B-INITIAL SITE GRADING PLN S&N.dwg LAYOUT: UC-4B SAVED: 12/16/2025 9:45 AM BY: HILL, CHRISTIAN

XREFS:
X-UDF-EXISTING SITE
X-2024-P-FENCE
X-UDF CONTRACT 11-BDR-C-LD
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS-CONTRACT 11
X-PROPOSED RIPRAP
IMAGES:
Arcadis Logo BW.PNG

EXISTING FEATURES LEGEND

- REBAR FOUND
- IRON PIN FOUND
- CONCRETE BOUND FOUND
- GRANITE BOUND FOUND
- BENCH MARK
- UTILITY POLE
- LAMP POST
- GUY WIRE
- MW 2022-2 — MONITORING WELL
- PZ 2022-8 — PIEZOMETER
- B 2022-8 — SOIL BORING
- WET AREA
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- EDGE OF WATER
- STONEWALL
- OH — OVERHEAD WIRES
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- 1010 — ELEVATION CONTOUR (5-FOOT INTERVAL)
- EVERSOURCE RIGHT-OF-WAY

DESIGN FEATURES LEGEND

- ELEVATION GRADE BREAK
- 1020 — INDEX ELEVATION CONTOUR (10-FOOT INTERVAL, SEE NOTE 2)
- INTERMEDIATE ELEVATION CONTOUR (2-FOOT INTERVAL, SEE NOTE 2)
- X — X — UDF SECURITY FENCE AND GATE (MODIFIED AS SHOWN ON SHEET UC-3A)
- UDF LIMITS OF CONSOLIDATED MATERIAL
- APPROXIMATE LIMITS OF GRADING
- SMA — STORMWATER MANAGEMENT AREA
- DETAIL/SECTION REFERENCE NUMBER
- DRAWING REFERENCE NUMBER
- OPERATIONS AREA/ ACCESS ROAD — 4 UC-32
- x 1101.7' — SPOT ELEVATION
- GUARDRAIL

NOTES:

1. REFER TO DRAWING UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. DESIGN ELEVATIONS SHOWN WITHIN BASELINER GRADE LIMITS REPRESENT LINER SYSTEM SUBGRADE ELEVATIONS. DESIGN ELEVATIONS SHOWN OUTSIDE BASELINER GRADE LIMITS REPRESENT FINAL GRADE ELEVATIONS.
3. REFER TO DRAWINGS UC-3A AND UC-3B FOR FENCE REMOVAL-REPLACEMENT LOCATIONS AS REQUIRED TO FACILITATE CONSTRUCTION EARTHWORK.
4. ALL WORK IN VICINITY OF POWER LINE RIGHT-OF-WAY AND ASSOCIATED POWER LINE EQUIPMENT TO BE CONDUCTED IN ACCORDANCE WITH EVERSOURCE LICENSE AGREEMENTS WITH GE.

100' 0 100' 200'
1"=100'

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Professional Engineer's Name: **MARK O. GRAVELDING**
Professional Engineer's No.: 42983

State	Date Signed	Project Mgr.
MA		DK
Designed by	Drawn by	Checked by
BMS	KLS	PHB

MARK O. GRAVELDING CIVIL No. 42983 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

INITIAL SITE GRADING PLAN (SOUTH)

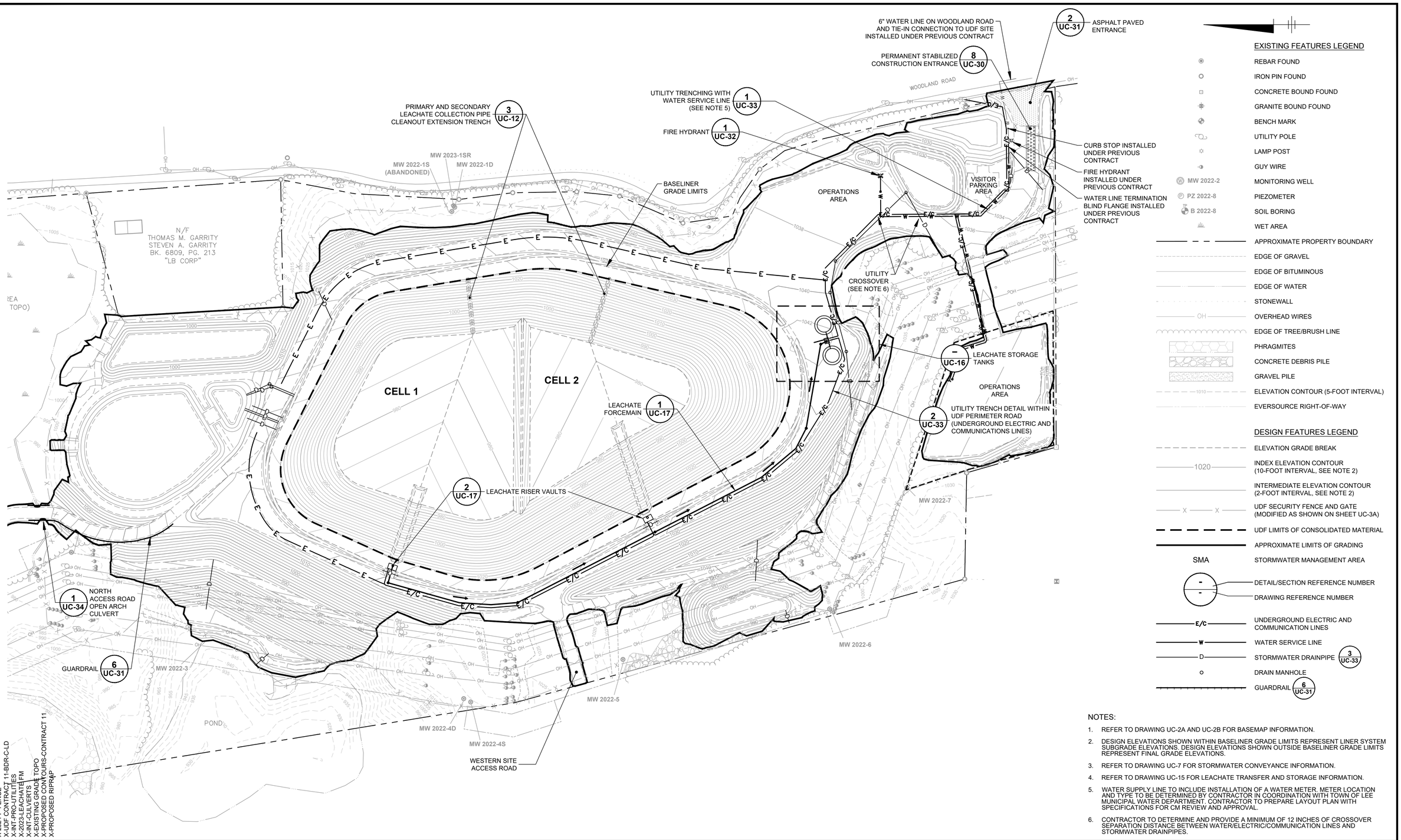
CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No.
30223149.3000

Date
DECEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-4B



NOTES:

1. REFER TO DRAWING UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. DESIGN ELEVATIONS SHOWN WITHIN BASELINER GRADE LIMITS REPRESENT LINER SYSTEM SUBGRADE ELEVATIONS. DESIGN ELEVATIONS SHOWN OUTSIDE BASELINER GRADE LIMITS REPRESENT FINAL GRADE ELEVATIONS.
3. REFER TO DRAWING UC-7 FOR STORMWATER CONVEYANCE INFORMATION.
4. REFER TO DRAWING UC-15 FOR LEACHATE TRANSFER AND STORAGE INFORMATION.
5. WATER SUPPLY LINE TO INCLUDE INSTALLATION OF A WATER METER. METER LOCATION AND TYPE TO BE DETERMINED BY CONTRACTOR IN COORDINATION WITH TOWN OF LEE MUNICIPAL WATER DEPARTMENT. CONTRACTOR TO PREPARE LAYOUT PLAN WITH SPECIFICATIONS FOR CM REVIEW AND APPROVAL.
6. CONTRACTOR TO DETERMINE AND PROVIDE A MINIMUM OF 12 INCHES OF CROSSOVER SEPARATION DISTANCE BETWEEN WATER/ELECTRIC/COMMUNICATION LINES AND STORMWATER DRAINPIPES.

C:\Users\CSHill\DC\ACCDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\UDF CONTRACT 11_04-C-UTILITY PLAN.dwg LAYOUT: UC-4C SAVED: 1/7/2026 9:53 AM BY: HILL, CHRISTIAN

XREFS:
IMAGES:
Arcadis Logo BW.PNG
X-UDF-EXISTING SITE
X-2024-P-FENCE
X-UDF CONTRACT 11-BDR-C-LD
X-INT-PRO-UTILITIES
X-2023-LEACHATE-FM
X-INT-CULVERTS
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS-CONTRACT 11
X-PROPOSED RIPRAP

100' 0 100' 200'
1"=100'

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No.	Date	Revisions	By	Ckd

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Professional Engineer's Name: MARK O. GRAVELDING		
Professional Engineer's No.: 42983		
State: MA	Date Signed	Project Mgr.: DK
Designed by: BMS	Drawn by: KLS	Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS MARK O. GRAVELDING CIVIL No. 42983 REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS

UPLAND DISPOSAL FACILITY

SITE UTILITY PLAN

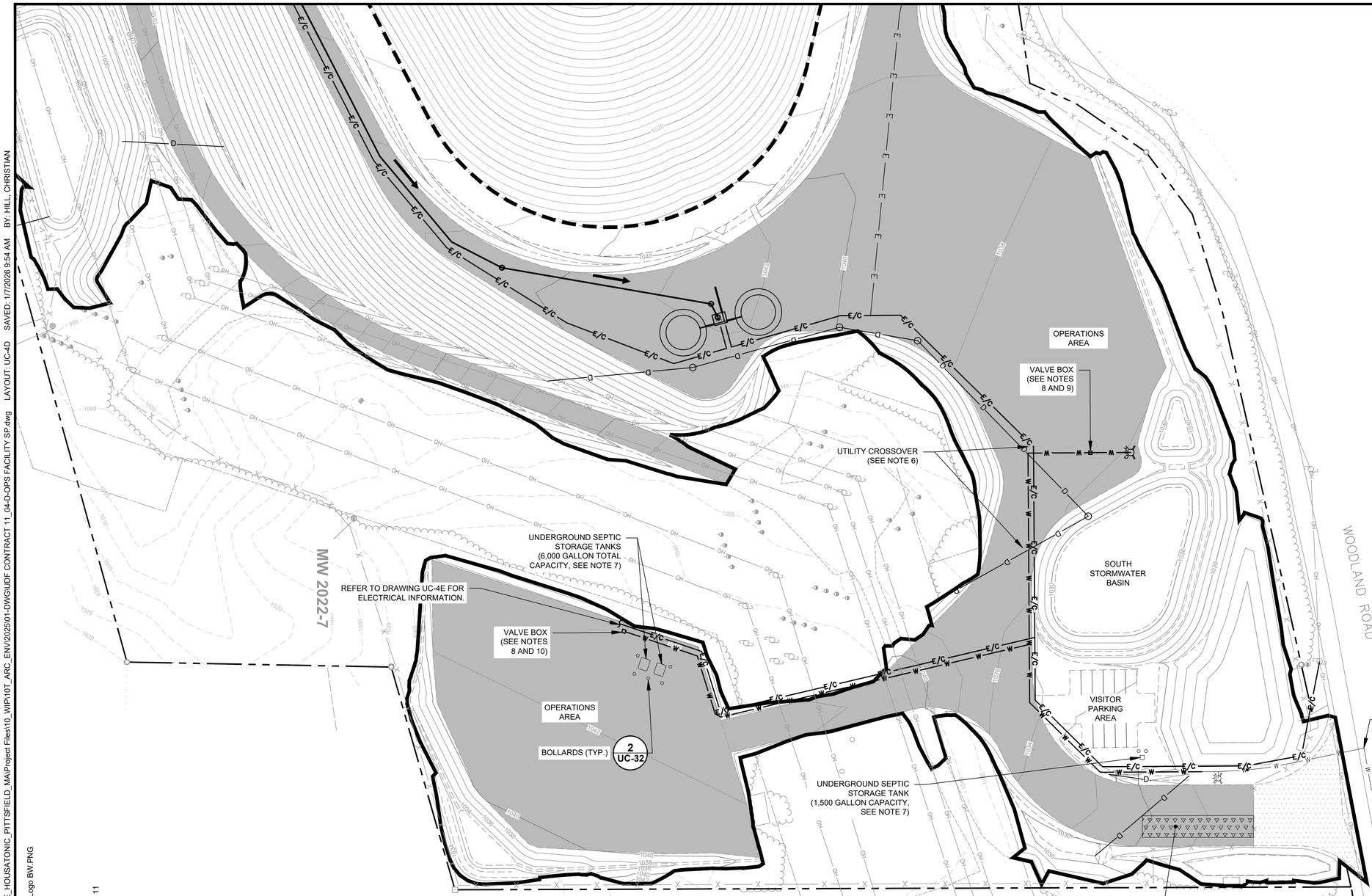
CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No. 30223149.3000

Date DECEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-4C



XREFS:
IMAGES: Arcadis Logo BW.PNG
X-UDF-EXISTING SITE
X-2024-P-FENCE
X-UDF CONTRACT 11-BDR-C-LD
X-INT-PRO-UTILITIES
X-2023-LEACHATE FM
X-INT-CULVERTS
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS-CONTRACT 11
X-PROPOSED RIPRAP

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EXISTING FEATURES LEGEND

- REBAR FOUND
- IRON PIN FOUND
- CONCRETE BOUND FOUND
- GRANITE BOUND FOUND
- BENCH MARK
- UTILITY POLE
- LAMP POST
- GUY WIRE
- MW 2022-2 — MONITORING WELL
- PZ 2022-8 — PIEZOMETER
- B 2022-8 — SOIL BORING
- WET AREA
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- EDGE OF WATER
- STONEWALL
- OH — OVERHEAD WIRES
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- 1010 — ELEVATION CONTOUR (5-FOOT INTERVAL)
- EVERSOURCE RIGHT-OF-WAY

DESIGN FEATURES LEGEND

- ELEVATION GRADE BREAK
- 1020 — INDEX ELEVATION CONTOUR (10-FOOT INTERVAL, SEE NOTE 2)
- INTERMEDIATE ELEVATION CONTOUR (2-FOOT INTERVAL, SEE NOTE 2)
- X — X — UDF SECURITY FENCE AND GATE (MODIFIED AS SHOWN ON SHEET UC-3A)
- UDF LIMITS OF CONSOLIDATED MATERIAL
- APPROXIMATE LIMITS OF GRADING
- SMA — STORMWATER MANAGEMENT AREA
- DETAIL/SECTION REFERENCE NUMBER
- DRAWING REFERENCE NUMBER
- OPERATIONS AREA/ACCESS ROAD — 4 UC-32
- E/C — UNDERGROUND ELECTRIC AND COMMUNICATION LINES
- W — WATER SERVICE LINE
- D — STORMWATER DRAINPIPE — 3 UC-33
- DRAIN MANHOLE
- GUARDRAIL — 6 UC-31

NOTES:

1. REFER TO DRAWING UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. DESIGN ELEVATIONS SHOWN WITHIN BASELINER GRADE LIMITS REPRESENT LINER SYSTEM SUBGRADE ELEVATIONS. DESIGN ELEVATIONS SHOWN OUTSIDE BASELINER GRADE LIMITS REPRESENT FINAL GRADE ELEVATIONS.
3. REFER TO DRAWING UC-7 FOR STORMWATER CONVEYANCE INFORMATION.
4. REFER TO DRAWING UC-15 FOR LEACHATE TRANSFER AND STORAGE INFORMATION.
5. WATER SUPPLY LINE TO INCLUDE INSTALLATION OF A WATER METER. METER LOCATION AND TYPE TO BE COORDINATED WITH THE TOWN OF LEE MUNICIPAL WATER DEPARTMENT.
6. CONTRACTOR TO DETERMINE AND PROVIDE A MINIMUM OF 12 INCHES OF CROSSOVER SEPARATION DISTANCE BETWEEN WATER/ELECTRIC/COMMUNICATION LINES AND STORMWATER DRAINPIPES.
7. SEPTIC TANKS SHALL BE PRE-CAST REINFORCED CONCRETE OR OTHER EQUIVALENT MATERIAL ACCEPTABLE TO THE CM. TANKS TO INCLUDE POLYURETHANE RISERS ON EACH ACCESS COVER TO FACILITATE INSPECTION AND PUMP OUT. NO OTHER APPURTENANCES ARE REQUIRED.
8. VALVE BOX TO BE H-20 LOADING RATED. EXACT LOCATION TO BE DETERMINED IN COORDINATION WITH THE CM AT TIME OF CONSTRUCTION. CONTRACTOR TO DETERMINE AND PROPOSE APPURTENANCES CUSTOMARY AND APPROPRIATE FOR USE AND SUBMIT FOR REVIEW AND APPROVAL BY THE CM.
9. EAST OPERATIONS AREA VALVE BOX TO INCLUDE, TEE-FITTING EQUIPPED WITH TWO SHUTOFF VALVES, AND A CAP (BLIND FLANGE OR OTHER EQUIVALENT TERMINATION) LOCATED ON NORTH SIDE OF TEE.
10. WEST OPERATIONS AREA VALVE BOX TO INCLUDE SHUTOFF VALVE AND A CAP (BLIND FLANGE OR OTHER EQUIVALENT TERMINATION).

1"=50' (50' 0 50' 100')

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.: 42983
State: MA | Date Signed | Project Mgr.: DK
Designed by: BMS | Drawn by: KLS | Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

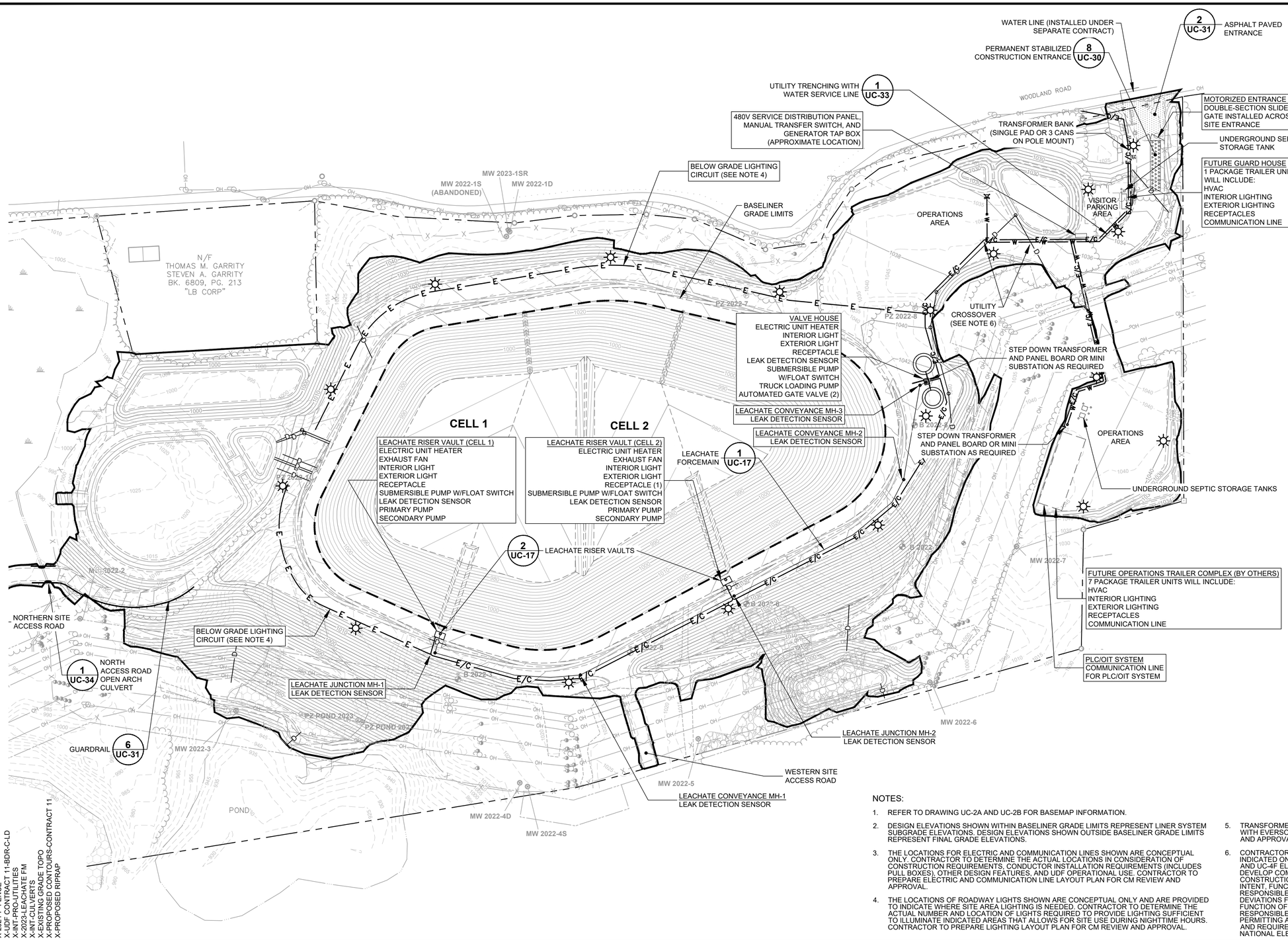
OPERATIONS FACILITY SITE PLAN

CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No. 30223149.3000
Date: DECEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-4D



EXISTING FEATURES LEGEND

- REBAR FOUND
- IRON PIN FOUND
- CONCRETE BOUND FOUND
- GRANITE BOUND FOUND
- BENCH MARK
- UTILITY POLE
- LAMP POST
- GUY WIRE
- MW 2022-2 — MONITORING WELL
- PZ 2022-8 — PIEZOMETER
- B 2022-8 — SOIL BORING
- WET AREA
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- EDGE OF WATER
- STONEWALL
- OH — OVERHEAD WIRES
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- 1010 — ELEVATION CONTOUR (5-FOOT INTERVAL)
- EVERSOURCE RIGHT-OF-WAY

DESIGN FEATURES LEGEND

- ELEVATION GRADE BREAK
- 1020 — INDEX ELEVATION CONTOUR (10-FOOT INTERVAL, SEE NOTE 2)
- INTERMEDIATE ELEVATION CONTOUR (2-FOOT INTERVAL, SEE NOTE 2)
- X — X — UDF SECURITY FENCE AND GATE (MODIFIED AS SHOWN ON SHEET UC-3A)
- UDF LIMITS OF CONSOLIDATED MATERIAL
- APPROXIMATE LIMITS OF GRADING
- SMA — STORMWATER MANAGEMENT AREA
- DETAIL/SECTION REFERENCE NUMBER
- DRAWING REFERENCE NUMBER
- E/C — UNDERGROUND ELECTRIC AND COMMUNICATION LINE (SEE NOTE 3)
- E — E — E — UNDERGROUND ELECTRIC LINE (SEE NOTE 3)
- W — WATER SERVICE LINE
- D — STORMWATER DRAINPIPE 3 UC-33
- DRAIN MANHOLE
- GUARDRAIL 6 UC-31
- ROADWAY LIGHT (SEE NOTE 4)

NOTES:

1. REFER TO DRAWING UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. DESIGN ELEVATIONS SHOWN WITHIN BASELINER GRADE LIMITS REPRESENT LINER SYSTEM SUBGRADE ELEVATIONS. DESIGN ELEVATIONS SHOWN OUTSIDE BASELINER GRADE LIMITS REPRESENT FINAL GRADE ELEVATIONS.
3. THE LOCATIONS FOR ELECTRIC AND COMMUNICATION LINES SHOWN ARE CONCEPTUAL ONLY. CONTRACTOR TO DETERMINE THE ACTUAL LOCATIONS IN CONSIDERATION OF CONSTRUCTION REQUIREMENTS, CONDUCTOR INSTALLATION REQUIREMENTS (INCLUDES PULL BOXES), OTHER DESIGN FEATURES, AND UDF OPERATIONAL USE. CONTRACTOR TO PREPARE ELECTRIC AND COMMUNICATION LINE LAYOUT PLAN FOR CM REVIEW AND APPROVAL.
4. THE LOCATIONS OF ROADWAY LIGHTS SHOWN ARE CONCEPTUAL ONLY AND ARE PROVIDED TO INDICATE WHERE SITE AREA LIGHTING IS NEEDED. CONTRACTOR TO DETERMINE THE ACTUAL NUMBER AND LOCATION OF LIGHTS REQUIRED TO PROVIDE LIGHTING SUFFICIENT TO ILLUMINATE INDICATED AREAS THAT ALLOWS FOR SITE USE DURING NIGHTTIME HOURS. CONTRACTOR TO PREPARE LIGHTING LAYOUT PLAN FOR CM REVIEW AND APPROVAL.
5. TRANSFORMER REQUIREMENTS TO BE DETERMINED BY CONTRACTOR IN COORDINATION WITH EVERSOURCE AND CM. CONTRACTOR TO PREPARE LAYOUT PLAN FOR CM REVIEW AND APPROVAL.
6. CONTRACTOR IS RESPONSIBLE FOR THE ELECTRICAL AND COMMUNICATIONS SYSTEMS AS INDICATED ON DESIGN DRAWINGS UC-4E ELECTRICAL AND COMMUNICATIONS SITE PLAN AND UC-4F ELECTRICAL AND COMMUNICATIONS DESCRIPTION PLAN. CONTRACTOR SHALL DEVELOP COMPLETE ELECTRICAL SUBMITTALS FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. DESIGN DRAWINGS UC-4E AND UC-4F ARE PROVIDED TO CONVEY THE INTENT, FUNCTION, AND REQUIREMENTS OF THE SYSTEMS DESCRIBED. CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND SUBMITTING ANY QUESTIONS, CONCERNS, OR DIRECT DEVIATIONS FROM THE PROJECT DOCUMENTS THAT MAY HAVE AN IMPACT ON THE FUNCTION OF THE ELECTRICAL AND COMMUNICATION SYSTEMS. CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH ELECTRIC UTILITY COMPANY AND ANY LOCAL PERMITTING AUTHORITY IN ORDER TO COMPLY WITH ANY LOCAL CODES, REGULATIONS, AND REQUIREMENTS. CONTRACTOR'S SUBMITTALS SHALL MEET APPLICABLE STATE, AND NATIONAL ELECTRIC CODES.

C:\Users\CSHillDCACDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\UDF CONTRACT 11_04-E-ELEC AND COMM SITE PLAN.dwg LAYOUT: UC-4E SAVED: 1/7/2026 9:35 AM BY: HILL, CHRISTIAN

XREFS:
X-UDF-EXISTING SITE
X-2024-P-FENCE
X-UDF CONTRACT 11-BDR-C-LD
X-INT-PRO-UTILITIES
X-2023-LEACHATE FM
X-INT-CULVERTS
X-EXISTING GRADE TOPO
X-EXISTING CONTOURS-CONTRACT 11
X-PROPOSED RIPRAP

IMAGES:
Arcadis Logo BW.PNG

1"=100' — 100' 0 100' 200'

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No.	Date	Revisions	By	Ckd

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Professional Engineer's Name: MARK O. GRAVELDING
Professional Engineer's No.: 42983
State: MA | Date Signed: | Project Mgr.: DK
Designed by: BMS | Drawn by: KLS | Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS MARK O. GRAVELDING CIVIL No. 42983 REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

ELECTRICAL AND COMMUNICATIONS SITE PLAN

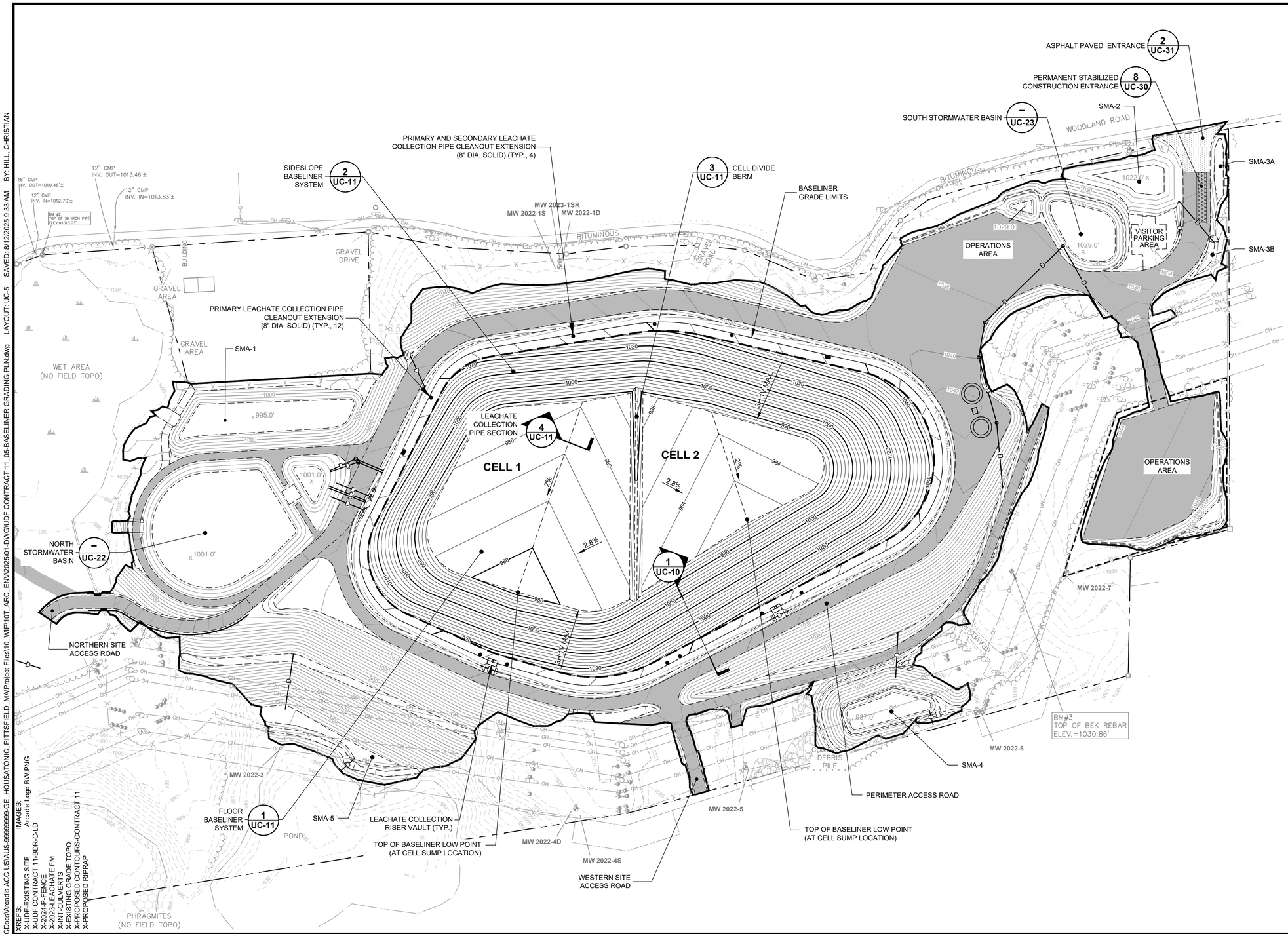
CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No. 30223149.3000

Date DECEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-4E



EXISTING FEATURES LEGEND

- REBAR FOUND
- IRON PIN FOUND
- CONCRETE BOUND FOUND
- GRANITE BOUND FOUND
- BENCH MARK
- UTILITY POLE
- LAMP POST
- GUY WIRE
- MW 2022-2 — MONITORING WELL
- PZ 2022-8 — PIEZOMETER
- WET AREA
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- EDGE OF WATER
- STONEWALL
- OH — OVERHEAD WIRES
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- 1010 — ELEVATION CONTOUR (5-FOOT INTERVAL)
- EVERSOURCE RIGHT-OF-WAY

DESIGN FEATURES LEGEND

- 1060 — INDEX ELEVATION CONTOUR (10-FOOT INTERVAL, SEE NOTE 2)
- INTERMEDIATE ELEVATION CONTOUR (2-FOOT INTERVAL, SEE NOTE 2)
- ELEVATION GRADE BREAK
- UDF LIMITS OF CONSOLIDATED MATERIAL
- APPROXIMATE LIMITS OF GRADING
- X — X — UDF SECURITY FENCE AND GATE (MODIFIED AS SHOWN ON DRAWING UC-3A)
- SMA — STORMWATER MANAGEMENT AREA
- DETAIL/SECTION REFERENCE
- DRAWING REFERENCE NUMBER
- OPERATIONS AREA/ACCESS ROAD — 4 UC-32
- x 1101.7' — SPOT ELEVATION
- D — STORMWATER DRAINPIPE
- GUARDRAIL

NOTES:

1. REFER TO DRAWING UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. DESIGN ELEVATIONS SHOWN WITHIN BASELINER GRADE LIMITS REPRESENT TOP OF BASELINER SYSTEM. DESIGN ELEVATIONS SHOWN OUTSIDE BASELINER GRADE LIMITS REPRESENT FINAL GRADE ELEVATIONS.
3. REFER TO DRAWING UC-6 FOR ADDITIONAL BASELINER LEACHATE COLLECTION SYSTEM INFORMATION.
4. SEE DRAWING UC-34, DETAIL 2 FOR TYPICAL CELL ACCESS ROAD-PERIMETER DITCH CROSSING. LOCATION OF CELL ACCESS ROADS TO BE DETERMINED AT TIME OF UDF OPERATIONS.

C:\Users\CSHill\DC\ACCDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\202501-DWG\UDF CONTRACT 11_05-BASELINER GRADING PLN.dwg LAYOUT: UC-5 SAVED: 8/12/2025 9:33 AM BY: HILL, CHRISTIAN

XREFS:
IMAGES: Arcadis Logo BW.PNG
X-UDF-EXISTING SITE
X-UDF CONTRACT 11-BDR-C-LD
X-2024-P-FENCE
X-2023-LEACHATE FM
X-INT-CULVERTS
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS-CONTRACT 11
X-PROPOSED RIPRAP

100' 0 100' 200'
1"=100'

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

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Professional Engineer's Name: **MARK O. GRAVELDING**
Professional Engineer's No.: 42983
State: MA | Date Signed | Project Mgr.: DK
Designed by: BMS | Drawn by: KLS | Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

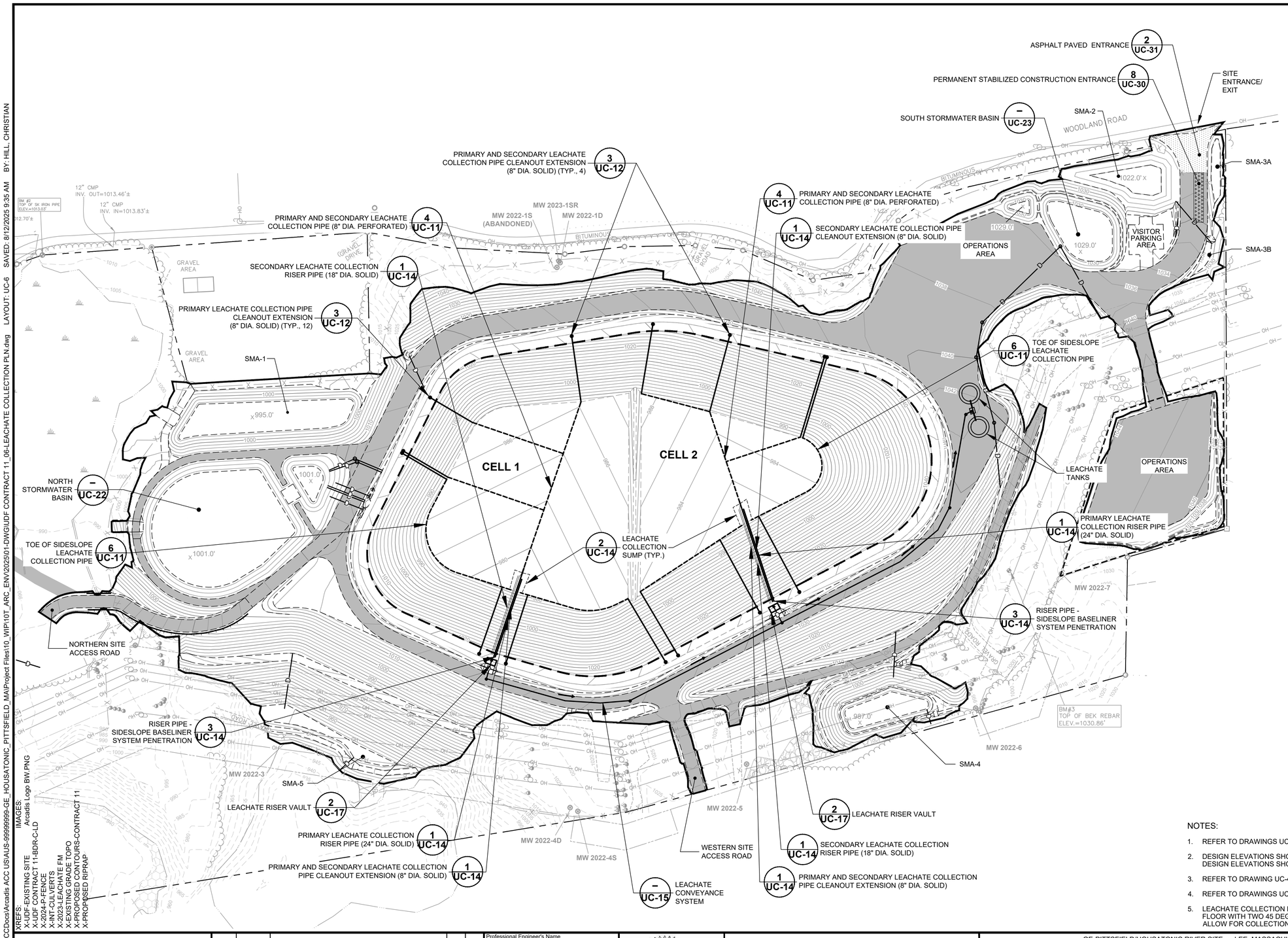
TOP OF BASELINER GRADING PLAN

CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No. 30223149.3000
Date DECEMBER 2025

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ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-5



EXISTING FEATURES LEGEND

- REBAR FOUND
- IRON PIN FOUND
- CONCRETE BOUND FOUND
- GRANITE BOUND FOUND
- BENCH MARK
- UTILITY POLE
- LAMP POST
- GUY WIRE
- MW 2022-2 — MONITORING WELL
- PZ 2022-8 — PIEZOMETER
- B 2022-8 — SOIL BORING
- WET AREA
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- EDGE OF WATER
- STONEWALL
- OH — OVERHEAD WIRES
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- 1010 — ELEVATION CONTOUR (5-FOOT INTERVAL)
- OVERHEAD LINE EASEMENT

DESIGN FEATURES LEGEND

- D—D — STORMWATER DRAIN PIPE
- 1060 — INDEX ELEVATION CONTOUR (10-FOOT INTERVAL, SEE NOTE 2)
- INTERMEDIATE ELEVATION CONTOUR (2-FOOT INTERVAL, SEE NOTE 2)
- ELEVATION GRADE BREAK
- APPROXIMATE LIMITS OF GRADING
- X — X — UDF SECURITY FENCE AND GATE (MODIFIED AS SHOWN ON DRAWING UC-3A)
- DETAIL/SECTION REFERENCE
- DRAWING REFERENCE NUMBER
- OPERATIONS AREA/ACCESS ROAD 4 UC-32
- x 1101.7' — SPOT ELEVATION
- LEACHATE COLLECTION PIPING (PERFORATED)
- LEACHATE COLLECTION PIPE CLEANOUT EXTENSION (SOLID)
- GUARDRAIL

NOTES:

1. REFER TO DRAWINGS UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. DESIGN ELEVATIONS SHOWN WITHIN THE BASELINER GRADE LIMITS REPRESENT TOP OF BASELINER SYSTEM. DESIGN ELEVATIONS SHOWN OUTSIDE BASELINER GRADE LIMITS REPRESENT FINAL GRADE ELEVATIONS.
3. REFER TO DRAWING UC-4C FOR UTILITY INFORMATION.
4. REFER TO DRAWINGS UC-35 THROUGH UC-38 FOR PROCESS AND INSTRUMENTATION DIAGRAMS.
5. LEACHATE COLLECTION PIPE CLEANOUT EXTENSION SHALL CONNECT TO LEACHATE COLLECTION PIPE ON FLOOR WITH TWO 45 DEGREE BENDS OR OTHER BEND COMBINATIONS AS REQUIRED. BEND DIRECTION TO ALLOW FOR COLLECTION PIPE CLEANOUT.

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XREFS:
X-UDF-EXISTING SITE
X-UDF CONTRACT 11-BDR-C-LD
X-2024-P-FENCE
X-INT-CULVERTS
X-2023-LEACHATE FM
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS-CONTRACT 11
X-PROPOSED RIPRAP
IMAGES:
Arcadis Logo BW.PNG

100' 0 100' 200'
1"=100'

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Professional Engineer's Name: **MARK O. GRAVELDING**
Professional Engineer's No.: 42983

State	Date Signed	Project Mgr.
MA		DK
Designed by: BMS	Drawn by: KLS	Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

ARCADIS

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GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

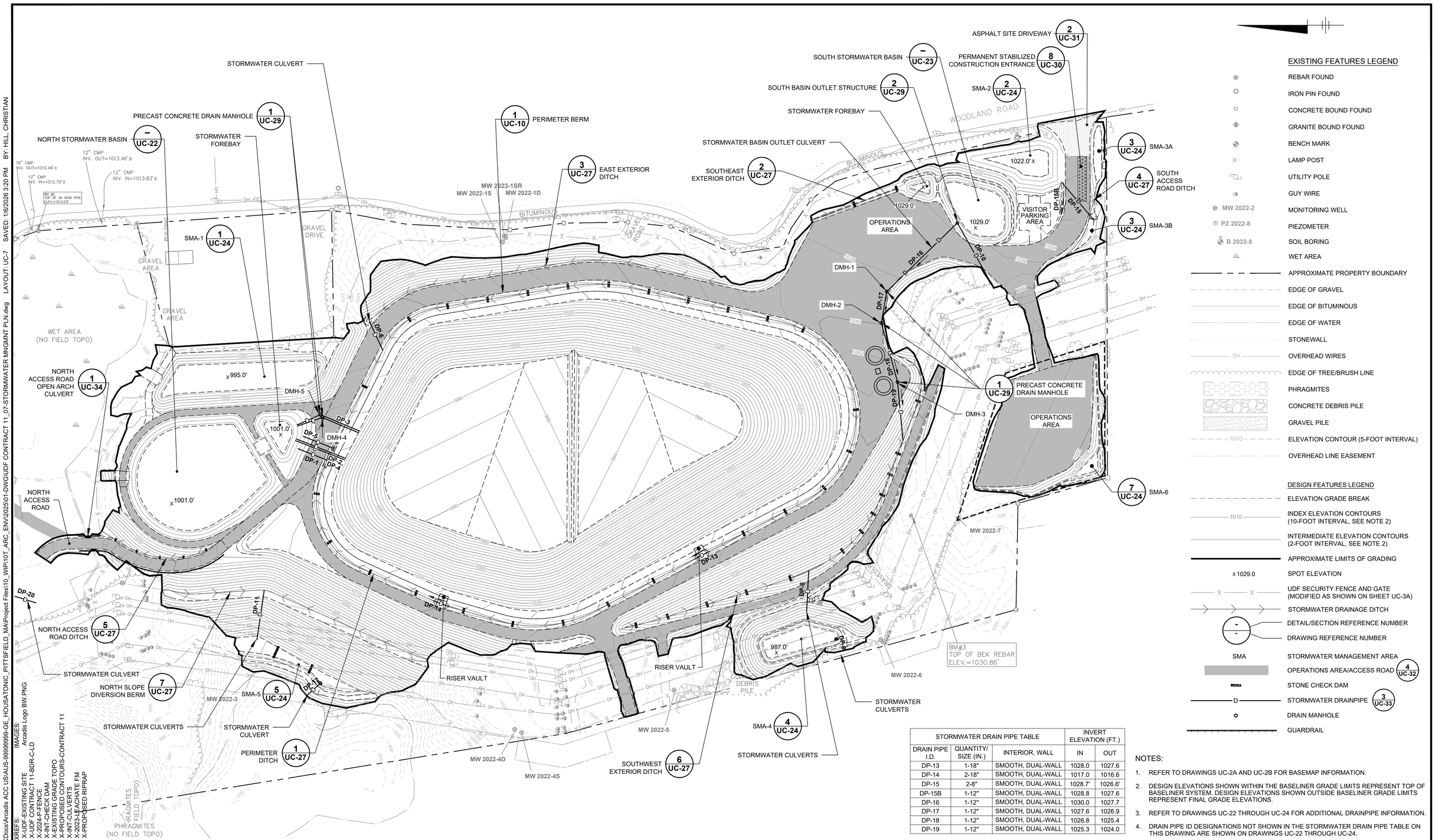
LEACHATE COLLECTION PLAN

CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No. 30223149.3000
Date DECEMBER 2025

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ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-6



EXISTING FEATURES LEGEND

- REBAR FOUND
- IRON PIN FOUND
- CONCRETE BOUND FOUND
- GRANITE BOUND FOUND
- BENCH MARK
- LAMP POST
- UTILITY POLE
- GUY WIRE
- MW 2022-2 — MONITORING WELL
- PZ 2022-8 — PIEZOMETER
- B 2022-8 — SOIL BORING
- WET AREA
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- EDGE OF WATER
- STONEWALL
- OH — OVERHEAD WIRES
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- 1010 — ELEVATION CONTOUR (5-FOOT INTERVAL)
- OVERHEAD LINE EASEMENT

DESIGN FEATURES LEGEND

- ELEVATION GRADE BREAK
- 1010 — INDEX ELEVATION CONTOURS (10-FOOT INTERVAL, SEE NOTE 2)
- INTERMEDIATE ELEVATION CONTOURS (2-FOOT INTERVAL, SEE NOTE 2)
- APPROXIMATE LIMITS OF GRADING
- x 1029.0 — SPOT ELEVATION
- UDF SECURITY FENCE AND GATE (MODIFIED AS SHOWN ON SHEET UC-3A)
- STORMWATER DRAINAGE DITCH
- DETAIL/SECTION REFERENCE NUMBER
- DRAWING REFERENCE NUMBER
- SMA — STORMWATER MANAGEMENT AREA
- OPERATIONS AREA/ACCESS ROAD — 4 UC-32
- STONE CHECK DAM
- D — STORMWATER DRAINPIPE — 3 UC-33
- DRAIN MANHOLE
- GUARDRAIL

STORMWATER DRAIN PIPE TABLE			INVERT ELEVATION (FT.)	
DRAIN PIPE I.D.	QUANTITY/ SIZE (IN.)	INTERIOR, WALL	IN	OUT
DP-13	1-18"	SMOOTH, DUAL-WALL	1028.0	1027.6
DP-14	2-18"	SMOOTH, DUAL-WALL	1017.0	1016.6
DP-15	2-8"	SMOOTH, DUAL-WALL	1028.7'	1026.6'
DP-15B	1-12"	SMOOTH, DUAL-WALL	1028.8	1027.6
DP-16	1-12"	SMOOTH, DUAL-WALL	1030.0	1027.7
DP-17	1-12"	SMOOTH, DUAL-WALL	1027.6	1026.9
DP-18	1-12"	SMOOTH, DUAL-WALL	1026.8	1025.4
DP-19	1-12"	SMOOTH, DUAL-WALL	1025.3	1024.0

NOTES:

1. REFER TO DRAWINGS UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. DESIGN ELEVATIONS SHOWN WITHIN THE BASELINER GRADE LIMITS REPRESENT TOP OF BASELINER SYSTEM. DESIGN ELEVATIONS SHOWN OUTSIDE BASELINER GRADE LIMITS REPRESENT FINAL GRADE ELEVATIONS.
3. REFER TO DRAWINGS UC-22 THROUGH UC-24 FOR ADDITIONAL DRAINPIPE INFORMATION.
4. DRAIN PIPE ID DESIGNATIONS NOT SHOWN IN THE STORMWATER DRAIN PIPE TABLE ON THIS DRAWING ARE SHOWN ON DRAWINGS UC-22 THROUGH UC-24.

C:\Users\CSHill\DCA\CCDocs\Arcadis ACC USAUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\UDF CONTRACT 11_07-STORMWATER MNGMNT PLN.dwg LAYOUT: UC-7 SAVED: 1/6/2026 3:20 PM BY: HILL, CHRISTIAN

XREFS:
X-UDF-EXISTING SITE
X-UDF CONTRACT 11-BDR-C-LD
X-2024-P-FENCE
X-INT-CHECK DAM
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS-CONTRACT 11
X-INT-CULVERTS
X-2024-CULVERT SITE FM
X-PROPOSED RIPRAP

IMAGES:
Arcadis Logo BW.PNG

100' 0 100' 200'
1"=100'

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.: 42983
State: MA | Date Signed: | Project Mgr.: DK
Designed by: BMS | Drawn by: KLS | Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS MARK O. GRAVELDING CIVIL No. 42983 REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

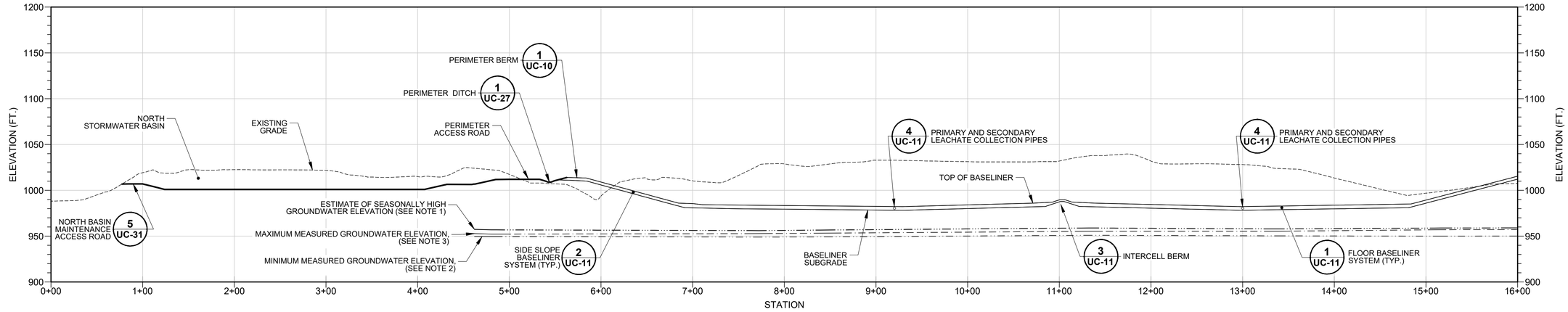
STORMWATER MANAGEMENT PLAN

CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No. 30223149.3000
Date DECEMBER 2025

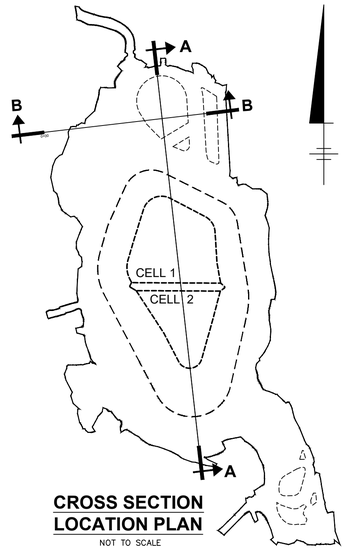
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110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-7



SITE CROSS SECTION A

SCALE: 1" = 60'
(NO VERTICAL EXAGGERATION)



CROSS SECTION LOCATION PLAN

NOT TO SCALE

SITE CROSS SECTION (CONTINUED) A

SCALE: 1" = 60'
(NO VERTICAL EXAGGERATION)

SITE CROSS SECTION B

SCALE: 1" = 60'
(NO VERTICAL EXAGGERATION)

NOTES:

1. THE ESTIMATE OF SEASONALLY HIGH GROUNDWATER ELEVATION SHOWN IS BASED ON THE METHODOLOGY AND RESULTING CALCULATIONS DESCRIBED IN SECTION 3.6.2 OF THE REVISED FINAL PRE-DESIGN INVESTIGATION SUMMARY REPORT FOR THE UPLAND DISPOSAL FACILITY AREA (ARCADIS 2024).
2. MINIMUM MEASURED GROUNDWATER ELEVATION IS BASED ON TRANSDUCER AND MANUAL GROUNDWATER ELEVATION GAUGING CONDUCTED FROM JUNE 2022 THROUGH JUNE 2023 AS DESCRIBED IN SECTION 3.6.1 OF THE REVISED FINAL PRE-DESIGN INVESTIGATION SUMMARY REPORT FOR THE UPLAND DISPOSAL FACILITY AREA (ARCADIS 2024). THE ELEVATIONS SHOWN REPRESENT THE LOWEST RECORDED GROUNDWATER ELEVATIONS FOR THE TRANSDUCER GAUGING PERIOD.
3. MAXIMUM MEASURED GROUNDWATER ELEVATION IS BASED ON TRANSDUCER GROUNDWATER ELEVATION GAUGING CONDUCTED FROM JUNE 2022 THROUGH JUNE 2023 AS DESCRIBED IN SECTION 3.6.1 OF THE REVISED FINAL PRE-DESIGN INVESTIGATION SUMMARY REPORT FOR THE UPLAND DISPOSAL FACILITY AREA (ARCADIS 2024). THE ELEVATIONS SHOWN REPRESENT THE HIGHEST RECORDED GROUNDWATER ELEVATIONS FOR THE TRANSDUCER GAUGING PERIOD.

C:\Users\CSHILL\DOCACCDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DW\UDF CONTRACT 11_08-SITE XSECTS.dwg LAYOUT: UC-8 SAVED: 6/12/2025 3:30 PM BY: HILL, CHRISTIAN
XREFS:
IMAGES:
X-UDF CONTRACT 11-BDR-C-LD
Arcadis Logo BW.PNG
X-XSECS

1"=60' 60' 0 60' 120'

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USE TO VERIFY FIGURE REPRODUCTION SCALE

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Professional Engineer's No.: 42983		
State: MA	Date Signed:	Project Mgr.: DK
Designed by: BMS	Drawn by: KLS	Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS MARK O. GRAVELDING CIVIL No. 42983 REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

SITE CROSS SECTIONS - 1

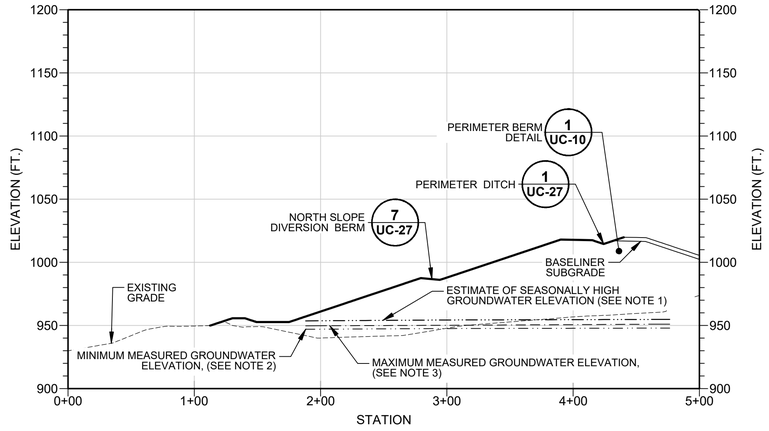
CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No.
30223149.3000

Date
DECEMBER 2025

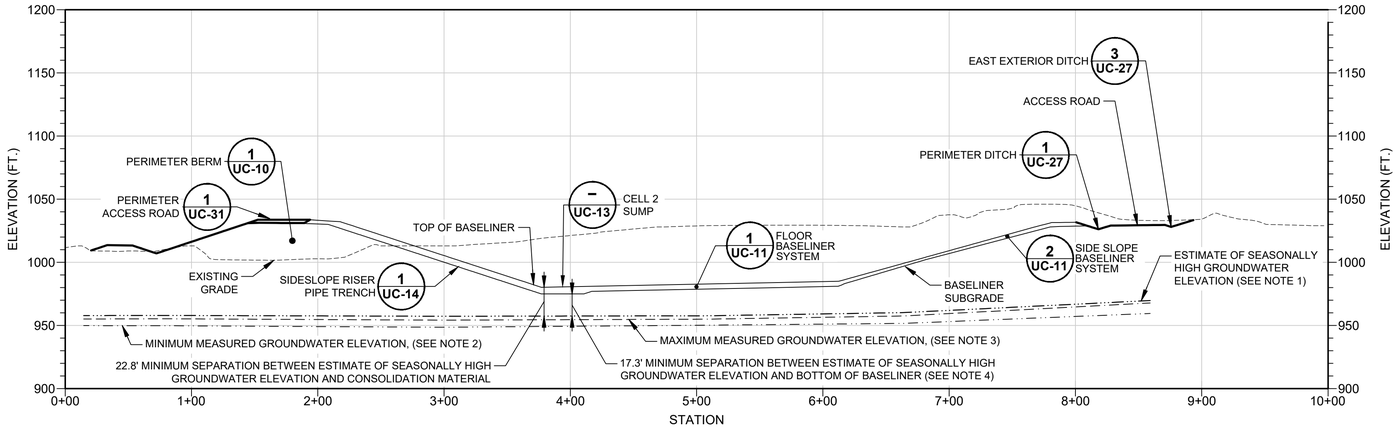
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ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-8



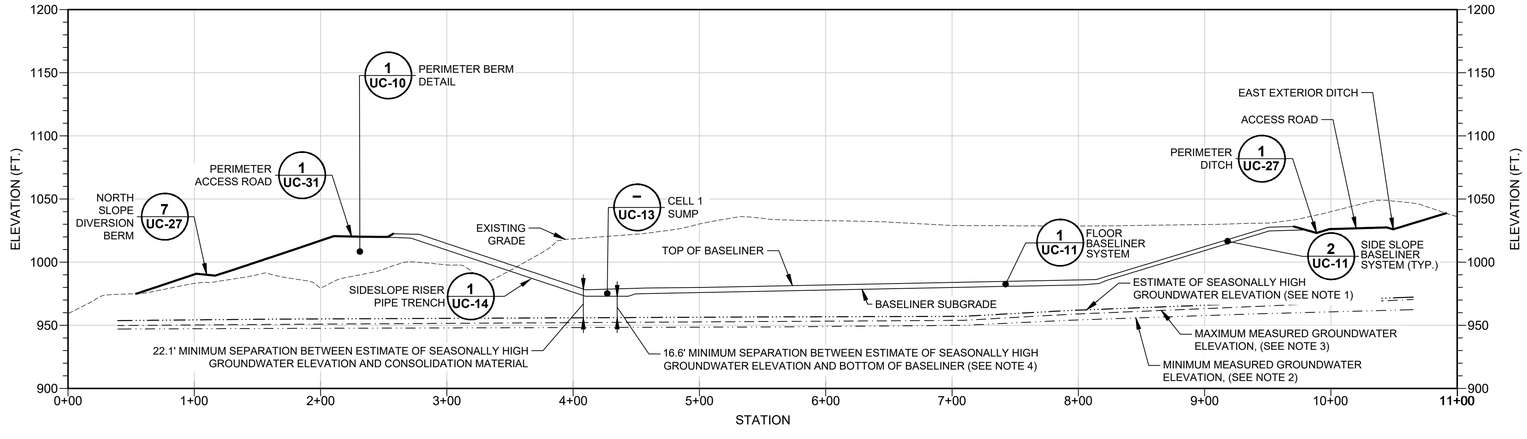
SITE CROSS SECTION C

SCALE: 1" = 60'
(NO VERTICAL EXAGGERATION)



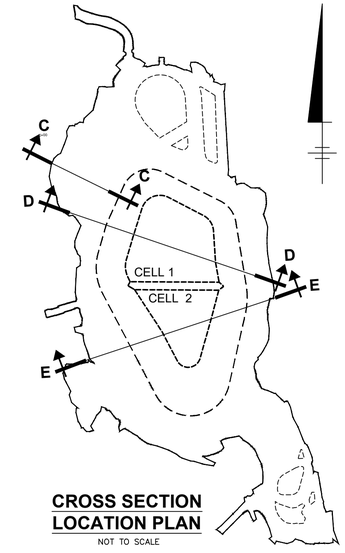
SITE CROSS SECTION E

SCALE: 1" = 60'
(NO VERTICAL EXAGGERATION)



SITE CROSS SECTION D

SCALE: 1" = 60'
(NO VERTICAL EXAGGERATION)



CROSS SECTION LOCATION PLAN

NOT TO SCALE

NOTES:

1. THE ESTIMATE OF SEASONALLY HIGH GROUNDWATER ELEVATION SHOWN IS BASED ON THE METHODOLOGY AND RESULTING CALCULATIONS DESCRIBED IN SECTION 3.6.2 OF THE REVISED FINAL PRE-DESIGN INVESTIGATION SUMMARY REPORT FOR THE UPLAND DISPOSAL FACILITY AREA (ARCADIS 2024).
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3. MAXIMUM MEASURED GROUNDWATER ELEVATION IS BASED ON TRANSDUCER GROUNDWATER ELEVATION GAUGING CONDUCTED FROM JUNE 2022 THROUGH JUNE 2023 AS DESCRIBED IN SECTION 3.6.1 OF THE REVISED FINAL PRE-DESIGN INVESTIGATION SUMMARY REPORT FOR THE UPLAND DISPOSAL FACILITY AREA (ARCADIS 2024). THE ELEVATIONS SHOWN REPRESENT THE HIGHEST RECORDED GROUNDWATER ELEVATIONS FOR THE TRANSDUCER GAUGING PERIOD.
4. SECTION II.B.5.A OF THE REVISED PERMIT SETS FORTH THE PERFORMANCE STANDARDS FOR THE UDF THAT REQUIRES THE BASELINER BE A MINIMUM OF 15 FEET ABOVE A CONSERVATIVE ESTIMATE OF THE SEASONALLY HIGH GROUNDWATER ELEVATION. THE SEASONALLY HIGH GROUNDWATER ELEVATION SHOWN ON THIS DRAWING AND USED FOR DESIGN OF THE UDF IS BASED ON THE FRIMPTER METHOD WHICH PROVIDES A CONSERVATIVE ESTIMATE OF THE GROUNDWATER ELEVATIONS USING SITE-SPECIFIC GROUNDWATER ELEVATION DATA COLLECTED IN THE LOCATION OF THE UDF THAT IS MODIFIED (PROJECTED) TO ACCOUNT FOR HISTORICAL GROUNDWATER LEVEL FLUCTUATIONS AT SIMILARLY SITED OFF-SITE, LONG-TERM MONITORING WELLS IN MASSACHUSETTS.

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60' 0 60' 120'
1"=60'

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Professional Engineer's Name: MARK O. GRAVELDING
Professional Engineer's No.: 42983

State	Date Signed	Project Mgr.
MA		DK
Designed by: BMS	Drawn by: KLS	Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

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UPLAND DISPOSAL FACILITY

SITE CROSS SECTIONS - 2

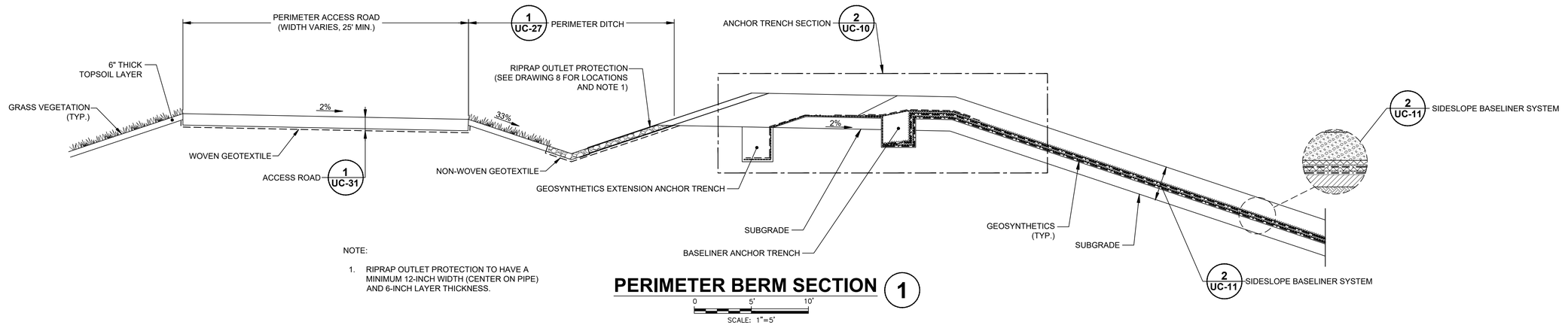
CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No.
30223149.3000

Date
DECEMBER 2025

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ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

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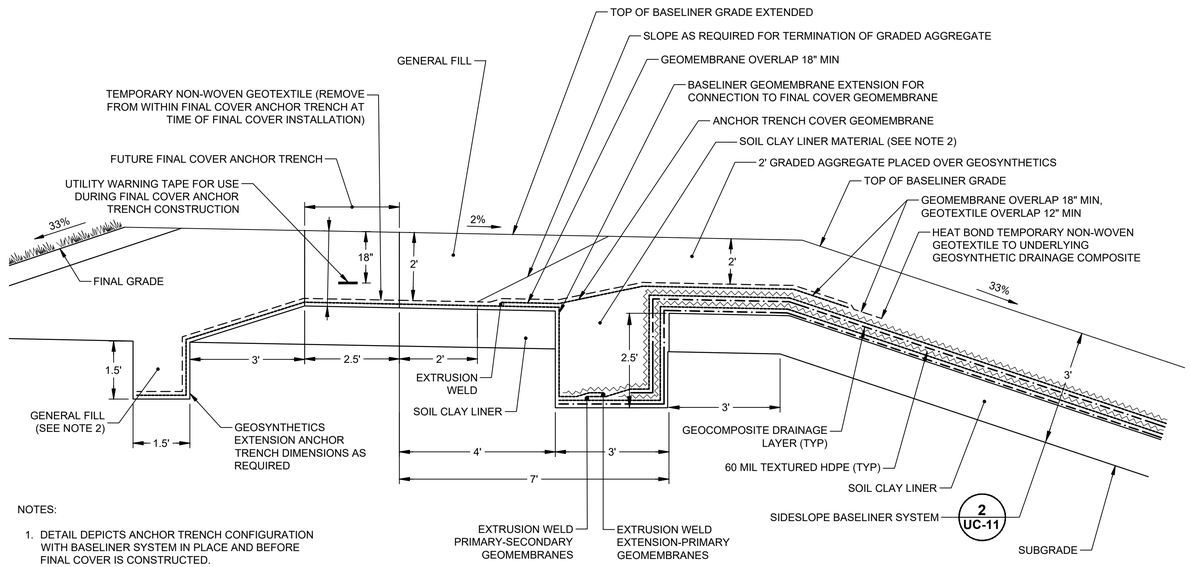
NOTE:

1. RIPRAP OUTLET PROTECTION TO HAVE A MINIMUM 12-INCH WIDTH (CENTER ON PIPE) AND 6-INCH LAYER THICKNESS.

PERIMETER BERM SECTION 1

0 5' 10'

SCALE: 1"=5'



NOTES:

1. DETAIL DEPICTS ANCHOR TRENCH CONFIGURATION WITH BASELINER SYSTEM IN PLACE AND BEFORE FINAL COVER IS CONSTRUCTED.
2. ANCHOR TRENCH BACKFILL MATERIAL SHALL BE PLACED AND COMPACTED IN LIFTS NO GREATER THAN 12 INCHES THICK. BACKFILLING SHALL BE DONE WITH EQUIPMENT AND IN A MANNER THAT DOES NOT DAMAGE THE GEOSYNTHETICS WITHIN AND SURROUNDING THE ANCHOR TRENCH. NO TESTING OF THE TRENCH BACKFILL SOIL IS REQUIRED.

BASELINER ANCHOR TRENCH 2

0 2' 4'

SCALE: 1"=2'

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Professional Engineer's No.: 42983		
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Designed by: BMS	Drawn by: KLS	Checked by: PHB

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PERIMETER BERM DETAILS

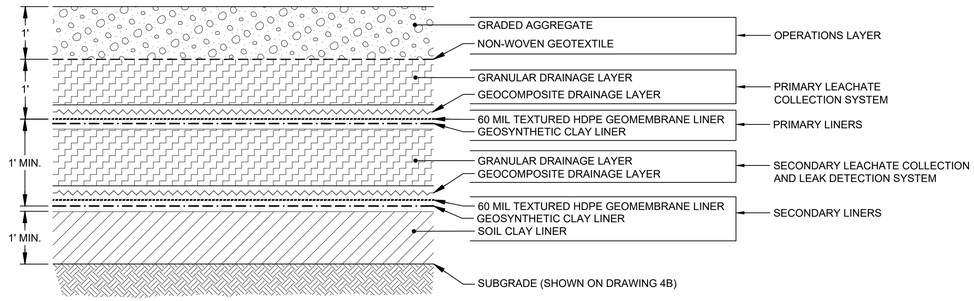
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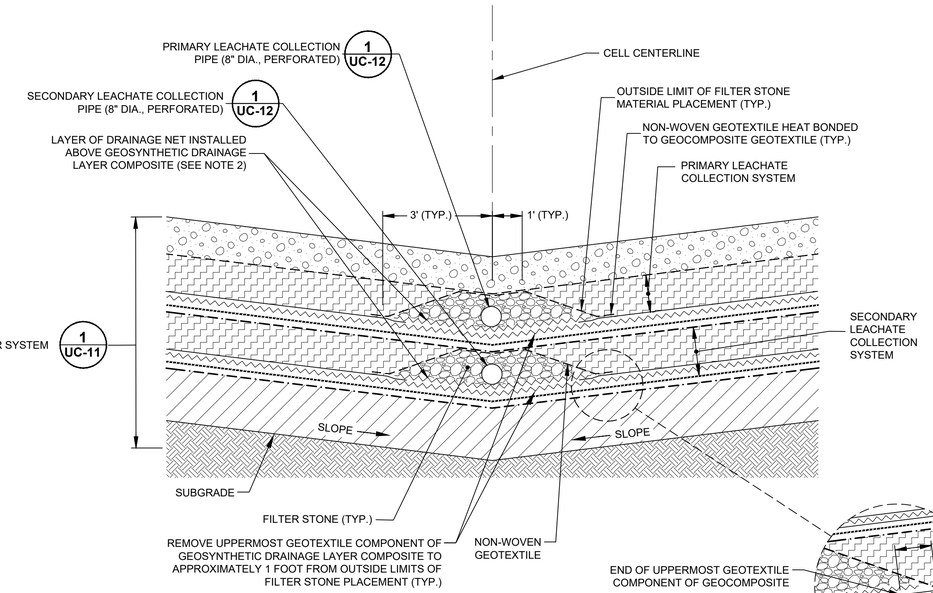
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FLOOR BASELINER SYSTEM 1

NOT TO SCALE

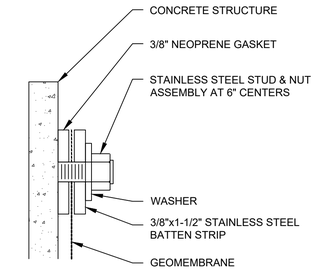


NOTES:

1. GEOTEXTILE OVERLAP SEAM TO BE SEWN OR HEAT-BONDED.
2. GEONET TO BE A MINIMUM THICKNESS OF 200 MILS AND INSTALLED TO THE LIMITS OF FILTER STONE PLACEMENT AND ABOVE 1 FOOT SEGMENT OF UNDERLYING GEOSYNTHETIC DRAINAGE LAYER COMPOSITE GEOTEXTILE. SECURE GEONET TO UNDERLYING EXPOSED GEOSYNTHETIC DRAINAGE LAYER COMPOSITE NET USING PLASTIC FASTENERS EVERY 5 FEET UP AND DOWN THE SLOPE AND EVERY 6 INCHES ON BUTT SEAMS ACROSS THE SLOPE.

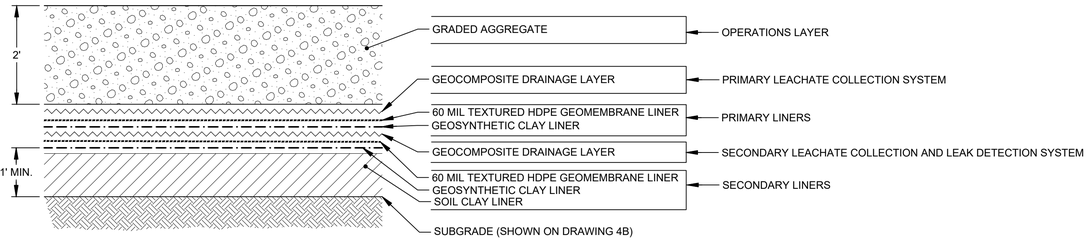
LEACHATE COLLECTION PIPE 4

NOT TO SCALE



GEOMEMBRANE/ CONCRETE SEAL 5

NOT TO SCALE



SIDESLOPE BASELINER SYSTEM 2

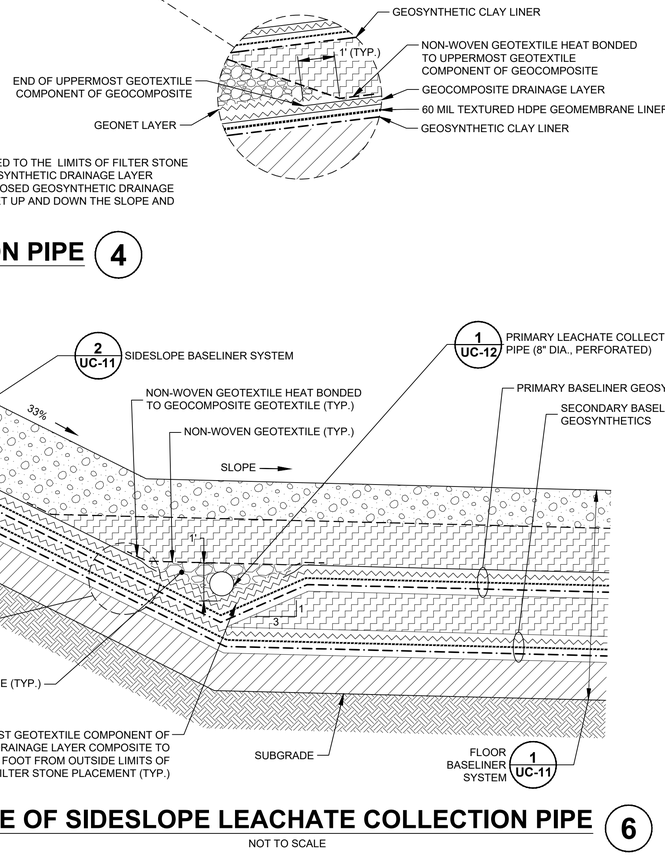
NOT TO SCALE

GENERAL NOTE:

1. GEOSYNTHETICS ARE SHOWN AT AN EXAGGERATED SCALE FOR CLARITY.

CELL DIVIDE BERM 3

NOT TO SCALE



TOE OF SIDESLOPE LEACHATE COLLECTION PIPE 6

NOT TO SCALE

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ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS

UPLAND DISPOSAL FACILITY

LINER SYSTEM DETAILS - 1

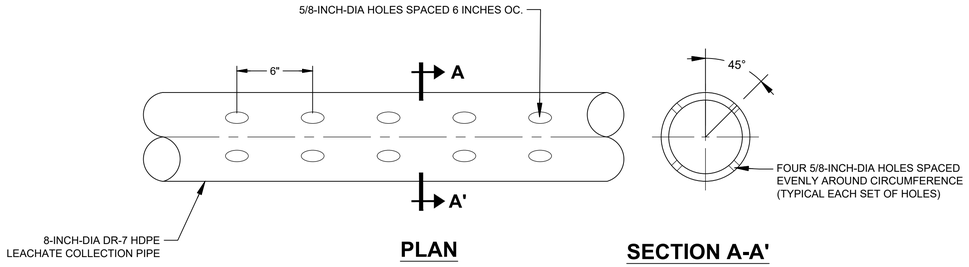
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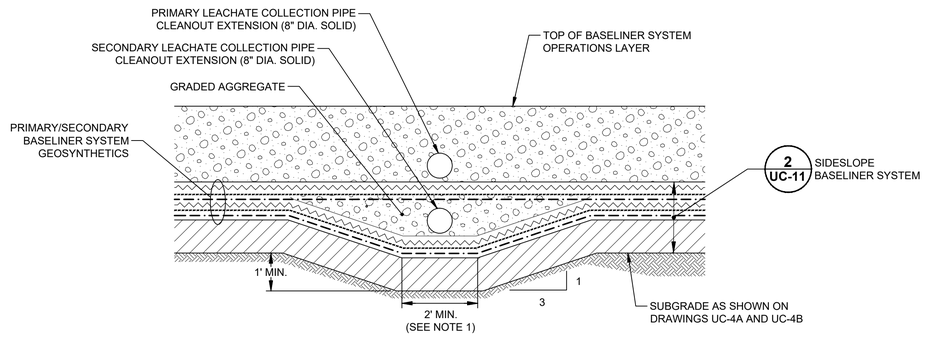
PLAN **SECTION A-A'**

NOTE:

1. PERFORATION DETAIL APPLIES TO BOTH PRIMARY AND SECONDARY LEACHATE COLLECTION PIPES.

LEACHATE COLLECTION PIPE PERFORATION 1

0 6" 12"
SCALE: 1"=6"

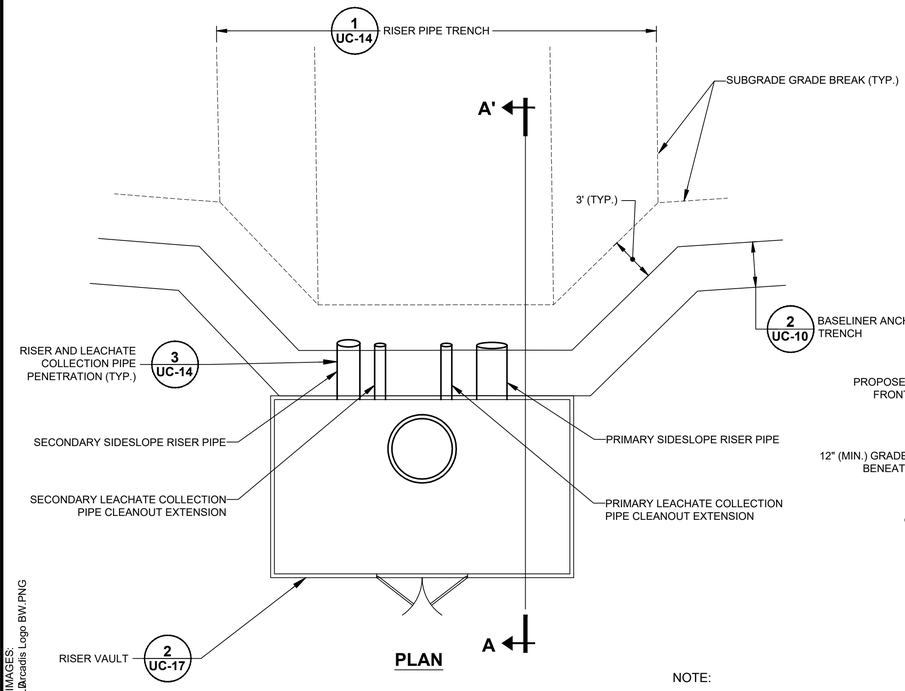


NOTE:

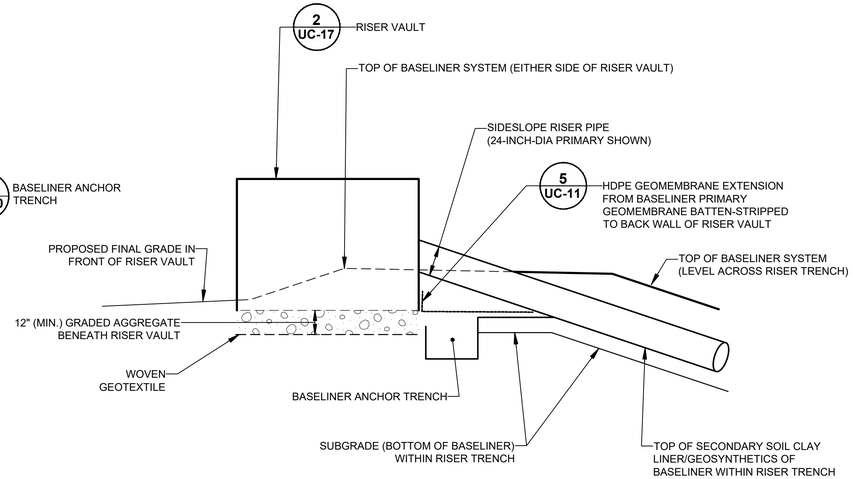
1. WIDTH OF TRENCH CAN BE GREATER THAN 2' IF NECESSARY TO ACCOMMODATE CONSTRUCTION METHOD AND EQUIPMENT.

PRIMARY AND SECONDARY LEACHATE COLLECTION PIPE CLEANOUT EXTENSION TRENCH 3

0 2' 4'
SCALE: 1"=2'



PLAN



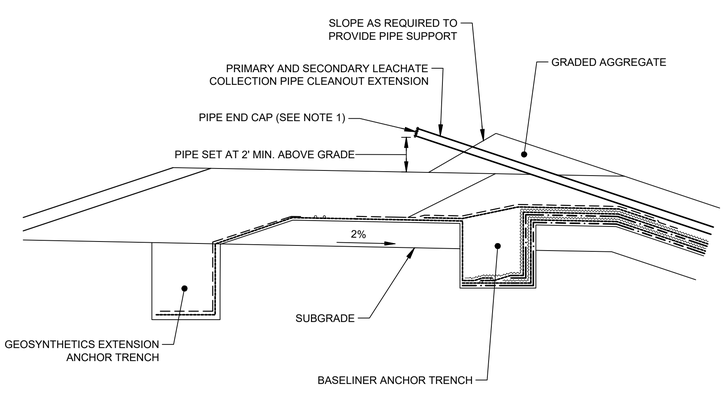
SECTION A-A'

NOTE:

1. INTERIOR DETAILS OF RISER VAULT OMITTED FOR CLARITY

BASELINER TERMINATION AT RISER VAULT 2

0 5' 10'
SCALE: 1"=5'



NOTES:

1. PIPE END CAP SHALL BE AN HDPE FLANGE WITH NEOPRENE GASKET, HDPE COVER PLATE, AND STAINLESS STEEL BACKUP RING. SECURE COVER PLATE AND BACKUP RING TO FLANGE WITH STAINLESS STEEL NUTS, BOLTS, AND WASHERS.

CLEANOUT PIPE EXTENSION 4

NOT TO SCALE

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Professional Engineer's No.: 42983
State: MA | Date Signed | Project Mgr.: DK
Designed by: BMS | Drawn by: KLS | Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS MARK O. GRAVELDING CIVIL No. 42983 REGISTERED PROFESSIONAL ENGINEER

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ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

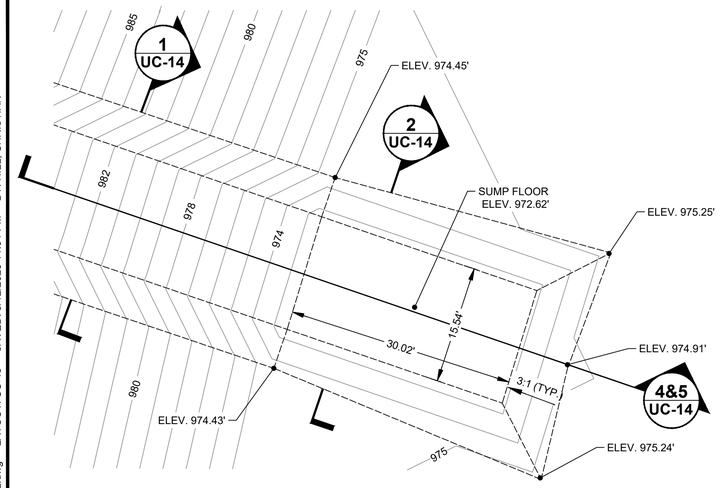
LINER SYSTEM DETAILS - 2

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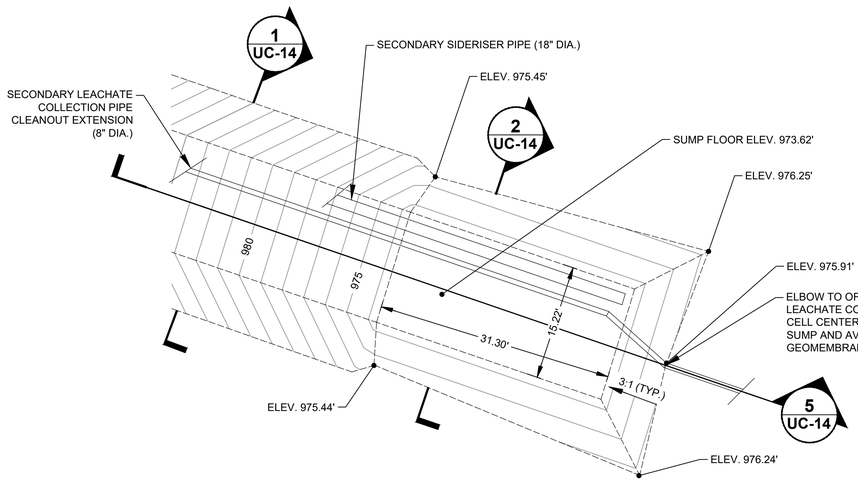
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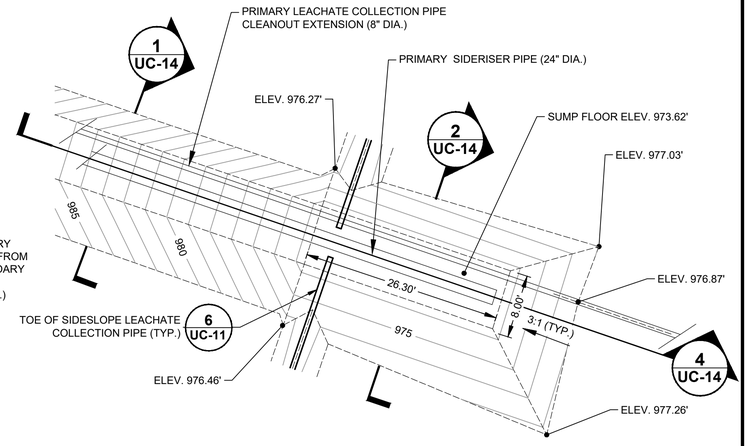
CELL 1
SUBGRADE SUMP PLAN (1)

SCALE: 1" = 10'



CELL 1
SECONDARY LEACHATE COLLECTION SUMP PLAN (2)

SCALE: 1" = 10'



CELL 1
PRIMARY LEACHATE COLLECTION SUMP PLAN (3)

SCALE: 1" = 10'

CELL 2
SUBGRADE SUMP PLAN (4)

SCALE: 1" = 10'

CELL 2
SECONDARY LEACHATE COLLECTION SUMP PLAN (5)

SCALE: 1" = 10'

CELL 2
PRIMARY LEACHATE COLLECTION SUMP PLAN (6)

SCALE: 1" = 10'

GENERAL NOTES:

1. SUBGRADE ELEVATIONS REPRESENT TOP OF SITE SOIL FOLLOWING PREPARATION FOR BASELINER SYSTEM.
2. SECONDARY SUMP ELEVATIONS REPRESENT TOP OF 1-FT-THICK COMPACTED SOIL CLAY LINER OF SECONDARY LINER SYSTEM AND IS THE SURFACE ON WHICH THE SECONDARY GEOSYNTHETICS WILL BE PLACED.
3. PRIMARY SUMP ELEVATIONS REPRESENT TOP OF SECONDARY GRANULAR DRAINAGE LAYERS WHERE PRESENT OR SECONDARY SUMP ELEVATIONS WHERE SECONDARY GRANULAR DRAINAGE LAYERS ARE ABSENT.
4. ELEVATIONS AND GRADES SHOWN FOR SUMP CONFIGURATIONS MAY VARY BASED ON CONSTRUCTION REQUIREMENTS.

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1"=10' (10' 0 10' 20')

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LEACHATE SUMP PLANS

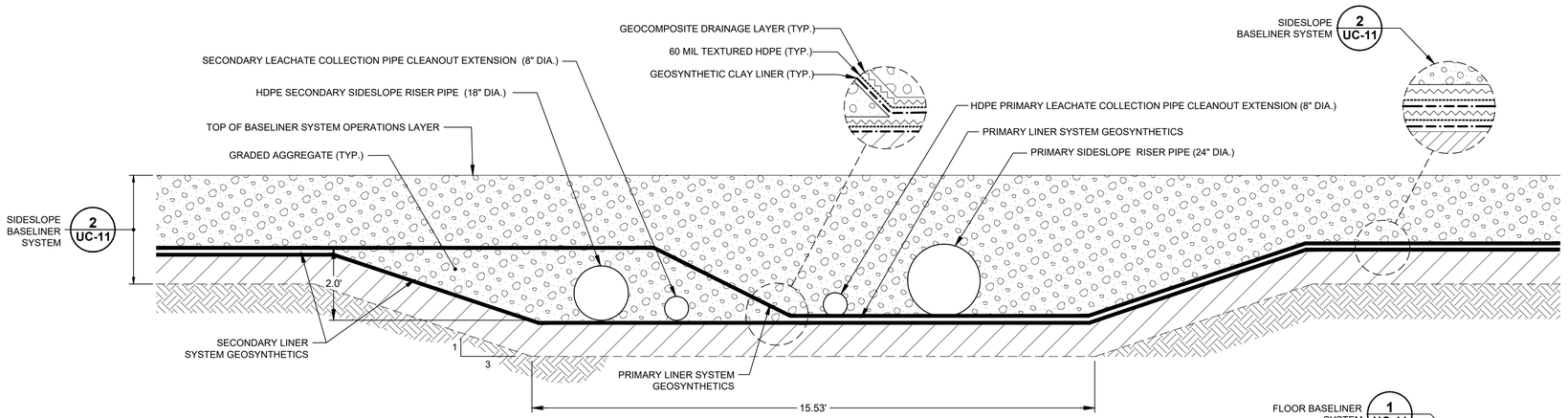
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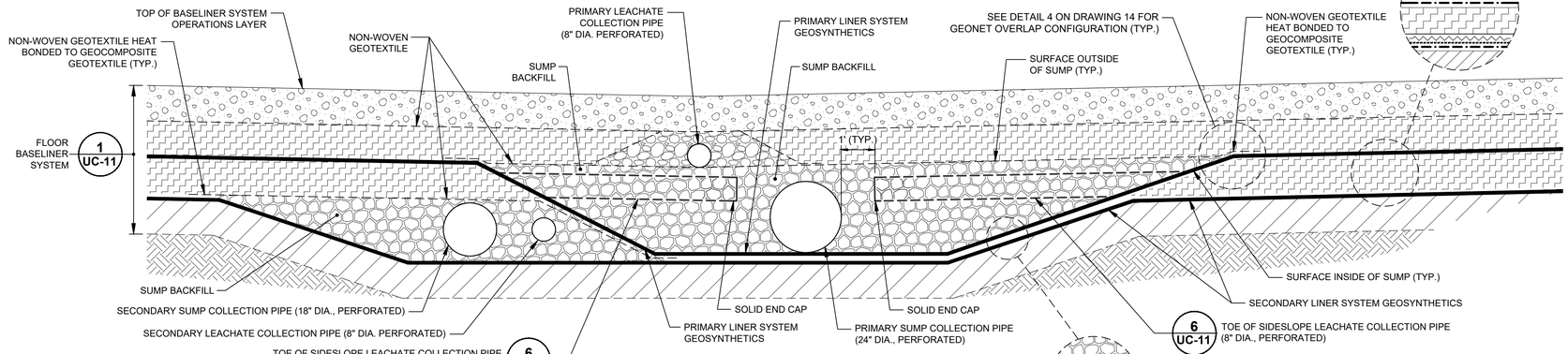
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PRIMARY/SECONDARY SIDESLOPE RISER PIPE TRENCH 1

0 2' 4'

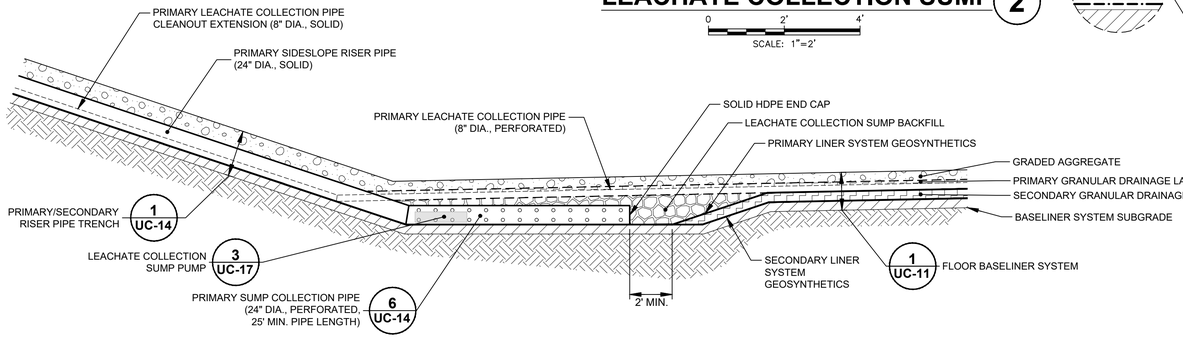
SCALE: 1"=2'



PRIMARY/SECONDARY LEACHATE COLLECTION SUMP 2

0 2' 4'

SCALE: 1"=2'



NOTE:

1. BASELINER SYSTEM GEOSYNTHETICS NOT SHOWN FOR CLARITY PURPOSES.

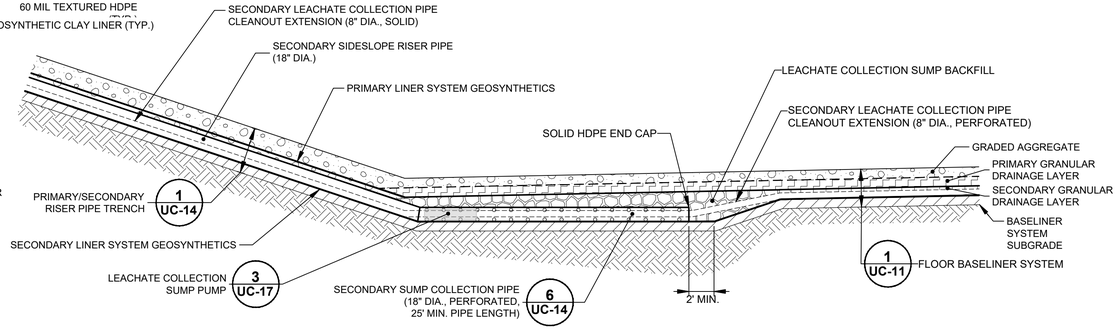
PRIMARY LEACHATE COLLECTION SUMP PROFILE 4

0 8' 16'

SCALE: 1"=8'

GENERAL NOTES:

1. ELEVATIONS AND GRADES SHOWN FOR SUMP CONFIGURATIONS MAY VARY BASED ON CONSTRUCTION REQUIREMENTS.
2. GEOSYNTHETICS ARE SHOWN AT AN EXAGGERATED SCALE FOR CLARITY.



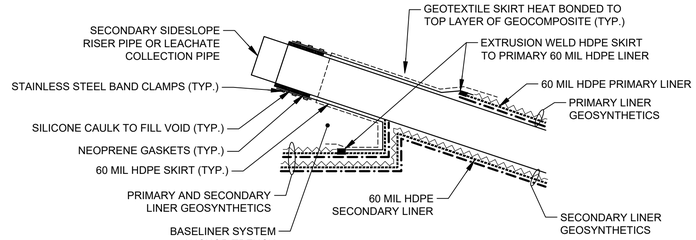
SECONDARY LEACHATE COLLECTION SUMP PROFILE 5

0 8' 16'

SCALE: 1"=8'

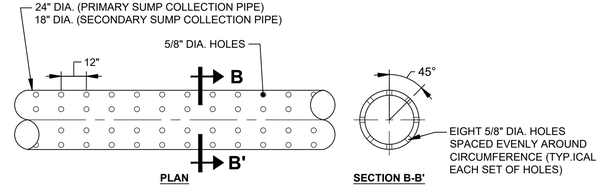
NOTE:

1. BASELINER SYSTEM GEOSYNTHETICS NOT SHOWN FOR CLARITY PURPOSES.



SECONDARY RISER PIPE-SIDESLOPE BASELINER SYSTEM PENETRATION 3

NOT TO SCALE



NOTE:

1. DETAIL APPLIES TO HORIZONTAL PORTIONS OF PRIMARY AND SECONDARY SUMP COLLECTION PIPES.

SUMP COLLECTION PIPE PERFORATION 6

NOT TO SCALE

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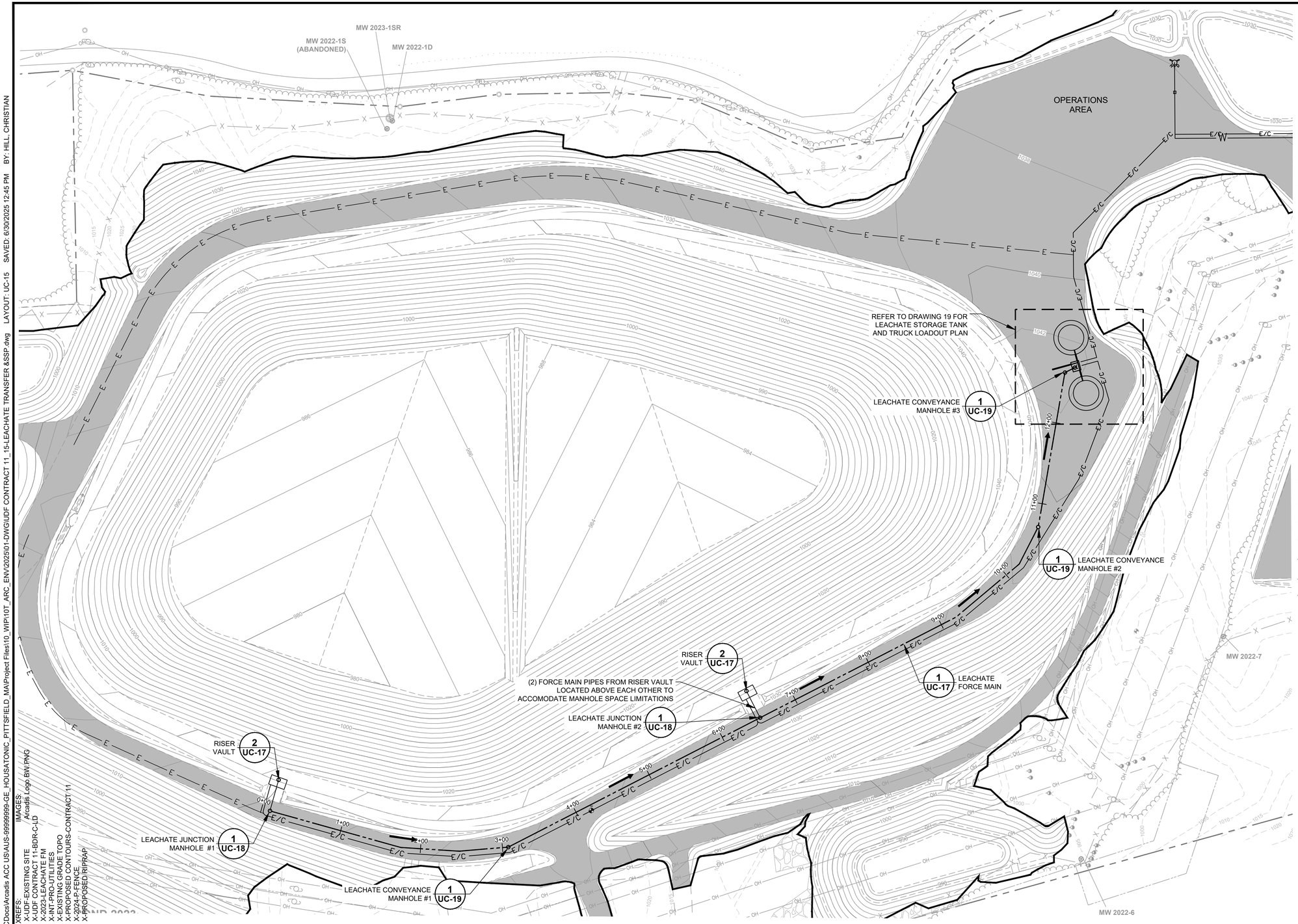
LEACHATE SUMP SECTIONS AND DETAILS

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EXISTING FEATURES LEGEND

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- BENCH MARK
- UTILITY POLE
- GUY WIRE
- MW 2022-2 — MONITORING WELL
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- EDGE OF WATER
- EDGE OF WETLAND
- STONEWALL
- OH — OVERHEAD WIRES
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- 1010 — ELEVATION CONTOUR (5-FOOT INTERVAL)
- OVERHEAD LINE EASEMENT

DESIGN FEATURES LEGEND

- 1060 — INDEX ELEVATION CONTOUR (10-FOOT INTERVAL, SEE NOTE 2)
- INTERMEDIATE ELEVATION CONTOUR (2-FOOT INTERVAL, SEE NOTE 2)
- ELEVATION GRADE BREAK
- APPROXIMATE LIMITS OF GRADING
- E/C — UNDERGROUND ELECTRIC AND COMMUNICATIONS LINES
- W — WATER SERVICE LINE
- LEACHATE FORCE MAIN
- LEACHATE FORCE MAIN FLOW DRECTION
- OPERATIONS AREA/ACCESS ROAD 4 UC-32

NOTES:

1. REFER TO DRAWINGS UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. DESIGN ELEVATION CONTOURS SHOWN WITHIN BASELINER GRADE LIMITS REPRESENT TOP OF BASELINER SYSTEM. DESIGN ELEVATION CONTOURS SHOWN OUTSIDE BASELINER GRADE LIMITS REPRESENT FINAL GRADE ELEVATIONS.
3. REFER TO DRAWING UC-4C FOR ADDITIONAL SITE UTILITY INFORMATION.

XREFS:
X-UDF-EXISTING SITE
X-UDF CONTRACT 11-BDR-C-LD
X-2023-LEACHATE FM
X-INT-PRO-UTILITIES
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS-CONTRACT 11
X-2024-FENCE
X-PROPOSED RIPRAP
IMAGES:
Arcadis Logo BW.PNG

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60' 0 60' 120'
1"=60'

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Professional Engineer's Name: MARK O. GRAVELDING		
Professional Engineer's No.: 42983		
State: MA	Date Signed:	Project Mgr.: DK
Designed by: BMS	Drawn by: KLS	Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

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UPLAND DISPOSAL FACILITY

LEACHATE CONVEYANCE AND STORAGE SYSTEM PLAN

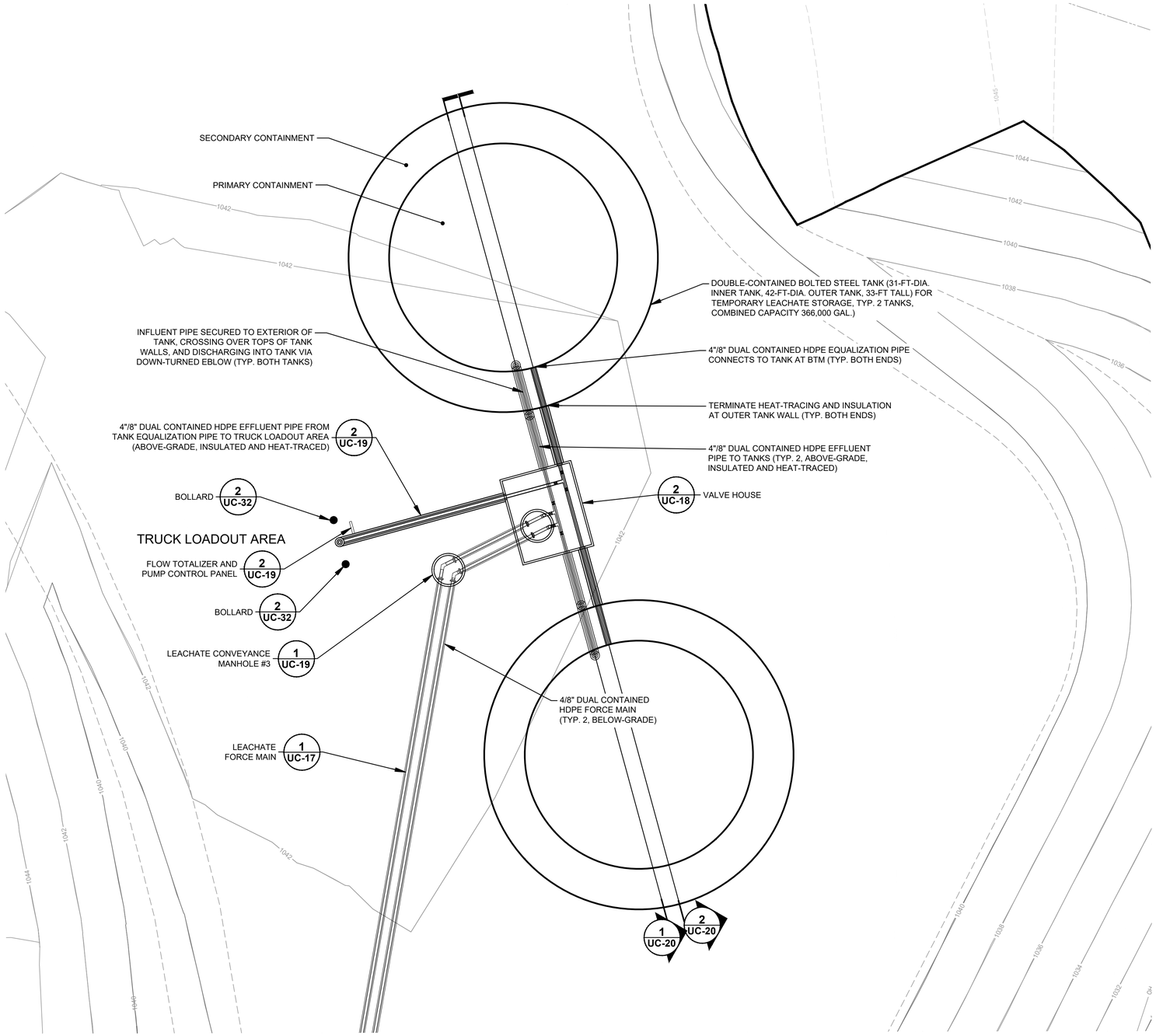
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UC-15



EXISTING FEATURES LEGEND

- OH — OVERHEAD WIRES
- 1010 — ELEVATION CONTOUR (5-FOOT INTERVAL)

DESIGN FEATURES LEGEND

- 1040 — INDEX ELEVATION CONTOUR (10-FOOT INTERVAL, SEE NOTE 2)
- INTERMEDIATE ELEVATION CONTOUR (2-FOOT INTERVAL, SEE NOTE 2)
- ELEVATION GRADE BREAK
- APPROXIMATE LIMITS OF GRADING

NOTES:

1. REFER TO DRAWINGS UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. DESIGN ELEVATIONS SHOWN OUTSIDE BASELINER GRADE LIMITS REPRESENT FINAL GRADE ELEVATIONS.

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XREFS:
IMAGES:
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X-UDF-EXISTING SITE
X-UDF CONTRACT 11-BDR-C-LD
X-2023-LEACHATE FM
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS-CONTRACT 11
X-PROPOSED RIPRAP

1"=10' (10' 0 10' 20')

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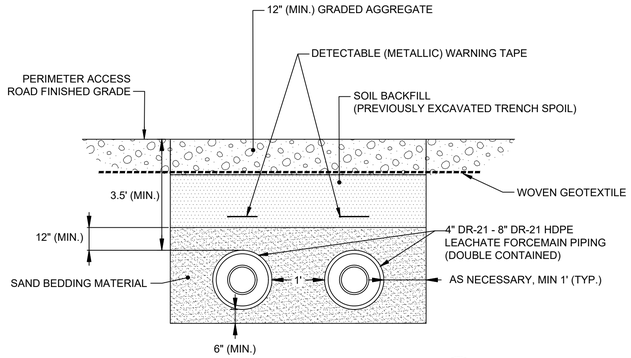
LEACHATE STORAGE TANK AND TRUCK LOADOUT PLAN

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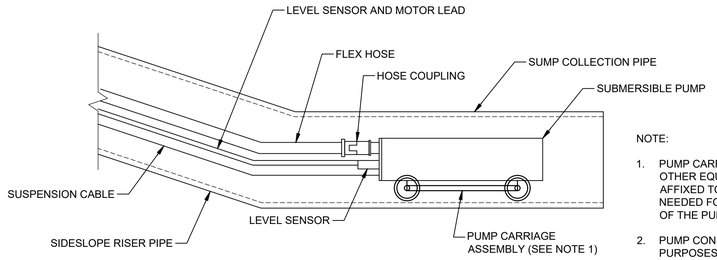
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UC-16



LEACHATE FORCE MAIN 1

NOT TO SCALE

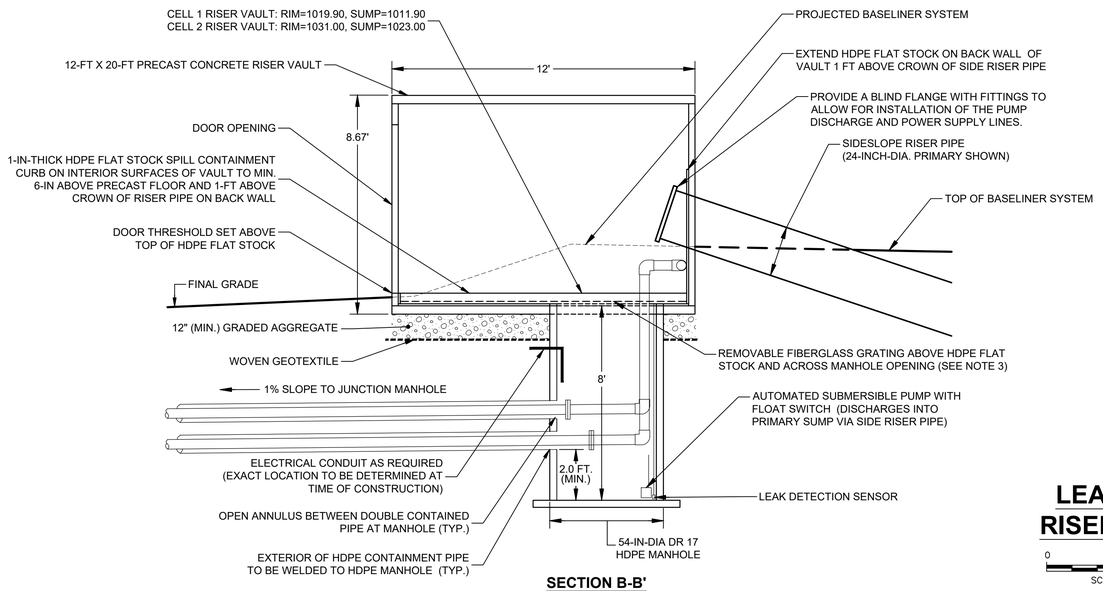


NOTE:

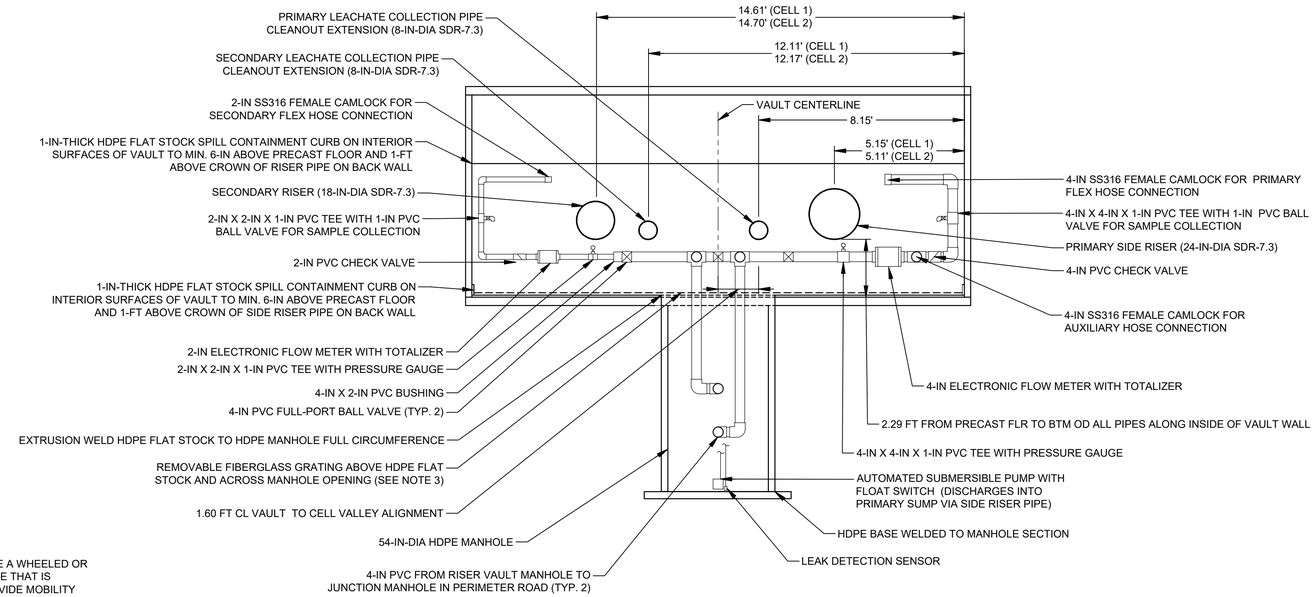
1. PUMP CARRIAGE ASSEMBLY SHALL BE A WHEELED OR OTHER EQUIVALENT TYPE STRUCTURE THAT IS AFFIXED TO THE PUMP BODY TO PROVIDE MOBILITY NEEDED FOR COMPLETE INSERTION AND REMOVAL OF THE PUMP INTO THE SIDESLOPE RISER PIPE.
2. PUMP CONFIGURATION SHOWN IS FOR ILLUSTRATION PURPOSES ONLY. ACTUAL CONFIGURATION WILL BE BASED ON SELECTED PUMP SYSTEM.

LEACHATE COLLECTION SUMP PUMP INSTALLATION 3

NOT TO SCALE



SECTION B-B'

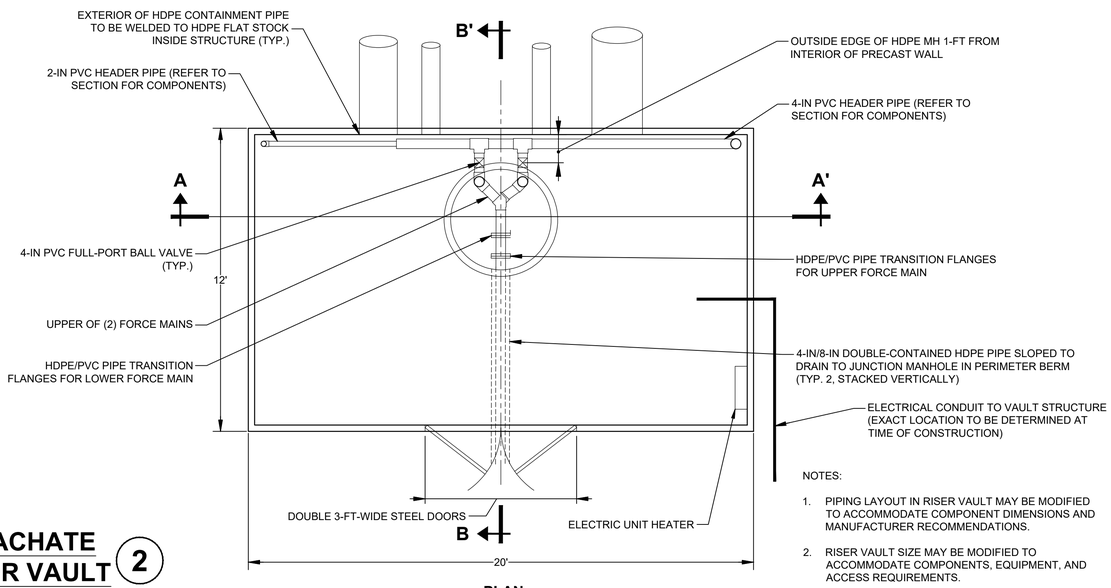


SECTION A-A'

LEACHATE RISER VAULT 2

0 3' 6'

SCALE: 1"=3'



PLAN

NOTES:

1. PIPING LAYOUT IN RISER VAULT MAY BE MODIFIED TO ACCOMMODATE COMPONENT DIMENSIONS AND MANUFACTURER RECOMMENDATIONS.
2. RISER VAULT SIZE MAY BE MODIFIED TO ACCOMMODATE COMPONENTS, EQUIPMENT, AND ACCESS REQUIREMENTS.
3. REMOVABLE FIBERGLASS GRATING TO BE REINFORCED OVER MANHOLE OPENING AS REQUIRED TO SUPPORT WORKER LOAD.

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Designed by: BMS	Drawn by: KLS	Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS MARK O. GRAVELDING CIVIL No. 42983 REGISTERED PROFESSIONAL ENGINEER

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LEACHATE CONVEYANCE AND STORAGE SYSTEM DETAILS - 1

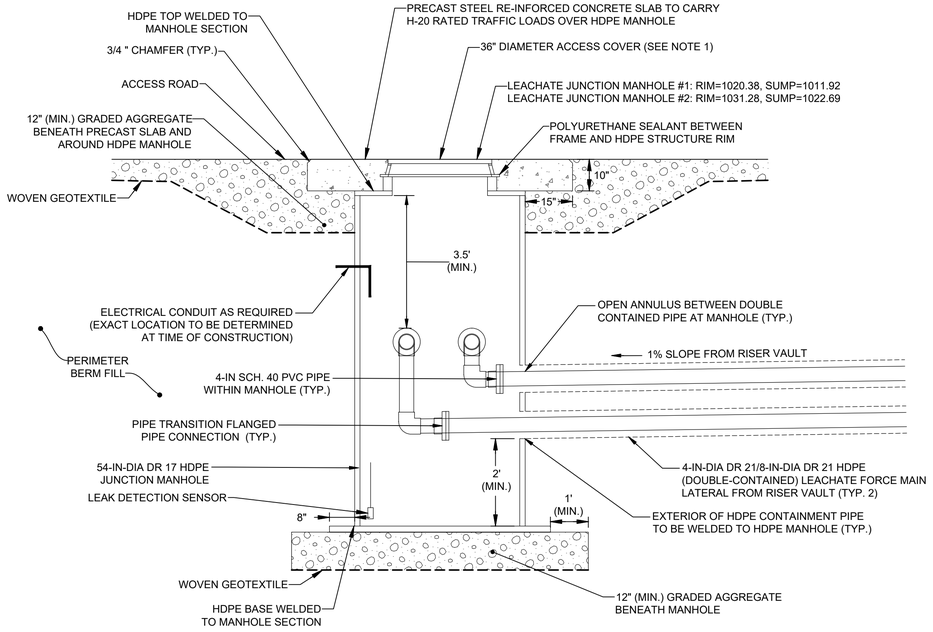
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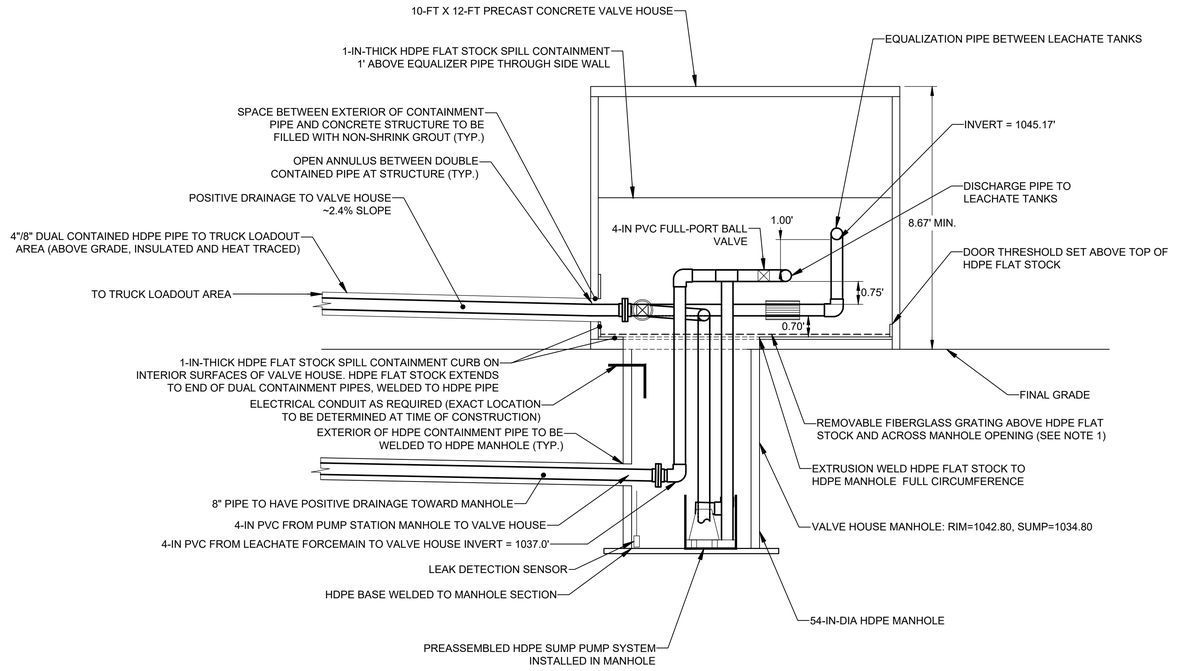
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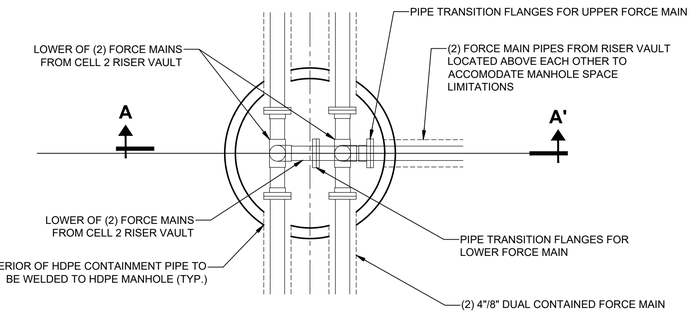
UC-17



SECTION A-A'



SECTION



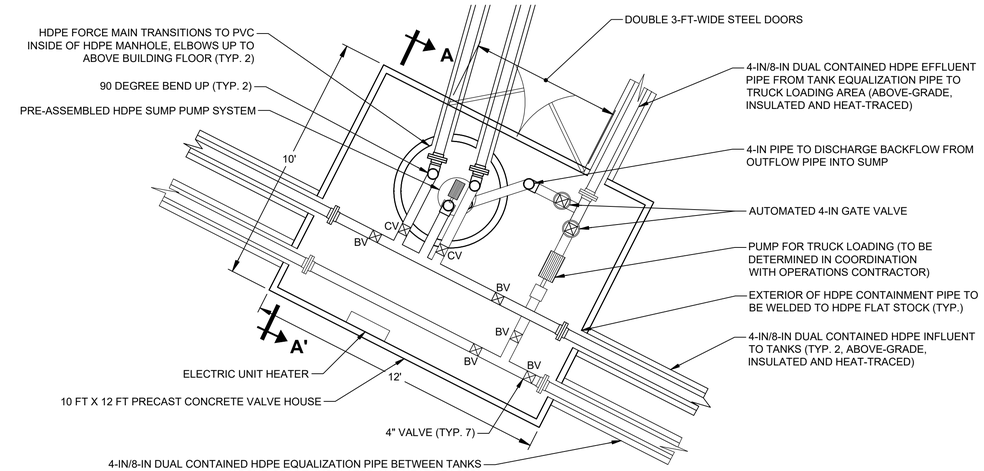
PLAN

NOTE:

1. GAP BETWEEN TOP OF HDPE MANHOLE AND BOTTOM OF PRECAST CONCRETE SLAB PROVIDES ISOLATION OF VEHICLE LOADS FROM TRANSFERRING TO MANHOLE. POLY FOAM BACKER ROD OR SIMILAR INERT COMPRESSIBLE MATERIAL TO BE PLACED ON TOP OF MANHOLE WALL TO FILL GAP AND PREVENT GRADED AGGREGATE FROM FALLING INTO MANHOLE INTERIOR.
2. LEACHATE CONVEYANCE SYSTEM HDPE MANHOLES ARE TO BE DESIGNED BY THE MANUFACTURER IN ACCORDANCE WITH ASTM F1759. MANUFACTURER'S CALCULATIONS FOR THE MANHOLE DESIGN ARE TO BE INCLUDED WITH THE CONTRACTOR'S SUBMITTAL PACKAGE.

LEACHATE JUNCTION MANHOLE (1)

SCALE: 1"=2'



PLAN

NOTE:

1. REMOVABLE FIBERGLASS GRATING TO BE REINFORCED OVER MANHOLE OPENING AS REQUIRED TO SUPPORT WORKER LOAD.

VALVE HOUSE (2)

SCALE: 1"=3'

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Professional Engineer's No.: 42983
State: MA | Date Signed: | Project Mgr.: DK
Designed by: BMS | Drawn by: KLS | Checked by: PHB

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LEACHATE CONVEYANCE AND STORAGE SYSTEM DETAILS - 2

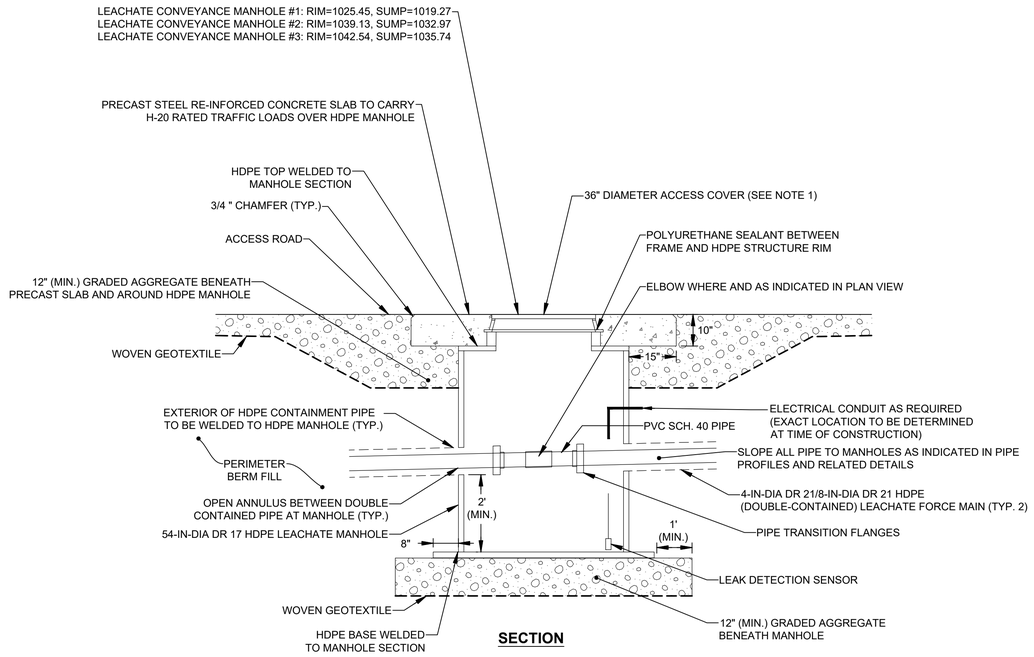
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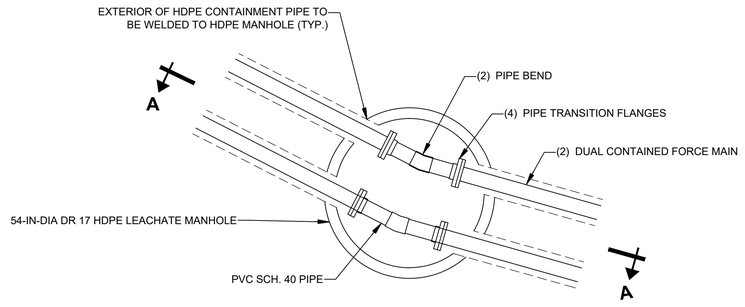
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UC-18



SECTION



PLAN

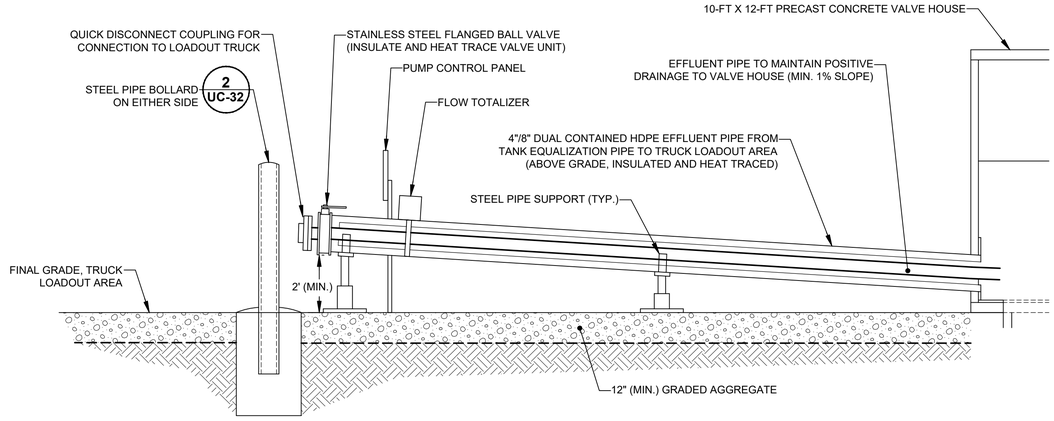
NOTE:

1. CIRCULAR ACCESS HATCH SHALL HAVE MINIMUM 36" DIAMETER STEEL FRAME AND COVER. HATCH SHALL BE RATED FOR H-20 TRAFFIC LOADING WITH WATER TIGHT SEAL.
2. LEACHATE CONVEYANCE SYSTEM HDPE MANHOLES ARE TO BE DESIGNED BY THE MANUFACTURER IN ACCORDANCE WITH ASTM F1759. MANUFACTURER'S CALCULATIONS FOR THE MANHOLE DESIGN ARE TO BE INCLUDED WITH THE CONTRACTOR'S SUBMITTAL PACKAGE.

LEACHATE CONVEYANCE MANHOLE 1

0 2' 4'

SCALE: 1"=2'



NOTE:

1. INSULATION SHALL BE 2-INCH THICK CLOSED CELL GLASS (OWENS CORNING FOAMGLAS OR EQUAL) WITH ALUMINUM JACKETING. HEAT TRACING TO BE INSTALLED DIRECTLY ON PIPING AND VALVES PRIOR TO INSULATION COVERING.

TRUCK LOADOUT PIPE 2

NOT TO SCALE

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Professional Engineer's No.: 42983

State	Date Signed	Project Mgr.
MA		DK
Designed by	Drawn by	Checked by
BMS	KLS	PHB

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LEACHATE CONVEYANCE AND STORAGE SYSTEM DETAILS - 3

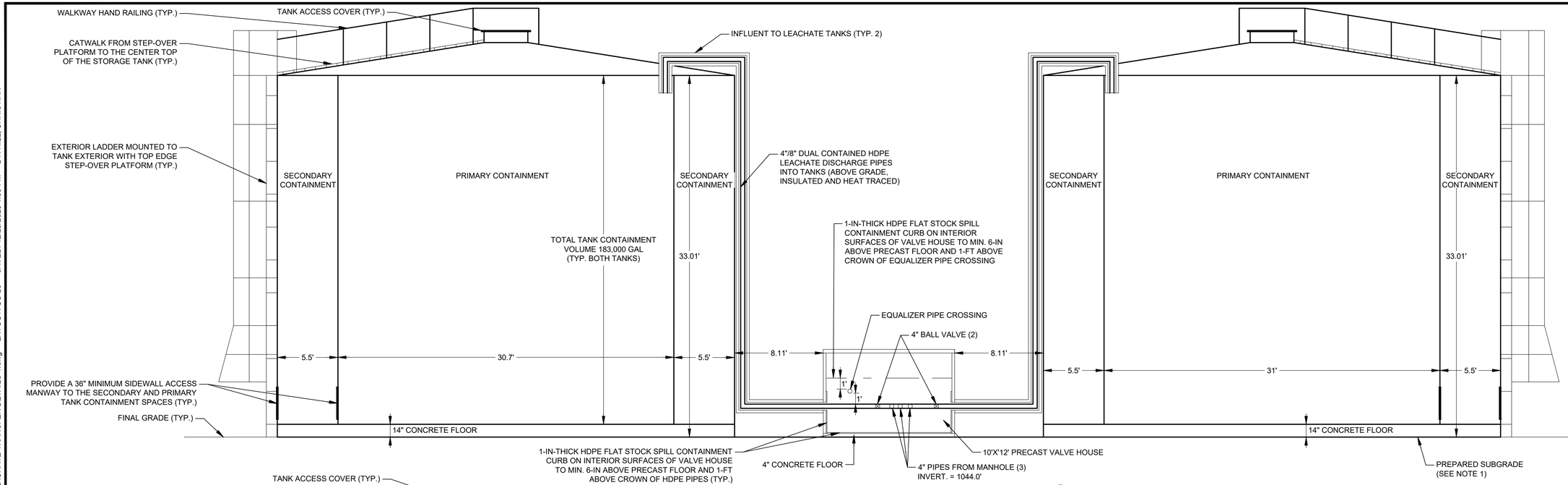
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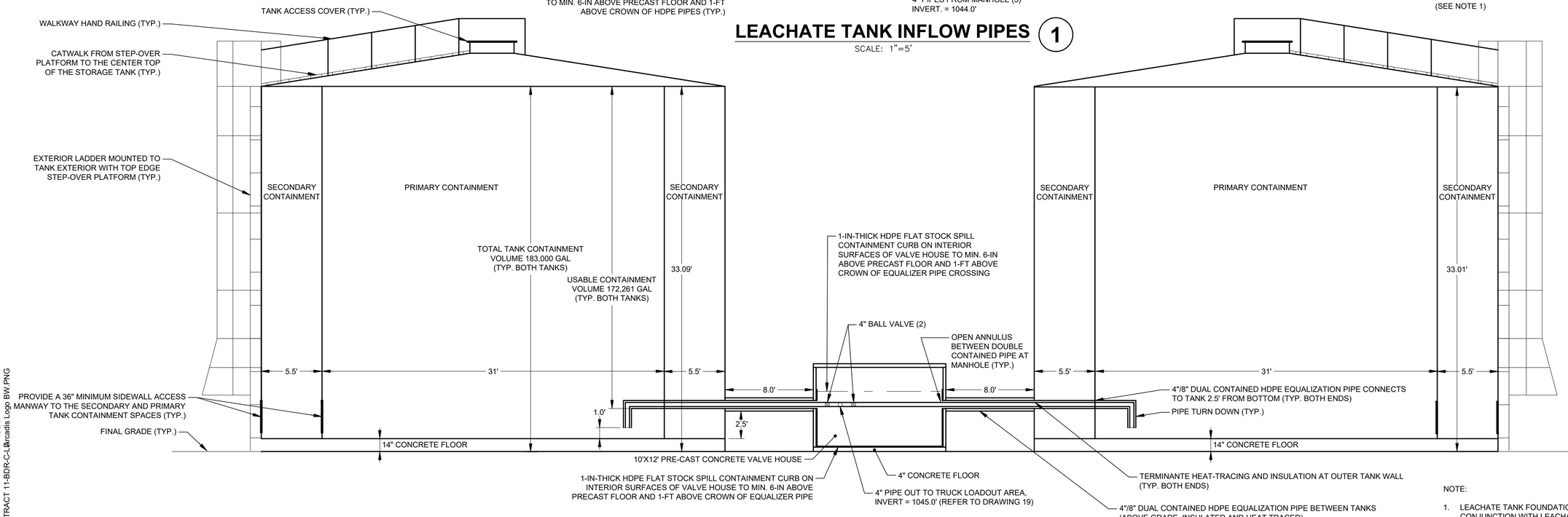
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UC-19



LEACHATE TANK INFLOW PIPES (1)

SCALE: 1"=5'



LEACHATE TANK EQUALIZATION PIPES (2)

SCALE: 1"=5'

NOTE:

1. LEACHATE TANK FOUNDATION REQUIREMENTS TO BE DETERMINED IN CONJUNCTION WITH LEACHATE TANK MANUFACTURER.
2. LEACHATE TANKS SHALL INCLUDE INSULATION TO PROTECT AGAINST FREEZING OF PRIMARY CONTAINMENT TANK CONTENTS.

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1"=5' 5' 0 5' 10'

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Professional Engineer's No.	42983	
State	Date Signed	Project Mgr.
MA		DK
Designed by	Drawn by	Checked by
BMS	KLS	PHB

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LEACHATE CONVEYANCE AND STORAGE SYSTEM DETAILS - 4

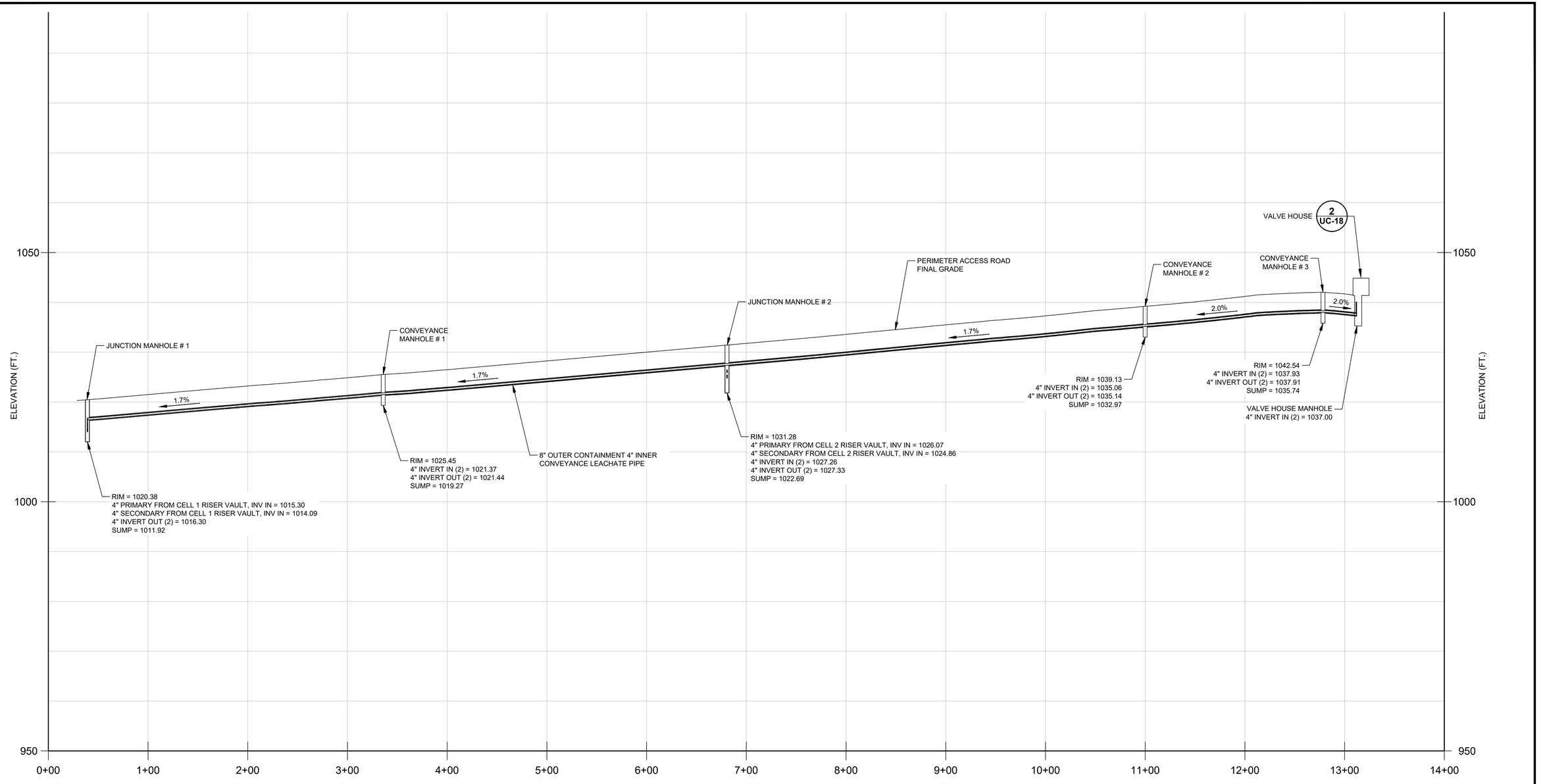
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UC-20



LEACHATE FORCEMAIN PROFILE

0 50' 100'

HORIZONTAL SCALE: 1"=50'

VERTICAL SCALE: 5X EXAGGERATION

NOTE:

1. REFER TO DRAWING UC-15 FOR LEACHATE TRANSFER SYSTEM PLAN INFORMATION.

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LEACHATE FORCEMAIN PROFILE

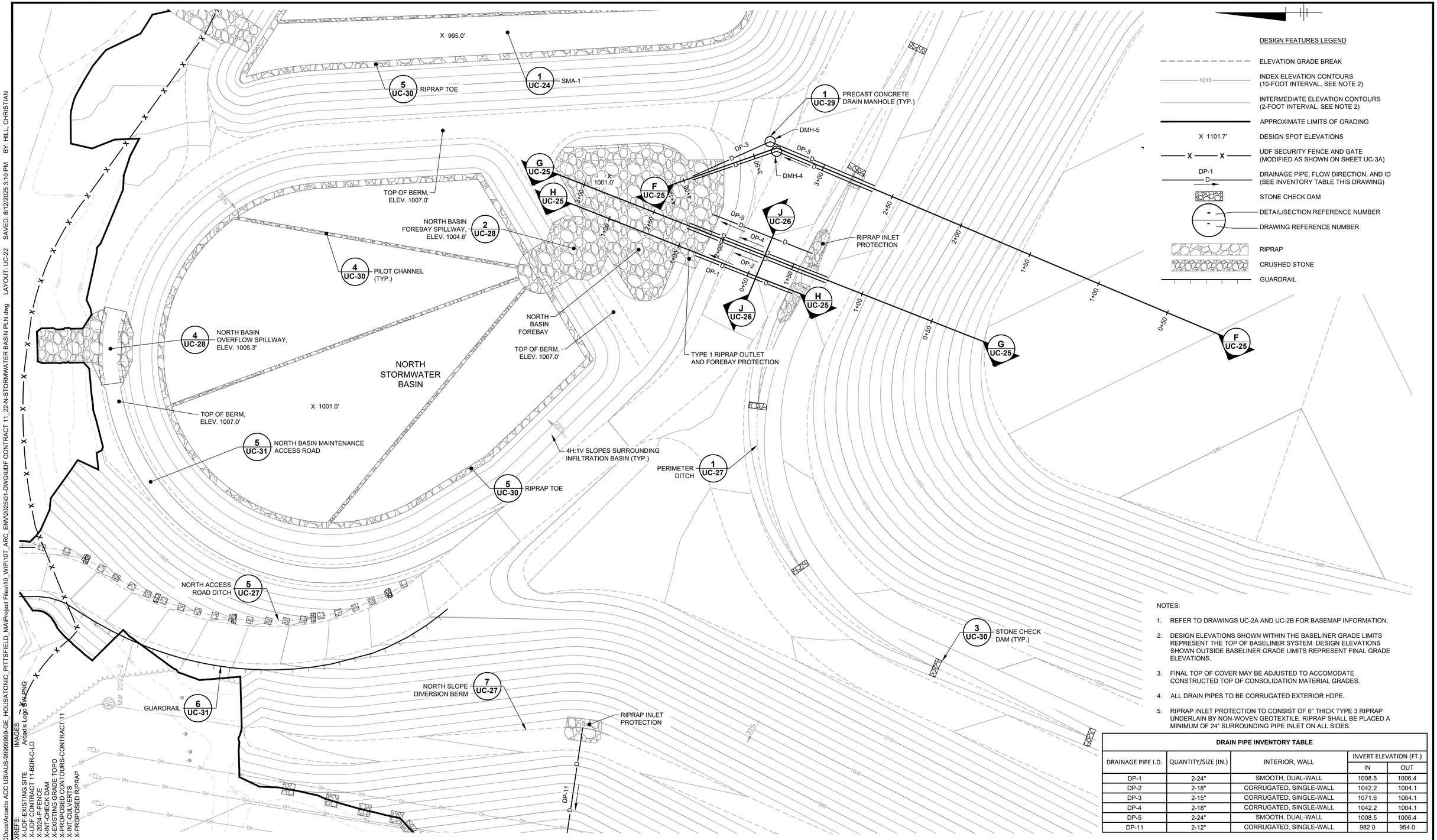
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UC-21



NOTES:

1. REFER TO DRAWINGS UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. DESIGN ELEVATIONS SHOWN WITHIN THE BASELINER GRADE LIMITS REPRESENT THE TOP OF BASELINER SYSTEM. DESIGN ELEVATIONS SHOWN OUTSIDE BASELINER GRADE LIMITS REPRESENT FINAL GRADE ELEVATIONS.
3. FINAL TOP OF COVER MAY BE ADJUSTED TO ACCOMODATE CONSTRUCTED TOP OF CONSOLIDATION MATERIAL GRADES.
4. ALL DRAIN PIPES TO BE CORRUGATED EXTERIOR HDPE.
5. RIPRAP INLET PROTECTION TO CONSIST OF 6" THICK TYPE 3 RIPRAP UNDERLAIN BY NON-WOVEN GEOTEXTILE. RIPRAP SHALL BE PLACED A MINIMUM OF 24" SURROUNDING PIPE INLET ON ALL SIDES.

DRAIN PIPE INVENTORY TABLE

DRAINAGE PIPE I.D.	QUANTITY/SIZE (IN.)	INTERIOR, WALL	INVERT ELEVATION (FT.)	
			IN	OUT
DP-1	2-24"	SMOOTH, DUAL-WALL	1008.5	1006.4
DP-2	2-18"	CORRUGATED, SINGLE-WALL	1042.2	1004.1
DP-3	2-15"	CORRUGATED, SINGLE-WALL	1071.6	1004.1
DP-4	2-18"	CORRUGATED, SINGLE-WALL	1042.2	1004.1
DP-5	2-24"	SMOOTH, DUAL-WALL	1008.5	1006.4
DP-11	2-12"	CORRUGATED, SINGLE-WALL	982.0	954.0

XREFS:
X-UDF-EXISTING SITE
X-UDF CONTRACT 11-BDR-C-LD
X-2024-P-FENCE
X-INT-CHECK DAM
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS-CONTRACT 11
X-INT-CULVERTS
X-PROPOSED RIPRAP
IMAGES:
Arcadis Logo 4cW.PNG

C:\Users\CSHillID\CACCDocs\Arcadis ACC USVAUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\202501-DWG\UDF CONTRACT 11_22-N-STORMWATER BASIN PLN.dwg LAYOUT: UC-22 SAVED: 8/12/2025 3:10 PM BY: HILL, CHRISTIAN

1"=30' (30' 0 30' 60')

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Professional Engineer's Name: **MARK O. GRAVELDING**
Professional Engineer's No.: 42983

State	Date Signed	Project Mgr.
MA		DK
Designed by: BMS	Drawn by: KLS	Checked by: PHB

MARK O. GRAVELDING, COMMONWEALTH OF MASSACHUSETTS, CIVIL, No. 42983, REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

NORTH STORMWATER BASIN PLAN

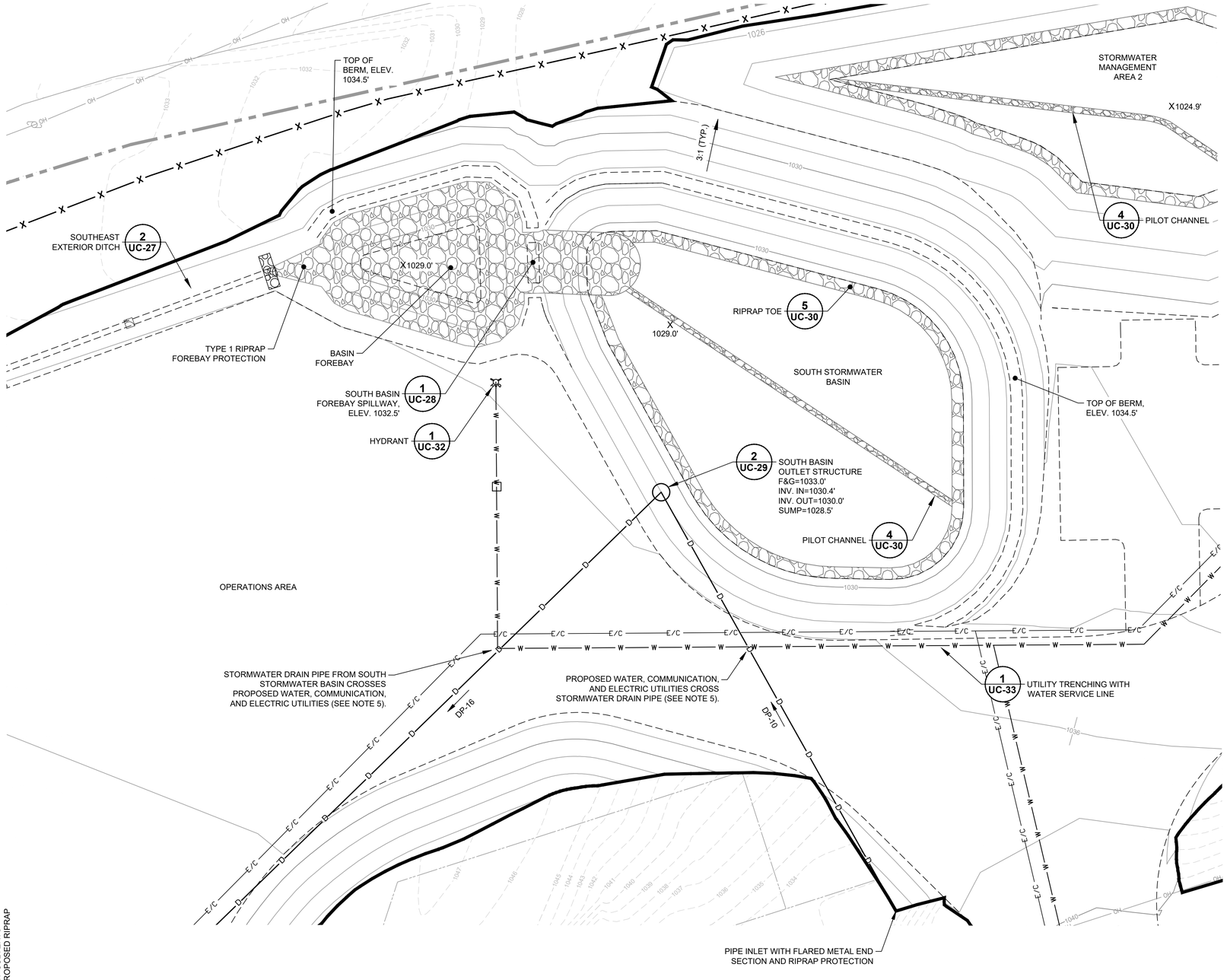
CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No.
30223149.3000

Date
DECEMBER 2025

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ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-22



DESIGN FEATURES LEGEND

- ELEVATION GRADE BREAK
- 1010 — INDEX ELEVATION CONTOURS (10-FOOT INTERVAL, SEE NOTE 2)
- INTERMEDIATE ELEVATION CONTOURS (2-FOOT INTERVAL, SEE NOTE 2)
- APPROXIMATE LIMITS OF GRADING
- X 1101.7' — DESIGN SPOT ELEVATIONS
- UDF SECURITY FENCE AND GATE (MODIFIED AS SHOWN ON SHEET UC-3A)
- DP-7 / D — DRAINPIPE, FLOW DIRECTION, AND ID (SEE INVENTORY TABLE THIS DRAWING)
- W — WATER SERVICE LINE
- E/C — UNDERGROUND ELECTRIC AND COMMUNICATIONS LINES
- DETAIL/SECTION REFERENCE NUMBER
- DRAWING REFERENCE NUMBER
- RIPRAP
- CRUSHED STONE

NOTES:

1. REFER TO DRAWINGS UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. PROPOSED GRADING REPRESENTS TOP OF FINAL GRADE.
3. REFER TO DRAWING UC-8 FOR ADDITIONAL FINAL GRADE INFORMATION.
4. ALL DRAINPIPES TO BE CORRUGATED EXTERIOR HDPE.
5. CONTRACTOR TO DETERMINE AND PROVIDE A MINIMUM OF 12 INCHES OF CROSSOVER SEPARATION DISTANCE BETWEEN WATER/ELECTRIC/COMMUNICATION LINES AND STORMWATER DRAINPIPES.

DRAINPIPE INVENTORY TABLE

DRAINAGE PIPE I.D.	QUANTITY/SIZE (IN.)	INTERIOR, WALL	INVERT ELEVATION (FT.)	
			IN	OUT
DP-10	1-12"	SMOOTH, DUAL-WALL	1032.1	1030.4
DP-16	1-12"	SMOOTH, DUAL-WALL	1030.0	1027.7

XREFS:
X-UDF-EXISTING SITE
X-UDF CONTRACT 11-BDR-C-LD
X-2024-P-FENCE
X-INT-PRO-UTILITIES
X-INT-CHECK DAM
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS-CONTRACT 11
X-ACC ROADS
X-PROPOSED RIPRAP
IMAGES:
Arcadis Logo BW.PNG

C:\Users\CSHILL\DOCACCDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\UDF CONTRACT 11_23-S-STORMWATER BASIN PLN.dwg LAYOUT: UC-23 SAVED: 12/12/2025 3:58 PM BY: HILL, CHRISTIAN

1"=20' (20' 0 20' 40')

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Professional Engineer's Name: **MARK O. GRAVELDING**
Professional Engineer's No.: 42983

State	Date Signed	Project Mgr.
MA		DK
Designed by: BMS	Drawn by: KLS	Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

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UPLAND DISPOSAL FACILITY

SOUTH STORMWATER BASIN PLAN

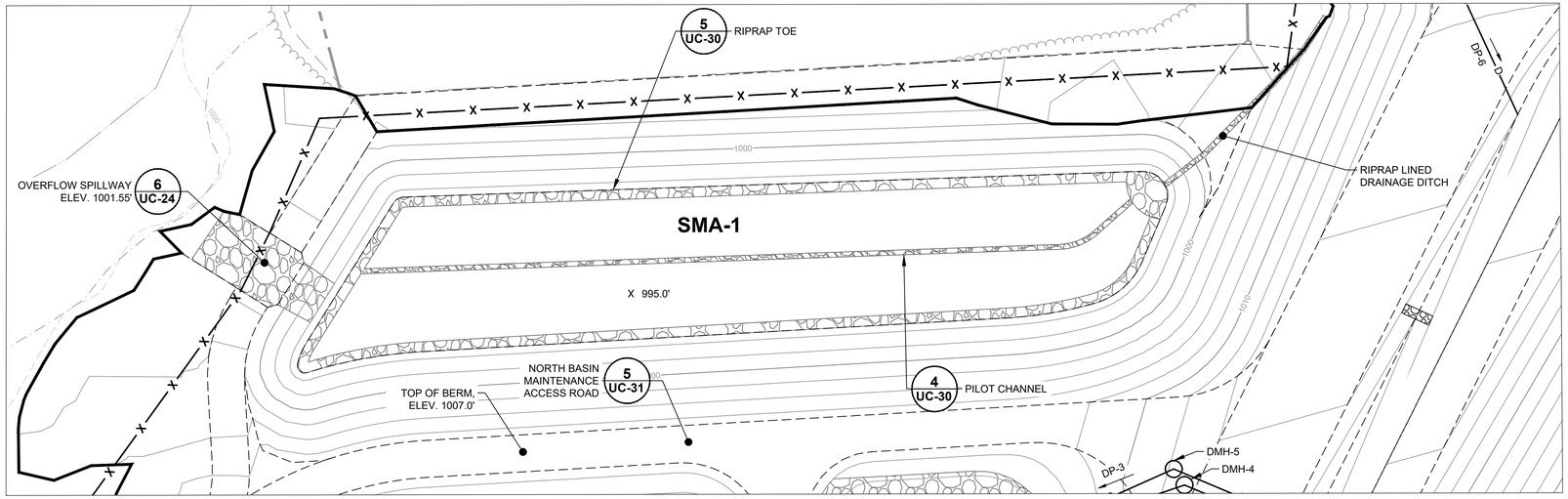
CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No. 30223149.3000

Date DECEMBER 2025

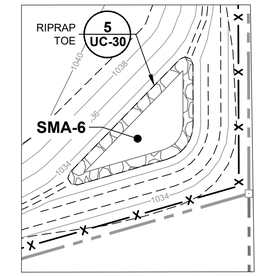
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UC-23



SMA-1 (1)

SCALE: 1" = 30'



SMA-6 (7)

SCALE: 1" = 30'

DESIGN FEATURES LEGEND

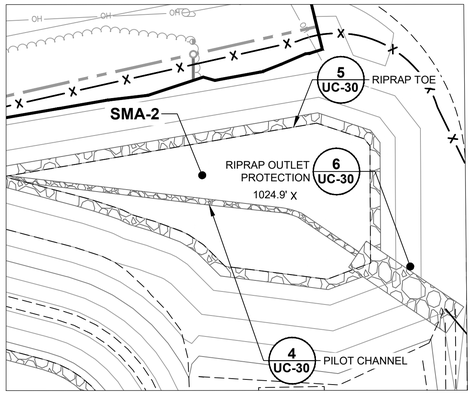
- ELEVATION GRADE BREAK
- 1010 — INDEX ELEVATION CONTOURS (10-FOOT INTERVAL, SEE NOTE 2)
- INTERMEDIATE ELEVATION CONTOURS (2-FOOT INTERVAL, SEE NOTE 2)
- APPROXIMATE LIMITS OF GRADING
- X 1101.7 — DESIGN SPOT ELEVATIONS
- UDF SECURITY FENCE AND GATE (MODIFIED AS SHOWN ON SHEET UC-3A)
- DP-7 — DRAINAGE PIPE, FLOW DIRECTION, AND ID (SEE INVENTORY TABLE THIS DRAWING)
- STONE CHECK DAM
- RIPRAP
- CRUSHED STONE
- DETAIL/SECTION REFERENCE NUMBER
- DRAWING REFERENCE NUMBER

NOTES:

1. REFER TO DRAWINGS UC-2A AND UC-2B FOR BASEMAP INFORMATION.
2. DESIGN ELEVATIONS SHOWN WITHIN THE BASELINER GRADE LIMITS REPRESENT THE TOP OF BASELINER SYSTEM. DESIGN ELEVATIONS SHOWN OUTSIDE BASELINER GRADE LIMITS REPRESENT FINAL GRADE ELEVATIONS.
3. FINAL TOP OF COVER MAY BE ADJUSTED TO ACCOMODATE CONSTRUCTED TOP OF CONSOLIDATION MATERIAL GRADES.
4. ALL DRAIN PIPES TO BE CORRUGATED EXTERIOR HDPE.
5. RENO MATTRESS IS 12" THICK TYPE 4 RIPRAP UNDERLAIN BY NON-WOVEN GEOTEXTILE.
6. RIPRAP INLET PROTECTION TO CONSIST OF 6" THICK LAYER OF TYPE 3 RIPRAP UNDERLAIN BY NON-WOVEN GEOTEXTILE. RIPRAP SHALL BE PLACED A MINIMUM OF 24" SURROUNDING PIPE INLET ON ALL SIDES.

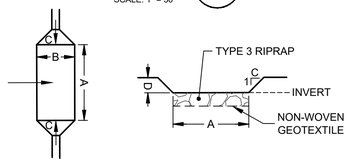
DRAIN PIPE INVENTORY TABLE

DRAIN PIPE I.D.	QUANTITY/SIZE (IN.)	INTERIOR, WALL	INVERT ELEVATION (FT.)	
			IN	OUT
DP-6	1-18"	SMOOTH, DUAL-WALL	1015.4'	1014.0'
DP-8	1-18"	CORRUGATED, SINGLE-WALL	999.4'	997.0'
DP-9	4-4"	SMOOTH, DUAL-WALL	987.5'	987.1'
DP-11	2-12"	CORRUGATED, SINGLE-WALL	982.0'	954.0'
DP-12	2-18"	SMOOTH, DUAL-WALL	952.5'	949.6'
DP-15	2-8"	SMOOTH, DUAL-WALL	1028.7'	1026.6'



SMA-2 (2)

SCALE: 1" = 30'

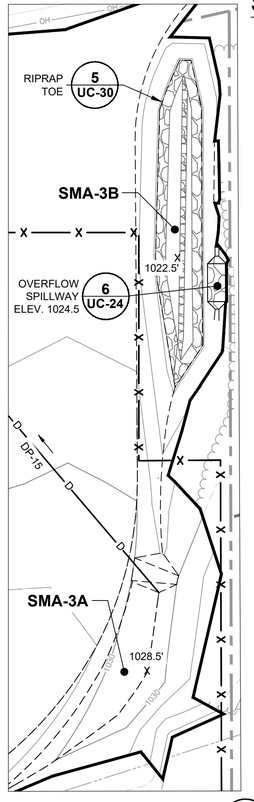


INVERTS AND DIMENSIONS FOR SMA-1, 3B, 4, & 5

	INVERT ELEVATION (FT.)	WIDTH (A)	LENGTH (B)	SIDESLOPES (C)	DEPTH (D)
SMA-1	1001.55	20	15	3	0.45
SMA-3B	1024.5	15	6	3	1
SMA-4	990	8	5	3	1
SMA-5	954.5	16	16.4	10	1

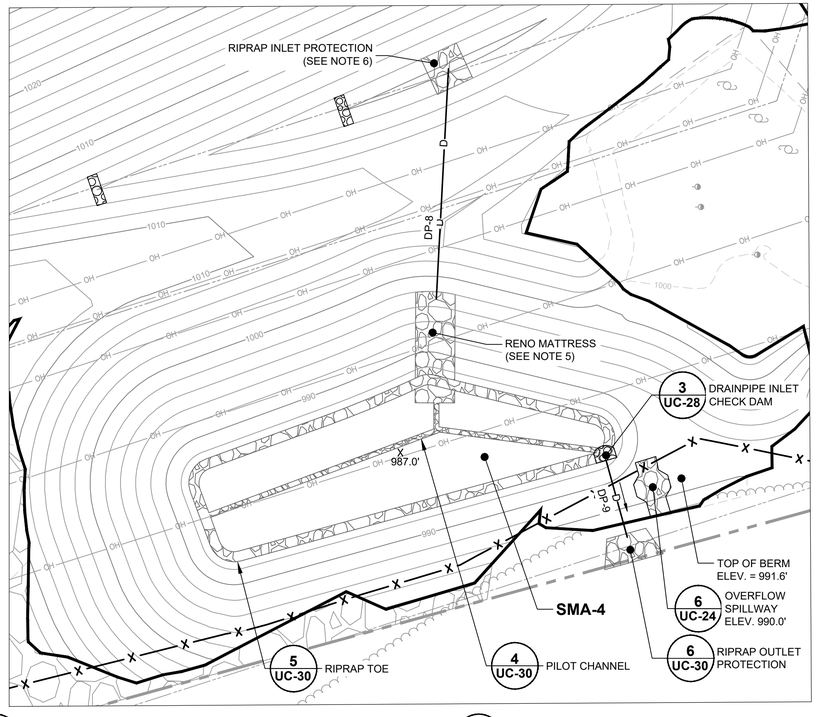
TYPICAL SMA OVERFLOW SPILLWAY (6)

NOT TO SCALE



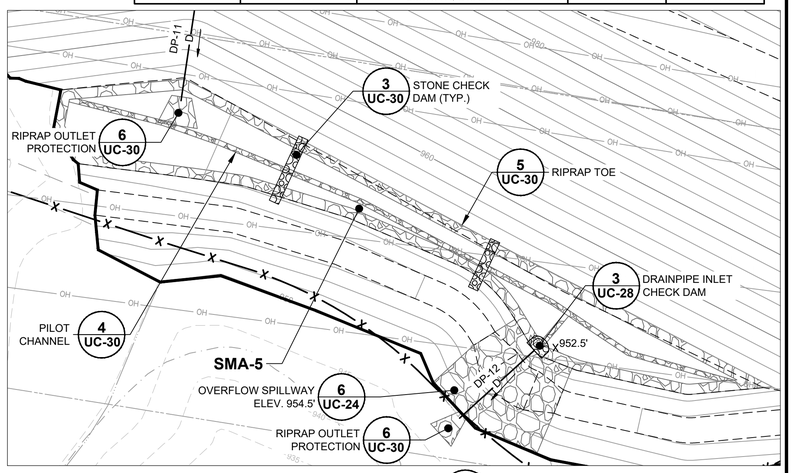
SMA-3A & 3B (3)

SCALE: 1" = 30'



SMA-4 (4)

SCALE: 1" = 30'



SMA-5 (5)

SCALE: 1" = 30'

XREFS:
IMAGES: Arcadis Logo BW.PNG
X-UDF-EXISTING SITE
X-UDF CONTRACT 11-BDR-C-LD
X-2024-P-FENCE
X-INT-CHECK DAM
X-EXISTING GRADE TOPO
X-PROPOSED CONTOURS-CONST
X-INT-CULVERTS
X-PROPOSED RIPRAP

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Professional Engineer's No.: 42983
State: MA | Date Signed: | Project Mgr.: DK
Designed by: BMS | Drawn by: KLS | Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

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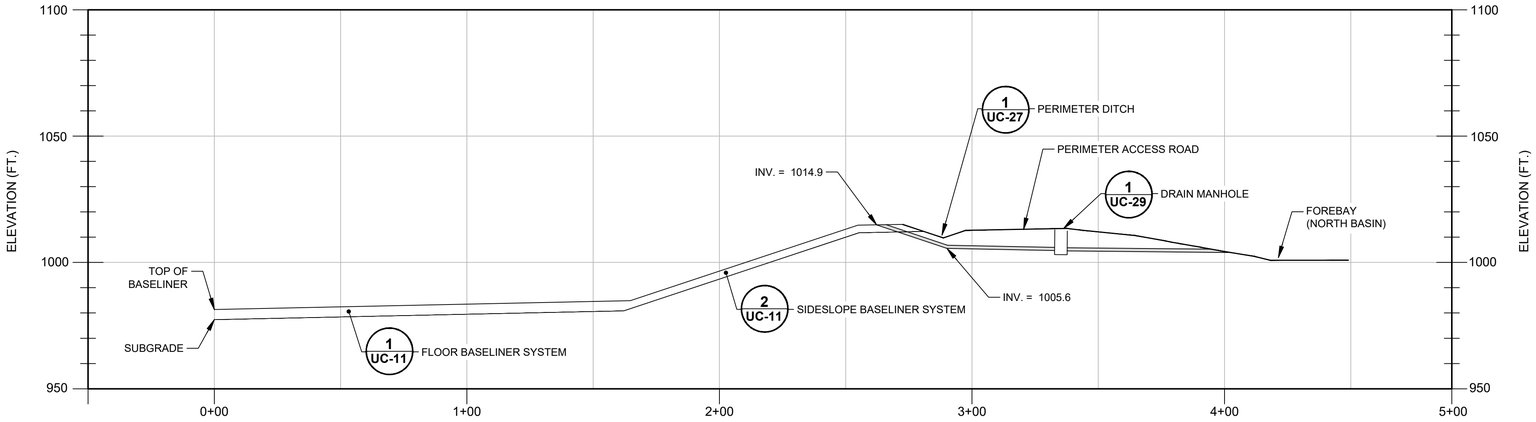
STORMWATER MANAGEMENT AREAS PLAN

CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No. 30223149.3000
Date DECEMBER 2025

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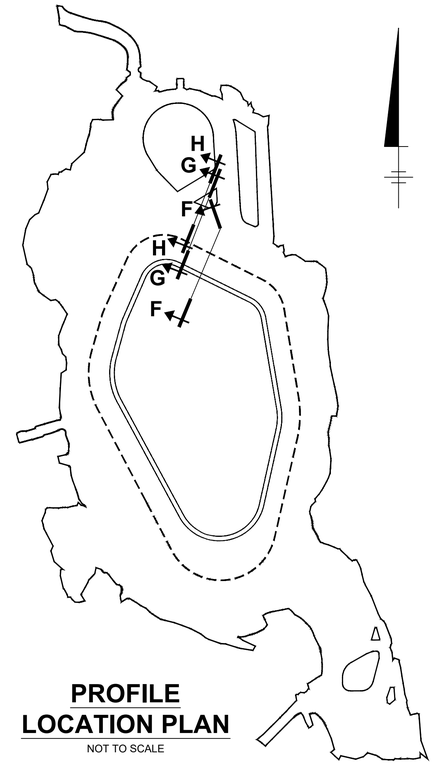
UC-24



STATION

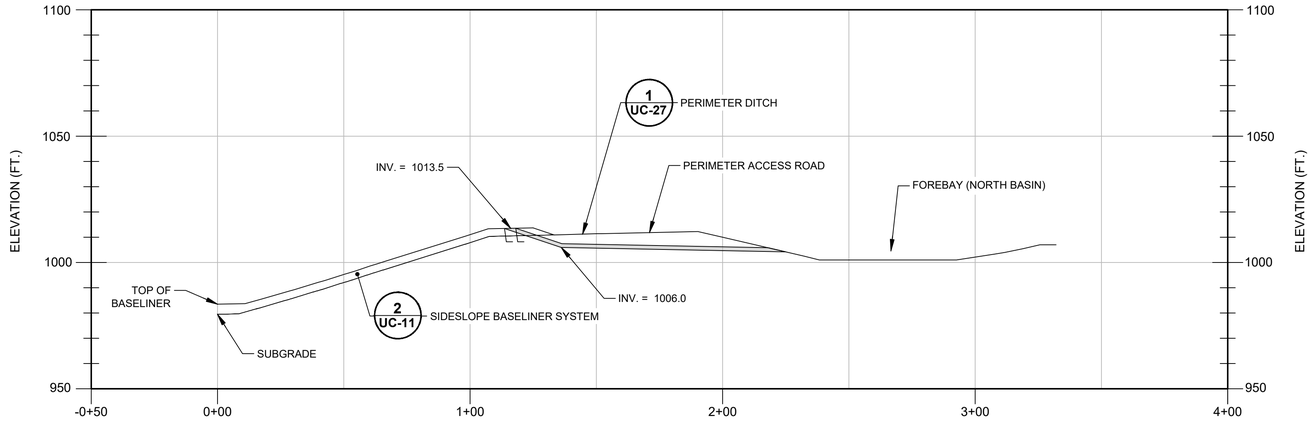
DRAIN PIPE PROFILE F

SCALE: 1" = 30'
(NO VERTICAL EXAGGERATION)



PROFILE LOCATION PLAN

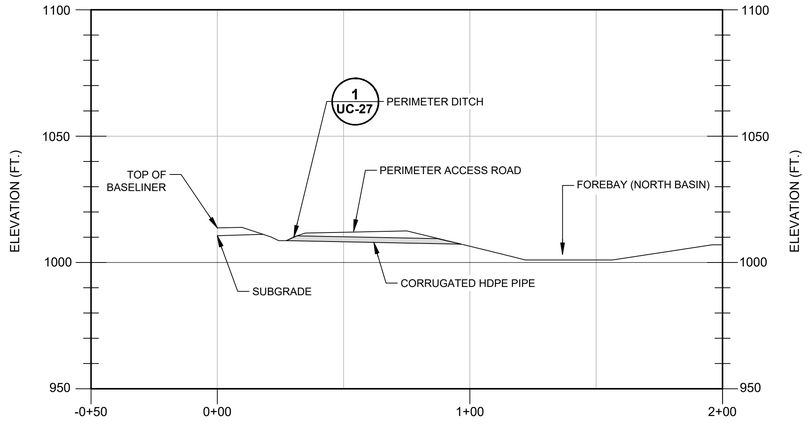
NOT TO SCALE



STATION

DRAIN PIPE PROFILE G

SCALE: 1" = 30'
(NO VERTICAL EXAGGERATION)



STATION

DRAIN PIPE PROFILE H

SCALE: 1" = 30'
(NO VERTICAL EXAGGERATION)

C:\Users\CSHill\DC\ACCDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\UDF CONTRACT 11_25-26-27-STORMWATER DETAILS-I-2-3.dwg LAYOUT: UC-25 SAVED: 12/29/2025 3:55 PM BY: HILL, CHRISTIAN

XREFS:
IMAGES:
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Professional Engineer's No.: 42983		
State: MA	Date Signed:	Project Mgr.: DK
Designed by: BMS	Drawn by: KLS	Checked by: PHB

MARK O. GRAVELDING
COMMONWEALTH OF MASSACHUSETTS
Civil
No. 42983
REGISTERED PROFESSIONAL ENGINEER

ARCADIS

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STORMWATER MANAGEMENT DETAILS - 1

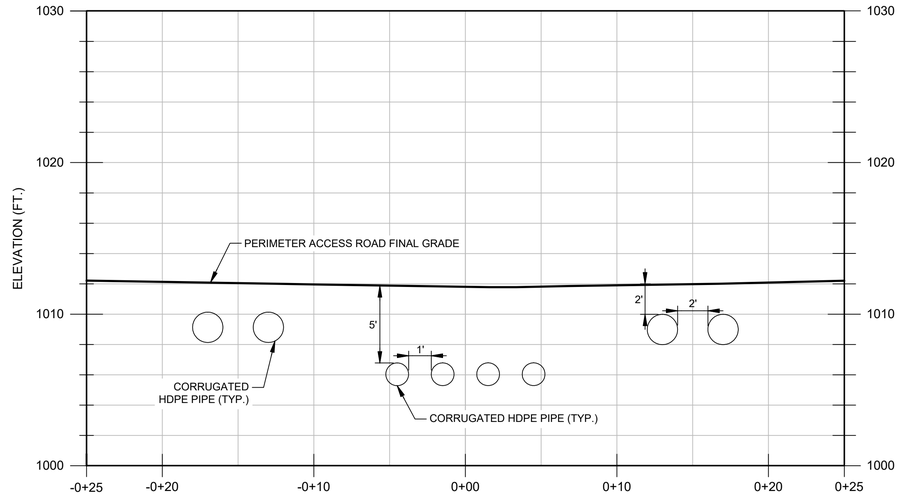
CONTRACT 11 - UDF CONSTRUCTION

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DECEMBER 2025

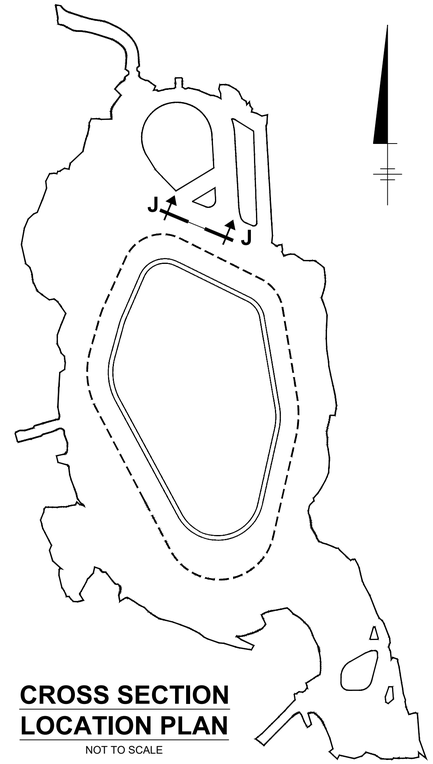
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110 WEST FAYETTE STREET
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UC-25



DRAIN PIPE SECTION (J)

SCALE: 1" = 5'
(NO VERTICAL EXAGGERATION)



CROSS SECTION LOCATION PLAN

NOT TO SCALE

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IMAGES:
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Professional Engineer's No.: 42983

State	Date Signed	Project Mgr.
MA		DK
Designed by: BMS	Drawn by: KLS	Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

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UPLAND DISPOSAL FACILITY

STORMWATER MANAGEMENT DETAILS - 2

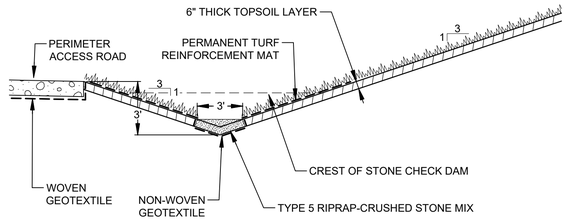
CONTRACT 11 - UDF CONSTRUCTION

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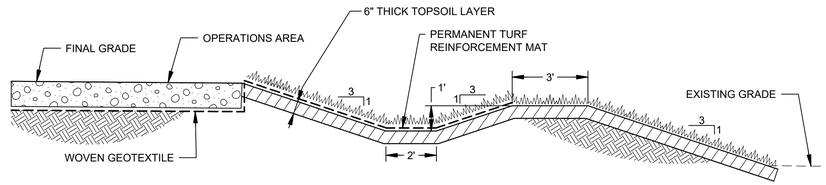
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UC-26



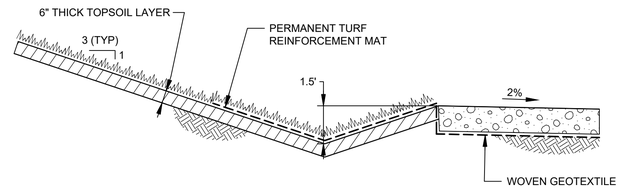
PERIMETER DITCH 1

NOT TO SCALE



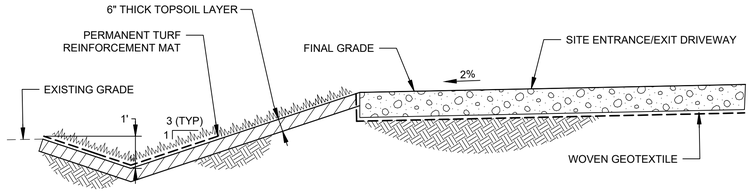
SOUTHEAST EXTERIOR DITCH 2

NOT TO SCALE



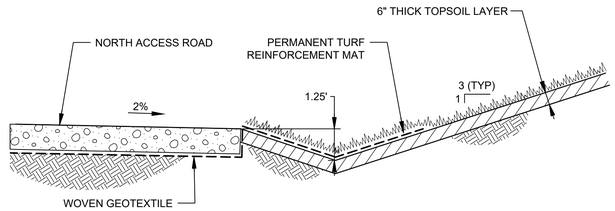
EAST EXTERIOR DITCH 3

NOT TO SCALE



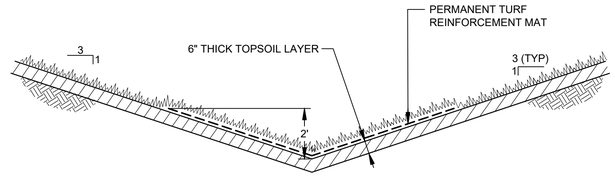
SOUTH ACCESS ROAD DITCH 4

NOT TO SCALE



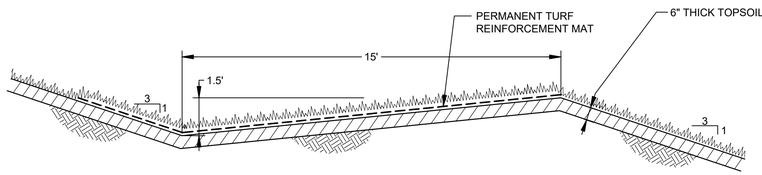
NORTH ACCESS ROAD DITCH 5

NOT TO SCALE



SOUTHWEST EXTERIOR DITCH 6

NOT TO SCALE



NORTH SLOPE DIVERSION BERM 7

NOT TO SCALE

GENERAL NOTES:

1. REFER TO THE FINAL GRADING PLAN ON DRAWING UC-8 FOR LONGITUDINAL SLOPES OF DITCHES.
2. REFER TO DRAWING UC-29, DETAIL 3 FOR TURF REINFORCEMENT MAT CHANNEL LINING.

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SCALE(S) AS INDICATED

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Professional Engineer's No.: 42983

State	Date Signed	Project Mgr.
MA		DK
Designed by: BMS	Drawn by: KLS	Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE ● LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

STORMWATER MANAGEMENT DETAILS - 3

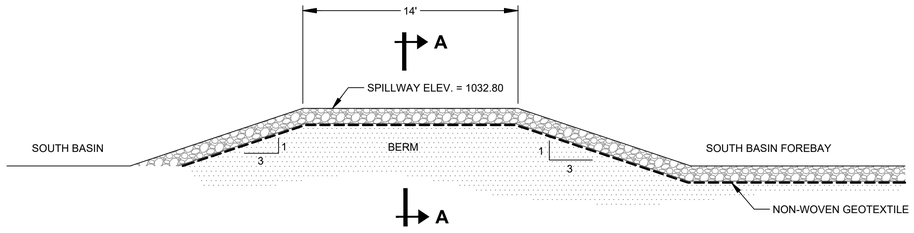
CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No.
30223149.3000

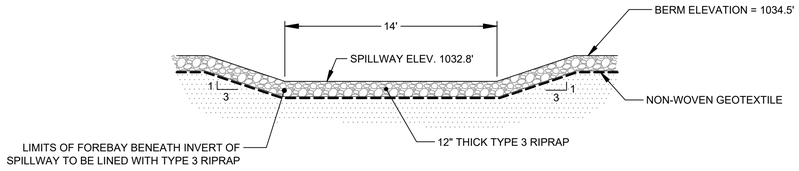
Date
DECEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-27



PROFILE

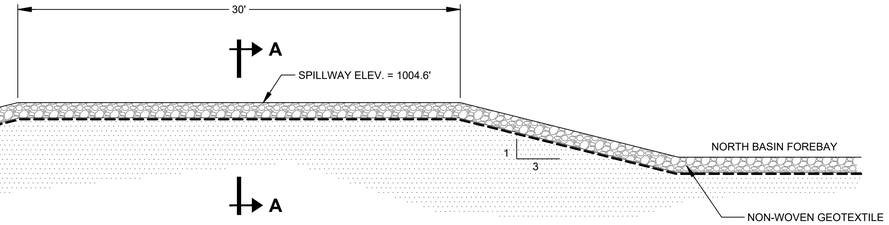


SECTION A-A

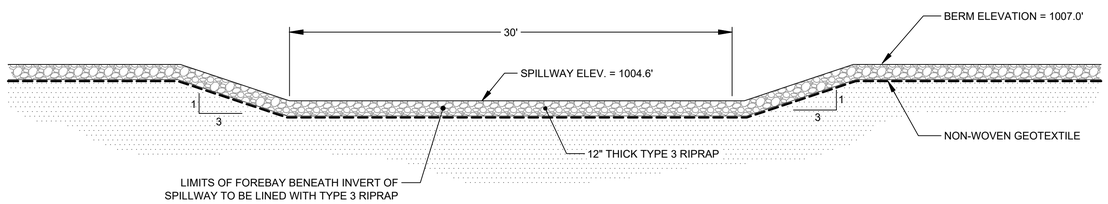
SOUTH BASIN FOREBAY SPILLWAY 1

0 5' 10'

SCALE: 1"=5'



PROFILE

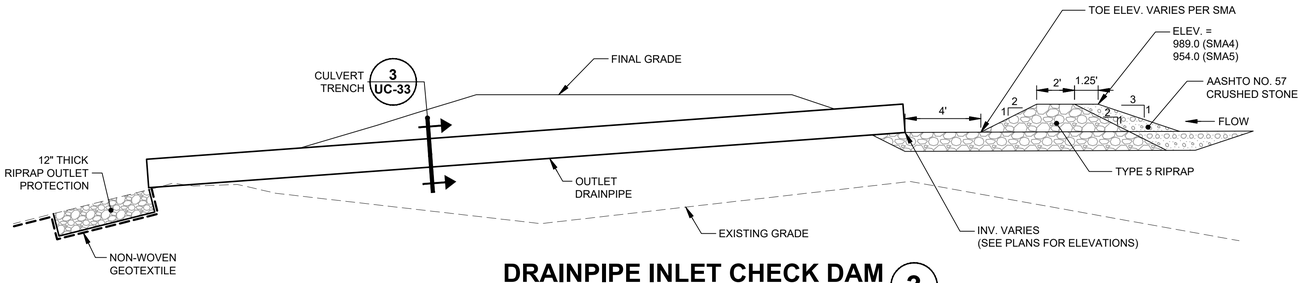


SECTION A-A

NORTH BASIN FOREBAY SPILLWAY 2

0 5' 10'

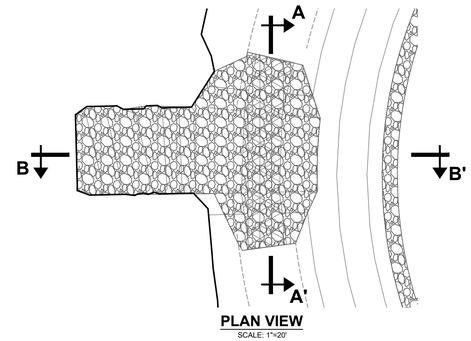
SCALE: 1"=5'



DRAINPIPE INLET CHECK DAM 3

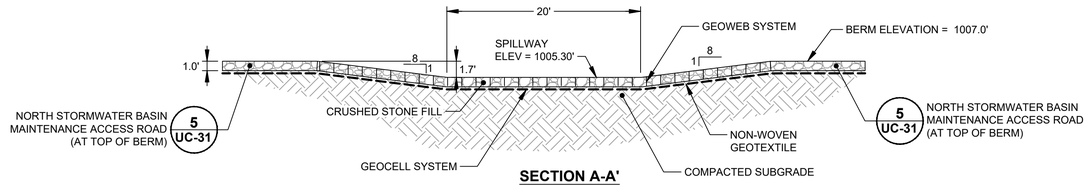
0 4' 8'

SCALE: 1"=4'

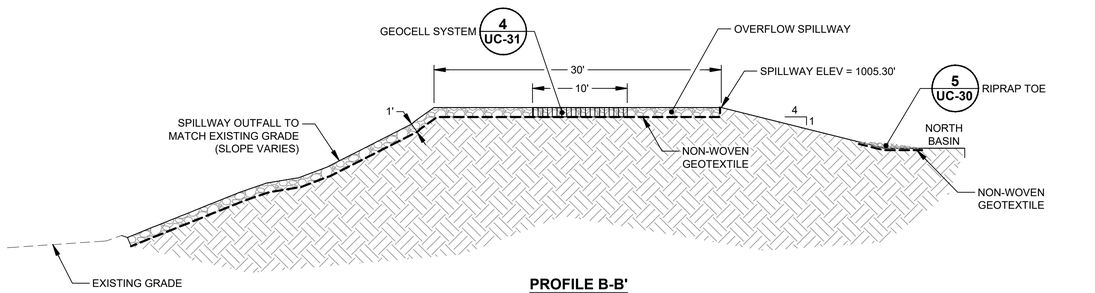


PLAN VIEW

SCALE: 1"=20'



SECTION A-A'



PROFILE B-B'

NORTH BASIN EMERGENCY SPILLWAY 4

0 8' 16'

SCALE: 1"=8'

XREFS:
X-UDF CONTRACT 11-BDR-C-LD
X-PROPOSED CONTOURS
X-PROPOSED RIPRAP

IMAGES:
Arcadis Logo BW.PNG

C:\Users\CSHILL\DOCACCDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\UDF CONTRACT 11_28-STORMWATER DETAILS-4.dwg LAYOUT: UC-28 SAVED: 6/14/2025 12:58 AM BY: HILL, CHRISTIAN

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.	42983	
State	Date Signed	Project Mgr.
MA		DK
Designed by	Drawn by	Checked by
BMS	KLS	PHB

COMMONWEALTH OF MASSACHUSETTS MARK O. GRAVELDING CIVIL No. 42983 REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS

UPLAND DISPOSAL FACILITY

STORMWATER MANAGEMENT DETAILS - 4

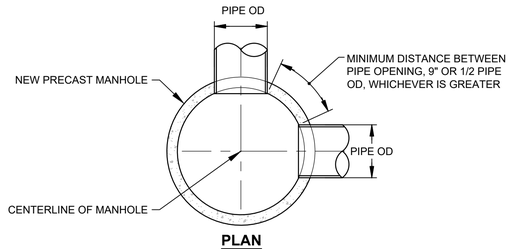
CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No. 30223149.3000

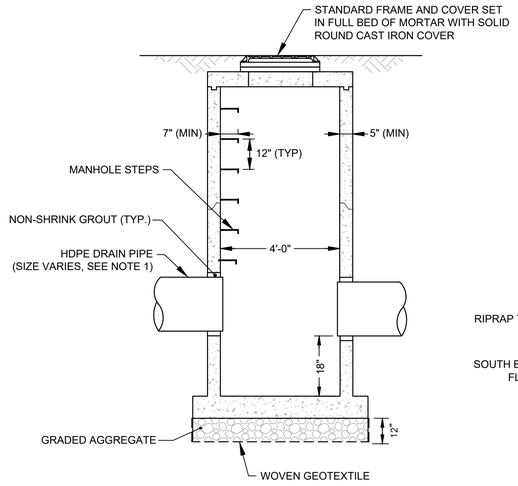
Date DECEMBER 2025

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SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-28



PLAN



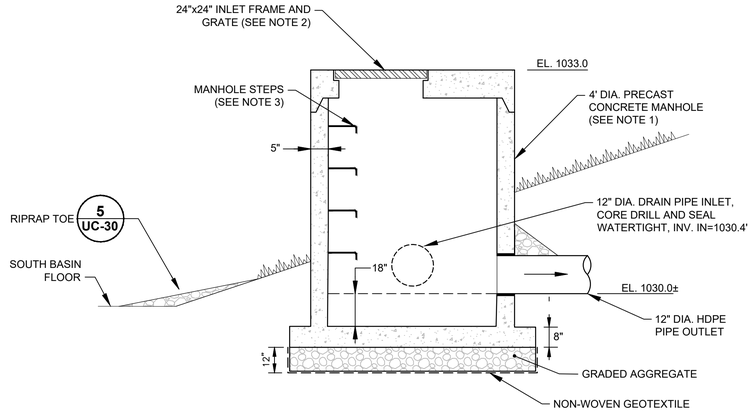
INVERT TABLE				
	RIM	INV. IN	INV. OUT	SUMP
DMH-1	1038.5	1027.7	1027.6	1026.1
DMH-2	1039.9	1026.9	1026.8	1025.3
DMH-3	1041.0	1025.4	1025.3	1023.8
DMH-4	1012.3	1004.8	1004.7	1003.2
DMH-5	1012.3	1004.8	1004.7	1003.2

NOTES:

1. REFER TO DRAWINGS UC-22-UC-24 FOR DRAINPIPE ALIGNMENTS, SIZES, AND INVERT ELEVATIONS.
2. CONFORM PRECAST MANHOLES TO LATEST VERSION OF ASTM C139 INCLUDING WATER PROOFING OF ALL EXTERIOR SURFACES.
3. FRAME AND COVER TO MEET OR EXCEED H-20 LOADING.
4. REFER TO THE TECHNICAL SPECIFICATIONS WITH REGARDS TO NON-SHRINK GROUT MATERIAL.
5. REFER TO DRAWING UC-7 FOR DRAIN MANHOLE LOCATIONS.

PRECAST CONCRETE DRAIN MANHOLE 1

NOT TO SCALE

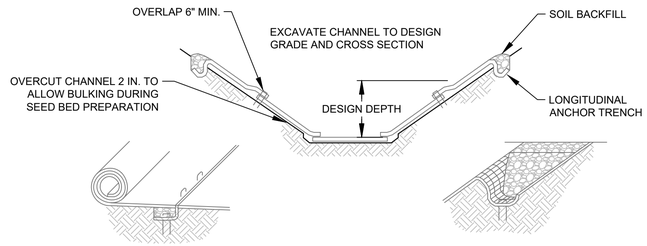


NOTES:

1. PRECAST REINFORCED CONCRETE MANHOLE SHALL CONFORM TO LATEST VERSION OF ASTM C478.
2. INLET FRAME AND GRATE STRUCTURE SHALL BE COMPLIANT WITH MASSDOT SPECIFICATIONS FOR H-20 LOAD RATING.
3. MANHOLE STEPS SHALL BE PROVIDED FOR ALL MANHOLES EXCEEDING 3 FEET DEEP. MANHOLE STEPS SHALL MEET ASTM C478 AND OSHA STANDARDS.

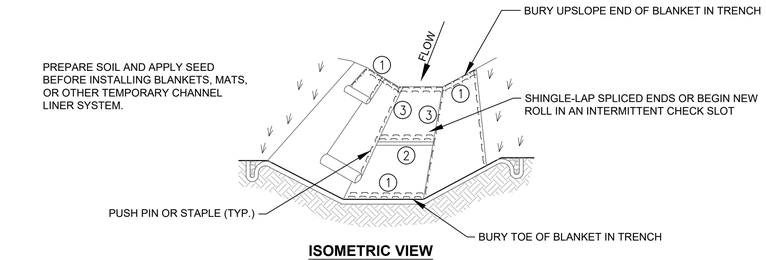
SOUTH BASIN OUTLET STRUCTURE 2

NOT TO SCALE

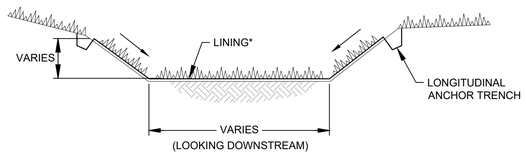


INTERMITTENT CHECK SLOT

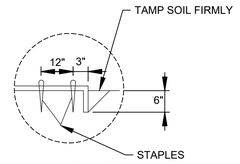
LONGITUDINAL ANCHOR TRENCH



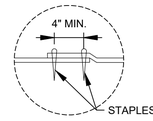
ISOMETRIC VIEW



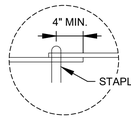
CHANNEL TRAPEZOIDAL CROSS-SECTION



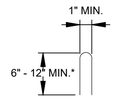
ANCHOR SLOT



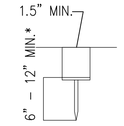
SINGLE JOINT



PARALLEL OVERLAPS



STAPLE DETAIL



PUSH PIN DETAIL

* SEE MANUFACTURER'S LINING INSTALLATION DETAIL FOR STAPLE PATTERNS, VEGETATIVE STABILIZATION FOR SOIL AMENDMENTS, SEED MIXTURES AND MULCHING INFORMATION

NOTES:

1. ANCHOR TRENCHES SHALL BE INSTALLED AT BEGINNING AND END OF CHANNEL IN THE SAME MANNER AS LONGITUDINAL ANCHOR TRENCHES.
2. CHANNEL DIMENSIONS SHALL BE CONSTANTLY MAINTAINED. CHANNEL SHALL BE CLEANED WHENEVER TOTAL CHANNEL DEPTH IS REDUCED BY 25% AT ANY LOCATION.
3. SEDIMENT DEPOSITS SHALL BE REMOVED WITHIN 24 HOURS OF DISCOVERY OR AS SOON AS SOIL CONDITIONS PERMIT ACCESS TO CHANNEL WITHOUT FURTHER DAMAGE. DAMAGED LINING SHALL BE REPAIRED OR REPLACED WITHIN 48 HOURS OF DISCOVERY.
4. NO MORE THAN ONE THIRD OF THE SHOOT (GRASS LEAF) SHALL BE REMOVED IN ANY MOWING. GRASS HEIGHT SHALL BE MAINTAINED BETWEEN 2 AND 3 INCHES UNLESS OTHERWISE SPECIFIED. EXCESS VEGETATION SHALL BE REMOVED FROM PERMANENT CHANNELS TO ENSURE SUFFICIENT CHANNEL CAPACITY.
5. AFTER CONSTRUCTION IS COMPLETE AND THE CHANNEL IS STABLE, INSPECT THE PERMANENT CHANNEL ANNUALLY AND AFTER EACH MAJOR RAINFALL FOR DAMAGE AND DETERIORATION. REPAIR DAMAGES IMMEDIATELY. ONGOING MAINTENANCE SHOULD INCLUDE THE REMOVAL OF ACCUMULATED SEDIMENT.
6. FOR SANDY SOIL CONDITIONS, STAPLE OR PUSH PIN SHALL BE A MINIMUM 8 INCHES.

TURF REINFORCEMENT MAT CHANNEL LINING 3

NOT TO SCALE

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IMAGES:
X-UDF CONTRACT 11-BDR-C-LD
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Professional Engineer's Name: **MARK O. GRAVELDING**
Professional Engineer's No.: 42983

State	Date Signed	Project Mgr.
MA		DK
Designed by	Drawn by	Checked by
BMS	KLS	PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE ● LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

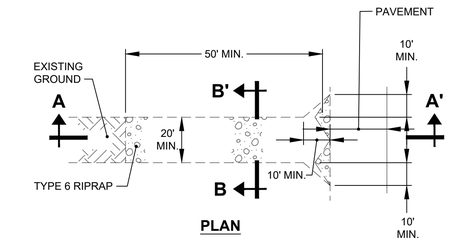
STORMWATER MANAGEMENT DETAILS - 5

CONTRACT 11 - UDF CONSTRUCTION

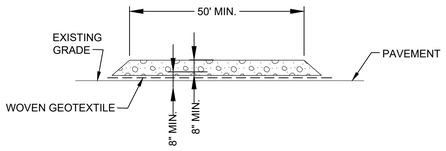
ARCADIS Project No. 30223149.3000
Date DECEMBER 2025

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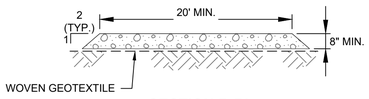
UC-29



PLAN



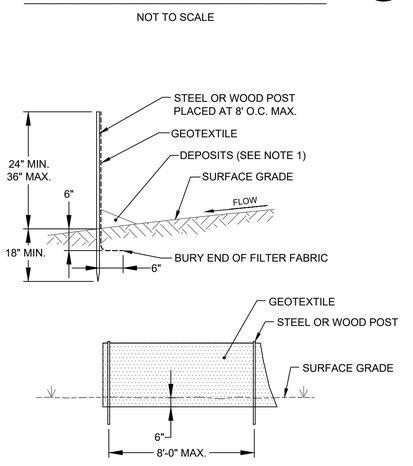
SECTION A-A'



SECTION B-B'

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE FOR MAIN SITE ACCESS 1

NOT TO SCALE

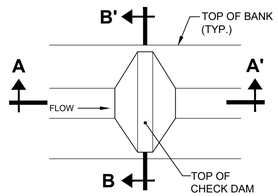


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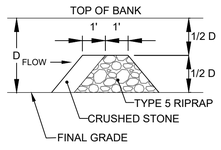
1. DEPOSITS SHALL BE REMOVED WHEN THEY REACH APPROXIMATELY 6 INCHES ABOVE GRADE ELEVATION.
2. THE SILT FENCE WILL REMAIN IN PLACE UNTIL A VEGETATIVE STAND IS ESTABLISHED.
3. THE SILT FENCE WILL BE USED FOR TEMPORARY EROSION AND SEDIMENTATION CONTROL ONLY.

TEMPORARY SILT FENCE 2

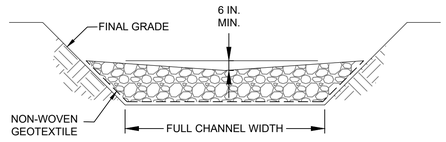
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PLAN



SECTION A-A



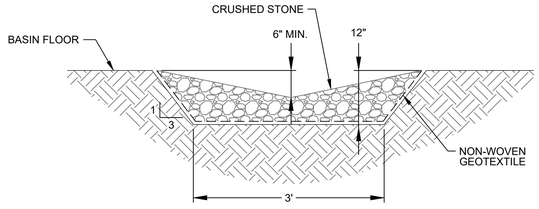
SECTION B-B

NOTES:

1. SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE HEIGHT OF THE DAMS.
2. DURING CONSTRUCTION, INSPECT STONE CHECK DAMS AT LEAST ONCE A WEEK AND WITHIN 24 HOURS OF THE END OF A STORM WITH A RAINFALL AMOUNT OF 0.5 INCH OR GREATER TO DETERMINE MAINTENANCE NEEDS.
3. REPLACE OR REPAIR THE CHECK DAM WITHIN 24 HOURS OF OBSERVED FAILURE.
4. IF STONE CHECK DAMS ARE USED IN GRASS-LINED CHANNELS WHICH WILL BE MOWED, CAREFULLY GRADE OUT THE STONE TO ENSURE IT DOES NOT INTERFERE WITH MOWING.
5. IMMEDIATELY UPON STABILIZATION OF EACH CHANNEL, REMOVE ACCUMULATED SEDIMENT AND STABILIZE DISTURBED AREAS.

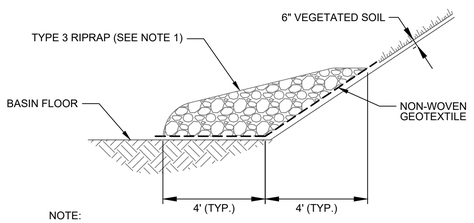
STONE CHECK DAM 3

NOT TO SCALE



PILOT CHANNEL 4

NOT TO SCALE

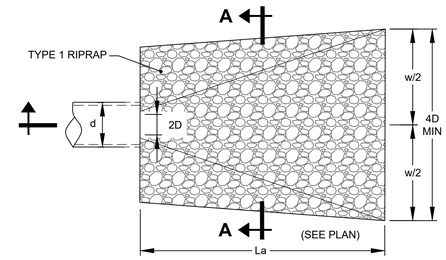


NOTE:

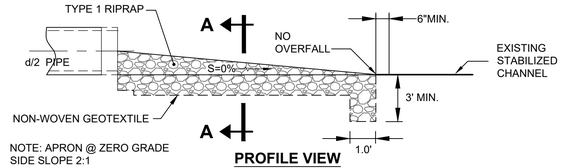
1. RIPRAP MOUND TO BE CONSTRUCTED ALONG INTERIOR TOE OF STORMWATER BASINS AND STORMWATER MANAGEMENT AREAS.

RIPRAP TOE OF BASIN 5

NOT TO SCALE

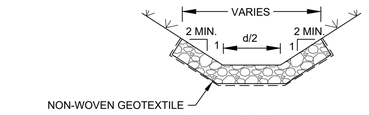


PLAN VIEW



NOTE: APRON @ ZERO GRADE
SIDE SLOPE 2:1

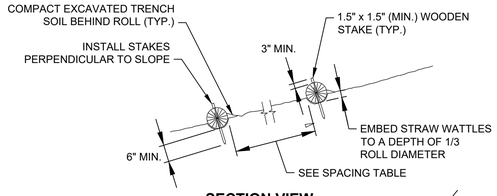
PROFILE VIEW



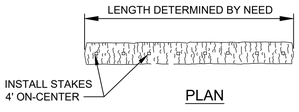
CROSS SECTION A-A

RIPRAP OUTLET PROTECTION 6

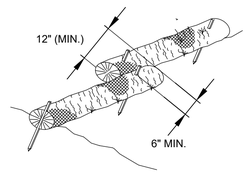
NOT TO SCALE



SECTION VIEW - GRASSED AREAS



PLAN



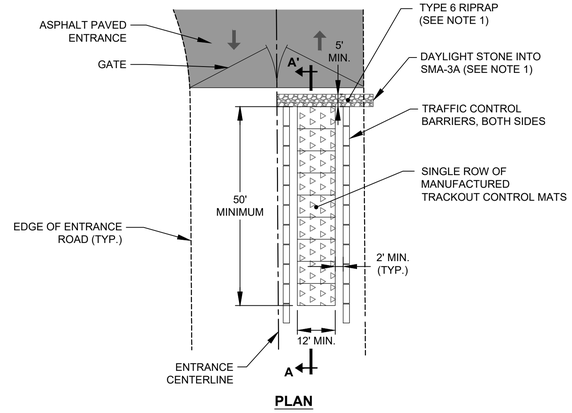
OVERLAPPING DETAIL

NOTES:

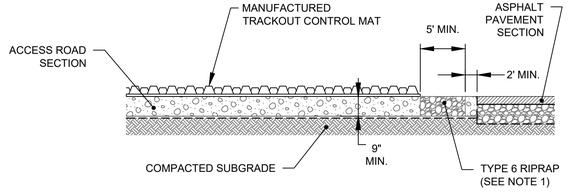
1. PLACE WATTLES PARALLEL TO TOE OF SLOPE OR ALONG SLOPE CONTOUR. TURN THE ENDS OF EACH WATTLE UPSLOPE TO INHIBIT FLOW AROUND THE ROLL.
2. WHEN MULTIPLE WATTLES ARE REQUIRED ALONG AN ALIGNMENT, OVERLAP ADJOINING SEGMENTS BY A MINIMUM OF 12 INCHES.
3. REMOVE SEDIMENT FROM THE UPSLOPE SIDE OF WATTLES WHEN 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 7

NOT TO SCALE



PLAN



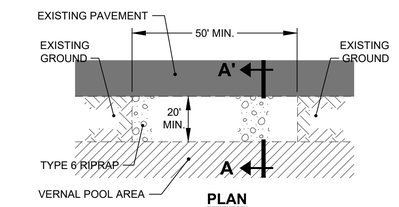
SECTION A-A'

NOTE:

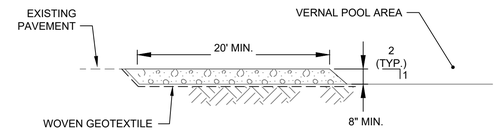
1. TYPE 6 RIPRAP TRANSITION TO BE SLOPED TOWARD AND DAYLIGHT INTO STORMWATER MANAGEMENT AREA (SMA) 3A. STONE TO BE PLACED IN A MANNER THAT ALLOWS FOR DRAINAGE WITHIN STONE MATERIAL TO DRAIN OUT INTO SMA-3A.

PERMANENT STABILIZED CONSTRUCTION ENTRANCE 8

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PLAN



SECTION A-A'

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE FOR VERNAL POOL ACCESS 9

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Professional Engineer's Name: MARK O. GRAVELDING
Professional Engineer's No.: 42983

State	Date Signed	Project Mgr.
MA		DK
Designed by: BMS	Drawn by: KLS	Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

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UPLAND DISPOSAL FACILITY

EROSION AND SEDIMENT CONTROL DETAILS

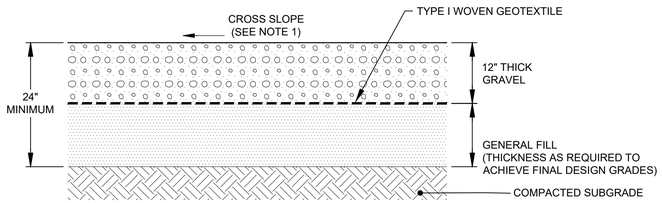
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ARCADIS Project No. 30223149.3000

Date DECEMBER 2025

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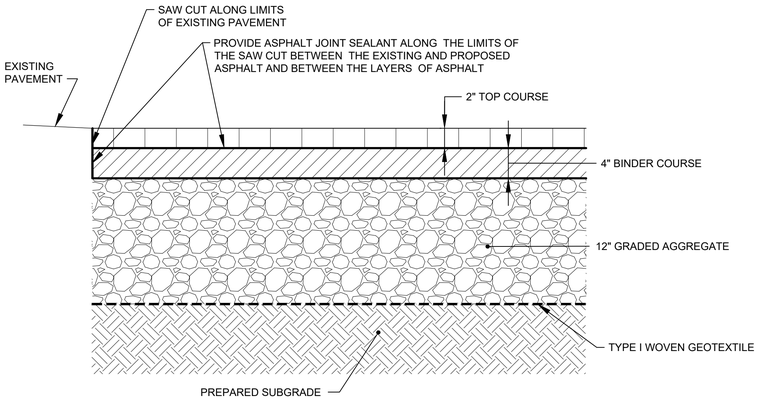


NOTE:

1. FINAL GRADE OF ACCESS ROAD SHALL MAINTAIN A CROSS SLOPE SUFFICIENT TO PROMOTE SURFACE RUNOFF DRAINAGE.

OPERATIONS AREA AND ACCESS ROAD (1)

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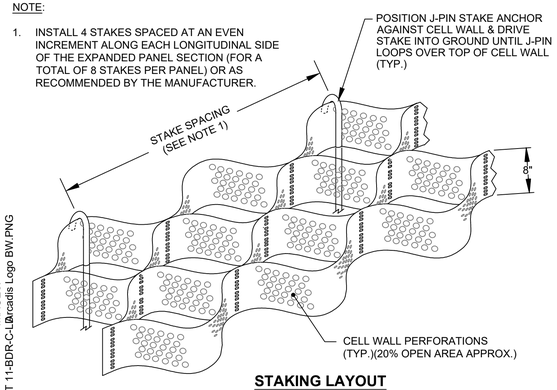


ASPHALT PAVEMENT (2)

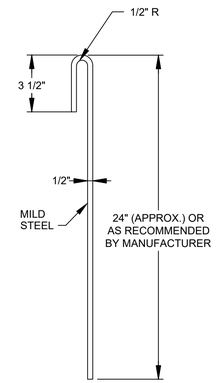
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NOTE:

1. INSTALL 4 STAKES SPACED AT AN EVEN INCREMENT ALONG EACH LONGITUDINAL SIDE OF THE EXPANDED PANEL SECTION (FOR A TOTAL OF 8 STAKES PER PANEL) OR AS RECOMMENDED BY THE MANUFACTURER.



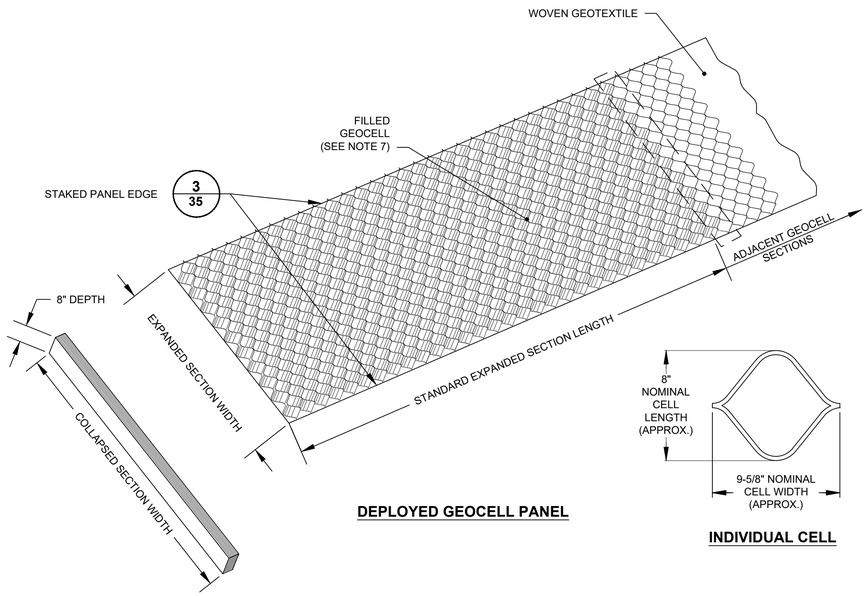
STAKING LAYOUT



J-PIN STAKE ANCHOR

STAKED PANEL EDGE (3)

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DEPLOYED GEOCELL PANEL

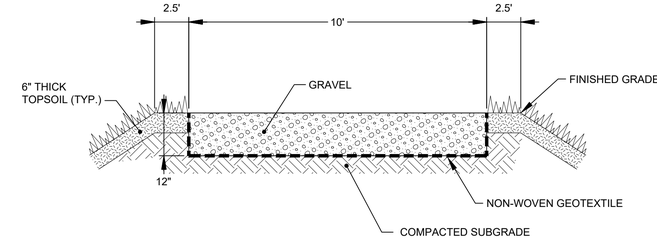
INDIVIDUAL CELL

GENERAL INSTALLATION NOTES:

1. SHAPE AND/OR SMOOTH SUBGRADE TO ACCEPT EXPANDED GEOCELL SECTIONS.
2. COMPACT SUBGRADE AND INSTALL GEOTEXTILE MATERIAL ALONG ALL GROUND INTERFACE AREAS. OVERLAP ADJACENT GEOTEXTILE PIECES A MINIMUM OF 2 FEET. PROVIDE ADEQUATE PINNING OF GEOTEXTILE FABRIC TO INHIBIT FABRIC MOVEMENT DURING GEOCELL INSTALLATION.
3. STAKE EDGES OF PROPOSED GEOCELL.
4. EXPAND GEOCELL. TOP OF GEOCELL SHALL BE FLUSH WITH FINAL GRADE.
5. PROPERLY ALIGN SECTIONS TO ENSURE ADJOINING PANELS ARE FLUSH AND MECHANICALLY CONNECT END SECTIONS.
6. BEING INFILLING ONLY AFTER ANCHORING IS IN PLACE. LIMIT DROP HEIGHT OF INFILL MATERIAL TO 3'.
7. ENSURE FILL IS FLUSH TO CELL TOP SURFACE AT COMPLETION OF WORK. AVOID EXCESSIVE OVERFILLING.

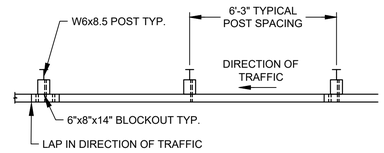
GEOCELL PANEL (4)

NOT TO SCALE

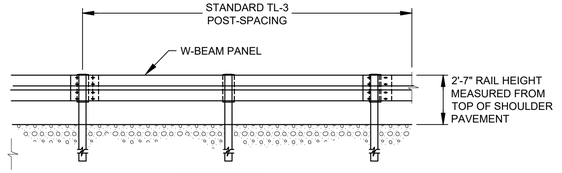


NORTH BASIN MAINTENANCE ACCESS ROAD (AT TOP OF BERM) (5)

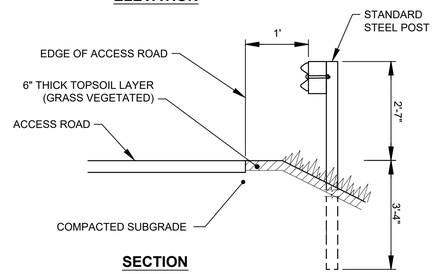
NOT TO SCALE



PLAN



ELEVATION



SECTION

NOTES:

1. REFER TO MASSDOT CONSTRUCTION STANDARDS, SHEETS 400.1.0, 400.1.1, 400.1.4, 400.1.5, AND 400.1.6 FOR DETAILS ON GUARDRAIL DIMENSIONS, MATERIALS, AND INSTALLATION.
2. EMBEDMENT DEPTH OF GUARDRAIL POST AT ARCH CULVERT MAY REQUIRE MODIFICATION.

GUARDRAIL (6)

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Professional Engineer's No.: 42983
State: MA | Date Signed: | Project Mgr.: DK
Designed by: BMS | Drawn by: KLS | Checked by: PHB

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ACCESS ROAD SECTIONS AND DETAILS

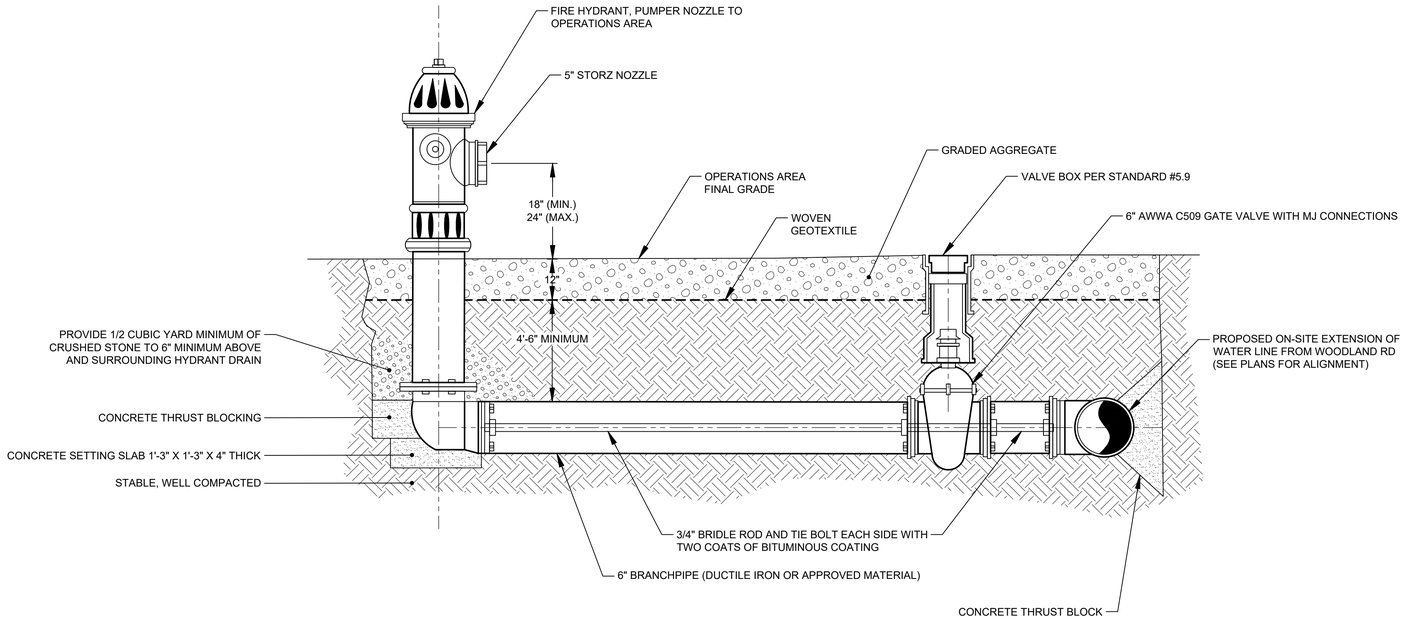
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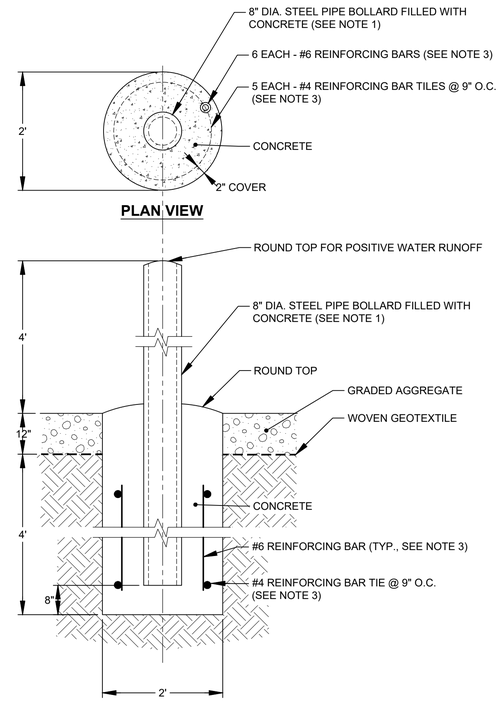


NOTES:

1. FOR HYDRANT INSTALLATION ON EXISTING MAIN, USE TAPPING SLEEVE AND VALVE.
2. RESTRAINING GLANDS MAY BE USED IN LIEU OF THREADED RODS IF APPROVED BY ENGINEER.

FIRE HYDRANT DETAIL (1)

NOT TO SCALE



NOTES:

1. PIPE BOLLARD SHALL BE 8" DIAMETER (NOMINAL) SCHEDULE 40 STEEL PIPE (WALL THICKNESS APPROXIMATELY 0.32 INCHES) CONFORMING TOT THE REQUIREMENTS OF ASTM A36 (STANDARD SPECIFICATION FOR CARBON STRUCTURAL STEEL).
2. PIPE BOLLARD SHALL BE PRIED AND PAINTED (MINIMUM TWO COATS) BY THE MANUFACTURER TO INHIBIT DEGRADATION. BOLLARD COLOR SHALL BE YELLOW UNLESS OTHERWISE DIRECTED BY THE OWNER OR ENGINEER.
3. REINFORCING BARS SHALL BE GRADE 60 DEFORMED BARS IN ACCORDANCE WITH ASTM A615 (STANDARD SPECIFICATION FOR DEFORMED AND PLAIN CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT.

BOLLARD (2)

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Professional Engineer's No.: 42983

State	Date Signed	Project Mgr.
MA		DK
Designed by	**Drawn by**	**Checked by**
BMS	KLS	PHB

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MISCELLANEOUS DETAILS

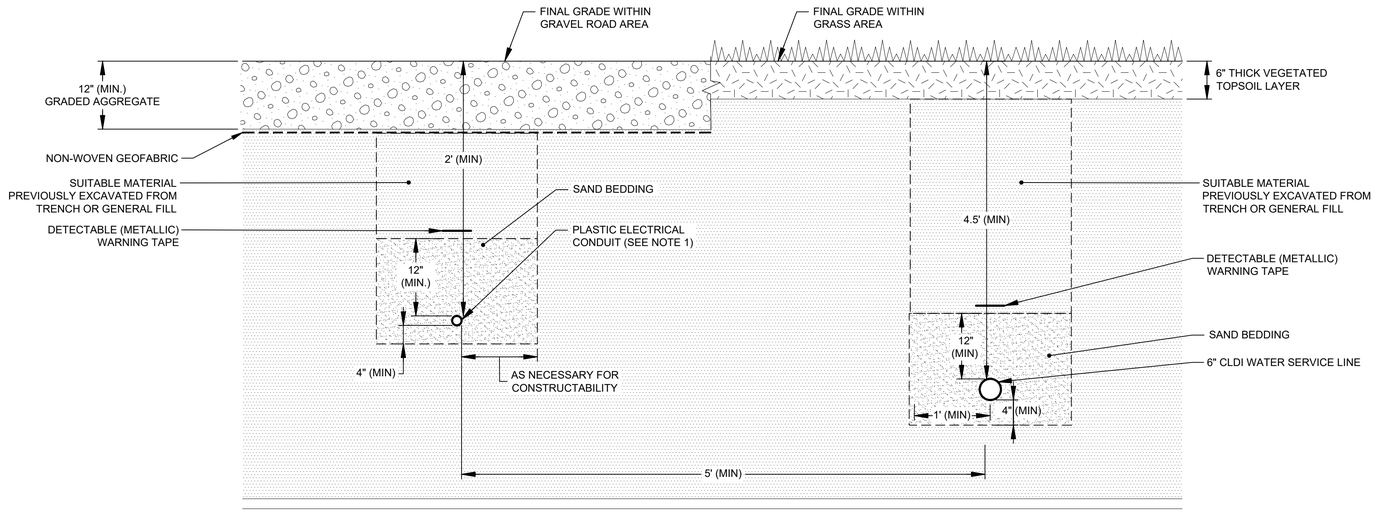
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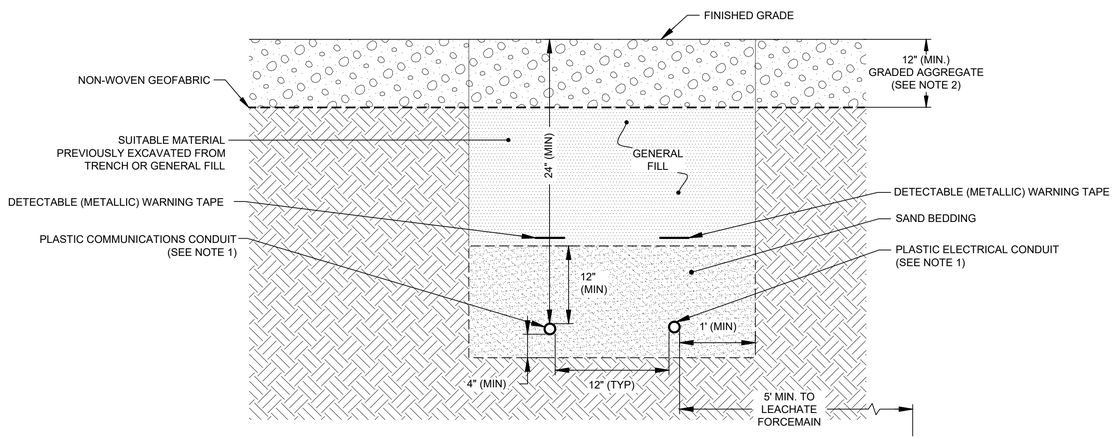


NOTES:

1. NUMBER OF CONDUITS AND SIZES TO BE DETERMINED AT TIME OF CONSTRUCTION BASED ON NUMBER AND SIZE OF CONDUCTORS.
2. SITE SOIL MAY BE SUBMITTED FOR GEOTCHNICAL TESTING TO DETERMINE COMPLIANCE WITH SAND BEDDING REQUIREMENTS AND MAY BE USED AS SUBSTITUTE PENDING ACCEPTABLE EST RESULTS.

TYPICAL UTILITY TRENCHING WITH WATER SERVICE LINE (1)

NOT TO SCALE

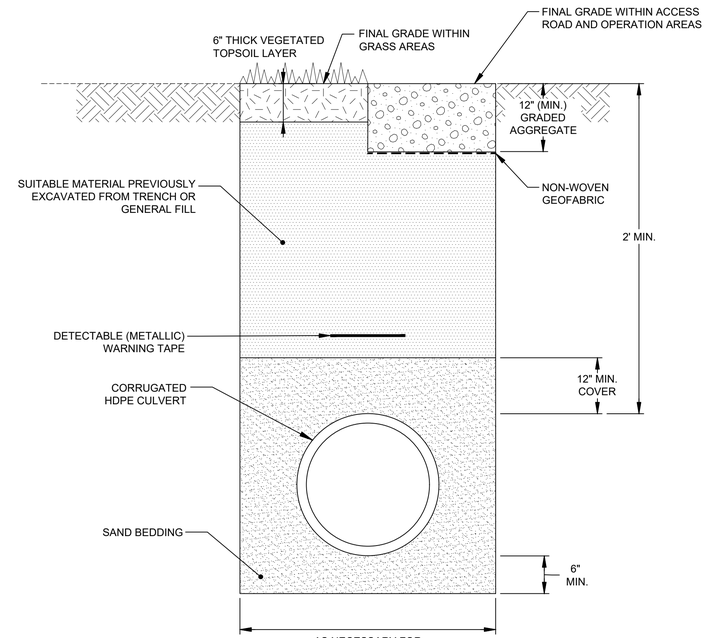


NOTES:

1. CONDUIT SIZES TO BE DETERMINED AT TIME OF CONSTRUCTION BASED ON NUMBER AND SIZE OF CONDUCTORS.
2. FOR UTILITY TRENCH INSTALLATION OUTSIDE ACCESS ROAD AREA, REPLACE 12" GRADED AGGREGATE WITH 6" THICK VEGETATED TOPSOIL LAYER.

TYPICAL UTILITY TRENCH WITHIN UDF ACCESS ROAD (2)

NOT TO SCALE



NOTES:

1. COVER THICKNESS INDICATED IS TYPICAL EXCEPT AT CULVER INLET AND OUTLET.
2. EXCLUDES DRAINPIPES INSIDE LIMITS OF CONSOLIDATION.

TYPICAL STORMWATER DRAINPIPE TRENCH (3)

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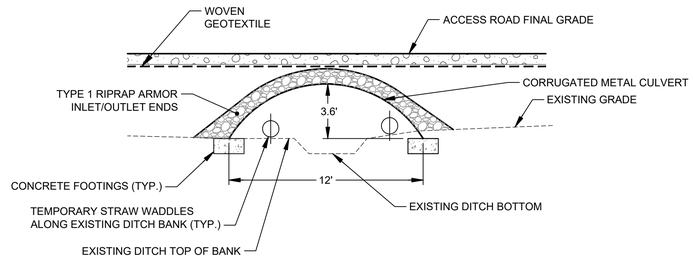
UTILITY TRENCH DETAILS

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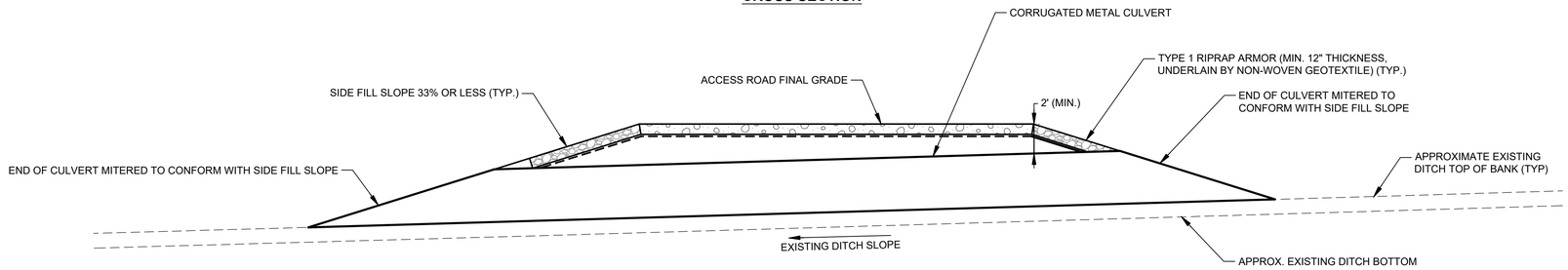
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CROSS SECTION



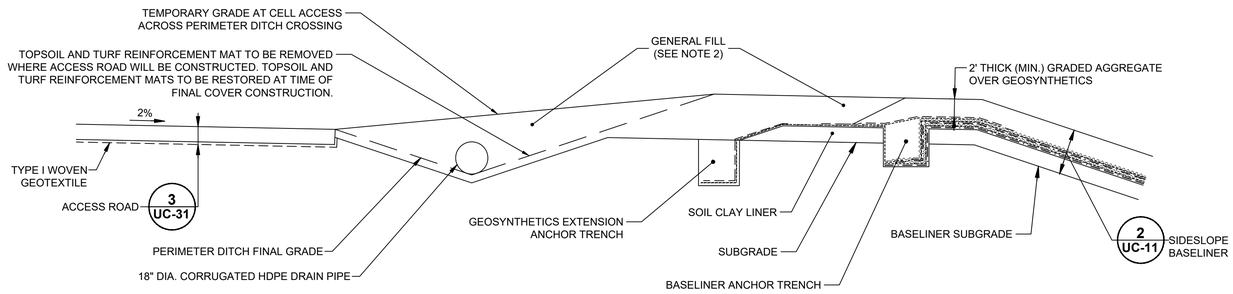
PROFILE

NOTES:

1. EXISTING DITCH CHANNEL TO BE MAINTAINED DURING CULVERT INSTALLATION.
2. CULVERT FOOTING DESIGN TO BE PROVIDED BY CULVERT MANUFACTURER.
3. ARCH CULVERT SHALL BE SINGLE RADIUS ARCH STRUCTURAL PLATE STEEL (0.111" MINIMUM WALL THICKNESS) WITH 6" x 2" CORRUGATIONS.

NORTH ACCESS ROAD ARCH CULVERT 1

NOT TO SCALE



NOTES:

1. REFER TO DRAWING UC-10 FOR ADDITIONAL PERIMETER DITCH AND ANCHOR TRENCH DETAILS.
2. CELL ACCESS ROAD MAY INCLUDE ADDITIONAL CONSTRUCTION MATERIALS SUCH AS GRAVEL SURFACING AND GEOTEXTILE UNDERLAYMENT.

CELL ACCESS ROAD PERIMETER DITCH CROSSING 2

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CULVERT DETAILS

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LEGEND:

- PIPING
- ELECTRIC SIGNAL
- CONTAINMENT BOUNDARY
- 4" PVC PIPING
- 4"/8" DOUBLE CONTAINMENT HDPE PIPING
- PUMP
- SUBMERSIBLE PUMP
- LOCAL INSTRUMENTATION
- PLC FUNCTION
- BALL VALVE
- CHECK VALVE
- ACTUATOR VALVE
- CAMLOCK
- REDUCER BUSHING
- FLANGE CONNECTION
- PRESSURE INDICATOR
- FLOWMETER AND TOTALIZER

DESCRIPTION	PART #	41	CONDITION	ACTION
LOW LEVEL SWITCH	LSL-100	41	LOW LEVEL AT PRIMARY SUMP 1	STOP PUMP P-100
HIGH LEVEL SWITCH	LSH-100	41	HIGH LEVEL AT PRIMARY SUMP 1	START PUMP P-100
HIGH HIGH LEVEL SWITCH	LSHH-100	41	HIGH HIGH LEVEL AT PRIMARY SUMP 1	SIGNAL ALARM
LOW LEVEL SWITCH	LSL-110	41	LOW LEVEL AT SECONDARY SUMP 1	STOP PUMP P-110
HIGH LEVEL SWITCH	LSH-110	41	HIGH LEVEL AT SECONDARY SUMP 1	START PUMP P-110
HIGH HIGH LEVEL SWITCH	LSHH-110	41	HIGH HIGH LEVEL AT SECONDARY SUMP 1	SIGNAL ALARM
LOW LEVEL SWITCH	LSL-120	41	LOW LEVEL AT RISER VAULT 1	STOP PUMP P-120
HIGH LEVEL SWITCH	LSH-120	41	HIGH LEVEL AT RISER VAULT 1	"START PUMP P-120 SIGNAL ALARM"
LOW LEVEL SWITCH	LSL-200	41	LOW LEVEL AT PRIMARY SUMP 2	STOP PUMP P-200
HIGH LEVEL SWITCH	LSH-200	41	HIGH LEVEL AT PRIMARY SUMP 2	START PUMP P-200
HIGH HIGH LEVEL SWITCH	LSHH-200	41	HIGH HIGH LEVEL AT PRIMARY SUMP 2	SIGNAL ALARM
LOW LEVEL SWITCH	LSL-210	41	LOW LEVEL AT SECONDARY SUMP 2	STOP PUMP P-210
HIGH LEVEL SWITCH	LSH-210	41	HIGH LEVEL AT SECONDARY SUMP 2	START PUMP P-210
HIGH HIGH LEVEL SWITCH	LSHH-210	41	HIGH HIGH LEVEL AT SECONDARY SUMP 2	SIGNAL ALARM
LOW LEVEL SWITCH	LSL-220	41	LOW LEVEL AT RISER VAULT 2	STOP PUMP P-220
HIGH LEVEL SWITCH	LSH-220	42	HIGH LEVEL AT RISER VAULT 2	"START PUMP P-220 SIGNAL ALARM"
HIGH LEVEL SWITCH	LSH-001	42	HIGH LEVEL AT LEACHATE JUNCTION MANHOLE 1	SIGNAL ALARM
HIGH LEVEL SWITCH	LSH-002	42	HIGH LEVEL AT LEACHATE CONVEYANCE MANHOLE 1	SIGNAL ALARM
HIGH LEVEL SWITCH	LSH-003	42	HIGH LEVEL AT LEACHATE JUNCTION MANHOLE 2	SIGNAL ALARM
HIGH LEVEL SWITCH	LSH-004	42	HIGH LEVEL AT LEACHATE CONVEYANCE MANHOLE 2	SIGNAL ALARM
HIGH LEVEL SWITCH	LSH-005	43	HIGH LEVEL AT LEACHATE CONVEYANCE MANHOLE 3	SIGNAL ALARM
HIGH LEVEL SWITCH	LSH-300	43	HIGH LEVEL AT VALVE HOUSE	"STOP PUMPS P-100, P-110, P-200, P-210, P-400"
HIGH LEVEL SWITCH	LSH-400, 401, 410, 411	43	HIGH LEVEL AT TANK T-400	"STOP PUMPS P-100, P-110, P-200, P-210 SIGNAL ALARM"

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Professional Engineer's Name: **MARK O. GRAVELDING**
Professional Engineer's No.: 42983

State	Date Signed	Project Mgr.
MA		DK
Designed by	Drawn by	Checked by
BMS	KLS	PHB

COMMONWEALTH OF MASSACHUSETTS — MARK O. GRAVELDING — CIVIL — No. 42983 — REGISTERED PROFESSIONAL ENGINEER

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE ● LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

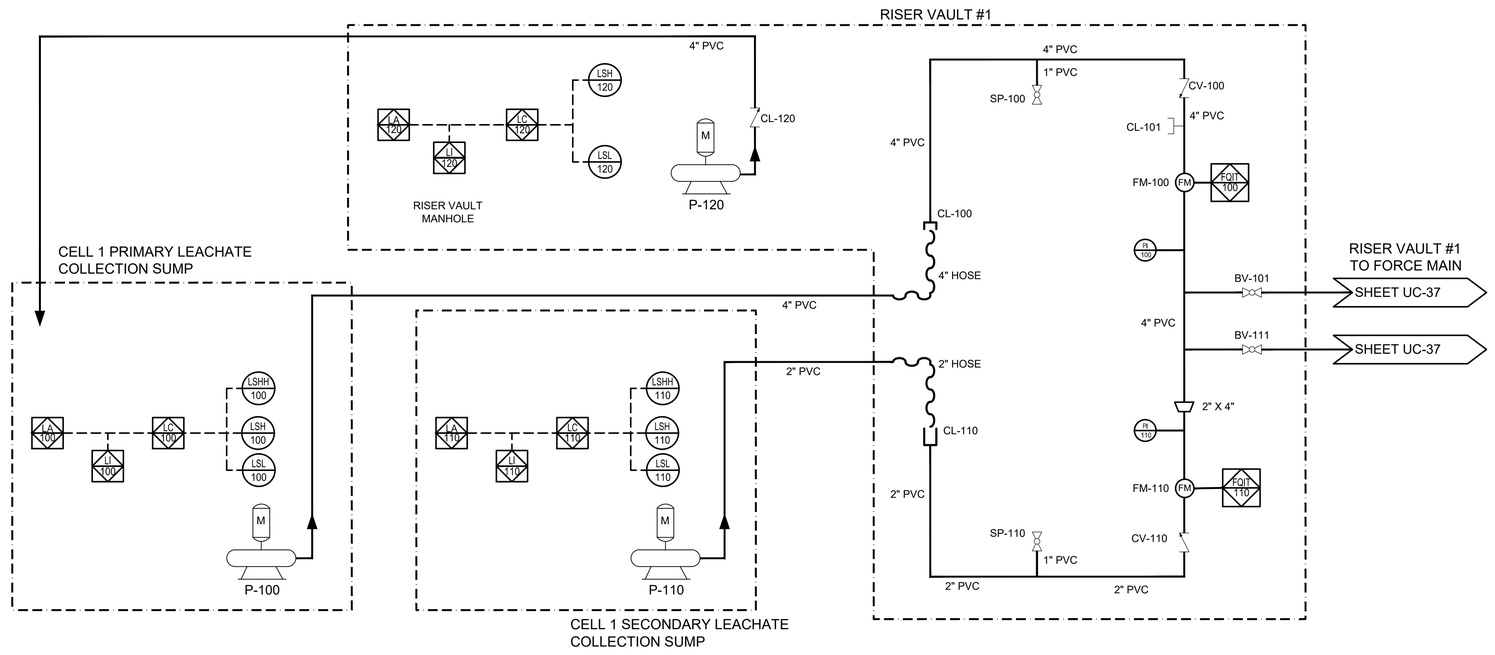
PROCESS & INSTRUMENTATION LEGEND AND TABLE

CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No. 30223149.3000
Date DECEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-35



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Professional Engineer's Name: **MARK O. GRAVELDING**
Professional Engineer's No.: 42983
State: MA | Date Signed: | Project Mgr.: DK
Designed by: BMS | Drawn by: KLS | Checked by: PHB

COMMONWEALTH OF MASSACHUSETTS MARK O. GRAVELDING CIVIL No. 42983 REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

PROCESS & INSTRUMENTATION DIAGRAM - 1

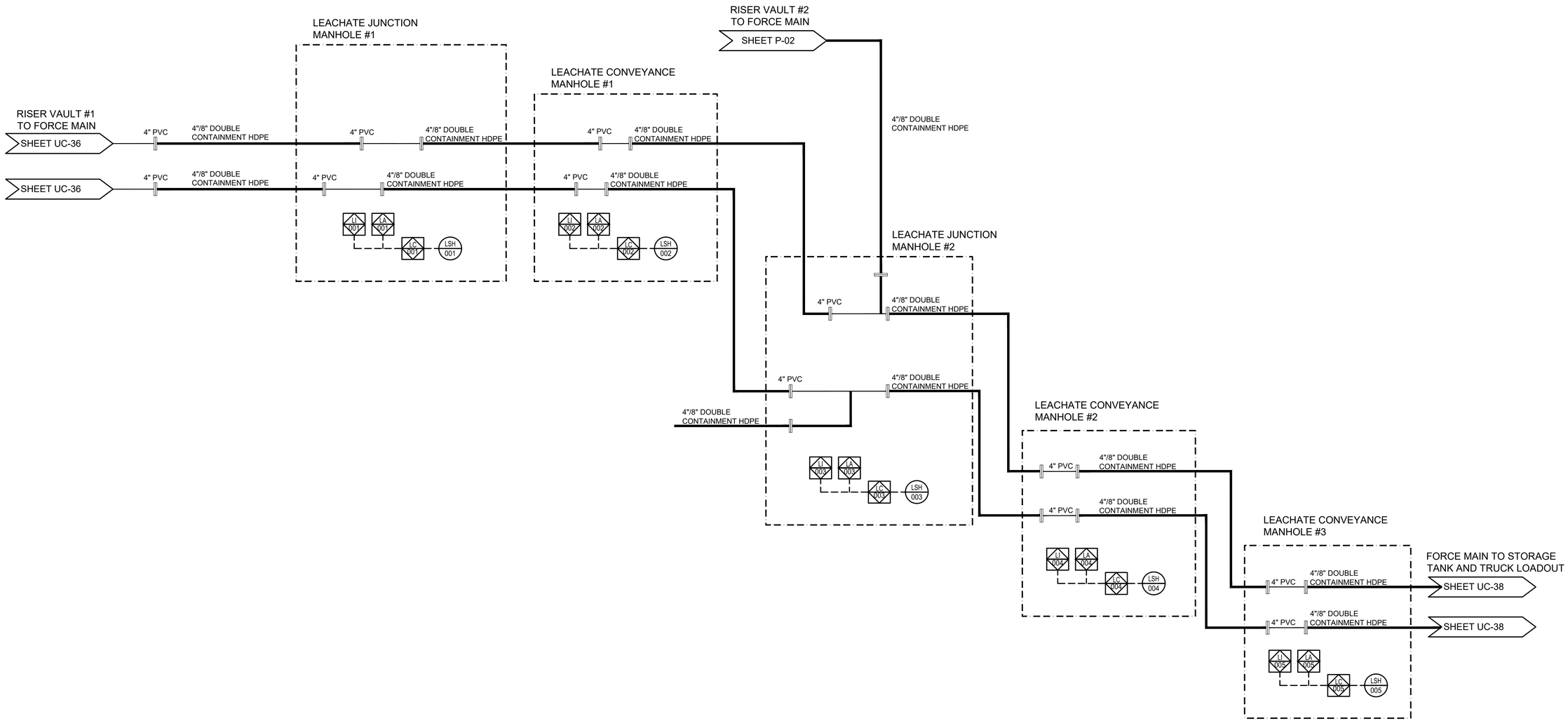
CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No. 30223149.3000

Date DECEMBER 2025

ARCADIS
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110 WEST FAYETTE STREET
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UC-36



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Professional Engineer's Name
MARK O. GRAVELDING
Professional Engineer's No.
42983

State	Date Signed	Project Mgr.
MA		DK
Designed by	Drawn by	Checked by
BMS	KLS	PHB

COMMONWEALTH OF MASSACHUSETTS
MARK O. GRAVELDING
CIVIL
No. 42983
REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

PROCESS & INSTRUMENTATION DIAGRAM - 2

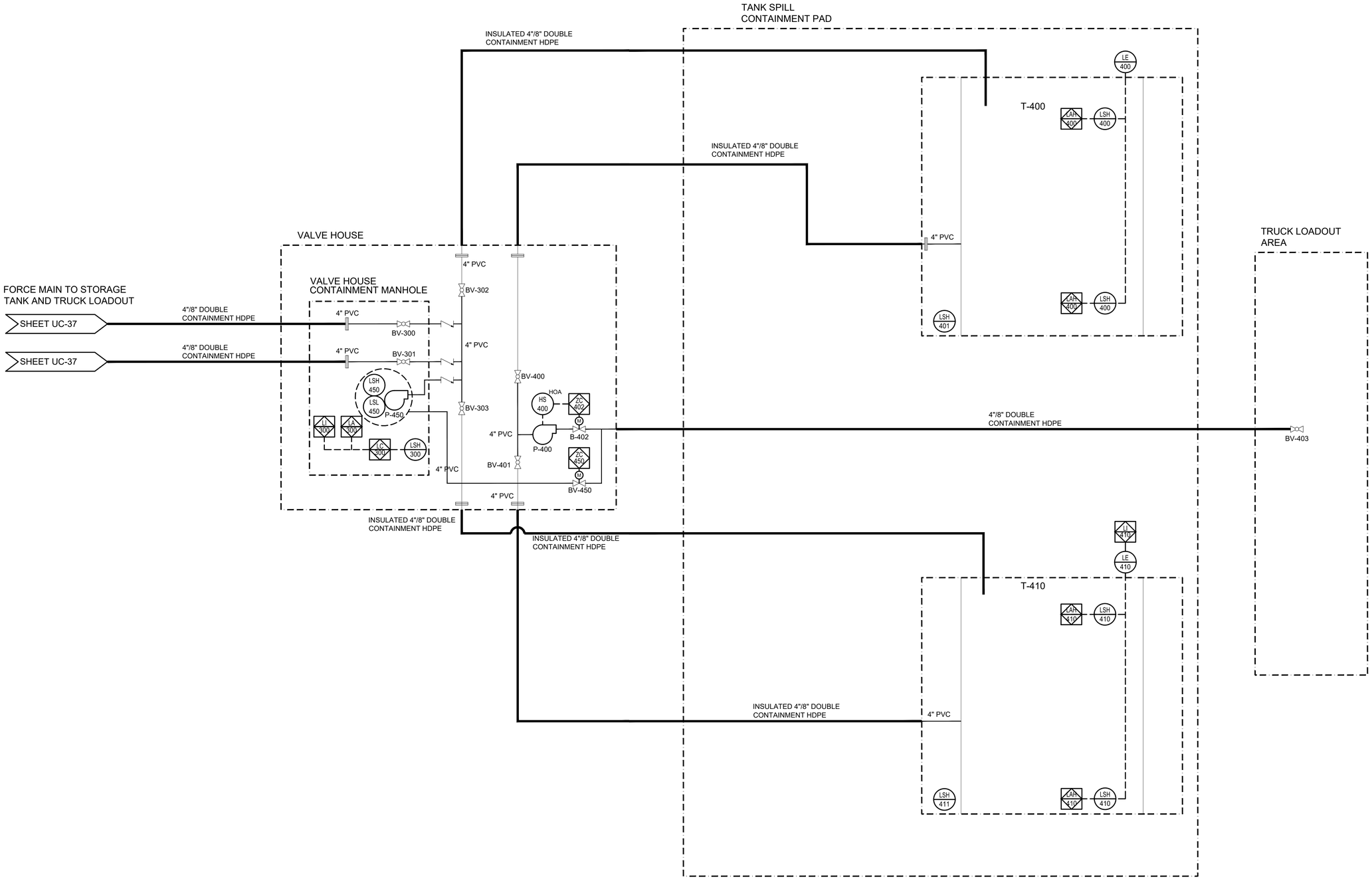
CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No.
30223149.3000

Date
DECEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-37



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XREFS:
X-UDF CONTRACT 11-BDR-C-L0
IMAGES:
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Professional Engineer's Name
MARK O. GRAVELDING
Professional Engineer's No.
42983

State	Date Signed	Project Mgr.
MA		DK
Designed by	Drawn by	Checked by
BMS	KLS	PHB

COMMONWEALTH OF MASSACHUSETTS
MARK O. GRAVELDING
CIVIL
No. 42983
REGISTERED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE ● LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

PROCESS & INSTRUMENTATION DIAGRAM - 3

CONTRACT 11 - UDF CONSTRUCTION

ARCADIS Project No.
30223149.3000

Date
DECEMBER 2025

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ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UC-38

WOODLAND ROAD

S1 S2 S3 S4 S5 S6 S7 S8 S9

W1-22 W1-23 W1-24 W1-25 W1-26 W1-27 W1-28 W1-29 W1-30 W1-31 W1-32 W1-33 W1-34 W1-35 W1-36 W1-37 W1-38 W1-39

OPEN CANOPY AREA

Legend

- GE Parcel Boundaries
- Field Delineated Wetland Boundary
- Wetland Flags
- Upland Areas
- Wetland Areas
- Culvert
- Paved Road
- Roadside Swale
- Soil Profile Description Locations

Site Topo (Hill Engineering 2023)

- 1-Foot Contour
- 5-Foot Contour

Vernal Pool Features

- Limits of Seasonal Flooding
- Deeply Flooded Pocket
- Large Stand of Silky Dogwood
- Tree Line
- Vernal Pool 0.5-Foot Contours

N W E S

1 inch = 12 feet

COMMONWEALTH OF MASSACHUSETTS
MICHAEL J. GARDNER
CIVIL
NO. 40733
REGISTERED PROFESSIONAL ENGINEER

AECOM

AECOM Environment
250 Apollo Drive
Chelmsford, MA 01824

Existing Conditions of the Vernal Pool Area

Proposed Vernal Pool Enhancement Plan
Upland Disposal Facility, Lee, Massachusetts

PROJ. NO.: 60605466

DATE: 2/13/2026

SHEET NUMBER: 1 OF 5

DRAWING NUMBER: **UC-39**

Improve existing roadside swale to maximize surface runoff into culvert

Re-grade swale to direct surface runoff into vernal pool area

WOODLAND ROAD

S1 S2 S3 S4 S5 S6 S7 S8 S9

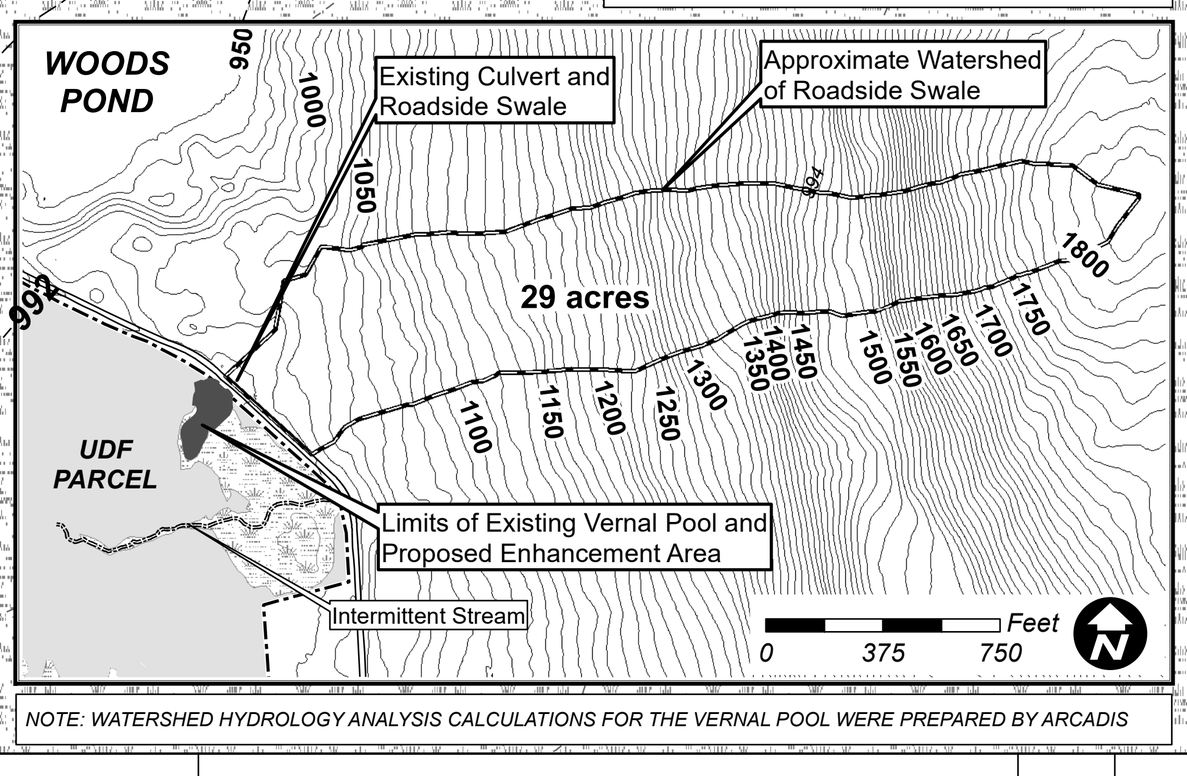
W1-24 W1-25 W1-26 W1-27 W1-28 W1-29 W1-30 W1-31 W1-32 W1-33 W1-34 W1-38

Legend

- GE Parcel Boundaries
- Culvert
- Paved Road
- Roadside Swale
- Field Delineated Wetland Boundary
- Wetland Flags
- Soil Profile Description Locations
- Upland Areas
- Wetland Areas
- Vernal Pool 0.5-Foot Contours

Site Topo (Hill Engineering 2023)

- 1-Foot Contour
- 5-Foot Contour
- New Wetland Boundary



NOTE: WATERSHED HYDROLOGY ANALYSIS CALCULATIONS FOR THE VERNAL POOL WERE PREPARED BY ARCADIS

N W E S

1 inch = 10 feet

COMMONWEALTH OF MASSACHUSETTS MICHAEL J. GARDNER CIVIL NO. 40713 REGISTERED PROFESSIONAL ENGINEER

AECOM
AECOM Environment
250 Apollo Drive
Chelmsford, MA 01824

Proposed Vernal Pool Enhancement/Grading Plan

Proposed Vernal Pool Enhancement Plan
Upland Disposal Facility, Lee, Massachusetts

PROJ. NO.: 60605466

DATE: 2/13/2026

SHEET NUMBER: 2 OF 5

DRAWING NUMBER: UC-40

Improve existing roadside swale to maximize surface runoff into culvert

Re-grade swale to direct surface runoff into vernal pool area

WOODLAND ROAD

Sugar Maple (2)

Witchhazel (12)

Meadowsweet (17)

Highbush Blueberry (22)

Winterberry (23)

Black Birch (3)

Buttonbush (10)

Silky Dogwood (33)

Red Maple (8)

W1-24 W1-25 W1-26 W1-28 W1-29 W1-30 W1-31 W1-32 W1-33 W1-34 W1-35 W1-36 W1-37 W1-38 W1-39

995 990 993 994 989 991 992 988.5

* Morrow's honeysuckle and any other invasive plants observed within the Wetland Edge and 50-Foot Buffer restoration areas will be removed and areas replanted with native shrubs at densities shown in Table 4.

Legend

- GE Parcel Boundaries
- Culvert
- Paved Road
- Roadside Swale
- Field Delineated Wetland Boundary
- 50-Foot Wetland Buffer
- Wetland Flags
- Soil Profile Description Locations
- Upland Areas
- Wetland Areas
- Vernal Pool 0.5-Foot Contours

Site Topo (Hill Engineering 2023)

- 1-Foot Contour
- 5-Foot Contour
- New Wetland Boundary

Planting Zones

- Herbaceous plugs (2,330 SF)
- Wetland Seed Mix (10,590 SF)
- Wetland Edge Restoration (1,900 SF)*
- 50-Foot Buffer Restoration (13,600 SF)*
- Conservation Seed Mix (4,000 SF)

N W E S

1 inch = 13 feet

COMMONWEALTH OF MASSACHUSETTS MICHAEL J. GARDNER CIVIL NO. 40713 REGISTERED PROFESSIONAL ENGINEER

AECOM Environment
250 Apollo Drive
Chelmsford, MA 01824

Proposed Vernal Pool Planting Plan

Proposed Vernal Pool Enhancement Plan
Upland Disposal Facility, Lee, Massachusetts

PROJ. NO.: 60605466

DATE: 2/13/2026

SHEET NUMBER: 3 OF 5

DRAWING NUMBER: UC-41

Table 1. New England Wetland Plants "WetMix"

Botanical Name	Common Name	Indicator
Carex vulpinoidea	Fox Sedge	OBL
Carex scoparia	Blunt Broom Sedge	FACW
Carex lurida	Lurid Sedge	OBL
Carex lupulina	Hop Sedge	OBL
Poa palustris	Fowl Bluegrass	FACW
Bidens frondosa	Beggar Ticks	FACW
Scirpus atrovirens	Green Bulrush	OBL
Asclepias incarnata	Swamp Milkweed	OBL
Carex crinita	Fringed Sedge	OBL
Vernonia noveboracensis	New York Ironweed	FACW
Juncus effusus	Soft Rush	FACW
Symphyotrichum lateriflorum	Starved/Calico Aster	FACW
Iris versicolor	Blue Flag	OBL
Glyceria grandis	American Mannagrass	OBL
Mimulus ringens	Monkey Flower	OBL
Eutrochium maculatum	Spotted Joe Pye Weed	OBL

Table 2. New England Conservation/Wildlife Mix

Botanical Name	Common Name
Elymus virginicus	Virginia Wild Rye
Schizachyrium scoparium	*Little Bluestem*
Andropogon gerardii	*Big Bluestem*
Festuca rubra	Red Fescue
Panicum virgatum	Switch Grass
Chamaecrista fasciculata	Partridge Pea
Desmodium paniculatum	Panicledleaf Tick Trefoil
Sorghastrum nutans	Indian Grass
Verbena hastata	Blue Vervain
Asclepias tuberosa	Butterfly Milkweed
Rudbeckia hirta	Black Eyed Susan
Helenium autunale	Common Sneezeweed
Symphyotrichum pilosum	Heath Aster
Solidago juncea	Early Goldenrod
Agrostis perennans	Upland Bentgrass

Apply seed mix at the recommended rates:

1. New England WetMix at 1 pound per 2,500 square feet requires approximately 5 pounds of seed mix needed (11,745 SF / 2,500 SF = 5 pounds).

2. New England Conservation/Wildlife Mix at 1 pound per 1,750 square feet requires approximately 2 pounds of seed mix needed for side-slopes plus other areas (4,300 SF / 1,750 SF = 2.0 pounds)

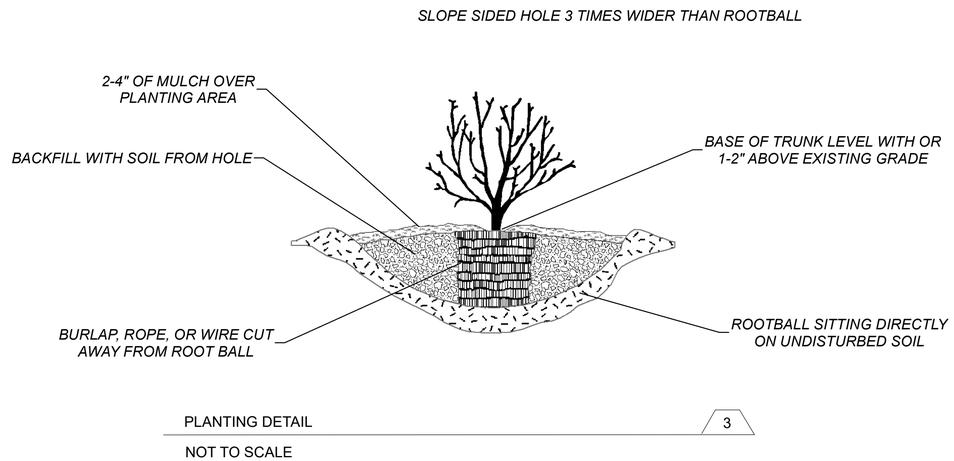
Table 3. Proposed wetland shrubs and herbaceous vegetation.

Cover Type	Scientific Name	Common Name	Size	Quantity
Trees and Shrubs	*Cephalanthus occidentalis*	Buttonbush	3'-4'	10
	Cornus amomum	Silky dogwood	3'-4'	33
	Hamamelis virginiana	Witchhazel	3'-4'	12
	Ilex verticillata	Winterberry	3'-4'	23
	Spirea alba	Meadowsweet	2'-3'	17
	Vaccinium corymbosum	Highbush blueberry	3'-4'	22
	Acer rubrum	Red maple	4'-6'	8
	Acer saccharum	Sugar maple	4'-6'	2
	Betula lenta	Black birch	4'-6'	3
Herbaceous[1]	*Pontederia cordata*	Pickerel weed	2" Plug	30
	Sparganium eurycarpum	Broadfruit bur-reed	2" Plug	30
	Sagittaria latifolia	Broadleaf arrowhead	2" Plug	30

1. Quantity estimate based on 5-foot on center distribution.

Table 4: Proposed Planting Schedule for Additional Restoration Areas.

Plant Strata/Type	Plant Species: Scientific Name	Plant Species: Common Name	Plant Size/Type	Planting Quantities[1]: % of Total Planted	Planting Quantities[1]: Total Number of Plants
		50-Foot Buffer Zone			
Shrub	*Amelanchier canadensis*	Service-Berry	18" Container	25%	62
	Clethra alnifolia	Sweet pepperbush	18" Container	25%	62
	Hamamelis virginiana	Witch-hazel	18" Container	25%	62
	Viburnum lentago	Nanny-berry	18" Container	25%	62
		Wetland Edge			
Shrub	*Cornus amomum*	Silky dogwood	18" Container	25%	9
	Sambucus canadensis	Elderberry	18" Container	25%	9
	Vaccinium corymbosum	Highbush Blueberry	18" Container	25%	9
	Viburnum dentatum	Arrowwood	18" Container	25%	9



PLANTING DETAIL 3

NOT TO SCALE

AECOM
AECOM Environment
250 Apollo Drive
Chelmsford, MA 01824

Proposed Vernal Pool Planting and Construction Notes -1

Proposed Vernal Pool Enhancement Plan
Upland Disposal Facility, Lee, Massachusetts

DATE: 2/13/2026

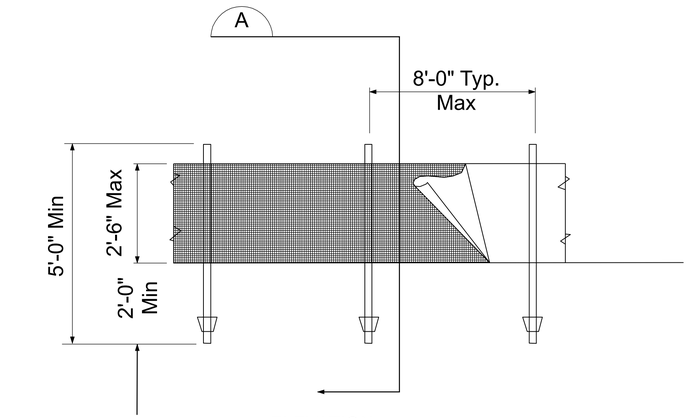
PROJ. NO.: 60605466

DRAWING NUMBER:
UC-42

SHEET NUMBER:
4 OF 5

WETLAND AND VERNAL POOL CREATION/PLANTING SPECIFICATIONS

1. ALL WORK WILL FOLLOW THE CONSTRUCTION SEQUENCE DEFINED ON THE APPROVED SITE PLANS. THE CONTRACTOR SHALL PROVIDE A SUITABLE QUALIFIED WETLAND SCIENTIST TO SUPERVISE TOPSOIL PLACEMENT AND PLANTING WORK FOR THE VERNAL POOL ENHANCEMENT. THE RESUME OF THE WETLAND SCIENTIST SHALL BE SUBMITTED TO THE CM FOR REVIEW AND APPROVAL. FOLLOW-UP MONITORING OF THE PLANTINGS PROPOSED IN THE PLANS WILL BE PERFORMED AS DESCRIBED IN THE UDF MITIGATION PLAN.
2. PRIOR TO THE START OF SITE WORK, ALL SEDIMENTATION AND EROSION CONTROL FENCING WILL BE INSTALLED BY THE CONTRACTOR AS DESCRIBED ON THE PLANS. AN ADEQUATE SUPPLY OF REPLACEMENT EROSION CONTROL MATERIALS WILL BE AVAILABLE ON SITE FOR EMERGENCY PURPOSES. EROSION CONTROL STRUCTURES WILL BE INSPECTED ON A REGULAR BASIS AND MAINTAINED IN GOOD ORDER UNTIL ALL EXPOSED SOILS ARE VEGETATED AND STABLE.
3. FOR EXCAVATIONS EXTENDING TO 1 FOOT BELOW EXISTING GROUND SURFACE THAT ARE ADJACENT TO MATURE TREES, THE CONTRACTOR SHALL PERFORM SUCH EXCAVATIONS BY HAND UNDER OVERSIGHT BY THE WETLAND SCIENTIST.
4. MATURE TREES WITHIN THE FOOTPRINT OF THE EXCAVATION WILL REMAIN IF FEASIBLE AND AT THE DISCRETION OF THE WETLAND SCIENTIST.
5. THE MITIGATION AREA SHALL BE OVER-EXCAVATED BY A DEPTH OF ONE FOOT. THREE INCHES OF A COMPACTED SILT LOAM OR FINER MATERIAL WILL BE PLACED OVER THE BOTTOM OF THE ENHANCEMENT AREA TO LIMIT DRAINAGE. THE REMAINING NINE INCHES WILL BE BROUGHT UP TO FINISH ELEVATIONS AS SHOWN ON FIGURE UC-41 IN LOOSE LIFTS WITH SUITABLE SOILS FURTHER DESCRIBED BELOW.
6. THE 3-INCH-THICK SOIL LAYER (FINAL, COMPACTED THICKNESS) SHALL BE COMPACTED UNDER MOIST CONDITIONS AND TRACKED IN PLACE WITH A SUITABLY SIZED METAL-TRACKED DOZER. 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.
7. ACCEPTABLE CONTENT OF THE COMPACTED SILT LAYER SHALL BE WITHIN THE FOLLOWING RANGES: SILT: 50-80%; CLAY: 10-20%; AND SAND: 10-20% AND HAVE A VERTICAL PERMEABILITY NO GREATION THAN 10^{-4} M/SEC.
8. THE 9-INCH SOIL LAYER SHALL HAVE A LOAM TEXTURE WITH 7-27% CLAY, 28-50% SILT AND 52% OR LESS OF SAND AND HAVE A WEAK GRANULAR STRUCTURE AND FRIABLE CONSISTENCE, WITH 20-30 PERCENT ORGANIC MATTER BY WEIGHT. AN ACCEPTABLE BULK DENSITY IS 1.3 G/CM^3, AND PH VALUES SHALL BE AROUND 6.1 ±0.1.
9. THE PLANTING PLAN PROVIDED FOR THE VERNAL POOL ENHANCEMENT (FIGURE UC-41) SHALL NOT BE DEVIATED FROM WITHOUT THE APPROVAL OF THE DESIGNATED WETLAND SCIENTIST. IT IS RECOGNIZED THAT NOT ALL SPECIES MAY BE AVAILABLE AT THE TIME OF PLANTING AND SUBSTITUTIONS ARE ALLOWED WITH APPROVAL OF THE WETLAND SCIENTIST.
10. A WETLAND SEED MIX WILL BE BROADCAST AT THE APPROPRIATE RATES THROUGHOUT THE MITIGATION TO CREATE AN HERBACEOUS GROUNDCOVER LAYER. NEW ENGLAND WET MIX (NEW ENGLAND WETLAND PLANTS, AMHERST MA) IS RECOMMENDED BUT COMPARABLE ALTERNATIVE SOURCES MAY BE APPROVED BY THE WETLAND SCIENTIST.
11. AN UPLAND/CONSERVATION SEED MIX WILL BE BROADCAST AT THE APPROPRIATE RATES OVER ALL UPLAND AREAS DISTURBED BY THE PROJECT AND SIDE SLOPES OF THE MITIGATION AREA. NEW ENGLAND CONSERVATION/WILDLIFE MIX (NEW ENGLAND WETLAND PLANTS, AMHERST MA) IS RECOMMENDED BUT COMPARABLE ALTERNATIVE SOURCES MAY BE APPROVED BY THE WETLAND SCIENTIST.
12. SEED SHOULD ALWAYS BE PLACED ON BARE SOIL AND LIGHTLY RAKED OR ROLLED TO ENSURE PROPER SOIL-SEED CONTACT.
13. TREES, SHRUBS, AND HERBACEOUS PLANTS WILL BE SIZED AS SPECIFIED ON FIGURE UC-42. PLANT MATERIAL WILL BE INSPECTED WHEN PICKED UP AT THE NURSERY, AS WELL AS UPON DELIVERY TO THE SITE. THE PLANTING SEASON WILL BE IN THE SPRING FROM APRIL 1 THROUGH JUNE 30, AND FALL FROM AUGUST 15 THROUGH DECEMBER 15.
14. THE FOLLOWING PLANTING PROTOCOL WILL BE FOLLOWED: 1) THE PLANTING CONTRACTOR SHALL MAINTAIN THE ORIGINAL GRADE OF ROOT FLARE AFTER BEING TRANSPLANTED FROM THE NURSERY; 2) THE TREE/SHRUB PIT SHALL BE 3 TIMES THE SIZE OF THE ROOT BALL AND SHALL BE BACKFILLED WITH A PLANTING SOIL MIXTURE OF LOAM, COMPOST, AND PEAT MOSS; 3) NO FERTILIZER WILL BE USED IN THE WETLAND AREAS; 4) A TEMPORARY EARTH SAUCER WILL BE MADE; 5) PLANT MATERIAL WILL BE IMMEDIATELY WATERED.
15. A SUFFICIENT AMOUNT OF WOODY SHRUBS AND/OR SAPLINGS CUT FROM WITHIN THE MITIGATION AREA WILL BE SET ASIDE FOR PLACEMENT INTO THE POOL POST-RESTORATION TO FUNCTION AS TEMPORARY EGG ATTACHMENT SITES AND COVER FOR DEVELOPING AMPHIBIAN LARVAE. ANY COARSE WOODY DEBRIS (LOGS 4-5" IN DIA) FOUND ON OR ADJACENT TO THE SITE MAY BE DISTRIBUTED RANDOMLY THROUGHOUT THE MITIGATION AREA AT THE DISCRETION OF THE WETLAND SCIENTIST.
16. ADDITIONAL EROSION CONTROL MATTING SHALL BE PLACED ON DISTURBED AREAS AS NEEDED, OR AT THE DIRECTION OF THE WETLAND SCIENTIST.
17. FOLLOWING COMPLETION OF THE WORK EROSION CONTROLS, WHICH SURROUNDS THE WETLAND AND VERNAL POOL AREAS MUST BE REMOVED ONCE STABILIZATION HAS BEEN ACHIEVED.



SILTATION FENCE DETAIL 2

NOT TO SCALE

AECOM
AECOM Environment
250 Apollo Drive
Chelmsford, MA 01824

Proposed Vernal Pool Planting and Construction Notes - 2

Proposed Vernal Pool Enhancement Plan
Upland Disposal Facility, Lee, Massachusetts

DATE: 2/16/2026

PROJ. NO.: 60605466

DRAWING NUMBER:
UC-43

SHEET NUMBER:
5 OF 5

Appendix D

Project Submittal Register

SUBMITTAL TRACKING REGISTER

Project Name:	**GE Contract 11 - Upland Disposal Facility Construction**	
Location:	Lee, MA	
Owner:	General Electric Company	
Contractor:	Charter Contracting Company, LLC	
Engineer:	Arcadis U.S., Inc.	
Specification Reference	**Specification Paragraph**	**Submittal Description**
02 21 00		**Surveys**
02 21 00	1.03.A	Survey Plan
02 21 00	1.03.B	Survey Data Records
02 21 00	1.03.C	As-Built Drawings
02 21 00	3.02.B	Pre-Construction survey - existing conditions
02 21 00	3.04.A	Post-Construction survey
02 41 00		**Demolition (Contract 10 Work - Limited applicability to Contract 11)**
02 41 00	1.03.A.1	Procedure Submittal
02 41 00	1.03.A.2	Demolition Notification
02 41 00	1.03.A.3	Qualifications of Electrician
02 71 10		**Chain Link Fence**
02 71 00	1.03.A	Fence materials products and installation methods
03 00 05		**Concrete**
03 00 05	1.04.A.1	Action Submittals - Shop Drawings
03 00 05	1.04.A.2	Action Submittals - Product Data
03 00 05	1.04.A.3	Action Submittals - Samples
03 00 05	1.04.B.1	Informational Submittals - Delivery Tickets
03 00 05	1.04.B.2	Informational Submittals - Site Quality Control Submittals
03 00 05	3.09.B.1.h	Laboratory Testing Results
22 10 00		**Polyvinyl Chloride Pipe and Fittings**
22 10 00	1.03.A	PVC shop drawings pipe, fittings, materials, pipe manufacturer
22 10 00	1.03.B	PVC manufacturer certification of compliance with specification
22 10 00	1.03.C.1	PVC manufacturer compound, source, and information re ASTM D1248
22 10 00	1.03.C.2	PVC manufacturer - Certificate that no recycled resin was used in manufaccturing
26 05 05		**General Provisions for Electrical Systems**
26 05 05	1.03.B.1	Action Submittals - Shop Drawings - Electrical system - diagrams, plans, components
26 05 05	1.03.B.2	Action Submittals - Shop Drawings - Electrical system - product data
26 05 05	1.03.B.3	Action Submittals - Shop Drawings - Electrical system - Test Procedures
26 05 05	1.03.C.1	Informational Submittals - Manufacturer's instructions
26 05 05	1.03.C.2	Informational Submittals - Source Quality Control - Shop testing results
26 05 05	1.03.C.3	Informational Submittals - Field Quality Control - Field testing results
26 05 05	1.03.C.4	Informational Submittals - Qualification - Electrical subcontractor & wiring coordinator
26 05 05	1.03.D.1.a	Closeout Submittals - Record Documentation - System record drawing
26 05 05	1.03.D.1.b	Closeout Submittals - Record Documentation - Point-to-Point interconnection wiring diagram drawings
26 05 05	1.03.D.1.c	Closeout Submittals - Record Documentation - Final equipment and field installation information
31 05 05		**Corrugated HDPE Pipe (Number changed from 35 05 05 to 31 05 05 per: Add 04)**
31 05 05	1.03.A.1.a	Action Submittals - Shop drawing details of piping and appurtenances
31 05 05	1.03.A.2.a	Action Submittals - Manufacturer's literature and specifications
31 05 05	1.03.B.1.a	Informational Submittals - Manufacturer's product certification
31 05 05	1.03.C.1.a	Closeout Submittals - Location of all piping work
31 05 05	1.03.C.1.b	Closeout Submittals - Piping elevations and dimensions from permanent structures
31 05 05	1.03.C.1.c	Closeout Submittals - Piping profile drawings
31 05 13		**Soils for Earthwork**
31 05 13	1.03.A.1	Informational Submittals - Delivery Tickets

SUBMITTAL TRACKING REGISTER

Project Name:	**GE Contract 11 - Upland Disposal Facility Construction**	
Location:	Lee, MA	
Owner:	General Electric Company	
Contractor:	Charter Contracting Company, LLC	
Engineer:	Arcadis U.S., Inc.	

Specification Reference	Specification Paragraph	Submittal Description
31 05 13.10		**Low Permeability Soil Liner**
31 05 13.10	1.03.A.1	Informational Submittals - Notify CM prior to starting construction of low permeability soil liner
31 05 13.10	1.03.A.2	Informational Submittals - Notify CM of work stoppage other than inclement weather
31 05 13.10	1.03.A.3	Informational Submittals - Delivery Tickets - Each load
31 05 13.10	2.02.A	Details of proposed equipment to be used for low perm soil
31 05 16		**Aggregates for Earthwork**
31 05 16	1.02.A	Informational Submittals - Delivery Tickets
31 05 16.10		**Materials for Earthwork**
31 05 16.10	1.04.A	Borrow pit background information
31 05 16.10	1.04.B	Names and qualifications of analytical and geotechnical laboratories
31 05 16.10	1.04.C	Results of laboratory chemical analysis of each material type from each pit
31 05 16.10	1.04.D	Result of laboratory geotechnical testing of each material type from each pit
31 05 16.10	1.04.E	Laboratory compaction characteristic data (Modfiled Proctor) for each material having a minimum compaction objective
31 05 16.10	1.04.F	Qualifications for firm proposed for conducting field nuclear density testing of fill materials
31 05 16.10	1.04.G	Submit plan that details how imported and on-site soil and aggregate materials will be managed at the site.
31 05 18.16		**Geosynthetic Clay Liner**
31 05 18.16	1.04.A.1	Manufacturers Quality Control certificates for geotextiles, bentonite clay and manufacturing process and each shift's production.
31 05 18.16	1.04.A.2	Quality Control Certificate requirements
31 05 18.16	1.04.A.3	Results of Geotechnical Laboratory testing for shear strength of soil-geosynthetic and geosynthetic-geosynthetic interfaces.
31 05 18.16	1.04.A.4	Results of geotechnical laboratory testing for internal shear strength of GCL
31 05 19.13		**Geotextiles for Earthwork**
31 05 19.13	1.04.A.1	Geotextile lot and roll numbers
31 05 19.13	1.04.A.2	Quality Control Certificates the reference lot and roll id number, sampling procedures, test methods, test results, and other items.
31 05 19.13	1.04.A.3	Geotextile lot and roll numbers
31 05 19.13	1.04.A.4	Geotextile QA test from the manufacturer - see ASTM references
31 05 19.16		**Geomembranes for Earthwork**
31 05 19.16	1.04.A.1	Geomembrane Manufacturer Qualifications and Experience
31 05 19.16	1.04.A.2	Geosynthetic Installer Qualifications and Experience
31 05 19.16	1.04.A.3.a	Contractor Certification - No Damage
31 05 19.16	1.04.A.3.b	Contractor Certification - Surface is acceptable to CM and Contractor
31 05 19.16	1.04.A.	Geosynthetic Installer Qualifications and Experience
31 05 19.16	1.04.A.4	Results of geotechnical testing - shear strength soil/geosynthetic and geosynthetic/geosynthetic interfaces
31 05 19.16	1.04.A.5	Geomembrane Manufacturers test results
31 05 19.16	1.04.A.6	Conformance test results
31 05 19.16	1.04.A.7	Field destructive and on-destructive seam testing
31 05 19.16	1.04.B.1	Certification - surface for geomembrane install is acceptable
31 05 19.16	1.04.B.2	Daily field logs of work, personnel, conditions, and problems
31 05 19.16	1.04.B.3	Field Quality Control documentation - seam tests
31 05 19.16	1.04.B.4	Certificate of Calibration = <12 Months for Field Tensiometer
31 05 19.16	1.04.C	Geomembrane lot and roll number of field-delivered material
31 05 19.16	1.04.D.1	Completion - Geomembrane Installation Certification
31 05 19.16	1.04.D.2	Completion - As-built panel layout diagram
31 05 19.16	1.04.D.3	Completion - Warranty from Geomembrane Manufacturer Installer (See 1.05)

SUBMITTAL TRACKING REGISTER

Project Name:	**GE Contract 11 - Upland Disposal Facility Construction**	
Location:	Lee, MA	
Owner:	General Electric Company	
Contractor:	Charter Contracting Company, LLC	
Engineer:	Arcadis U.S., Inc.	
Specification Reference	**Specification Paragraph**	**Submittal Description**
31 05 19.16	3.02.A	Layout Drawings for geomembrane
31 05 19.20		**Geoelectric Leak Location Survey**
31 05 19.20	1.03.A	Leak Location Survey Work Plan
31 05 19.26		**Geocomposite for Earthwork**
31 05 19.26	1.04.A	Geocomposite manufacturers data
31 05 19.26	1.04.B	Geocomposite conformance test results
31 05 19.26	1.04.C	Geosynthetic Shear Strength test results - Soil-Geosynthetic & Geosynthetic-Geosynthetic interfaces
31 05 19.26	1.04.D.1	Certification - geocomposite has not been damaged
31 05 19.26	1.04.D.2	Certification - Surface for geosynthetic install is acceptable
31 05 19.26	1.04.D.3	Daily field logs of work, personnel, conditions, and problems
31 05 19.26	1.04.D.4	Experience of install personnel
31 05 19.26	1.04.E.1	Completion - Quality control certificates from manufacturer
31 05 19.26	1.04.E.2	Completion - QC tests results
31 05 19.26	1.04.E.3	Completion - Certification that field-delivered material meets the Manufacturer's specifications
31 11 00		**Clearing and Grubbing**
31 11 00	1.02.A	Clearing and Grubbing Plan
31 22 00		**Grading**
31 22 00	1.04.A	Proposed equipment and compaction method(s)
31 22 00	1.04.B	Moisture density test results on fill materials (ASTM D1557)
31 22 00	1.04.C	In-place density test results on fill materials (ASTM D6938)
31 23 00		**Excavation and Fill**
31 23 00	1.04.A.1	Excavation and Backfilling Plan
31 23 00	1.04.A.2.a	Qualifications statement - Professional Engineer
31 23 00	1.04.A.2.b	Qualifications statement - Testing Laboratory & Field QC Personnel
31 23 00	1.04.A.3	Source Quality Control data for each fill source
31 23 00	1.04.A.4	Delivery tickets for each load of general fill, subbase, & pipe bedding material
31 23 00	1.04.A.5	Field Quality Control - Laboratory Test Reports
31 23 00	1.04.A.5	Field Quality Control - Daily Inspection Logs
31 25 00		**Erosion and Sediment Controls**
31 25 00	1.04.A	Action Submittals - Product Data
31 25 00	1.04.B	Site-specific SWPPP
31 36 00		**Wire Mesh Gabions and Gabion Mattresses**
31 36 00	1.04.A.1	Product Data
31 36 00	1.04.A.2	Shop Drawings
31 36 00	1.04.A.3	Particle-size distribution of rock fill for gabions
31 36 00	1.04.A.4	Sources of rock fill for gabions
31 36 00	1.04.A.5	Test reports - particle size distribution and soundness testing
31 37 00		**Riprap**
31 37 00	1.02.A.1	Informational Submittals - Delivery tickets
31 91 19.13		**Topsoil Placement and Grading**
31 91 19.13	1.03.A.1	Informational Submittals - Delivery tickets
32 12 00		**Flexible Paving**
32 12 00	1.04.A.1.a	Action Submittals - Shop drawings - asphalt concrete mix design
32 12 00	1.04.A.1.b	Action Submittals - Shop drawings - aggregate gradation
32 12 00	1.04.A.2.a	Action Submittals - Product Data - Pavement marking data

SUBMITTAL TRACKING REGISTER

Project Name:	**GE Contract 11 - Upland Disposal Facility Construction**	
Location:	Lee, MA	
Owner:	General Electric Company	
Contractor:	Charter Contracting Company, LLC	
Engineer:	Arcadis U.S., Inc.	
Specification Reference	**Specification Paragraph**	**Submittal Description**
32 12 00	1.04.B.1	Informational Submittals - Quality assurance and source quality control test data
32 12 00	1.04.B.2	Informational Submittals - Delivery tickets - asphalt concrete, tack coat
32 12 00	1.04.B.3	Informational Submittals - Field quality control testing results
32 92 00		**Turf and Grasses**
32 92 00	1.04.A.1	Action Submittals - Shop drawings - planting schedule
32 92 00	1.04.A.2.a	Action Submittals - Product Data - Fertilizer composition and analysis, purchast receipts
32 92 00	1.04.A.2.b	Action Submittals - Product Data - Hydroseed mixture proportions
32 92 00	1.04.A.2.c	Action Submittals - Product Data - Percent PLS for each seed and seed lot
32 92 00	1.04.B.1.a	Informational Submittals - Landscape installer name and address
32 92 00	1.04.B.1.a	Informational Submittals - Landscape installer qualifications and experience
32 92 00	1.04.B.1.b	Informational Submittals - Landscape supervisor and applicable certifications
32 92 00	1.04.B.2.a	Informational Submittals - Seed supplier certification
32 92 00	1.04.B.2.a	Informational Submittals - Seed storage certification
33 05 05		**Buried Water Pipe**
33 05 05	1.04.A.1.a	Action Submittals - Shop drawing laying schedule for pipe
33 05 05	1.04.A.1.b	Action Submittals - Details of piping and appurtenances
33 05 05	1.04.A.2.a	Action Submittals - Manufacturer's literature and specifications
33 05 05	1.04.A.3.a	Action Submittals - Proposed testing procedures, equipment, and sequencing
33 05 05	1.04.B.1.a	Informational Submittals - Manufacturers product certifications
33 05 05	1.04.B.2.a	Informational Submittals - Field quality control test results
33 05 05	1.04.C.1.a	Closeout Submittals - Field modifications, actual location of piping and appurtenances
33 05 05	1.04.C.1.b	Closeout Submittals - Piping elevations and dimensions from permanent structures
33 05 33		**High Density Polyethylene Pipe and Fittings**
31 05 05	1.03.A	Shop drawings of all HDPE pipe and fittings, list of material, manufacturer
31 05 05	1.03.B	Pipe Manufacturer's certification of compliance with specifications
31 05 05	1.03.C	Manufacturer data on pipe sizes, material type, pipe joint fabrication requirements
31 05 05	1.03.D	Manufacturer test results with shipment of materials
31 05 05	1.03.F	Manufacturing data - stock density, melt flow, flexural modulus, tensile strength, and coloration.
33 49 00		**Precast Structures**
33 49 00	1.04.A.1.a	Action Submittal - Shop drawings - Precast structures
33 49 00	1.04.A.1.b	Action Submittal - Shop Drawings - Access entry steps
33 49 00	1.04.A.1.c	Action Submittal - Shop Drawings - Cast iron frames and covers
33 49 00	1.04.A.2.a	Action Submittal - Product Data - Manufacturer's data and specs - resilient pipe connectors an dcorrugated pipe adapter
33 49 00	1.04.A.2.b	Action Submittal - Product Data - Manufacturer's data and specs - Cast iron frames and covers
33 49 00	1.04.A.1.a	Closeout Submittal - Record Documentation - Show field modifications
33 49 00	1.04.A.1.a	Closeout Submittal - Record Documentation - Show structures with rim and invert elevations
35 20 23		**Vegetation Removal and Subaqueous Backfill**
35 20 23	1.04.A	Vegetation and Debris Removal Plan
35 20 23	1.04.B	Pond Backfilling Plan
40 05 53		**Hydrants**
40 05 53	1.04.A.1.a	Action Submittals - Shop Drawings - Hydrant valve and appurtenances
40 05 53	1.04.A.2	Action Submittals - Product Data - Hydrant product data sheets

SUBMITTAL TRACKING REGISTER

Project Name:	**GE Contract 11 - Upland Disposal Facility Construction**	
Location:	Lee, MA	
Owner:	General Electric Company	
Contractor:	Charter Contracting Company, LLC	
Engineer:	Arcadis U.S., Inc.	
Specification Reference	**Specification Paragraph**	**Submittal Description**
40 05 53	1.04.A.3	Action Submittals - Testing Plan - Shop testing of each valve if specified
40 05 53	1.04.B.1.a	Informational Submittals - Manufacturer's certificates of compliance
40 05 53	1.04.B.2.a	Informational Submittals - Manufacturer's instructions - handling, storing, installing
40 05 53	1.04.B.3.a	Informational Submittals - Manufacturer certification - shop test results and inspection data
40 05 53	1.04.B.4.a	Informational Submittals - Field quality control test results
40 05 53	1.04.B.5.a	Informational Submittals - Supplier service reports - upon CM request
40 05 53	1.04.B.6.a	Informational Submittals - Manufacturer's qualifications demonstrating compliance with the specifications - upon CM request
40 05 53	1.04.C.1	Closeout Submittal - Operation and maintenance manuals, nameplate data for valves and acuators.
40 05 53	1.04.D.1	Closeout Materials - Maintenance Materials - Spare parts, extra stock materials and tools for each size/type of valve
46 01 00.10		**Cell Secondary Leachate Collection System (SLCS) Testing and Monitoring**
46 01 00.10	1.02.A	SLCS Plan - for testing and monitoring
46 01 00.10	1.02.B	Document and record all work performed and record all data for the SLCS and PLCS testing and monitoring

Appendix E

Contractor's Stormwater Pollution Prevention Plan

Plan Title: **31 25 00 Stormwater Pollution Prevention Plan**

Project Title: Contract 11 – Upland Disposal Facility Construction
Housatonic River – Rest of River Remediation Project
Lee, Massachusetts

Prepared For: Arcadis of New York, Inc.
One Lincoln Center
110 West Fayette Street, Suite 300
Syracuse, NY 13202

Prepared By: Charter Contracting Company, LLC
500 Harrison Avenue, Suite 4R
Boston, MA 02118-2439

Contract No.:

Charter No.: 2-1859

Date: 2/17/2026

Revision No.: 01

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2/17/2026
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File: 04 31 25 00 Stormwater Pollution Prevention Plan REV00.docx

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APPENDICES

APPENDIX A –Project Schedule Overview

APPENDIX B – 2022 Construction General Permit for Stormwater Discharges from Construction Activities

APPENDIX C – SWPPP Inspection Report Form

APPENDIX D – SWPPP Training Log Form

APPENDIX E – SWPPP Delegation of Authority Form

APPENDIX F – Corrective Action Report Log

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This Stormwater Pollution Prevention Plan (SWPPP) is prepared specifically for Contract 11 – Upland Disposal Facility in Lee, Massachusetts. The Preliminary Stormwater Pollution Prevention Plan Draft, published in June 2025, was used to develop the site-specific SWPPP for Contract 11.

A Construction General Permit (CGP) will not be required for this project. Still, this SWPPP was prepared to meet the substantive requirements of the 2022 National Pollution Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Construction Activity.

1. CONTACT INFORMATION/RESPONSIBLE PARTIES

1.1. Construction Management

The persons listed below will be engaged in construction activities at the Site and will have their respective responsibilities. Additionally, both representatives can also be contacted 24 hours a day, 7 days a week for any site emergencies.

Site Construction Operator: Charter Contracting Company, LLC

- Claire Bradford, On-Site Project Manager, cbradford@charter.us, 617-356-6225
- Camden Murray, Site Superintendent, cmurray@charter.us, 617-992-8639

Emergency 24-Hour Contact: Charter Contracting Company, LLC

- Claire Bradford, On-Site Project Manager, cbradford@charter.us, 617-356-6225
- Camden Murray, Site Superintendent, cmurray@charter.us, 617-992-8639
- Ed Price, Health and Safety Director, eprice@charter.us, 617-593-0997

1.2. Stormwater Management Team

The Stormwater Management Team outlined in the table below comprises individuals responsible for overseeing the development of the SWPPP, any subsequent modifications to the Plan, and compliance with the permit requirements (i.e., installing and maintaining stormwater controls, conducting Site inspections, and taking corrective actions where required).

Stormwater Management Team		
		I have read the CGP and understand the applicable requirements
Claire Bradford On-Site Project Manager	SWPPP Development and Modifications	☒ Yes Date: 1/20/2026
Camden Murray Site Superintendent	Site compliance with permit requirements (e.g., installing and maintaining stormwater controls, conducting site inspections, and taking corrective actions where required).	☒ Yes Date: 1/20/20266

2. SITE EVALUATION, ASSESSMENT, AND PLANNING

2.1. Project/Site Information

Project Site Information	
Project/Site Name	GE-Pittsfield/Housatonic River Upland Disposal Facility
Project Street/Location	339 Woodland Road
City/State/ZIP Code	Lee, Massachusetts 01238
County or Similar Subdivision	Berkshire
Business Days & Hours	Monday – Friday: 7:00 am to 6:00 pm
Project Latitude Project Longitude Data Source	42.341270º N -73.236657º W Google Earth
Horizontal Reference Datum	North American Datum (NAD) 83

Additional Project Information

Are you requesting permit coverage as a “federal operator” as defined in the 2022 Construction General Permit requirements (Appendix A of the 2022 NPDES General Permit from Discharges from Construction Activity)?

☐ Yes ☒ No

Is the project/site located on Indian country lands, or located on a property of religious or cultural significance to an Indian tribe?

☐ Yes ☒ No

2.2. Discharge Information

Stormwater drains to ten Site locations as described in this SWPPP. Stormwater drainage into these ten areas primarily discharges through soil infiltration, with any excess amounts flowing overland. See the Points of Discharge table below for descriptions of discharge locations and the project design drawings for those locations.

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)?

☐ Yes ☒ No

Are there any waters of the U.S. within 50 feet of your project's earth disturbances?

☐ Yes ☒ No

		Is the			**Is this receiving water designated as Tier 2, Tier 2.5, or Tier 3 water?**
North Low Point at Powerline Crossing	Housatonic River	☒Yes ☐ No	Escherichia Coli (E. Coli) Fecal Coliform PCBs in Fish Tissue PCBs in Sediment Polychlorinated Biphenyls (PCBs) Water Chestnut	☒ Yes ☐ No	☐ Yes ☒ No
SMA-1	Housatonic River	☒ Yes ☐ No	Escherichia Coli (E. Coli) Fecal Coliform PCBs in Fish Tissue PCBs in Sediment Polychlorinated Biphenyls (PCBs) Water Chestnut	☒ Yes ☐ No	☐ Yes ☒ No
North Low Point on Woodland Rd	Washington Mountain Brook	☐ Yes ☒ No	None	☐ Yes ☒ No	☐ Yes ☒ No
South Low Point on Woodland Rd	Washington Mountain Brook	☐ Yes ☒ No	None	☐ Yes ☒ No	☐ Yes ☒ No
SMA-2	Washington Mountain Brook	☐ Yes ☒ No	None	☐ Yes ☒ No	☐ Yes ☒ No
SMA-3B	Washington Mountain Brook	☐ Yes ☒ No	None	☐ Yes ☒ No	☐ Yes ☒ No

		303(d) list)?			**Is this receiving water designated as Tier 2, Tier 2.5, or Tier 3 water?**
SMA-4	Housatonic River	☒ Yes ☐ No	Escherichia Coli (E. Coli) Fecal Coliform PCBS in Fish Tissue PCBs in Sediment Polychlorinated Biphenyls (PCBs) Water Chestnut	☒ Yes ☐ No	☐ Yes ☒ No
Low Point on Western Property Boundary	Housatonic River	☒ Yes ☐ No	Escherichia Coli (E. Coli) Fecal Coliform PCBs in Fish Tissue PCBs in Sediment Polychlorinated Biphenyls (PCBs) Water Chestnut	☒ Yes ☐ No	☐ Yes ☒ No
SMA-5	Housatonic River	☒ Yes ☐ No	Escherichia Coli (E. Coli) Fecal Coliform PCBs in Fish Tissue PCBs in Sediment Polychlorinated Biphenyls (PCBs) Water Chestnut	☒ Yes ☐ No	☐ Yes ☒ No
SMA-6	Housatonic River	☒ Yes ☐ No	Escherichia Coli (E. Coli) Fecal Coliform PCBs in Fish Tissue PCBs in Sediment Polychlorinated Biphenyls (PCBs) Water Chestnut	☒ Yes ☐ No	☐ Yes ☒ No

2.3. Nature of Construction Activities

The construction activities at the Site include access road construction, earthwork, backfilling, installation of a consolidation area baseliner, installation of a leachate collection and storage system, and restoration of disturbed areas. Additional Site activities associated with construction include installing erosion and sediment control features, installing stormwater features, constructing temporary access roads, and establishing material staging areas.

2.4. Size of Construction Site

Construction Site Metrics	Construction Area
Size of Property	75 Acres
Total Area Expected to be Disturbed by Construction Activities (Limit of Disturbance)	39 Acres
Maximum Area Expected to be Disturbed at Any One Time	39 Acres

2.5. Type of Construction Site

Indicate the type of site that this work is proposed on:

☐ Single-Family Residential ☐ Multi-Family Residential ☐ Commercial ☒ Industrial

☐ Institutional ☐ Highway or Road ☐ Utility ☐ Other

Will there be demolition of any structure built or renovated before January 1, 1980?

Yes ☒ No

If yes, do any of the structures being demolished have at least 10,000 square feet of floor space?

Yes ☐ No ☒ NA

Was the pre-development land use used for agriculture (see Appendix A of the 2022 NPDES General Permit from Discharges from Construction Activity for definition of “agricultural land”)?

Yes ☒ No

2.6. Potential Pollutant Sources

The table below lists the potential activities that generate pollutants at the Site and the pollutants associated with each activity. The site does not have any current known contamination.

Pollutant-Generating Activity	Pollutants or Pollutant Constituents	Location on Site
Excavation/Handling/Stockpiling/ Loading/Disposal of Soils	Dust/Sediment	See design drawings for Limits of Disturbance.
Construction Vehicle Movement	Soil/sediment	Throughout the site
Vehicle/Equipment Cleaning	Soil and sediment-laden water	Throughout the site
Vehicle/Equipment Usage	Fuel/oil	Throughout the site
Excavation, Backfilling, and Grading	Dust/sediment	Dust and sediment will occur throughout the excavation areas of the site
Site Restoration/Vernal Pool Construction	Landscaping Materials	Landscaping materials will be used only for vegetated areas
Gravel Road and Operations Areas Installation	Dust/sediment	See design drawings for access road extents
General Construction	General Litter/Project waste/Debris	Waste containers will be available on-site 24/7 and located out of public view. Waste will be kept tidy and in the proper associated waste bins/collection bins.
Trenching and Infrastructure Installation	Dust/Sediment, Project waste	See design drawings with infrastructure information

2.7. Construction Activities

The construction activities for the project include, but are not limited to, the following:

- Installation of Site erosion and sediment controls;
- Excavation, backfilling, and grading;
- Construction of access roads and support areas;
- Installation of temporary facilities;
- Installation of Site infrastructure systems;
- Geosynthetics installation;
- Vernal pool enhancement;
- Construction of stormwater management facilities; and
- Site restoration.

2.8. Sequence and Estimated Dates of Construction Activities

Construction activities are anticipated to begin in May 2026 and end by December 2027. Site work construction activities will generally be conducted within the timeframes described in the table below. A preliminary schedule of major construction activities is included in **Appendix A –Project Schedule Overview**. Updated schedules identifying the stormwater activities outlined in the SWPPP will be submitted monthly as part of the required schedule updates.

Soil Excavation and Associated Activities	Date
Estimated Start Date of Construction Activities for this Phase	May 8, 2026
Estimated "Winter Shutdown Period"	December 2026 to April 2027
Estimated End Date of Construction Activities for this Phase	December 9, 2027
Estimated Date(s) of Completed Site Restoration	December 9, 2027
Estimated Date(s) when Erosion and Sediment Controls will be Removed	Once stabilization has occurred.

2.9. Authorized Non-Stormwater Discharges

Type of Authorized Non-Stormwater Discharges Present at the Site	Likely to be Present at Your Site?
Discharges from emergency fire-fighting activities	☐ Yes ☒ No
Fire hydrant flushing	☒ Yes ☐ No
Landscape irrigation	☐ Yes ☒ No
Waters used to wash vehicles and equipment	☒ Yes ☐ No
Water used to control dust	☒ Yes ☐ No
Potable water, including uncontaminated water line flushing	☒ Yes ☐ No
External building washdown (soaps/solvents are not used, and external surfaces do not contain hazardous substances)	☐ Yes ☒ No
Pavement wash waters	☐ Yes ☒ No
Uncontaminated air conditioning or compressor condensate	☒ Yes ☐ No
Uncontaminated, non-turbid discharges of groundwater or spring water	☐ Yes ☒ No
Foundation or footing drains	☐ Yes ☒ No
Construction dewatering water	☒ Yes ☐ No

2.10. Site Drawings

The Contract 11 - UDF Construction project design drawings associated with this SWPPP provide general information about existing and proposed site conditions, construction components, project notes, planned erosion and sediment control BMPs, and other associated details.

Erosion controls will be implemented and installed in accordance with the construction plans and specifications. Earth-disturbing activities will be within the limits of disturbance outlined in the contract drawings.

3. DOCUMENTATION OF COMPLIANCE WITH OTHER FEDERAL REQUIREMENTS

3.1. Endangered Species Protection

Eligibility Criterion - In accordance with the 2022 NPDES General Permit from Discharges from Construction Activity, this construction site is eligible for coverage under Criterion C, where discharges are not likely to adversely affect the Endangered Species Act (ESA)-listed species and/or designated critical habitat as described below.

According to the National Marine Fisheries Service (NMFS), there are four species for which critical habitats exist within the New England management area: Atlantic Sturgeon, Loggerhead Turtle, North Atlantic Right Whale, and Atlantic Salmon (National Marine Fisheries Service, 2021).

Review of the Critical Habitat Maps for each of these species via the online NOAA resource mapping confirmed that the Site is neither located within nor likely to impact any of the critical habitats of the aforementioned species (National Marine Fisheries Service, 2021). Additionally, the Habitat Restoration and Mitigation Assessment Report and Plan for the Upland Disposal Facility Area were prepared to assess the impact of site development on natural habitats and to identify potential endangered species. The Northern Long-Eared Bat was identified as the only endangered animal in the vicinity of the site. There is one proposed threatened insect: the Monarch Butterfly. Refer to the Habitat Restoration and Mitigation Assessment Report for the list of threatened and endangered species from site visits. However, there are no critical habits within the Site vicinity.

Potential effects of the construction on the Northern Long-Eared Bat will be considered. There is an absence of known hibernacula, maternity roosts, or observations of the Northern Long-Eared Bat on the site. Clearing activities are not expected to take place under the scope of Contract 11 – UDF, however to further ensure protection of endangered species, the Client will make best efforts to schedule tree removal within the USFWS approved time window (November 1 to March 31) per Condition #121 of EPA's September 12, 2024 conditional approval letter, if any tree removal is necessary.

In addition, measures to promote Monarch Butterfly activity on-site have been considered. The project will include transplanting and seeding milkweed plants to promote Monarch breeding and migration. Transplanting will not take place until it is necessary to complete construction activities.

Therefore, there are no expected negative impacts on endangered species. Finally, the Construction Manager reviewed the Massachusetts State BioMap 2 software, and it was determined that there are no core habitats directly downstream from the Site (Massachusetts Division of Fisheries & Wildlife, 2021). The Habitat Restoration and Mitigation Assessment Report and Plan for Upland Disposal Facility Area is provided in the project reference documents.

3.2. Historic Preservation

The Construction Manager conducted a Cultural Resources Assessment (CRA) for the Site as part of the UDF Site pre-design investigation. The CRA determined that the UDF Site does not contain any significant cultural resources. The CRA for the UDF Site is provided in the project reference documents.

3.3. Safe Drinking Water Act Underground Injection Control Requirements

There will be no installation of infiltration trenches, commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow, nor any drywells, seepage pits, or improved sinkholes. The infiltration areas and stormwater management areas shown on the project design drawings do not apply as the features are not deeper than their widest surface dimension (CGP Part 7.2.9.c). As such, the underground injection control requirements of the Safe Drinking Water Act do not apply to this project.

4. EROSION AND SEDIMENT CONTROLS

This section describes the erosion and sediment control measures planned for implementation during construction. Proposed erosion and sediment control locations, BMPs, and details regarding their installation and maintenance will be in accordance with the project design drawings.

4.1. Natural Buffers

There are no waters of the U.S. within 50 feet of the project earth disturbance limits; therefore, no buffer compliance needs to be met.

4.2. Perimeter Sediment Controls

Perimeter sediment controls will be installed in areas downgradient of soil disturbances. Perimeter sediment controls will include straw wattles, silt fences, and a temporary stabilized construction

entrance. These controls will reduce the potential for sediment migration to areas downgradient of the work limits. Each control is described in the tables below.

Straw Wattle	
Description: Straw wattles (also called fiber rolls/logs) are tube-shaped erosion control devices filled with straw or approved alternative compost material. Straw or other material is wrapped in UV-degradable polypropylene or biodegradable materials. (See design drawings).	
Installation	May/June 2026
Maintenance Requirements	Remove sediment from the upslope side when accumulation reaches half the effective height of the barrier. Straw Wattles will be replaced as necessary to ensure materials are working effectively. At a minimum, the materials will be replaced per the manufacturer's guidelines.

Silt Fence	
Description: Silt fencing is placed at the downstream end of disturbed areas where runoff occurs as sheet flow. Silt fence intercepts and detains sediment from operations in contributing drainage areas, reducing runoff velocity. (See design drawings).	
Installation	May/June 2026
Maintenance Requirements	Inspect immediately after rainfall. Remove accumulated sediment behind the silt fence when it reaches 6 inches above the surrounding grade. Silt Fence will be replaced as necessary to ensure materials are working effectively. At a minimum, the materials will be replaced per the manufacturer's guidelines.

Compost Filter Sock	
Description: Compost filter socks are placed along the perimeter of a site or along slopes to capture sheet flow. Compost filter socks detain surface water flow, creating temporary ponding upgradient that allows sediment to settle.	
Installation	May/June 2026
Maintenance Requirements	Inspect regularly and after each rainfall event. Excessive upstream ponding indicates the need for additional filter socks further up the slope. Remove accumulated sediment when it reaches one-half the height of the filter sock. Compost Filter Sock will be replaced as necessary to ensure materials are working effectively. At a minimum, the materials will be replaced per the manufacturer's guidelines.

Rock Check Dams	
Description: Check dams are placed in drainage swales where vegetation is not stabilized at regular intervals. Check dams reduce flow velocities through the channel and trap sediment.	
Installation	May/June 2026
Maintenance Requirements	Check dams are placed in drainage swales where vegetation is not stabilized at regular intervals. Check dams reduce flow velocities through the channel and trap sediment.

Stabilized Construction Entrance	
Description: Stabilized construction entrances are at the entrance/exit to the site to reduce sediment leaving and/or being tracked out of the site limits.	
Installation	May 2026
Maintenance Requirements	Construction entrances should be maintained in compliance with local regulations and applicable permits. Maintenance steps should include adding stone/gravel, removing sediment, sweeping soil, and removing accumulated soil.

4.3. Soil Tracking

Vehicle entrances and exits may change throughout the project based on construction requirements and work location, but all are on asphalt or clean stone surfaces. Site exits will be monitored for soil tracking, and sweeping around the exits and along affected public roadways will be performed, as necessary.

Vehicles and equipment that come into contact with construction-related soil or debris will be cleaned before leaving the site to prevent sediment from tracking onto off-site roadways/areas.

4.4. Stockpiled Materials

Excavated and imported soil materials will be stockpiled on Site until their use during site backfilling/restoration, and will be brought onsite at an appropriate rate to ensure stockpiles are kept to reasonably quantities. Stockpiled materials will be surrounded by perimeter erosion controls and watered or covered as necessary to minimize dust generation. Should spraying of stockpiles be necessary for dust control, enough water will be applied to wet the top layer of the stockpiles, but not so much water as to generate runoff from the pile. Collected sediment material will be managed within appropriate onsite stockpiles (i.e., stockpiles designated for offsite disposal or reuse as backfill).

During the winter shutdown, erosion controls will be inspected, as required and replaced as necessary. Perimeter controls will remain in place and any stockpiled materials will continue to have proper erosion controls installed and be covered, as necessary.

4.5. Dust Mitigation

Dust control activities may include applying water spray to exposed soils from a water truck, an on-site water tank, or other approved water source, limiting vehicle speeds, sweeping paved roadways, and covering stockpiles.

These activities will be implemented on an as-needed basis to reduce the potential for dust generation. Water for dust suppression will be applied such that runoff or excessive soil saturation does not result in soil erosion or sediment transport. If necessary, other dust-control methods (e.g., soil binders) may be considered. Such measures will be reviewed for acceptability by the Construction Manager before implementation.

4.6. Minimize Steep Slope Disturbances

There are no existing or proposed steep slope conditions at the site. Temporary excavation side wall slopes coincident with excavation work are located within the site limits. They will be appropriately managed with controlled sloping, benching, and use of erosion control blankets where necessary, in accordance with the project specifications. As these steep slope conditions are temporary, and all associated drainage will remain within the excavation areas, erosion control practices on these slope surfaces will be installed, if necessary, to minimize potential for erosion and off-site sediment migration.

4.7. Topsoil

Earthwork activities will remove existing topsoil, and the topsoil will be conserved, where applicable, for restoration to final conditions. Topsoil will be conserved in stockpiles on-site. In areas where topsoil conservation is not feasible (topsoil has eroded, does not meet material requirements, etc.), topsoil will be obtained from off-site sources that meet project specifications and are suitable for maintaining vegetative growth, where necessary.

4.8. Soil Compaction

After completing topsoil placement and grading, topsoil areas will be decompacted, if required, to promote infiltration and vegetation establishment. Contractors shall use appropriate decompaction methods (e.g., scarifying, tilling, scraping, etc.). Equipment access will be restricted in areas that have received final preparation for seeding to prevent unnecessary compaction of the topsoil material.

4.9. Storm Drain Inlets

There are no known existing storm drain inlets adjacent to the Site. Any inlets discovered during construction and installed as part of the work that construction activities may impact will have appropriate erosion and sediment control devices installed to protect them.

4.10. Stormwater Conveyance Channels

Several primary stormwater conveyance channels and ditches will be installed during planned construction, and are listed below. Other minor ditches and swales not listed below will be constructed and will still require inspection and maintenance as the work progresses.

Southwest Exterior Ditch	
Description: Stormwater conveyance channel on the southwestern side of the UDF. This feature collects sheet flow from adjacent sideslopes and discharges into a stormwater culvert underneath an access road.	
Installation	June – October 2026
Maintenance Requirements	Inspect the ditch for erosion problems, litter accumulation, clogging, and vegetation health annually. Remove sediment buildup from the bottom of the ditch if the accumulation reaches 25 percent of the original design volume, as needed. Mow ditches as needed to maintain a height of 3 to 4 inches.
Design Specifications	See design drawings.

Southeast Exterior Ditch	
Description: Stormwater conveyance channel on the southeastern side of the UDF. This feature collects sheet flow from adjacent sideslopes and discharges into the South Stormwater Basin.	
Installation	July/August 2026
Maintenance Requirements	Inspect the ditch for erosion problems, litter accumulation, clogging, and vegetation health annually. Remove sediment buildup from the bottom of the ditch if the accumulation reaches 25 percent of the original design volume, as needed. Mow ditches as needed to maintain a height of 3 to 4 inches.
Design Specifications	See design drawings.

Perimeter Ditch	
Description: Stormwater conveyance channel encircling the UDF consolidation area. Perimeter ditch discharges into a stormwater culvert upgradient to the North Stormwater Basin.	
Installation	October/November 2027
Maintenance Requirements	Inspect the ditch for erosion problems, litter accumulation, clogging, and vegetation health annually. Remove sediment buildup from the bottom of the ditch if the accumulation reaches 25 percent of the original design volume, as needed. Mow ditches as needed to maintain a height of 3 to 4 inches.
Design Specifications	See design drawings

North Access Road Ditch	
Description: Stormwater conveyance channel along North Access Road to collect runoff from sideslopes and discharge into an existing drainage channel north of the UDF.	
Installation	September/October 2026
Maintenance Requirements	Inspect the ditch for erosion problems, litter accumulation, clogging, and vegetation health annually. Remove sediment buildup from the bottom of the ditch if the accumulation reaches 25 percent of the original design volume, as needed. Mow ditches as needed to maintain a height of 3 to 4 inches.
Design Specifications	See design drawings.

East Exterior Ditch	
Description: Stormwater conveyance channel on the eastern side of the UDF. This feature collects sheet flow from adjacent areas and discharges into a stormwater culvert underneath an access road.	
Installation	October/November 2027
Maintenance Requirements	Inspect the ditch for erosion problems, litter accumulation, clogging, and vegetation health annually. Remove sediment buildup from the bottom of the ditch if the accumulation reaches 25 percent of the original design volume, as needed. Mow ditches as needed to maintain a height of 3 to 4 inches.
Design Specifications	See design drawings.

4.11. Sediment Basins

There will be nine sediment basins installed as part of the planned construction: North Stormwater Basin, South Stormwater Basin, and SMA-1, SMA-2, SMA-3a, SMA-3b, SMA-4, SMA-5, and SMA-6. The sediment basins will later serve as stormwater detention and infiltration features in final build-out conditions. The sediment basins are designed to manage the 100-year, 24-hour storm event under final site conditions.

4.12. Potential Chemical Treatment Applications

Soil Types - Provided below is a description of soil types expected to be encountered at the site during remedial excavation work. Web soil survey investigations have identified up to 4 different material types at the site. These materials are listed below.

- Copake fine sandy loam (3 to 8 percent slopes);
- Copake fine sandy loam (8 to 15 percent slopes);
- Copake fine sandy loam (15 to 25 percent slopes);
- Hero loam (3 to 8 percent slopes);
- Groton and Hinckley soils (25 to 35 percent slopes); and
- Pits, gravel.

Treatment Chemicals – No treatment chemicals are planned for the project work.

Special Controls for Cationic Treatment Chemicals (if applicable) - No cationic treatment is planned for this project work.

Schematic Drawings of Stormwater Controls/Chemical Treatment Systems - Schematic Drawings are not applicable for the use of foaming agents and are therefore not included.

Training - No specific training is required for handling and applying chemicals, as no chemical treatment is anticipated for the project work.

4.13. Dewatering Practices

An existing pond that will be backfilled as part of construction activities will be dewatered to facilitate earthwork. Pumped water will be managed in accordance with the project construction documents. Dewatering may also be performed during construction as needed to remove stormwater runoff from active excavation areas. Any water removed in this way will be managed in accordance with the project construction documents.

4.14. Other Stormwater Controls

No other stormwater controls are planned for the project work.

4.15. Site Stabilization

The project area of disturbance comprises mainly pervious surfaces, gravel pits, and unconnected impervious areas. All bare soil areas will be covered with the surface controls described below to minimize sediment movement off-site. Refer to project design drawings for land cover types and construction details.

Total Amount of Land Disturbance Occurring at Any One Time

☐ Five Acres or less ☒ More than Five Acres

Gravel/Asphalt	
☐ Vegetative ☒ Non-Vegetative ☐ Temporary ☒ Permanent	
Description: Gravel and asphalt will be applied to reduce the long-term potential for erosion and sediment transport from disturbed or bare soil areas. Gravel and asphalt will be placed as shown on the project design drawings, including at the stabilized construction entrance.	
Installation	July 2026
Maintenance Requirements	Re-apply when gravel seems sparse/clogged with sediment.

Vegetation	
☒ Vegetative ☐ Non-Vegetative ☐ Temporary ☒ Permanent	
Description: Where indicated on the project design drawings, grass vegetation will be established to reduce the long-term potential for erosion and sediment transport from disturbed or bare soil areas. Permanent seeding will be applied to provide protective cover after site work is complete. The seedbed will be prepared as necessary, before applying seed, in accordance with the project construction documents.	
Installation	August-December 2026 August – December 2027 (In accordance with Planting/Seeding Windows) If needed, March 15th to June 1st spring planting window will also be utilized.
Maintenance Requirements	Disturbed areas will not be considered stabilized until a minimum percent uniform vegetative cover of erosion-resistant perennial species is achieved in accordance with the project construction documents, unless otherwise stabilized (e.g., graveled or paved). Until that time, all downgradient erosion and sediment controls will remain in place.

5. POLLUTION PREVENTION

5.1. Potential Sources Of Pollution

Potential sources of pollution are presented in the table below.

Pollutant-Generating Activity	Pollutants or Pollutant Constituents	Location on Site
Excavation/Handling/Stockpiling/ Loading/Disposal of Soils	Dust/Sediment	See design drawings for Limits of Disturbance.
Construction Vehicle Movement	Soil/sediment	Throughout the site
Vehicle/Equipment Cleaning	Soil and sediment-laden water	Throughout the site
Vehicle/Equipment Usage	Fuel/oil	Throughout the site
Excavation, Backfilling, and Grading	Dust/sediment	Dust and sediment will occur throughout the excavation areas of the site
Site Restoration/Vernal Pool Construction	Landscaping Materials	Landscaping materials will be used only for vegetated areas

Pollutant-Generating Activity	Pollutants or Pollutant Constituents	Location on Site
Gravel Road and Operations Areas Installation	Dust/sediment	See design drawings for access road extents
General Construction	General Litter/Project waste/Debris	Waste containers will be available on-site 24/7 and located out of public view. Waste will be kept tidy and in the proper associated waste bins/collection bins.
Trenching and Infrastructure Installation	Dust/Sediment, Project waste	See design drawings with infrastructure information

5.2. Spill Prevention And Response

A Spill Prevention, Control, and Countermeasure (SPCC) Plan is required for the project and provided separately by the construction contractor as part of the Supplemental Information Package (SIP).

The Contractor will be responsible for implementing appropriate spill response procedures when responding to releases of, but not limited to, equipment oil, fuel, and hydraulic fluid during the performance of construction activities. Spills of reportable quantities, either under 40 CFR 110, 40CFR 117, or 40 CFR 302, and other State-mandated levels such as those in the Massachusetts Contingency Plan (310 CMR 40.0000), will be immediately reported to the CM. Spills will be reported to federal, state, and local agencies, as required. Names and phone numbers of these personnel are included in Section 1.1. Reporting spills to the relevant agencies complies with applicable regulations and requirements.

The Contractor is responsible for implementing appropriate spill response procedures, which may include the following:

1) Ceasing operation of the affected equipment: This will consist of shutting off the equipment and/or closing any valves and stopping the leak, if possible.

2) Containing the spill: If the spilled material is floating on a water surface, spill-absorbent pads/booms will be placed across the path of the floating spill. If the spill occurs on land, a ditch, dam, or other containment feature will be constructed to stop the flow of the spilled material. Absorbent material will be applied, as necessary.

3) Cleaning up the spill: Spills in water will be recovered using, but not limited to, pumps and sorbent material, as necessary, until the spilled material is recovered, and no sheen or other evidence of the spill is observed on the water surface. Spills on land will be recovered using pumps, sorbent material, hand tools, and/or heavy equipment, as necessary, until the spilled material is recovered. Other activities during spill cleanup include removing impacted soil/sorbent pads and using rags and cleaning solution to remove excess spilled material from equipment.

4) Containerizing spill materials: Spilled materials, including but not limited to impacted soil and sorbent pads, will be containerized in Massachusetts Department of Transportation-approved containers. The containers will be labeled with the waste type and the collection date in accordance with applicable regulations. Samples of the containerized material will be obtained to characterize the spilled materials for disposal, as required.

5) Disposing of spill materials: Impacted materials and spill cleanup debris will be disposed of at a facility permitted to accept such materials.

6) Performing post-spill maintenance: Following cleanup of the spill, the Contractor's On-Site Project Manager or Site Superintendent, as defined in Section 1.1, will verify that all used spill cleanup material and equipment have been disposed of or decontaminated, as appropriate. If the equipment that caused the spill cannot be adequately repaired, replacement equipment will be obtained.

5.3. Fueling and Maintenance of Equipment or Vehicles

The Contractor will perform routine vehicle/equipment maintenance activities and will store and manage construction materials (fuels, maintenance tools, etc.) in designated areas to prevent potential release to stormwater drains. All fuels or fluids will be covered appropriately, contained, and/or placed in a temporary shed or enclosure. Other best management practices are listed below.

- Drip pans and/or oil absorbent pads will be placed under vehicles with observable leaks
- Vehicles parked outdoors will be closely observed for leaks
- Drip pans and/or oil absorbent pads placed under vehicles will be routinely inspected, emptied, and cleaned to prevent overtopping/oversaturation
- No fill nozzle trigger locks will be allowed
- Fuel dispensing operations will be observed at all times
- Excessive amounts of fuel will not be stored onsite. Fuel trucks will come to the site daily to refuel equipment, and small, containable fuel cells will store a small amount of excess fuel.

5.4. Washing of Equipment and Vehicles

If dry methods are insufficient to prevent soil transport outside work areas, washing measures will be implemented within the Site. Vehicles and equipment that come into contact with soil or debris will be cleaned to prevent the tracking of soil/sediment from the Site. In the event sediment is deposited on paved areas outside the Site, the soil/sediment will be collected to minimize its transport in runoff over impervious surfaces and its entry into stormwater management systems. Cleaning will be limited to water; no soap, solvent, or detergents will be applied.

5.5. Storage, Handling, and Disposal of Building Products, Materials, and Wastes

5.5.1. Construction Products

Construction products will be stored in secure locations on the Site within the perimeter security fencing and away from public access. Conex-type storage boxes and field trailers will be located on-site and locked at the end of each day, and when the site is unattended.

5.5.2. Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Chemicals

Fuel, oil, hydraulic fluids, other petroleum products, and chemicals will be kept in secondary containment and under cover, if present on the jobsite.

5.5.3. Hazardous or Toxic Waste

It is not anticipated that construction activities will generate hazardous waste. However, if any hazardous waste is identified or generated, it will be managed and disposed of in accordance with the project construction documents and the specific characteristics of the identified waste.

5.5.4. Construction and Domestic Waste

General construction waste will be separated appropriately, containerized, and disposed of off-site at an approved waste disposal facility permitted to accept the waste.

5.5.5. Sanitary Waste

Portable toilets will be positioned securely and located away from receiving waters, storm drain inlets, and all other drainage features. Portable toilets will be cleaned frequently and kept sanitary.

5.5.6. Application of Fertilizers

Fertilizers will be applied at a rate compliant with the manufacturer’s specifications and at the appropriate time of year for maximum vegetation uptake. Fertilizers will not be applied before anticipated rain events, to frozen ground, or directly to drainage features. The application of fertilizer will comply with applicable Federal, State, and local requirements.

6. INSPECTION, MAINTENANCE, AND CORRECTIVE ACTION

Inspections of erosion and sediment controls will be conducted to confirm that this SWPPP is being implemented and remains functional, given site conditions and actual project activities. Before land disturbing activities (excluding installation of erosion and sediment control practices), a qualified person, as defined in Section 4 of the NPDES Construction General Permit for Stormwater Discharges from Construction Activities, and included as **Appendix B** with this SWPPP, will perform a pre-construction site assessment to verify that erosion and sediment controls are correctly installed and functional.

During construction activities, the contractor will inspect all disturbed areas without stabilization, as well as all erosion and sediment control practices and pollution prevention measures implemented within the active work area. If deficiencies are identified, the Contractor will implement corrective actions in accordance with Section 6.2 below.

A qualified person will inspect construction-phase erosion and sediment control measures in accordance with the requirements in Section 7.1 until the Site is deemed sufficiently stable.

6.1. Inspection Personnel and Procedures

Inspections include all disturbed areas that have not achieved final stabilization, all points of discharge to natural surface waterbodies within or immediately adjacent to the Site, and all points of stormwater discharge from the Site. After each inspection, the Qualified person will prepare an SWPP Inspection Report (provided in **Appendix C).** If corrective actions are identified, they will be communicated in accordance with Section 6.2.

Personnel Responsible for Inspections:

- Site Superintendent

Standard Frequency:
☒ Every 7 days ☐ Every 14 days and within 24 hours of a 0.25” rain or the occurrence of runoff from snowmelt sufficient to cause a discharge[1]
Increased Frequency (if applicable):
For areas of sites discharging to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3 ☐ Every 7 days and within 24 hours of a 0.25” rain

Reduced Frequency (if applicable)
For stabilized areas ☐ Twice during the first month, no more than 14 calendar days apart; then once per month after the first month; ▪ SPECIFY LOCATIONS WHERE STABILIZATION STEPS HAVE BEEN COMPLETED. ▪ INSERT DATE THAT THEY WERE COMPLETED. (Note: Likely, you will not be able to include this in your initial SWPPP. If you qualify for this reduction (see Part 4.4.1 of the CGP), you will need to modify your SWPPP to include this information.)
For stabilized areas on "linear construction sites." ☐ Twice during the first month, no more than 14 calendar days apart; then once more within 24 hours of a 0.25" rain ▪ SPECIFY LOCATIONS WHERE STABILIZATION STEPS HAVE BEEN COMPLETED ▪ INSERT DATE THAT THEY WERE COMPLETED (Note: Likely, you will not be able to include this in your initial SWPPP. If you qualify for this reduction (see Part 4.4.1 of the CGP), you will need to modify your SWPPP to include this information.)
For arid, semi-arid, or drought-stricken areas during seasonally dry periods or during drought ☐ Once per month and within 24 hours of a 0.25" rain Insert beginning and ending dates of the seasonally defined dry period for your area or the valid period of drought: ▪ Beginning date of seasonally dry period: INSERT APPROXIMATE DATE ▪ Ending date of seasonally dry period: INSERT APPROXIMATE DATE
For frozen conditions where earth-disturbing activities are being conducted ☐ Once per month Insert beginning and ending dates of frozen conditions on your site: ▪ Beginning date of frozen conditions: INSERT APPROXIMATE DATE ▪ Ending date of frozen conditions: INSERT APPROXIMATE DATE

Note: 1. An inspection must be conducted within 24 hours once a storm event has produced 0.25 inches within 24 hours, even if the storm event is continuing. Thus, if you have elected to inspect bi-weekly in accordance with Part 4.2.2 of the CGP, and a storm event at your site persists for multiple days. Each day the storm produces 0.25 inches or more of rain, you must inspect within 24 hours of the first day of the storm and within 24 hours after the end of the storm. If the latter option is chosen, a rain gauge must be on site for readings.

Inspection Report Forms - Refer to **Appendix C** for a sample SWPPP Inspection Form.

6.2. Corrective Action

The selection, design, installation, and implementation of the erosion and sediment control measures will be routinely reviewed to determine whether modifications are necessary due to changes in design, construction, operation, or maintenance that may significantly affect the potential for pollutant discharge.

The selection, design, installation, and implementation of the erosion and sediment control measures will be reviewed and revised, and there will be corrective actions taken whenever any of the following conditions occur:

- An unauthorized discharge occurs (e.g., spill, leak, or discharge of non-stormwater that is not authorized under the General Permit or another NPDES permit);
- A visual assessment indicates evidence of stormwater pollution (e.g., color, odor, floating solids, settled solids, suspended solids, foam);
- The control measures are not stringent enough to meet applicable water quality standards or non-numeric effluent limits;
- An inspection by an EPA official or local MS4 operator determines that modifications are necessary to the Sites BMPs to meet the erosion and sediment control measures/BMPs specified in the CGP; or
- Routine inspections indicate that control measures are not being adequately operated and maintained.

If corrective action is needed, the contractor will, as soon as practicable, take reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up of any contaminated surfaces.

Maintenance or repair of installed erosion and sediment controls will be initiated within one (1) business day of notification of deficiencies, unless a modified timetable is approved by the site superintendent and completed within a reasonable timeframe. Corrective actions will be closed as soon as practicable, and no later than 1-week after identification of the issue.

Erosion and sediment control measures will be maintained for the duration of the project until all permanent stabilization measures have become fully established and a satisfactory final Site inspection has been performed by a Qualified Person.

6.3. Delegation of Authority

Following proper training, the Site Superintendent will have qualified personnel complete the SWPPP Training Log Form (**Appendix D**) and SWPPP Delegation of Authority Form (**Appendix E**).

7. TRAINING

The personnel in the following table have received the training and instruction necessary to understand the items listed below, as they pertain to their job responsibilities:

- The CGP timeframes associated with installation, maintenance, and removal of erosion and sediment controls and stabilization of disturbed areas;
- The location of all erosion and sediment controls on the site required by this CGP, and how they are to be maintained;
- The proper procedures to follow for the SWPPP pollution prevention requirements; and

- When and how to conduct inspections, record findings, and develop/implement corrective actions.

Any personnel fitting the categories listed below must have the training and instruction described above and be shown in the table below:

- Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention measures);
- Personnel responsible for the application and storage of treatment chemicals (if applicable);
- Personnel who are responsible for conducting inspections in accordance with this SWPPP; and
- Personnel who are responsible for taking corrective actions as required in Section 6.2.

Documentation for Completion of Training

Documentation of training completion will be recorded on the SWPPP Training Log Form in **Appendix D** and in the table below.

Name	Training Course	Date Completed
Matthew Wilder Director of Construction	Site Inspector Training Course	1/9/2024 – Expires 5/17/2027
Claire Bradford On-Site Project Manager	Site Inspector Training Course	In Process
Camden Murray Site Superintendent	Site Inspector Training Course	In Process

8. CERTIFICATION AND NOTIFICATION

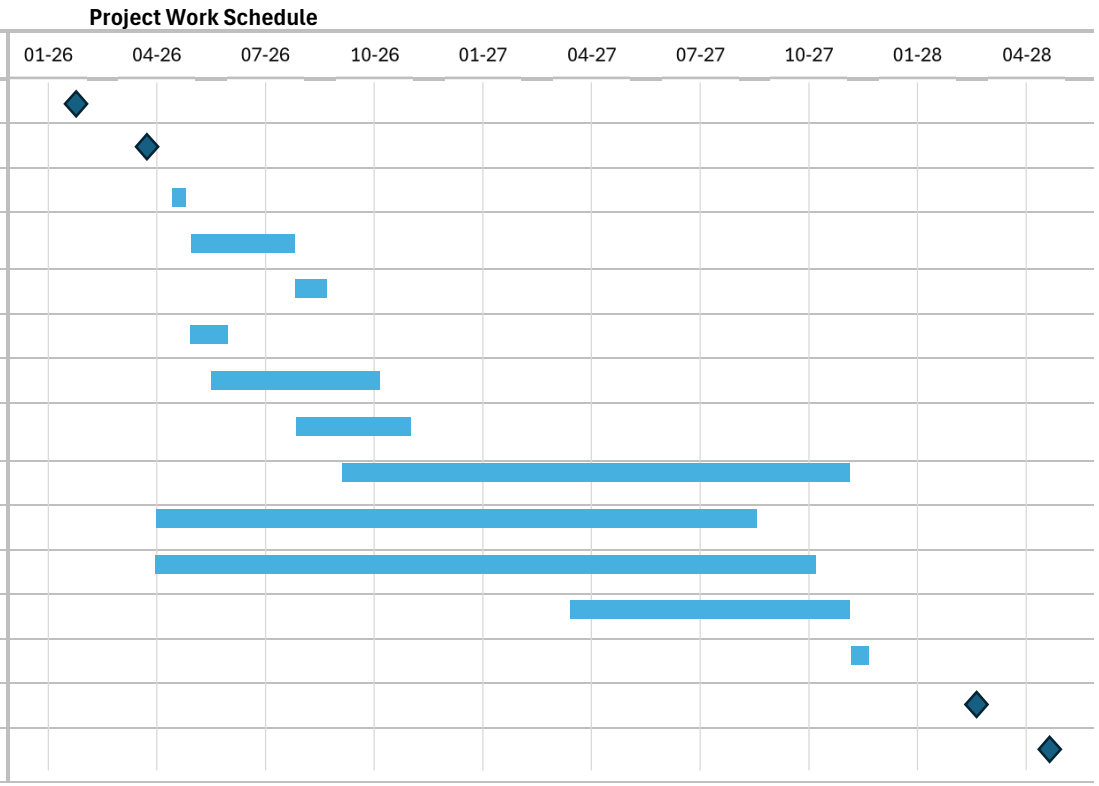
I certify under penalty of law that this SWPPP and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

APPENDIX A

Project Schedule Overview

Project Work Schedule

ID	Task Name	Start	Finish
1	**SIP Submittal by GE**	2/18/26	2/18/26
2	**EPA SIP Approval**	4/21/26	4/21/26
3	**Mobilization**	5/11/26	5/22/26
4	**Operations/Support Area Visitor Parking, & Construction Entrance**	5/26/26	8/20/26
5	**Vernal Pool Enhancement & Habitat Mitigation**	8/21/26	9/16/26
6	**Gravel Pond**	5/26/26	6/26/26
7	**Mass Earth Excavation to Subgrade**	6/12/26	10/30/26
8	**North Stormwater Basin, SMA 1, & 5 Cell 1 Drainage Pipes, Culvert**	8/21/26	11/24/26
9	**Install Multi-Layer Baseliner System**	9/29/26	11/23/27
10	**Leachate Storage System**	4/27/26	9/7/27
11	**Leachate Riser Vaults & Conveyance**	4/27/26	10/26/27
12	**Perimeter Access Road**	4/5/27	11/23/27
13	**Demobilization**	11/24/27	12/9/27
14	**Construction Completion Report Submittal by GE**	3/9/28	3/9/28
15	**EPA Approval of Construction Completion Report**	5/9/28	5/9/28



Legend

Item	Symbol
Activity	
Milestone	

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APPENDIX B

2022 Construction General Permit for Stormwater Discharges from Construction Activities

February 17, 2022

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National Pollutant Discharge Elimination System (NPDES)
Construction General Permit (CGP) for Stormwater Discharges from Construction Activities

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et. seq., (hereafter CWA), as amended by the Water Quality Act of 1987, P.L. 100-4, "operators" of construction activities (defined in Appendix A) that meet the requirements of Part 1.1 of this National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP), are authorized to discharge pollutants in accordance with the effluent limitations and conditions set forth herein. Permit coverage is required from the "commencement of construction activities" (see Appendix A) until one of the conditions for terminating CGP coverage has been met (see Part 8.2).

This permit becomes effective on 12:00 am, April 8, 2025.

This permit and the authorization to discharge expire at 11:59pm, February 16, 2027.

The 2022 CGP was modified to expand the list of areas eligible for coverage to include Lands of Exclusive Federal Jurisdiction in the U.S., to clarify the requirements that apply to projects that discharge to receiving waters within these areas, and to make corresponding changes in Appendices A, B, and D. See *2022 CGP Modification - Fact Sheet* for additional information.

Signed and issued this 8th day of April 2025

JAVIER LAUREANO PEREZ
Digitally signed by JAVIER LAUREANO PEREZ
Date: 2025.04.08 09:24:10 -04'00'

Javier Laureano Perez,
Director, Water Division, EPA Region 2.

Signed and issued this 8th day of April 2025

CARMEN GUERRERO PEREZ
Digitally signed by CARMEN GUERRERO PEREZ
Date: 2025.04.08 12:41:41 -04'00'

Carmen Guerrero Perez,
Director, Caribbean Environmental Protection Division,
EPA Region 2.

Signed and issued this 8th day of April 2025

KATHLENE BUTLER
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Date: 2025.04.08 14:05:04 -04'00'

Kathlene Butler,
Director, Water Division, EPA Region 4.

Signed and issued this 8th day of April 2025

TERA FONG
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Date: 2025.04.08 15:01:22 -05'00'

Tera Fong,
Director, Water Division, EPA Region 5.

Signed and issued this 8th day of April 2025

TROY HILL
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Date: 2025.04.08 14:04:26 -05'00'

Troy Hill,
Director, Water Division, EPA Region 6.

Signed and issued this 8th day of April 2025

JEFFERY ROBICHAUD
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Date: 2025.04.08 14:31:40 -05'00'

Jeffery Robichaud,
Director, Water Division, EPA Region 7.

Signed and issued this 8th day of April 2025

STEPHANIE DEJONG
Digitally signed by STEPHANIE DEJONG
Date: 2025.04.08 09:32:38 -06'00'

Stephanie DeJong,
Manager, Clean Water Branch, EPA Region 8.

Signed and issued this 8th day of April 2025

Digitally signed by TOMAS TORRES
Date: 2025.04.08 09:19:32 -07'00'

Tomas Torres,
Director, Water Division, EPA Region 9.

Signed and issued this 8th day of April 2025

MATHEW MARTINSON
MATHEW MARTINSON
2025.04.08 14:41:11 -07'00'

Mathew Martinson,
Director, Water Division, EPA Region 10.

For EPA Regions 1 and 3, this modified permit becomes effective at 2:00 pm, June 10, 2025. This permit and the authorization to discharge expire at 11:59pm, February 16, 2027.

The 2022 CGP was modified to expand the list of areas eligible for coverage to include Lands of Exclusive Federal Jurisdiction in the U.S., to clarify the requirements that apply to projects that discharge to receiving waters within these areas, and to make corresponding changes in Appendices A, B, and D. See *2022 CGP Modification - Fact Sheet* for additional information.

Signed and issued this 10th day of June 10, 2025

MARK SANBORN

Digitally signed by MARK SANBORN
Date: 2025.06.10 11:00:04 -04'00'

Mark Sanborn
Regional Administrator, EPA Region 1

Signed and issued this 10th day of June 10, 2025

MICHELLE PRICE-FAY

Digitally signed by MICHELLE PRICE-FAY
Date: 2025.06.10 09:35:25 -04'00'

Michelle Price-Fay
Director, Water Division, EPA Region 3

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1 HOW TO OBTAIN COVERAGE UNDER THE CONSTRUCTION GENERAL PERMIT (CGP)

To be covered under this permit, you must meet the eligibility conditions and follow the requirements for obtaining permit coverage in this Part.

1.1 ELIGIBILITY CONDITIONS

1.1.1 You are an "operator" of a construction site for which discharges will be covered under this permit. For the purposes of this permit and in the context of stormwater discharges associated with construction activity, an "operator" is any party associated with a construction project that meets either of the following two criteria:

- **a.** The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
- **b.** The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

Where there are multiple operators associated with the same project, all operators must obtain permit coverage.[1] Subcontractors generally are not considered operators for the purposes of this permit.

1.1.2 Your site's construction activities:

- **a.** Will disturb one or more acres of land, or will disturb less than one acre of land but are part of a common plan of development or sale (as defined in Appendix A) that will ultimately disturb one or more acres of land; or
- **b.** Have been designated by EPA as needing permit coverage under 40 CFR § 122.26(a)(1)(v) or 40 CFR § 122.26(b)(15)(ii);

1.1.3 Your site is located in an area where EPA is the permitting authority and where coverage under this permit is available (see Appendix B).

1.1.4 Discharges from your site are not:

- **a.** Already covered by a different NPDES permit for the same discharge; or
- **b.** In the process of having coverage under a different NPDES permit for the same discharge denied, terminated, or revoked.[2, 3]

1.1.5 You can demonstrate you meet one of the criteria in the Endangered Species Protection section of the Notice of Intent (NOI) that you submit for coverage under this permit, per Part 1.4, with respect to the protection of Federally listed endangered or threatened species and Federally designated critical habitat under the Endangered Species Act (ESA). If the EPA Regional Office grants you a waiver from electronic reporting per Part

[1] If the operator of a "construction support activity" (see Part 1.2.1c) is different than the operator of the main site, that operator must also obtain permit coverage. See Part 7.1 for clarification on the sharing of permit-related functions between and among operators on the same site and for conditions that apply to developing a SWPPP for multiple operators associated with the same site.

[2] Parts 1.1.4a and 1.1.4b do not include sites currently covered under the 2017 CGP that are in the process of obtaining coverage under this permit, nor sites covered under this permit that are transferring coverage to a different operator.

[3] Notwithstanding a site being made ineligible for coverage under this permit because it falls under the description of Parts 1.1.4a or 1.1.4b, above, EPA may waive the applicable eligibility requirement after specific review if it determines that coverage under this permit is appropriate.

1.4.2, you must complete the ESA worksheet in Appendix D to demonstrate you meet one of the criteria and submit it with your paper NOI (Appendix I).

1.1.6 You have completed the screening process in Appendix E relating to the protection of historic properties; and

1.1.7 You have complied with all requirements in Part 9 imposed by the applicable State, Indian Tribe, or Territory in which your construction activities and/or discharge will occur.[4]

1.1.8 For "new sources" (as defined in Appendix A) only:

a. EPA has not, prior to authorization under this permit, determined that discharges from your site will not meet applicable water quality standards. Where such a determination is made prior to authorization, EPA may notify you that an individual permit application is necessary. However, EPA may authorize your coverage under this permit after you have included appropriate controls and implementation procedures designed to bring your discharge into compliance with this permit, specifically the requirement to meet water quality standards. In the absence of information demonstrating otherwise, EPA expects that compliance with the requirements of this permit, including the requirements applicable to such discharges in Part 3, will result in discharges that meet applicable water quality standards.

b. Discharges from your site to a Tier 2, Tier 2.5, or Tier 3 water[5] will not lower the water quality of the applicable water. In the absence of information demonstrating otherwise, EPA expects that compliance with the requirements of this permit, including the requirements applicable to such discharges in Part 3.2, will result in discharges that will not lower the water quality of such waters.

1.1.9 If you plan to add "cationic treatment chemicals" (as defined in Appendix A) to stormwater and/or authorized non-stormwater prior to discharge, you may not submit your NOI until you notify your applicable EPA Regional Office (see Appendix J) in advance and the EPA Regional Office authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will result in discharges that meet applicable water quality standards.

[4] EPA notes that the requirements of Part 9 do not apply to projects within Lands of Exclusive Federal Jurisdiction.

[5] Note: Your site will be considered to discharge to a Tier 2, Tier 2.5, or Tier 3 water if the first receiving water to which you discharge is identified by a State, Tribe, or EPA as a Tier 2, Tier 2.5, or Tier 3 water. For discharges that enter a storm sewer system prior to discharge, the first receiving water to which you discharge is the waterbody that receives the stormwater discharge from the storm sewer system. The current list of Tier 2, Tier 2.5, and Tier 3 waters located in the areas eligible for coverage under this permit can be found at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates. You can also use EPA's Discharge Mapping Tool (https://www.epa.gov/npdes/epas-stormwater-discharge-mapping-tools) to assist you in identifying whether any receiving waters to which you discharge are listed as impaired (and the pollutant for which it is impaired) and whether an approved total maximum daily load (TMDL) exists for that waterbody.

1.2 TYPES OF DISCHARGES AUTHORIZED[6]

1.2.1 The following stormwater discharges are authorized under this permit provided that appropriate stormwater controls are designed, installed, and maintained (see Parts 2 and 3):

- **a.** Stormwater discharges, including stormwater runoff, snowmelt runoff, and surface runoff and drainage, associated with construction activity under 40 CFR § 122.26(b)(14) or § 122.26(b)(15)(i);
- **b.** Stormwater discharges designated by EPA as needing a permit under 40 CFR §122.26(a)(1)(v) or § 122.26(b)(15)(ii);
- **c.** Stormwater discharges from on or off-site construction support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided that:
  - **i.** The support activity is directly related to the construction site required to have permit coverage for stormwater discharges;
  - **ii.** The support activity is not a commercial operation, nor does it serve multiple unrelated construction sites;
  - **iii.** The support activity does not continue to operate beyond the completion of the construction activity at the site it supports; and
  - **iv.** Stormwater controls are implemented in accordance with Part 2 and Part 3 for discharges from the support activity areas; and
- **d.** Stormwater discharges from earth-disturbing activities associated with the construction of staging areas and the construction of access roads conducted prior to active mining.

1.2.2 The following non-stormwater discharges associated with your construction activity are authorized under this permit provided that, with the exception of water used to control dust and to irrigate vegetation in stabilized areas, these discharges are not routed to areas of exposed soil on your site and you comply with any applicable requirements for these discharges in Parts 2 and 3:

- **a.** Discharges from emergency fire-fighting activities;
- **b.** Fire hydrant flushings;
- **c.** Landscape irrigation;
- **d.** Water used to wash vehicles and equipment, provided that there is no discharge of soaps, solvents, or detergents used for such purposes;
- **e.** Water used to control dust;
- **f.** Potable water including uncontaminated water line flushings;

[6] See "Discharge" as defined in Appendix A. Note: Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under CWA Section 402(k) by disclosure to EPA, State, or local authorities after issuance of this permit via any means, including the Notice of Intent (NOI) to be covered by the permit, the SWPPP, or during an inspection.

g. External building washdown, provided soaps, solvents, and detergents are not used, and external surfaces do not contain hazardous substances (as defined in Appendix A) (e.g., paint or caulk containing polychlorinated biphenyls (PCBs));

h. Pavement wash waters, provided spills or leaks of toxic or hazardous substances have not occurred (unless all spill material has been removed) and where soaps, solvents, and detergents are not used. You are prohibited from directing pavement wash waters directly into any receiving water, storm drain inlet, or constructed or natural site drainage features, unless the feature is connected to a sediment basin, sediment trap, or similarly effective control;

i. Uncontaminated air conditioning or compressor condensate;

j. Uncontaminated, non-turbid discharges of ground water or spring water;

k. Foundation or footing drains where flows are not contaminated with process materials such as solvents or contaminated ground water; and

l. Uncontaminated construction dewatering water[7] discharged in accordance with Part 2.4.

1.2.3 Also authorized under this permit are discharges of stormwater listed above in Part 1.2.1, or authorized non-stormwater discharges listed above in Part 1.2.2, commingled with a discharge authorized by a different NPDES permit and/or a discharge that does not require NPDES permit authorization.

1.3 PROHIBITED DISCHARGES[8]

The discharges listed in this Part are prohibited outright or authorized only under the identified conditions. To prevent the discharges in Parts 1.3.1 through 1.3.5, operators must comply with the applicable pollution prevention requirements in Part 2.3 or ensure the discharge is authorized by another NPDES permit consistent with Part 1.2.3 for commingled discharges.

1.3.1 Wastewater from washout of concrete, unless managed by an appropriate control as described in Part 2.3.4;

1.3.2 Wastewater from washout and/or cleanout of stucco, paint, form release oils, curing compounds, and other construction materials;

1.3.3 Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;

1.3.4 Soaps, solvents, or detergents used in vehicle and equipment washing or external building washdown; and

1.3.5 Toxic or hazardous substances from a spill or other release.

[7] EPA notes that operators may need to comply with additional procedures to verify that the dewatering discharge is uncontaminated. Operators should review Part 9 to determine if any of these requirements apply to their discharge and should ensure that they have complied with any State, Tribal, or local dewatering requirements that apply.

[8] EPA includes these prohibited non-stormwater discharges here as a reminder to the operator that the only non-stormwater discharges authorized by this permit are at Part 1.2.2. Any unauthorized non-stormwater discharges must be covered under an individual permit or alternative general permit.

1.4 SUBMITTING YOUR NOTICE OF INTENT (NOI)

All "operators" (as defined in Appendix A) associated with your construction site who meet the Part 1.1 eligibility conditions, and who seek coverage under this permit, must submit to EPA a complete and accurate NOI in accordance with the deadlines in Table 1 prior to commencement of construction activities (as defined in Appendix A).

Exception: If you are conducting construction activities in response to a public emergency (e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services), and the related work requires immediate authorization to avoid imminent endangerment to human health, public safety, or the environment, or to reestablish essential public services, you may discharge on the condition that a complete and accurate NOI is submitted within 30 calendar days after commencing construction activities (see Table 1) establishing that you are eligible for coverage under this permit. You must also provide documentation in your Stormwater Pollution Prevention Plan (SWPPP) to substantiate the occurrence of the public emergency pursuant to Part 7.2.3i.

1.4.1 Prerequisite for Submitting Your NOI

You must develop a SWPPP consistent with Part 7 before submitting your NOI for coverage under this permit.

1.4.2 How to Submit Your NOI

You must use EPA's NPDES eReporting Tool (NeT) to electronically prepare and submit your NOI for coverage under the 2022 CGP unless you received a waiver from your applicable EPA Regional Office.

To access NeT, go to https://cdx.epa.gov/cdx.

Waivers from electronic reporting may be granted based on one of the following conditions:

a. If your operational headquarters is physically located in a geographic area (i.e., ZIP code or census tract) that is identified as under-served for broadband Internet access in the most recent report from the Federal Communications Commission; or

b. If you have limitations regarding available computer access or computer capability.

If the EPA Regional Office grants you approval to use a paper NOI, and you elect to use it, you must complete the form in Appendix H.

1.4.3 Deadlines for Submitting Your NOI and Your Official Date of Permit Coverage

Table 1 provides the deadlines for submitting your NOI and the official start date of your permit coverage, which differ depending on when you commence construction activities.

Table 1 NOI Submittal Deadlines and Official Start Date for Permit Coverage.

Type of Operator	NOI Submittal Deadline[9]	Permit Authorization Date[10]
Operator of a new site (i.e., a site where construction activities commence on or after February 17, 2022)	At least 14 calendar days before commencing construction activities.	14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied.
Operator of an existing site (i.e., a site with 2017 CGP coverage where construction activities commenced prior to February 17, 2022)	No later than May 18, 2022.	14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied. Provided you submit your NOI no later than May 18, 2022, your authorization under the 2017 CGP is automatically continued until you have been granted coverage under this permit or an alternative NPDES permit, or coverage is otherwise terminated.
New operator of a permitted site (i.e., an operator that through transfer of ownership and/or operation replaces the operator of an already permitted construction site that is either a "new site" or an "existing site")	At least 14 calendar days before the date the transfer to the new operator will take place.	14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied.
Operator of an "emergency-related project" (i.e., a project initiated in response to a public emergency (e.g., mud slides, earthquake, extreme flooding conditions, disruption in essential public services), for which the related work requires immediate authorization to avoid imminent endangerment to human health or the environment, or to reestablish essential public services)	No later than 30 calendar days after commencing construction activities.	You are considered provisionally covered under the terms and conditions of this permit immediately, and fully covered 14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied.

[9] If you miss the deadline to submit your NOI, any and all discharges from your construction activities will continue to be unauthorized under the CWA until they are covered by this or a different NPDES permit. EPA may take enforcement action for any unpermitted discharges that occur between the commencement of construction activities and discharge authorization.

[10] Discharges are not authorized if your NOI is incomplete or inaccurate or if you are not eligible for permit coverage.

1.4.4 Modifying your NOI

If after submitting your NOI you need to correct or update any fields, you may do so by submitting a "Change NOI" form using NeT. Waivers from electronic reporting may be granted as specified in Part 1.4.2. If the EPA Regional Office has granted you approval to submit a paper NOI modification, you may indicate any NOI changes on the same NOI form in Appendix H.

When there is a change to the site's operator, the new operator must submit a new NOI, and the previous operator must submit a Notice of Termination (NOT) form as specified in Part 8.3.

The following modifications to an NOI form will result in a 14-day review process:

- Changes to the name of the operator;
- Changes to the project or site name;
- Changes to the estimated area to be disturbed;
- Changes to the name of the receiving water[11], or additions to the applicable receiving waters;
- Changes to eligibility information related to endangered species protection or historic preservation;
- Changes to information provided related to the use of chemical treatment at your site; and
- Changes to answers provided regarding the demolition of structures over 10,000 square feet of floor space built or renovated before January 1, 1980.

During the 14-day review process, you may continue to operate based on the information provided in your original NOI, but you must wait until the review period has ended before you may commence or continue activities on any portion of your site that would be affected by any of the above modifications, unless EPA notifies you that the authorization is delayed or denied.

1.4.5 Your Official End Date of Permit Coverage

Once covered under this permit, your coverage will last until the date that:

a. You terminate permit coverage consistent with Part 8; or

b. You receive permit coverage under a different NPDES permit or a reissued or replacement version of this permit after expiring on February 16, 2027; or

c. You fail to submit an NOI for coverage under a reissued or replacement version of this permit before the deadline for existing construction sites where construction activities continue after this permit has expired.

1.5 REQUIREMENT TO POST A NOTICE OF YOUR PERMIT COVERAGE

You must post a sign or other notice of your permit coverage at a safe, publicly accessible location in close proximity to the construction site. The notice must be located so it is visible from the public road that is nearest to the active part of the construction

[11] As defined in Appendix A, a "receiving water" is "a "Water of the United States" as defined in 40 CFR §122.2 into which the regulated stormwater discharges.

site, and it must use a font large enough to be readily viewed from a public right-of-way.[12] At a minimum, the notice must include:

a. The NPDES ID (i.e., permit tracking number assigned to your NOI and the EPA webpage where a copy of the NOI can be found (https://permitsearch.epa.gov/epermit-search/ui/search));

b. A contact name and phone number for obtaining additional construction site information;

c. The Uniform Resource Locator (URL) for the SWPPP (if available), or the following statement: "If you would like to obtain a copy of the Stormwater Pollution Prevention Plan (SWPPP) for this site, contact the EPA Regional Office at [*include the appropriate CGP Regional Office contact information found at* https://www.epa.gov/npdes/contact-us-stormwater#regional];" and

d. The following statement "If you observe indicators of stormwater pollutants in the discharge or in the receiving water, contact the EPA through the following website: https://www.epa.gov/enforcement/report-environmental-violations."

2 TECHNOLOGY-BASED EFFLUENT LIMITATIONS

You must comply with the following technology-based effluent limitations in this Part for all authorized discharges.[13]

2.1 GENERAL STORMWATER CONTROL DESIGN, INSTALLATION, AND MAINTENANCE REQUIREMENTS

You must design, install, and maintain stormwater controls required in Parts 2.2, 2.3, and 2.4 to minimize the discharge of pollutants in stormwater from construction activities.[14] To meet this requirement, you must:

2.1.1 Account for the following factors in designing your stormwater controls:

a. The expected amount, frequency, intensity, and duration of precipitation;[15]

b. The nature of stormwater runoff (i.e., flow) and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features. You must design stormwater controls to control stormwater volume, velocity, and peak flow rates to minimize discharges of pollutants in stormwater and to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points; and

c. The soil type and range of soil particle sizes expected to be present on the site.

[12] If the active part of the construction site is not visible from a public road, then place the notice of permit coverage in a position that is visible from the nearest public road and as close as possible to the construction site.

[13] For each of the effluent limits in Part 2, as applicable to your site, you must include in your SWPPP (1) a description of the specific control(s) to be implemented to meet the effluent limit; (2) any applicable design specifications; (3) routine maintenance specifications; and (4) the projected schedule for installation/implementation. See Part 7.2.6.

[14] The permit does not recommend or endorse specific products or vendors.

[15] Stormwater controls must be designed using the most recent data available to account for recent precipitation patterns and trends.

If your site is exposed to or has previously experienced major storms, such as hurricanes, storm surge, extreme/heavy precipitation, and flood events, you should also include consideration of and contingencies for whether implementing structural improvements, enhanced/resilient stormwater controls, and other mitigation measures may help minimize impacts from stormwater discharges from such major storm events.

2.1.2 Design and install all stormwater controls in accordance with good engineering practices, including applicable design specifications.[16]

2.1.3 Complete installation of stormwater controls by the time each phase of construction activities has begun.

a. By the time construction activity in any given portion of the site begins, install and make operational any downgradient sediment controls (e.g., buffers, perimeter controls, exit point controls, storm drain inlet protection) that control discharges from the initial site clearing, grading, excavating, and other earth-disturbing activities.[17]

b. Following the installation of these initial controls, install and make operational all stormwater controls needed to control discharges prior to subsequent earth-disturbing activities.

2.1.4 Ensure all stormwater controls are maintained and remain in effective operating condition during permit coverage and are protected from activities that would reduce their effectiveness.

a. Comply with any specific maintenance requirements for the stormwater controls listed in this permit, as well as any recommended by the manufacturer.[18]

b. If at any time you find that a stormwater control needs routine maintenance (i.e., minor repairs or other upkeep performed to ensure the site's stormwater controls remain in effective operating condition, not including significant repairs or the need to install a new or replacement control), you must immediately initiate the needed work, and complete such work by the close of the next business day. If it is infeasible to complete the routine maintenance by the close of the next business day, you must document why this is the case and why the repair or other upkeep to be performed should still be considered routine maintenance in your inspection report under Part 4.7.1c and complete such work no later than seven (7) calendar days from the time of discovery of the condition requiring maintenance.

c. If you must repeatedly (i.e., three (3) or more times) make the same routine maintenance fixes to the same control at the same location, even if the fix can be completed by the close of the next business day, you must either:

i. Complete work to fix any subsequent repeat occurrences of this same problem under the corrective action procedures in Part 5, including keeping any records

[16] Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practices and must be explained in your SWPPP. You must also comply with any additional design and installation requirements specified for the effluent limits in Parts 2.2, 2.3, and 2.4.

[17] Note that the requirement to install stormwater controls prior to each phase of construction activities for the site does not apply to the earth disturbance associated with the actual installation of these controls. Operators should take all reasonable actions to minimize the discharges of pollutants during the installation of stormwater controls.

[18] Any departures from such maintenance recommendations made by the manufacturer must reflect good engineering practices and must be explained in your SWPPP.

of the condition and how it was corrected under Part 5.4; or

ii. Document in your inspection report under Part 4.7.1c why the specific reoccurrence of this same problem should still be addressed as a routine maintenance fix under this Part.[19]

d. If at any time you find that a stormwater control needs a significant repair or that a new or replacement control is needed, you must comply with the corrective action deadlines for completing such work in in Part 5.2.1c.

2.2 EROSION AND SEDIMENT CONTROL REQUIREMENTS

You must implement erosion and sediment controls in accordance with the following requirements to minimize the discharge of pollutants in stormwater from construction activities.

2.2.1 Provide and maintain natural buffers and/or equivalent erosion and sediment controls for discharges to any receiving waters that is located within 50 feet of the site's earth disturbances.

a. Compliance Alternatives. For any discharges to receiving waters located within 50 feet of your site's earth disturbances, you must comply with one of the following alternatives:

i. Provide and maintain a 50-foot undisturbed natural buffer; or

ii. Provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by erosion and sediment controls that achieve, in combination, the sediment load reduction equivalent to a 50-foot undisturbed natural buffer; or

iii. If infeasible to provide and maintain an undisturbed natural buffer of any size, implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

See Appendix F, Part F.2 for additional conditions applicable to each compliance alternative.

b. Exceptions. See Appendix F, Part F.2 for exceptions to the compliance alternatives.

2.2.2 Direct stormwater to vegetated areas and maximize stormwater infiltration and filtering to reduce pollutant discharges, unless infiltration would be inadvisable due to the underlying geology (e.g., karst topography) and ground water contamination concerns, or infeasible due to site conditions.[20]

[19] Such documentation could include, for example, that minor repairs completed within the required timeframe are all that is necessary to ensure that the stormwater control continues to operate as designed and installed and that the stormwater control remains appropriate for the flow reaching it.

[20] Operators should consider whether factors such as specific contaminant concerns from the construction site, the underlying soils or geology, hydrology, depth to the ground water table, or proximity to source water or wellhead protection area(s) make the site unsuitable for infiltrating construction stormwater. Site conditions that may be of particular concern include proximity to: a current or future drinking water aquifer; a drinking water well or spring (including private/household wells); highly conductive geology such as karst; known pollutant hot spots, such as hazardous waste sites, landfills, gas stations, brownfields; an on-site sewage system or underground storage tank; or soils that do not allow for infiltration. Operators may find it helpful to consult EPA's Drinking Water Mapping Application to Protect Source Waters (DWMAPS). DWMAPS is an online mapping tool that can be used to locate drinking water providers, potential sources of contamination, polluted waterways, and information on protection initiatives in the site area.

2.2.3 Install sediment controls along any perimeter areas of the site that are downslope from any exposed soil or other disturbed areas.[21]

a. The perimeter control must be installed upgradient of any natural buffers established under Part 2.2.1, unless the control is being implemented pursuant to Part 2.2.1a.ii-iii;

b. To prevent stormwater from circumventing the edge of the perimeter control, install the perimeter control on the contour of the slope and extend both ends of the control up slope (e.g., at 45 degrees) forming a crescent rather than a straight line;

c. After installation, to ensure that perimeter controls continue to work effectively:

i. Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control; and

ii. After a storm event, if there is evidence of stormwater circumventing or undercutting the perimeter control, extend controls and/or repair undercut areas to fix the problem.

d. Exception. For areas at "linear construction sites" (as defined in Appendix A) where perimeter controls are infeasible (e.g., due to a limited or restricted right-of-way), implement other practices as necessary to minimize pollutant discharges to perimeter areas of the site.

2.2.4 Minimize sediment track-out.

a. Restrict vehicle use to properly designated exit points;

b. Use appropriate stabilization techniques[22] at all points that exit onto paved roads;

i. Exception: Stabilization is not required for exit points at linear utility construction sites that are used only episodically and for very short durations over the life of the project, provided other exit point controls[23] are implemented to minimize sediment track-out;

c. Implement additional track-out controls[24] as necessary to ensure that sediment removal occurs prior to vehicle exit; and

d. Where sediment has been tracked-out from your site onto paved roads, sidewalks, or other paved areas outside of your site, remove the deposited sediment by the end of the same business day in which the track-out occurs or by the end of the next business day if track-out occurs on a non-business day. Remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. You are prohibited from hosing or sweeping tracked-out

[21] Examples of perimeter controls include filter berms; different types of silt fence such as wire-backed silt fence, super silt fence, or multi-layer geotextile silt fence; compost filter socks; gravel barriers; and temporary diversion dikes.

[22] Examples of appropriate stabilization techniques include the use of aggregate stone with an underlying geotextile or non-woven filter fabric, and turf mats.

[23] Examples of other exit point controls include preventing the use of exit points during wet periods; minimizing exit point use by keeping vehicles on site to the extent possible; limiting exit point size to the width needed for vehicle and equipment usage; using scarifying and compaction techniques on the soil; and avoiding establishing exit points in environmentally sensitive areas (e.g., *karst areas; steep slopes)*.

[24] Examples of additional track-out controls include the use of wheel washing, rumble strips, and rattle plates.

sediment into any constructed or natural site drainage feature, storm drain inlet, or receiving water.[25]

2.2.5 Manage stockpiles or land clearing debris piles composed, in whole or in part, of sediment and/or soil:[26]

a. Locate the piles outside of any natural buffers established under Part 2.2.1 and away from any constructed or natural site drainage features, storm drain inlets, and areas where stormwater flow is concentrated;

b. Install a sediment barrier along all downgradient perimeter areas of stockpiled soil or land clearing debris piles;[27]

c. For piles that will be unused for 14 or more days, provide cover[28] or appropriate temporary stabilization (consistent with Part 2.2.14);

d. You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any constructed or natural site drainage feature, storm drain inlet, or receiving water.

2.2.6 Minimize dust. On areas of exposed soil, minimize dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged in stormwater from the site.

2.2.7 Minimize steep slope disturbances. Minimize the disturbance of "steep slopes" (as defined in Appendix A).[29]

2.2.8 Preserve native topsoil, unless infeasible.[30]

2.2.9 Minimize soil compaction.[31] In areas of your site where final vegetative stabilization will occur or where infiltration practices will be installed:

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[25] Fine grains that remain visible (e.g., staining) on the surfaces of off-site streets, other paved areas, and sidewalks after you have implemented sediment removal practices are not a violation of Part 2.2.4.

[26] The requirements in Part 2.2.5 do not apply to the storage of rock, such as rip rap, landscape rock, pipe bedding gravel, and boulders. Refer to Part 2.3.3a for the requirements that apply to these types of materials.

[27] Examples of sediment barriers include berms, dikes, fiber rolls, silt fences, sandbags, gravel bags, or straw bale.

[28] Examples of cover include tarps, blown straw and hydroseeding.

[29] Where disturbance to steep slopes cannot be avoided, operators should consider implementing controls suitable for steep slope disturbances that are effective at minimizing erosion and sediment discharge (e.g., preservation of existing vegetation, hydraulic mulch, geotextiles and mats, compost blankets, earth dikes or drainage swales, terraces, velocity dissipation devices). To identify slopes and soil types that are of comparatively higher risk for sediment discharge in areas of the country where the CGP is in effect, operators can use the tables in Appendix F (see Tables F-2 thru F-6).

[30] Stockpiling topsoil at off-site locations, or transferring topsoil to other locations, is an example of a practice that is consistent with the requirements in Part 2.2.8. Preserving native topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed. For example, some sites may be designed to be highly impervious after construction, and therefore little or no vegetation is intended to remain, or may not have space to stockpile native topsoil on site for later use, in which case it may not be feasible to preserve topsoil.

[31] Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted.

a. Restrict vehicle and equipment use in these locations to avoid soil compaction; and

b. Before seeding or planting areas of exposed soil that have been compacted, use techniques that rehabilitate and condition the soils as necessary to support vegetative growth.

2.2.10 Protect storm drain inlets.

a. Install inlet protection measures that remove sediment from discharges prior to entry into any storm drain inlet that carries stormwater from your site to a receiving water, provided you have authority to access the storm drain inlet.[32] Inlet protection measures are not required for storm drain inlets that are conveyed to a sediment basin, sediment trap, or similarly effective control; and

b. Clean, or remove and replace, the inlet protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.

2.2.11 Control stormwater discharges, including both peak flowrates and total stormwater volume, to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points.[33]

2.2.12 If you install a sediment basin or similar impoundment:

a. Situate the basin or impoundment outside of any receiving water. and any natural buffers established under Part 2.2.1;

b. Design the basin or impoundment to avoid collecting water from wetlands;

c. Design the basin or impoundment to provide storage for either:

i. The calculated volume of runoff from a 2-year, 24-hour storm;[34] or

ii. 3,600 cubic feet per acre drained.

d. Utilize outlet structures that withdraw water from the surface of the sediment basin or similar impoundment, unless infeasible;[35]

e. Use erosion controls and velocity dissipation devices to prevent erosion at inlets and outlets; and

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[32] Inlet protection measures can be removed in the event of flood conditions or to prevent erosion.

[33] Examples of stormwater controls that can be used to comply with this requirement include the use of erosion controls and/or velocity dissipation devices (e.g., check dams, sediment traps), within and along the length of a constructed site drainage feature and at the outfall to slow down stormwater.

[34] Operators may refer to https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates for guidance on determining the volume of precipitation associated with their site's local 2-year, 24-hour storm event.

[35] The circumstances in which it is infeasible to design outlet structures in this manner are rare. Exceptions may include areas with extended cold weather, where using surface outlets may not be feasible during certain time periods (although they must be used during other periods). If you determine that it is infeasible to meet this requirement, you must provide documentation in your SWPPP to support your determination, including the specific conditions or time periods when this exception will apply.

f. Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition.

2.2.13 If using treatment chemicals (e.g., *polymers, flocculants, coagulants*):

a. Use conventional erosion and sediment controls before and after the application of treatment chemicals. Chemicals may only be applied where treated stormwater is directed to a sediment control *(e.g., sediment basin, perimeter control)* before discharge.

b. Select appropriate treatment chemicals*.* Chemicals must be appropriately suited to the types of soils likely to be exposed during construction and present in the discharges being treated *(i.e., the expected turbidity, pH, and flow rate of stormwater flowing into the chemical treatment system or area)*.

c. Minimize discharge risk from stored chemicals. Store all treatment chemicals in leak-proof containers that are kept under storm-resistant cover and surrounded by secondary containment structures *(e.g., spill berms, dikes, spill containment pallets),* or provide equivalent measures designed and maintained to minimize the potential discharge of treatment chemicals in stormwater or by any other means *(e.g., storing chemicals in a covered area, having a spill kit available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill)*.

d. Comply with State/local requirements. Comply with applicable State and local requirements regarding the use of treatment chemicals.

e. Use chemicals in accordance with good engineering practices and specifications of the chemical provider/supplier. Use treatment chemicals and chemical treatment systems in accordance with good engineering practices, and with dosing specifications and sediment removal design specifications provided by the provider/supplier of the applicable chemicals, or document in your SWPPP specific departures from these specifications and how they reflect good engineering practice.

f. Ensure proper training. Ensure all persons who handle and use treatment chemicals at the construction site are provided with appropriate, product-specific training prior to beginning application of treatment chemicals. Among other things, the training must cover proper dosing requirements.

g. Perform additional measures specified by the EPA Regional Office for the authorized use of cationic chemicals. If you have been authorized to use cationic chemicals at your site pursuant to Part 1.1.9, you must perform all additional measures as conditioned by your authorization to ensure the use of such chemicals will not result in discharges that do not meet water quality standards.

2.2.14 Stabilize exposed portions of the site. Implement and maintain stabilization measures (*e.g., seeding protected by erosion controls until vegetation is established,*[36] *sodding, mulching, erosion control blankets, hydromulch, gravel*) that minimize erosion from any areas of exposed soil on the site in accordance with Part.

[36] If you will be evaluating the use of some type of erosion control netting to the site as part of your site stabilization, EPA encourages you to consider employing products that have been shown to minimize

a. Stabilization Deadlines:[37]

Table 2 Deadlines for Initiating and Completing Site Stabilization.

Total Amount of Land Disturbance Occurring At Any One Time[38]	**Deadline**
i. Five acres or less (≤5.0) **Note: this includes sites disturbing more than five acres (>5.0) total over the course of a project, but that limit disturbance at any one time (i.e., *phase the disturbance*) to five acres or less (≤5.0)**	• Initiate the installation of stabilization measures immediately[39] in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days;[40] and • Complete the installation of stabilization measures as soon as practicable, but no later than 14 calendar days

impacts on wildlife. For instance, the U.S. Fish & Wildlife Service provides recommendations on the type of netting practices that are considered "wildlife friendly," including those that use natural fiber or 100 percent biodegradable materials and that use a loose weave with a non-welded, movable jointed netting, as well as those products that are not wildlife friendly including square plastic netting that are degradable (e.g., photodegradable, UV-degradable, oxo-degradable), netting made from polypropylene, nylon, polyethylene, or polyester. Other recommendations include removing the netting product when it is no longer needed. See https://www.fws.gov/midwest/eastlansing/library/pdf/WildlifeFriendlyErosionControlProducts_revised.pdf for further information. There also may be State, Tribal, or local requirements about using wildlife friendly erosion control products.

[37] EPA may determine, based on an inspection carried out under Part 4.8 and corrective actions required under Part 5.3, that the level of sediment discharge on the site makes it necessary to require a faster schedule for completing stabilization. For instance, if sediment discharges from an area of exposed soil that is required to be stabilized are compromising the performance of existing stormwater controls, EPA may require stabilization to correct this problem.

[38] Limiting disturbances to five (5) acres or less at any one time means that at no time during the project do the cumulative earth disturbances exceed five (5) acres. The following examples would qualify as limiting disturbances at any one time to five (5) acres or less:

1. The total area of disturbance for a project is five (5) acres or less.
2. The total area of disturbance for a project will exceed five (5) acres, but the operator ensures that no more than five (5) acres will be disturbed at any one time through implementation of stabilization measures. In this way, site stabilization can be used to "free up" land that can be disturbed without exceeding the five (5)-acre cap to qualify for the 14-day stabilization deadline. For instance, if an operator completes stabilization of two (2) acres of land on a five (5)-acre disturbance, then two (2) additional acres could be disturbed while still qualifying for the longer 14-day stabilization deadline.

[39] The following are examples of activities that would constitute the immediate initiation of stabilization:

1. Prepping the soil for vegetative or non-vegetative stabilization as long as seeding, planting, and/or installation of non-vegetative stabilization products takes place as soon as practicable, but no later than one (1) calendar day of completing soil preparation;
2. Applying mulch or other non-vegetative product to the exposed area;
3. Seeding or planting the exposed area;
4. Starting any of the activities in # 1 – 3 on a portion of the entire area that will be stabilized; and
5. Finalizing arrangements to have stabilization product fully installed in compliance with the deadlines for completing stabilization.

[40] The requirement to initiate stabilization immediately is triggered as soon as you know that construction work on a portion of the site is temporarily ceased and will not resume for 14 or more days, or as soon as you know that construction work is permanently ceased. In the context of this provision, "immediately" means as soon as practicable, but no later than the end of the next business day, following the day when the construction activities have temporarily or permanently ceased.

Total Amount of Land Disturbance Occurring At Any One Time[38]	Deadline
	after stabilization has been initiated.[41]
ii. More than five acres (>5.0)	• Initiate the installation of stabilization measures immediately[42] in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days;[43] and • Complete the installation of stabilization measures as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated.[44]

b. Exceptions:

i. Arid, semi-arid, and drought-stricken areas (as defined in Appendix A)**.** If it is the seasonally dry period (as defined in Appendix A)[45] or a period in which drought is occurring, and vegetative stabilization measures are being used:

(a) Immediately initiate and, within 14 calendar days of temporary or permanent cessation of work in any portion of your site, complete the installation of temporary non-vegetative stabilization measures to the extent necessary to prevent erosion;

(b) As soon as practicable, given conditions or circumstances on the site, complete all activities necessary to seed or plant the area to be stabilized; and

(c) If construction is occurring during the seasonally dry period, indicate in your SWPPP the beginning and ending dates of the seasonally dry period and your site conditions. Also include the schedule you will follow for initiating and completing vegetative stabilization.

ii. Unforeseen circumstances. Operators that are affected by unforeseen circumstances[46] that delay the initiation and/or completion of vegetative stabilization:

[41] If vegetative stabilization measures are being implemented, stabilization is considered "installed" when all activities necessary to seed or plant the area are completed, including the application of any non-vegetative protective cover (e.g., mulch, erosion control blanket), if applicable. If non-vegetative stabilization measures are being implemented, stabilization is considered "installed" when all such measures are implemented or applied.

[42] See footnote 39.

[43] See footnote 40.

[44] See footnote 41.

[45] The term "seasonally dry period" as defined in Appendix A refers to a month in which the long-term average total precipitation is less than or equal to 0.5 inches. Refer to EPA's Seasonally Dry Period Locator Tool at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates and supporting maps for assistance in determining whether a site is operating during a seasonally dry period for the area.

[46] Examples include problems with the supply of seed stock or with the availability of specialized equipment and unsuitability of soil conditions due to excessive precipitation and/or flooding.

(a) Immediately initiate and, within 14 calendar days, complete the installation of temporary non-vegetative stabilization measures to prevent erosion;

(b) Complete all soil conditioning, seeding, watering or irrigation installation, mulching, and other required activities related to the planting and initial establishment of vegetation as soon as conditions or circumstances allow it on your site; and

(c) Document in the SWPPP the circumstances that prevent you from meeting the deadlines in Part 2.2.14a and the schedule you will follow for initiating and completing stabilization.

iii. Discharges to a sediment- or nutrient-impaired water or to a water that is identified by your State, Tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes. Complete stabilization as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated.

iv. Discharges to a receiving water located within Lands of Exclusive Federal Jurisdiction. Complete stabilization as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated. This deadline applies regardless of whether another exception in this section applies to your site.

c. Final Stabilization Criteria (for any areas not covered by permanent structures)**:**

i. Establish uniform, perennial vegetation *(*i.e.*, evenly distributed, without large bare areas)* to provide 70 percent or more of the vegetative cover native to local undisturbed areas; and/or

ii. Implement permanent non-vegetative stabilization measures[47] to provide effective cover of any areas of exposed soil.

iii. Exceptions:

(a) **Arid, semi-arid, and drought-stricken areas** (as defined in Appendix A). Final stabilization is met if the area has been seeded or planted to establish vegetation that provides 70 percent or more of the vegetative cover native to local undisturbed areas within three (3) years and, to the extent necessary to prevent erosion on the seeded or planted area, non-vegetative erosion controls have been applied to provide cover for at least three years without active maintenance.

(b) **Disturbed areas on agricultural land that are restored to their preconstruction agricultural use.** The Part 2.2.14c final stabilization criteria do not apply.

(c) **Areas that need to remain disturbed.** In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed, and only the minimum area needed remains disturbed *(*e.g.*, dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, materials)*.

[47] Examples of permanent non-vegetative stabilization measures include riprap, gravel, gabions, and geotextiles.

2.3 POLLUTION PREVENTION REQUIREMENTS[48]

You must implement pollution prevention controls in accordance with the following requirements to minimize the discharge of pollutants in stormwater and to prevent the discharge of pollutants from spilled or leaked materials from construction activities.

2.3.1 For equipment and vehicle fueling and maintenance:

a. Provide an effective means of eliminating the discharge of spilled or leaked chemicals, including fuels and oils, from these activities;[49]

b. If applicable, comply with the Spill Prevention Control and Countermeasures (SPCC) requirements in 40 CFR part 112 and Section 311 of the CWA;

c. Ensure adequate supplies are available at all times to handle spills, leaks, and disposal of used liquids;

d. Use drip pans and absorbents under or around leaky vehicles;

e. Dispose of or recycle oil and oily wastes in accordance with other Federal, State, Tribal, or local requirements; and

f. Clean up spills or contaminated surfaces immediately, using dry clean up measures (do not clean contaminated surfaces by hosing the area down), and eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge.

2.3.2 For equipment and vehicle washing:

a. Provide an effective means of minimizing the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other types of wash waters;[50]

b. Ensure there is no discharge of soaps, solvents, or detergents in equipment and vehicle wash water; and

c. For storage of soaps, detergents, or solvents, provide either (1) cover *(*e.g., *plastic sheeting, temporary roofs)* to minimize the exposure of these detergents to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.

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[48] Under this permit, you are not required to minimize exposure for any products or materials where the exposure to precipitation and to stormwater will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

[49] Examples of effective means include:

- Locating activities away from receiving waters, storm drain inlets, and constructed or natural site drainage feature so that stormwater coming into contact with these activities cannot reach waters of the U.S.;
- Providing secondary containment (e.g., *spill berms, dikes, spill containment pallets*) and cover where appropriate; and
- Having a spill kit available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill.

[50] Examples of effective means include locating activities away from receiving waters and storm drain inlets or constructed or natural site drainage features and directing wash waters to a sediment basin or sediment trap, using filtration devices, such as filter bags or sand filters, or using other similarly effective controls.

2.3.3 For storage, handling, and disposal of building products, materials, and wastes:[51]

a. *For building materials and building products*,[52] provide either (1) cover (e.g., *plastic sheeting, temporary roofs*) to minimize the exposure of these products to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.

Exception: Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

b. *For pesticides, herbicides, insecticides, fertilizers, and landscape materials:*

i. In storage areas, provide either (1) cover (e.g., *plastic sheeting, temporary roofs*) to minimize the exposure of these chemicals to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas; and

ii. Comply with all application and disposal requirements included on the registered pesticide, herbicide, insecticide, and fertilizer label (see also Part 2.3.5).

c. *For diesel fuel, oil, hydraulic fluids, other petroleum products, and other chemicals:* The following requirements apply to the storage and handling of chemicals on your site. If you are already implementing controls as part of an SPCC or other spill prevention plan that meet or exceed the requirements of this Part, you may continue to do so and be considered in compliance with these provisions provided you reference the applicable parts of the SPCC or other plans in your SWPPP as required in Part 7.2.6b.viii.

i. If any chemical container has a storage capacity of less than 55 gallons:
(a) The containers must be water-tight, and must be kept closed, sealed, and secured when not being actively used;

(b) If stored outside, use a spill containment pallet or similar device to capture small leaks or spills; and

(c) Have a spill kit available on site that is in good working condition (i.e., not damaged, expired, or used up) and ensure personnel are available to respond immediately in the event of a leak or spill.

ii. If any chemical container has a storage capacity of 55 gallons or more:
(a) The containers must be water-tight, and must be kept closed, sealed, and secured when not being actively used;

(b) Store containers a minimum of 50 feet from receiving waters, constructed or natural site drainage features, and storm drain inlets. If infeasible due to site constraints, store containers as far away from these features as the site

[51] Compliance with the requirements of this permit does not relieve compliance requirements with respect to Federal, State, or local laws and regulations governing the storage, handling, and disposal of solid, hazardous, or toxic wastes and materials.

[52] Examples of building materials and building products typically present at construction sites include asphalt sealants, copper flashing, roofing materials, adhesives, concrete admixtures, and gravel and mulch stockpiles.

permits. If site constraints prevent you from storing containers 50 feet away from receiving waters or the other features identified, you must document in your SWPPP the specific reasons why the 50-foot setback is infeasible, and how you will store containers as far away as the site permits;

(c) Provide either (1) cover (e.g., temporary roofs) to minimize the exposure of these containers to precipitation and to stormwater, or (2) secondary containment (e.g., curbing, spill berms, dikes, spill containment pallets, double-wall, above-ground storage tank); and

(d) Have a spill kit available on site that is in good working condition (i.e., not damaged, expired, or used up) and ensure personnel are available to respond immediately in the event of a leak or spill. Additional secondary containment measures are listed at 40 CFR § 112.7(c)(1).

iii. Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge.

d. *For hazardous or toxic wastes:*[53]

i. Separate hazardous or toxic waste from construction and domestic waste;

ii. Store waste in sealed containers, constructed of suitable materials to prevent leakage and corrosion, and labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable Federal, State, Tribal, or local requirements;

iii. Store all outside containers within appropriately-sized secondary containment (e.g., *spill berms, dikes, spill containment pallets*) to prevent spills from being discharged, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas *(*e.g., *storing chemicals in a covered area, having a spill kit available on site);*

iv. Dispose of hazardous or toxic waste in accordance with the manufacturer's recommended method of disposal and in compliance with Federal, State, Tribal, and local requirements;

v. Clean up spills immediately, using dry clean-up methods, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge; and

vi. Follow all other Federal, State, Tribal, and local requirements regarding hazardous or toxic waste.

e. *For construction and domestic wastes:*[54]

[53] Examples of hazardous or toxic waste that may be present at construction sites include paints, caulks, sealants, fluorescent light ballasts, solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids.

[54] Examples of construction and domestic wastes include packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, demolition debris; and other trash or discarded materials.

i. Provide waste containers *(*e.g., *dumpster, trash receptacle)* of sufficient size and number to contain construction and domestic wastes;

(a) For waste containers with lids, keep waste container lids closed when not in use, and close lids at the end of the business day and during storm events. For waste containers without lids, provide either (1) cover *(*e.g., *a tarp, plastic sheeting, temporary roof)* to minimize exposure of wastes to precipitation, or (2) a similarly effective means designed to minimize the discharge of pollutants *(*e.g., *secondary containment)*;

(b) On business days, clean up and dispose of waste in designated waste containers; and

(c) Clean up immediately if containers overflow, and if there is litter elsewhere on the site from escaped trash.

ii. Waste containers are not required for the waste remnant or unused portions of construction materials or final products that are covered by the exception in Part 2.2.3a provided that:

(a) These wastes are stored separately from other construction or domestic wastes addressed by Part 2.3.3e.i (i.e., wastes not covered by the exception in Part 2.3.3a). If the wastes are mixed, they must be stored in waste containers as required in Part 2.3.3e.i; and

(b) These wastes are stored in designated areas of the site, the wastes are described in the SWPPP (see Part 7.2.6b.ix), and identified in the site plan (see Part 7.2.4i).

f. *For sanitary waste*, position portable toilets so they are secure and will not be tipped or knocked over, and are located away from receiving waters, storm drain inlets, and constructed or natural site drainage features.

2.3.4 For washing applicators and containers used for stucco, paint, concrete, form release oils, curing compounds, or other materials:

a. Direct wash water into a leak-proof container or leak-proof and lined pit designed so no overflows can occur due to inadequate sizing or precipitation;

b. Handle washout or cleanout wastes as follows:

i. For liquid wastes:

(a) Do not dump liquid wastes or allow them to enter into constructed or natural site drainage features, storm inlets, or receiving waters;

(b) Do not allow liquid wastes to be disposed of through infiltration or to otherwise be disposed of on the ground;

(c) Comply with applicable State, Tribal, or local requirements for disposal

ii. Remove and dispose of hardened concrete waste consistent with your handling of other construction wastes in Part 2.3.3e; and

c. Locate any washout or cleanout activities as far away as possible from receiving waters, constructed or natural site drainage features, and storm drain inlets, and, to the extent feasible, designate areas to be used for these activities and conduct such activities only in these areas.

2.3.5 For the application of fertilizers:

a. Apply at a rate and in amounts consistent with manufacturer's specifications, or document in the SWPPP departures from the manufacturer specifications where appropriate in accordance with Part 7.2.6b.x;

b. Apply at the appropriate time of year for your location, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;

c. Avoid applying before heavy rains that could cause excess nutrients to be discharged;

d. Never apply to frozen ground;

e. Never apply to constructed or natural site drainage features; and

f. Follow all other Federal, State, Tribal, and local requirements regarding fertilizer application.

2.3.6 Emergency Spill Notification Requirements

Discharges of toxic or hazardous substances from a spill or other release are prohibited, consistent with Part 1.3.5. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR part 110, 40 CFR part 117, or 40 CFR part 302 occurs during a 24-hour period, you must notify the National Response Center (NRC) at (800) 424-8802 or, in the Washington, DC metropolitan area, call (202) 267-2675 in accordance with the requirements of 40 CFR part 110, 40 CFR part 117, and 40 CFR part 302 as soon as you have knowledge of the release. You must also, within seven (7) calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release. State, Tribal, or local requirements may necessitate additional reporting of spills or discharges to local emergency response, public health, or drinking water supply agencies.

2.4 CONSTRUCTION DEWATERING REQUIREMENTS

Comply with the following requirements to minimize the discharge of pollutants from dewatering[55] operations.

2.4.1 Route dewatering water through a sediment control (e.g., sediment trap or basin, pumped water filter bag) designed to prevent discharges with visual turbidity; [56]

2.4.2 Do not discharge visible floating solids or foam;

2.4.3 The discharge must not cause the formation of a visible sheen on the water surface, or visible oily deposits on the bottom or shoreline of the receiving water. Use an oil-water separator or suitable filtration device (such as a cartridge filter) designed to remove oil, grease, or other products if dewatering water is found to or expected to contain these materials;

[55] "Dewatering" is defined in Appendix A as "the act of draining accumulated stormwater and/or ground water from building foundations, vaults, and trenches, or other similar points of accumulation."

[56] For the purposes of this permit, visual turbidity is present where there is a sediment plume in the discharge or the discharge appears cloudy, or opaque, or has a visible contrast that can be identified by an observer.

2.4.4 To the extent feasible, use well-vegetated (e.g., grassy or wooded), upland areas of the site to infiltrate dewatering water before discharge.[57] You are prohibited from using receiving waters as part of the treatment area;

2.4.5 To prevent dewatering-related erosion and related sediment discharges:

a. Use stable, erosion-resistant surfaces (e.g., well-vegetated grassy areas, clean filter stone, geotextile underlayment) to discharge from dewatering controls;

b. Do not place dewatering controls, such as pumped water filter bags, on steep slopes (as defined in Appendix A); and

c. At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 2.2.11.

2.4.6 For backwash water, either haul it away for disposal or return it to the beginning of the treatment process;

2.4.7 Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications; and

2.4.8 Comply with dewatering-specific inspection requirements in Part 4.

3 WATER QUALITY-BASED EFFLUENT LIMITATIONS

3.1 GENERAL EFFLUENT LIMITATION TO MEET APPLICABLE WATER QUALITY STANDARDS

Discharges must be controlled as necessary to meet applicable water quality standards. Discharges must also comply with any additional State or Tribal requirements that are in Part 9.

In the absence of information demonstrating otherwise, EPA expects that compliance with the conditions in this permit will result in stormwater discharges being controlled as necessary to meet applicable water quality standards. If at any time you become aware, or EPA determines, that discharges are not being controlled as necessary to meet applicable water quality standards, you must take corrective action as required in Parts 5.1 and 5.2, and document the corrective actions as required in Part 5.4.

EPA may insist that you install additional controls (to meet the narrative water quality-based effluent limit above) on a site-specific basis, or require you to obtain coverage under an individual permit, if information in your NOI or from other sources indicates that your discharges are not controlled as necessary to meet applicable water quality standards. This includes situations where additional controls are necessary to comply with a wasteload allocation in an EPA-established or approved TMDL.

If during your coverage under a previous permit, you were required to install and maintain stormwater controls specifically to meet the assumptions and requirements of an EPA-approved or established TMDL (for any parameter) or to otherwise control your discharge to meet water quality standards, you must continue to implement such controls as part of your coverage under this permit.

3.2 WATER QUALITY-BASED CONDITIONS FOR SITES DISCHARGING TO CERTAIN IMPAIRED AND HIGH QUALITY RECEIVING WATERS

For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by your State, Tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for

[57] See footnote 20.

antidegradation purposes,[58] you must comply with the inspection frequency specified in Part 4.3 and you must comply with the stabilization deadline specified in Part 2.2.14b.iii.[59]

If you discharge to a water that is impaired for a parameter other than a sediment-related parameter or nutrients, EPA will inform you if any additional controls are necessary for your discharge to be controlled as necessary to meet water quality standards. These controls might include those necessary for your discharge to be consistent with the assumptions of any available wasteload allocation in any applicable TMDL. In addition, EPA may require you to apply for and obtain coverage under an individual NPDES permit.

In addition, on a case-by-case basis, EPA may notify operators of new sites or operators of existing sites with increased discharges that additional analyses, stormwater controls, and/or other measures are necessary to comply with the applicable antidegradation requirements, or notify you that an individual permit application is necessary.

If you discharge to a water that is impaired for polychlorinated biphenyls (PCBs) and are engaging in demolition of any structure with at least 10,000 square feet of floor space built or renovated before January 1, 1980, you must:

a. Implement controls[60] to minimize the exposure of PCB-containing building materials, including paint, caulk, and pre-1980 fluorescent lighting fixtures, to precipitation and to stormwater; and

b. Ensure that disposal of such materials is performed in compliance with applicable State, Federal, and local laws.

3.3 TURBIDITY BENCHMARK MONITORING FOR SITES DISCHARGING DEWATERING WATER TO PROTECT THE WATER QUALITY OF SENSITIVE WATERS

For sites discharging dewatering water to "sensitive waters" (i.e., receiving waters listed as impaired for sediment or a sediment-related parameter (as defined in Appendix A), receiving waters designated as a Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes, or receiving waters located within Lands of Exclusive Federal Jurisdiction) you are required to comply with the benchmark monitoring requirements in this Part and document the procedures you will use at your site in your SWPPP pursuant to Part 7.2.8. A summary of these requirements is included in Table 1.

EPA notes that the benchmark threshold is not an effluent limitation, rather it is an indicator that the dewatering controls may not be working to protect water quality, which the operator must investigate and correct as appropriate. A benchmark exceedance is not a permit violation. However, if a benchmark exceedance triggers

[58] Refer to Appendix A for definitions of "impaired water" and "Tier 2," "Tier 2.5," and "Tier 3" waters. For assistance in determining whether your site discharges to impaired waters, EPA has developed a tool that is available at https://www.epa.gov/npdes/epas-stormwater-discharge-mapping-tools. For assistance in determining whether your site discharges to a Tier 2, 2.5, or 3 water, refer to the list of such waters at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates.

[59] If you qualify for any of the reduced inspection frequencies in Part 4.4, you may conduct inspections in accordance with Part 4.4 for any portion of your site that discharges to a sensitive water.

[60] Examples of controls to minimize exposure of PCBs to precipitation and stormwater include separating work areas from non-work areas and selecting appropriate personal protective equipment and tools, constructing a containment area so that all dust or debris generated by the work remains within the protected area, and using tools that minimize dust and heat (<212°F). For additional information, refer to Part 2.3.3 of the CGP Fact Sheet.

corrective action in Part 5.1.5a, failure to conduct any required action is a permit violation.

Where there are multiple operators associated with the same site, the operators may coordinate with one another to carry out the monitoring requirements of this Part in order to avoid duplicating efforts. Such coordinating arrangements must be described in the SWPPP consistent with Part 7.2.8. Regardless of how the operators divide the responsibilities for monitoring and reporting, each operator remains responsible for compliance with these requirements.[61]

3.3.1 Turbidity monitoring requirements[62]

a. Sampling frequency. You must collect at least one turbidity sample from your dewatering discharge each day a discharge occurs.

b. Sampling location. Samples must be taken at all points where dewatering water is discharged. Samples must be taken after the dewatering water has been treated by installed treatment devices pursuant to Parts 2.4.1 and 2.4.3 and prior to its discharge off site into a receiving water, constructed or natural site drainage feature, or storm drain inlet.

c. Representative samples. Samples taken must be representative of the dewatering discharge for any given day as required in Appendix G (standard permit conditions), Part G.10.2.

d. Test methods. Samples must be measured using a turbidity meter that reports results in nephelometric turbidity units (NTUs) and conforms with a Part 136-approved method (e.g., methods 180.1 and 2130). You are required to use the meter, and conduct a calibration verification prior to each day's use, consistent with the manufacturer's instructions.

3.3.2 Turbidity benchmark

a. The benchmark threshold for turbidity for this permit is 50 NTUs (referred to elsewhere in this permit as the "standard 50 NTU benchmark") unless EPA has authorized the use of an alternate benchmark in accordance with Part 3.3.2b.

b. Request for alternate benchmark threshold.

i. At any time prior to or during your coverage under this permit, you may request that EPA approve a benchmark for your site that is higher than 50 NTUs if you

[61] For instance, if Operator A relies on Operator B to meet the Part 3.3.1 turbidity monitoring requirements, the Part 3.3.4 reporting and recordkeeping requirements, and the Part 5.2.2 corrective action provisions when applicable, Operator A does not have to duplicate these same functions if Operator B is implementing them for both operators to be in compliance with the permit. However, Operator A remains responsible for complying with these permit requirements if Operator B fails to take actions that were necessary for Operator A to comply with the permit. See also footnote 84. EPA notes that both Operator A and B are required to submit turbidity monitoring reports as required under Part 3.3.4, however, Operator A's report does not need to include the data collected by Operator B as long as Operator B submits the required data and Operator A's report indicates that it is relying on Operator B to report the data. See Part 3.3.4a.

[62] Operators may find it useful to consult EPA's *Monitoring and Inspection Guide for Construction Dewatering*, available at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates, which provides guidelines on how to correctly monitor for turbidity, determine if the weekly average exceeds the benchmark, and, if so, how to proceed with corrective action.

have information demonstrating the higher number is the same as your receiving water's water quality standard for turbidity. Unless EPA approves an alternate benchmark, you will be required to use the standard 50 NTU benchmark. To request approval of an alternate benchmark, you must submit the following information to your applicable EPA Regional Office (see Appendix K):

(a) The current turbidity water quality standard that applies to your receiving water and the source/citation.[63]

(b) If the applicable turbidity water quality standard requires information on natural or background turbidity levels (e.g., "no more than 10 NTU above natural turbidity levels") to determine the specific standard for the receiving water, include available data that can be used to establish the natural turbidity levels of your receiving water (including literature studies or Federal, State, Tribal, or local government data). Data must be representative of the natural turbidity levels of your specific receiving water. Identify the source(s) of all data provided, including if the data are from samples you collected of the receiving water.

ii. EPA will inform you of its decision on whether to approve the requested alternate benchmark within 30 days. EPA may approve your request, request additional time (e.g., if additional information is needed to substantiate the data you provided), or deny your request. Unless and until EPA approves your request to use an alternate benchmark, you are required to use the standard benchmark of 50 NTUs and take any required corrective actions if an exceedance occurs.

3.3.3 Comparison of turbidity samples to benchmark. Compare the weekly average[64] of your turbidity monitoring results to the standard 50 NTU benchmark, or alternate benchmark if approved by EPA.

a. If the weekly average of your turbidity monitoring results exceeds the standard benchmark (or your approved alternate benchmark), you are required to conduct follow-up corrective action in accordance with Part 5.2.2 and document any corrective action taken in your corrective action log in accordance with Part 5.4.

b. For averaging purposes, a "monitoring week" starts with a Monday and ends on Sunday. Once a new monitoring week starts, you will need to calculate a new average for that week of turbidity monitoring results.[65] A weekly average may consist

[63] For instance, if your site is located in Washington, DC, and you are discharging to a Class B water, for which the water quality standard is that turbidity may not increase above ambient levels by more than 20 percent, you would reference "Water Quality Standards for the District of Columbia, Chapter 11, Section 1104.8."

[64] A "weekly average" is defined as the sum of all of the turbidity samples taken during a "monitoring week" divided by the number of samples measured during that week. Average values should be calculated to the nearest whole number.

[65] For example, if turbidity samples from your dewatering discharge in week 1 result in values of 30 NTU on Tuesday, 40 NTU on Wednesday, and 45 NTU on Thursday, your weekly average turbidity value would be 38.33 NTU ((30+40+45) ÷ 3 = 38 NTU). If in week 2, your turbidity samples resulted in values of 45 NTU on Monday, 30 NTU on Tuesday, 25 NTU on Wednesday, and 15 NTU on Thursday, you would calculate a new average for that week, which would yield an average turbidity value of 28.75 NTU ((45+30+25+15) ÷ 4 = 29 NTU). By comparison, if your samples on consecutive days from Friday to Monday were 60 NTU, 45 NTU, 40

of one or more turbidity monitoring results.

c. Although you are not required to collect and analyze more than one turbidity sample per day from your dewatering discharge, if you do collect and analyze more than one sample on any given day, you must include any additional results in the calculation of your weekly average (i.e., add all individual results for that monitoring week and divide by the total number of samples).[66]

d. If you are conducting turbidity monitoring for more than one dewatering discharge point, you must calculate a weekly average turbidity value for each discharge point and compare each to the turbidity benchmark.

3.3.4 Reporting and recordkeeping.

a. You must submit reports of your weekly average turbidity data to EPA no later than 30 days following the end of each monitoring quarter. If there are monitoring weeks in which there was no dewatering discharge, or if there is a monitoring quarter with no dewatering discharge, indicate this in your turbidity monitoring report. If another operator associated with your same site is conducting turbidity monitoring on your behalf pursuant to Part 3.3, indicate this in your turbidity monitoring report.

b. For the purposes of this permit, the following monitoring quarters and reporting deadlines apply:

Table 3. Monitoring Quarters and Deadlines for Reporting Turbidity Benchmark Monitoring Data.

Monitoring Quarter #	**Months**	**Reporting Deadline** (no later than 30 days after end of the monitoring quarter)
1	January 1 – March 31	April 30
2	April 1 – June 30	July 30
3	July 1 – September 30	October 30
4	October 1 – December 31	January 30

c. You must use EPA's NPDES eReporting Tool (NeT) to electronically submit your quarterly turbidity data, unless, consistent with Part 1.4.2, you received a waiver from your applicable EPA Regional Office. If the EPA Regional Office grants you approval to use a paper turbidity monitoring report form, and you elect to use it, you must complete the form in Appendix K. If EPA approves of your request to use an alternate turbidity benchmark pursuant to Part 3.3.2b, EPA will substitute the alternate benchmark in your NeT account.

d. For each day in which you are required to monitor, you must record the monitoring information required by Appendix G, Parts G.10.2 and G.10.3 and retain all such information for a period of at least three years from the date this permit expires or

NTU, and 43 NTU, respectively, and there are no other dewatering discharges for the remainder of the week, you would calculate one weekly average for the Friday to Sunday to be 48 NTU ((60+45+40) ÷ 3 = 48 NTU), and a separate weekly average for the one Monday to be 43 NTU (43 ÷ 1 = 43 NTU).

[66] For example, if during a monitoring week you take two turbidity samples on Tuesday with a value of 30 NTU and 35 NTU, three samples on Wednesday with a value of 40 NTU, 45 NTU, and 48 NTU, and one sample on Thursday with a value of 45 NTU, your weekly average turbidity value for this week would be 41 NTU ((30+35+40+45+48+45) ÷ 6 = 41 NTU).

from the date your authorization is terminated.

Table 4. Summary of Turbidity Benchmark Monitoring Requirements.

Applicability	Sampling Requirement	Turbidity Benchmark	Corrective Action	Reporting
Sites discharging dewatering water to a sediment-impaired water, to a water designated as a Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes, or to receiving waters located within Lands of Exclusive Federal Jurisdiction.	Collect at least one turbidity sample per day, from each discharge point, on any day there is a dewatering discharge. Use turbidity sampling procedures specified in Part 3.3.1.	Compare the weekly average of your turbidity monitoring results to the 50 NTU benchmark (or alternate benchmark if approved by EPA).	If the weekly average of turbidity monitoring results exceeds the 50 NTU turbidity benchmark (or alternate benchmark if approved by EPA), you are required to take follow-up corrective action in accordance with Part 5.2.2.	Report all weekly average turbidity monitoring results on a quarterly basis via NeT-CGP (unless use of the paper monitoring form in Appendix K is approved by EPA) no later than 30 days following the end of each monitoring quarter.

4 INSPECTION REQUIREMENTS

4.1 PERSON(S) RESPONSIBLE FOR CONDUCTING SITE AND DEWATERING INSPECTIONS

The person(s) inspecting your site may be a person on your staff or a third party you hire to conduct such inspections. You are responsible for ensuring that any person conducting inspections pursuant to this Part is a "qualified person." A qualified person is someone who has completed the training required by Part 6.3.

4.2 FREQUENCY OF INSPECTIONS.[67]

At a minimum, you must conduct a site inspection in accordance with one of the two schedules listed below, unless you are subject to the Part 4.3 site inspection frequency for discharges to sediment or nutrient-impaired or high quality waters, or qualify for a Part 4.4 reduction in the inspection frequency:

4.2.1 At least once every seven (7) calendar days; *or*

4.2.2 Once every 14 calendar days *and* within 24 hours[68] of the occurrence of:

- **a.** A storm event that produces 0.25 inches or more of rain within a 24-hour period.
  - **i.** If a storm event produces 0.25 inches or more of rain within a 24-hour period (including when there are multiple, smaller storms that alone produce less than

[67] Inspections are only required during the site's normal working hours.

[68] For the purposes of the inspection requirements in this Part, conducting an inspection "within 24 hours" means that once either of the two conditions in Parts 4.2.2a or 4.2.2b are met you have 24 hours from that time to conduct an inspection. For clarification, the 24 hours is counted as a continuous passage of time, and not counted by business hours (e.g., 3 business days of 8 hours each). When the 24-hour inspection time frame occurs entirely outside of normal working hours, you must conduct an inspection by no later than the end of the next business day.

0.25 inches but together produce 0.25 inches or more in 24 hours), you are required to conduct one inspection within 24 hours of when 0.25 inches of rain or more has fallen.

ii. If a storm event produces 0.25 inches or more of rain within a 24-hour period on the first day of a storm and continues to produce 0.25 inches or more of rain on subsequent days, you must conduct an inspection within 24 hours of the first day of the storm and within 24 hours after the last day of the storm that produces 0.25 inches or more of rain (i.e., only two inspections would be required for such a storm event).[69]

b. A discharge caused by snowmelt from a storm event that produces 3.25 inches[70] or more of snow within a 24-hour period. You are required to conduct one inspection once the discharge of snowmelt from a 3.25-inch or more snow accumulation occurs. Additional snowmelt inspections are only required if following the discharge from the first snowmelt, there is a discharge from a separate storm event that produces 3.25 inches or more of snow.

4.2.3 To determine whether a storm event meets either of the thresholds in Parts 4.2.2a or 4.2.2b:

a. For rain, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any 24-hour period during which there is 0.25 inches or more of rainfall, you must record the total rainfall measured for that day in accordance with Part 4.7.1d.

b. For snow, you must either take measurements of snowfall at your site,[71] or rely on similar information from a local weather forecasting provider that is representative of your location.

4.3 INCREASE IN INSPECTION FREQUENCY FOR CERTAIN SITES.

The increased inspection frequencies established in this Part take the place of the Part 4.2 inspection frequencies for the portion of the site affected.

4.3.1 For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by your State, Tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes (see Part 3.2), or that discharges to receiving waters located within Lands of Exclusive Federal Jurisdiction, you must conduct an inspection once every seven (7) calendar days *and* within 24 hours of the occurrence of a storm event

[69] For example, if 0.30 inches of rain falls on Day 1, 0.25 inches of rain falls on Day 2, and 0.10 inches of rain fall on Day 3, you would be required to conduct a first inspection within 24 hours of the Day 1 rainfall and a second inspection within 24 hours of the Day 2 rainfall, but a third inspection would not be required within 24 hours of the Day 3 rainfall.

[70] This is the amount of snow that is equivalent to 0.25 inches of rain, based on information from the National Oceanic and Atmospheric Administration (NOAA) indicating that 13 inches of snow is, on average, equivalent to 1 inch of rain. See https://www.nssl.noaa.gov/education/svrwx101/winter/faq/.

[71] For snowfall measurements, EPA suggests use of NOAA's National Weather Service guidelines at https://www.weather.gov/jkl/snow_measurement. These guidelines recommend use of a "snowboard" (a piece of wood about 16 inches by 16 inches) that is placed in an unobstructed part of the site on a hard surface.

that produces 0.25 inches or more of rain within a 24-hour period, or within 24 hours of a snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period.

Refer to Parts 4.2.3a and 4.2.3b for the requirements to determine if a storm event produces enough rain or snow to trigger the inspection requirement.

4.3.2 For sites discharging dewatering water, you must conduct an inspection in accordance with Part 4.6.3 during the discharge once per day on which the discharge occurs. The Part 4.2 inspection frequency still applies to all other portions of the site, unless the site is affected by either the increased frequency in Part 4.3.1 or the reduced frequency in Part 4.4.

4.4 REDUCTIONS IN INSPECTION FREQUENCY

4.4.1 Stabilized areas.

a. You may reduce the frequency of inspections to twice per month for the first month, no more than 14 calendar days apart, then once per month until permit coverage is terminated consistent with Part 8 in any area of your site where the stabilization steps in Part 2.2.14a have been completed. If construction activity resumes in this portion of the site at a later date, the inspection frequency immediately increases to that required in Parts 4.2 and 4.3, as applicable. You must document the beginning and ending dates of this period in your SWPPP.

b. Exception. For "linear construction sites" (as defined in Appendix A) where disturbed portions have undergone final stabilization at the same time active construction continues on others, you may reduce the frequency of inspections to twice per month for the first month, no more than 14 calendar days apart, in any area of your site where the stabilization steps in Part 2.2.14a have been completed. After the first month, inspect once more within 24 hours of the occurrence of a storm event that produces 0.25 inches of rain or more within a 24-hour period, or within 24 hours of a snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period. If there are no issues or evidence of stabilization problems, you may suspend further inspections. If "wash-out" of stabilization materials and/or sediment is observed, following re-stabilization, inspections must resume at the inspection frequency required in Part 4.4.1a. Inspections must continue until final stabilization is visually confirmed following a storm event that produces 0.25 inches of rain or more within a 24-hour period.

4.4.2 Arid, semi-arid, or drought-stricken areas (as defined in Appendix A). If it is the seasonally dry period[72] or a period in which drought is occurring, you may reduce the frequency of inspections to once per month and within 24 hours of the occurrence of a storm event that produces 0.25 inches of rain or more within a 24-hour period, or within 24 hours of a snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period. You must document that you are using this reduced schedule and the beginning and ending dates of the seasonally dry period in your SWPPP. Follow the procedures in Part 4.2.3a and 4.2.3b, accordingly, to determine if a storm event occurs that produces 0.25 inches or more of rain or 3.25 inches or more of snow within a 24-hour period. For any 24-hour period during which there is 0.25 inches or more of rainfall, or 3.25

[72] See footnote 45.

inches or more of snow, you must record the total rainfall or snow measured for that day in accordance with Part 4.7.1d.

4.4.3 Frozen conditions:

a. If you are suspending construction activities due to frozen conditions, you may temporarily suspend inspections on your site until thawing conditions (as defined in Appendix A) begin to occur if:

i. Discharges are unlikely due to continuous frozen conditions that are likely to continue at your site for at least three (3) months based on historic seasonal averages.[73] If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must immediately resume your regular inspection frequency as described in Parts 4.2 and 4.3, as applicable;

ii. Land disturbances have been suspended; and

iii. All disturbed areas of the site have been stabilized in accordance with Part 2.2.14a.

b. If you are still conducting construction activities during frozen conditions, you may reduce your inspection frequency to once per month if:

i. Discharges are unlikely due to continuous frozen conditions that are likely to continue at your site for at least three (3) months based on historic seasonal averages. If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must immediately resume your regular inspection frequency as described in Parts 4.2 and 4.3, as applicable; and

ii. Except for areas in which you are actively conducting construction activities, disturbed areas of the site have been stabilized in accordance with Part 2.2.14a.

You must document the beginning and ending dates of this period in your SWPPP.

4.5 AREAS THAT MUST BE INSPECTED

During your site inspection, you must at a minimum inspect the following areas of your site:

4.5.1 All areas that have been cleared, graded, or excavated and that have not yet completed stabilization consistent with Part 2.2.14a;

4.5.2 All stormwater controls, including pollution prevention controls, installed at the site to comply with this permit;[74]

4.5.3 Material, waste, borrow, and equipment storage and maintenance areas that are covered by this permit;

4.5.4 All areas where stormwater typically flows within the site, including constructed or natural site drainage features designed to divert, convey, and/or treat stormwater;

[73] Use data sets that include the most recent data available to account for recent precipitation patterns and trends.

[74] This includes the requirement to inspect for sediment that has been tracked out from the site onto paved roads, sidewalks, or other paved areas consistent with Part 2.2.4.

4.5.5 All areas where construction dewatering is taking place, including controls to treat the dewatering discharge and any channelized flow of water to and from those controls;

4.5.6 All points of discharge from the site; and

4.5.7 All locations where stabilization measures have been implemented.

You are not required to inspect areas that, at the time of the inspection, are considered unsafe to your inspection personnel.

4.6 REQUIREMENTS FOR INSPECTIONS

4.6.1 During each site inspection, you must at a minimum:

a. Check whether all stormwater controls *(*i.e.*, erosion and sediment controls and pollution prevention controls)* are properly installed, appear to be operational, and are working as intended to minimize pollutant discharges.

b. Check for the presence of conditions that could lead to spills, leaks, or other accumulations of pollutants on the site.

c. Identify any locations where new or modified stormwater controls are necessary to meet the requirements of Parts 2 and/or 3.

d. Check for signs of visible erosion and sedimentation *(*i.e.*, sediment deposits)* that have occurred and are attributable to your discharge at points of discharge and, if applicable, on the banks of any receiving waters flowing within or immediately adjacent to the site;

e. Check for signs of sediment deposition that are visible from your site and attributable to your discharge (e.g., sand bars with no vegetation growing on top in receiving waters or in other constructed or natural site drainage features, or the buildup of sediment deposits on nearby streets, curbs, or open conveyance channels).

f. Identify any incidents of noncompliance observed.

4.6.2 If a discharge is occurring during your inspection:

a. Identify all discharge points at the site; and

b. Observe and document the visual quality of the discharge, and take note of the characteristics of the stormwater discharge, including color; odor; floating, settled, or suspended solids; foam; oil sheen; and other indicators of stormwater pollutants. Check also for signs of these same pollutant characteristics that are visible from your site and attributable to your discharge in receiving waters or in other constructed or natural site drainage features.

4.6.3 For dewatering inspections conducted pursuant to Parts 4.3.2, record the following in a report within 24 hours of completing the inspection:

a. The inspection date;

b. Names and titles of personnel making the inspection;

c. Approximate times that the dewatering discharge began and ended on the day of inspection;[75]

[75] If the dewatering discharge is a continuous discharge that continues after normal business hours,

d. Estimates of the rate (in gallons per day) of discharge on the day of inspection;

e. Whether or not any of the following indications of pollutant discharge were observed at the point of discharge to any receiving waters flowing through or immediately adjacent to the site and/or to constructed or natural site drainage features or storm drain inlets:[76]

i. a sediment plume, suspended solids, unusual color, presence of odor, decreased clarity, or presence of foam; and/or

ii. a visible sheen on the water surface or visible oily deposits on the bottom or shoreline of the receiving water; and

f. Photographs of (1) the dewatering water prior to treatment by a dewatering control(s) and the final discharge after treatment; (2) the dewatering control(s); and (3) the point of discharge to any receiving waters flowing through or immediately adjacent to the site and/or to constructed or natural site drainage features, storm drain inlets, and other conveyances to receiving waters.

You must also comply with the Part 4.7.2, 4.7.3, and 4.7.4 requirements for signing the reports, keeping them available on site, and retaining copies.

4.6.4 Based on the results of your inspection:

a. Complete any necessary maintenance repairs or replacements under Part 2.1.4 or under Part 5, whichever applies; and

b. Modify your SWPPP site map in accordance with Part 7.4.1 to reflect changes to your stormwater controls that are no longer accurately reflected on the current site map.

4.7 INSPECTION REPORT

4.7.1 You must complete an inspection report within 24 hours of completing any site inspection. Each inspection report (except for dewatering inspection reports, which are covered in Part 4.6.3) must include the following:

a. The inspection date;

b. Names and titles of personnel making the inspection;

c. A summary of your inspection findings, covering at a minimum the observations you made in accordance with Part 4.6, including any problems found during your inspection that make it necessary to perform routine maintenance pursuant to Part 2.1.4b or corrective action pursuant to Part 5. Include also any documentation as to why the corrective action procedures under Part 5 are unnecessary to fix a problem that repeatedly occurs as described in Part 2.1.4c;

d. If you are inspecting your site at the frequency specified in Part 4.2.2, Part 4.3, or Part 4.4.1b, and you conducted an inspection because of a storm event that produced rainfall measuring 0.25 inches or more within a 24-hour period, you must include the applicable rain gauge or weather station readings that triggered the inspection. Similarly, if you conducted an inspection because of a snowmelt discharge from a

indicate that the discharge is continuous.

[76] If the operator observes any of these indicators of pollutant discharge, corrective action is required consistent with Parts 5.1.5b and 5.2.2.

storm event that produced 3.25 inches or more of snow within a 24-hour period, you must include any measurements taken of snowfall at your site, or weather station information you relied on; and

e. If you determined that it is unsafe to inspect a portion of your site, you must describe the reason you found it to be unsafe and specify the locations to which this condition applies.

4.7.2 Each inspection report must be signed by the operator's signatory in accordance with Appendix G, Part G.11 of this permit.

4.7.3 You must keep a copy of all inspection reports at the site or at an easily accessible location, so that it can be made immediately available at the time of an on-site inspection or upon request by EPA.[77]

4.7.4 You must retain all inspection reports completed for this Part for at least three (3) years from the date that your permit coverage expires or is terminated.

4.8 INSPECTIONS BY EPA

You must allow EPA, or an authorized representative of EPA, to conduct the following activities at reasonable times. To the extent that you are utilizing shared controls, that are not on site, to comply with this permit, you must make arrangements for EPA to have access at all reasonable times to those areas where the shared controls are located.

4.8.1 Enter onto all areas of the site, including any construction support activity areas covered by this permit, any off-site areas where shared controls are utilized to comply with this permit, discharge locations, adjoining waterbodies, and locations where records are kept under the conditions of this permit;

4.8.2 Access and copy any records that must be kept under the conditions of this permit;

4.8.3 Inspect your construction site, including any construction support activity areas covered by this permit (see Part 1.2.1c), any stormwater controls installed and maintained at the site, and any off-site shared controls utilized to comply with this permit; and

4.8.4 Sample or monitor for the purpose of ensuring compliance.

5 CORRECTIVE ACTIONS

5.1 CONDITIONS TRIGGERING CORRECTIVE ACTION.

You must take corrective action to address any of the following conditions identified at your site:

5.1.1 A stormwater control needs a significant repair or a new or replacement control is needed, or, in accordance with Part 2.1.4c, you find it necessary to repeatedly (i.e., three (3) or more times) conduct the same routine maintenance fix to the same control at the same location (unless you document in your inspection report under Part 4.7.1c that the specific reoccurrence of this same problem should still be addressed as a routine

[77] Inspection reports may be prepared, signed, and kept electronically, rather than in paper form, if the records are: (a) in a format that can be read in a similar manner as a paper record; (b) legally dependable with no less evidentiary value than their paper equivalent; and (c) immediately accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be, if the records were stored in paper form. For additional guidance on the proper practices to follow for the electronic retention of inspection report records, refer to the Fact Sheet discussion related to Part 4.7.3.

maintenance fix under Part 2.1.4); or

5.1.2 A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly; or

5.1.3 Your discharges are not meeting applicable water quality standards;

5.1.4 A prohibited discharge has occurred (see Part 1.3); or

5.1.5 During discharge from site dewatering activities:

a. The weekly average of your turbidity monitoring results exceeds the 50 NTU benchmark (or alternate benchmark if approved by EPA pursuant to Part 3.3.2b); or

b. You observe or you are informed by EPA, State, or local authorities of the presence of the conditions specified in Part 4.6.3e.

5.2 CORRECTIVE ACTION DEADLINES

5.2.1 If responding to any of the Part 5.1.1, 5.1.2, 5.1.3, or 5.1.4 triggering conditions, you must:

a. Immediately take all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events; and

b. When the problem does not require a new or replacement control or significant repair, the corrective action must be completed by the close of the next business day; or

c. When the problem requires a new or replacement control or significant repair, install the new or modified control and make it operational, or complete the repair, by no later than seven (7) calendar days from the time of discovery. If it is infeasible to complete the installation or repair within seven (7) calendar days, you must document in your records why it is infeasible to complete the installation or repair within the 7-day timeframe and document your schedule for installing the stormwater control(s) and making it operational as soon as feasible after the 7-day timeframe. Where these actions result in changes to any of the stormwater controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within seven (7) calendar days of completing this work.

5.2.2 If responding to either of the Part 5.1.5 triggering conditions related to site dewatering activities, you must:

a. Immediately take all reasonable steps to minimize or prevent the discharge of pollutants until you can implement a solution, including shutting off the dewatering discharge as soon as possible depending on the severity of the condition[78] taking safety considerations into account;

b. Determine whether the dewatering controls are operating effectively and whether they are causing the conditions; and

[78] For instance, if the weekly average of your turbidity monitoring results or a single sample is extremely high (e.g., a single turbidity sample results in 355 NTUs or higher), you should take action to safely shut off the discharge so that you can evaluate the cause of the high turbidity. Note: A single turbidity sample of 355 NTUs or higher means that the weekly average turbidity value will exceed 50 NTU regardless of the turbidity values the other days during the week.

c. Make any necessary adjustments, repairs, or replacements to the dewatering controls to lower the turbidity levels below the benchmark or remove the visible plume or sheen.

When you have completed these steps and made any changes deemed necessary, you may resume discharging from your dewatering activities.

5.3 CORRECTIVE ACTION REQUIRED BY EPA

You must comply with any corrective actions required by EPA as a result of permit violations found during an inspection carried out under Part 4.8.

5.4 CORRECTIVE ACTION LOG

5.4.1 For each corrective action taken in accordance with this Part, you must record the following in a corrective action log:

a. Within 24 hours of identifying the corrective action condition, document the specific condition and the date and time it was identified.

b. Within 24 hours of completing the corrective action (in accordance with the deadlines in Part 5.2), document the actions taken to address the condition, including whether any SWPPP modifications are required.

5.4.2 Each entry into the corrective action log, consisting of the information required by both Parts 5.4.1a and 5.4.1b, must be signed by the operator's signatory in accordance with Appendix G, Part G.11.2 of this permit.

5.4.3 You must keep a copy of the corrective action log at the site or at an easily accessible location, so that it can be made immediately available at the time of an on-site inspection or upon request by EPA.[79]

5.4.4 You must retain the corrective action log for at least three (3) years from the date that your permit coverage expires or is terminated.

6 STORMWATER TEAM FORMATION/STAFF TRAINING REQUIREMENTS

6.1 STORMWATER TEAM

Each operator, or group of multiple operators, must assemble a "stormwater team" that will be responsible for carrying out activities necessary to comply with this permit. The stormwater team must include the following people:

a. Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention controls);

b. Personnel responsible for the application and storage of treatment chemicals (if applicable);

c. Personnel who are responsible for conducting inspections as required in Part 4.1; and

[79] The corrective action log may be prepared, signed, and kept electronically, rather than in paper form, if the records are: (a) in a format that can be read in a similar manner as a paper record; (b) legally dependable with no less evidentiary value than their paper equivalent; and (c) immediately accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be, if the records were stored in paper form. For additional guidance on the proper practices to follow for the electronic retention of corrective action log records, refer to the Fact Sheet discussion related to Part 4.7.3.

d. Personnel who are responsible for taking corrective actions as required in Part 5.

Members of the stormwater team must be identified in the SWPPP pursuant to Part 7.2.2.

6.2 GENERAL TRAINING REQUIREMENTS FOR STORMWATER TEAM MEMBERS

Prior to the commencement of construction activities, you must ensure that all persons[80] assigned to the stormwater team understand the requirements of this permit and their specific responsibilities with respect to those requirements, including the following related to the scope of their job duties:

a. The permit requirements and deadlines associated with installation, maintenance, and removal of stormwater controls, as well as site stabilization**;**

b. The location of all stormwater controls on the site required by this permit and how they are to be maintained;

c. The proper procedures to follow with respect to the permit's pollution prevention requirements; and

d. When and how to conduct inspections, record applicable findings, and take corrective actions. Specific training requirements for persons conducting site inspections are included in Part 6.3.

You are responsible for ensuring that all activities on the site comply with the requirements of this permit. You are not required to provide or document formal training for subcontractors or other outside service providers (unless the subcontractors or outside service providers are responsible for conducting the inspections required in Part 4, in which case you must provide such documentation consistent with Part 7.2.2), but you must ensure that such personnel understand any requirements of this permit that may be affected by the work they are subcontracted to perform.

6.3 TRAINING REQUIREMENTS FOR PERSONS CONDUCTING INSPECTIONS

For projects that receive coverage under this permit on or after February 17, 2023, to be considered a qualified person under Part 4.1 for conducting inspections under Part 4, you must, at a minimum, either:

a. Have completed the EPA construction inspection course developed for this permit and have passed the exam; or

b. Hold a current valid construction inspection certification or license from a program that, at a minimum, covers the following:[81]

i. Principles and practices of erosion and sediment control and pollution prevention practices at construction sites;

ii. Proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites; and

[80] If the person requiring training is a new employee who starts after you commence construction activities, you must ensure that this person has the proper understanding as required above prior to assuming particular responsibilities related to compliance with this permit. For emergency-related projects, the requirement to train personnel prior to commencement of construction activities does not apply, however, such personnel must have the required training prior to NOI submission.

[81] If one of the following topics (e.g., installation and maintenance of pollution prevention practices) is not covered by the non-EPA training program, you may consider supplementing the training with the analogous module of the EPA course (e.g., Module 4) that covers the missing topic.

iii. Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Part 4.

For projects that receive coverage under this permit prior to February 17, 2023, any personnel conducting site inspections pursuant to Part 4 on your site must, at a minimum, be a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality, and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.[82]

6.4 STORMWATER TEAM'S ACCESS TO PERMIT DOCUMENTS

Each member of the stormwater team must have easy access to an electronic or paper copy of applicable portions of this permit, the most updated copy of your SWPPP, and other relevant documents or information that must be kept with the SWPPP.

7 STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

7.1 GENERAL REQUIREMENTS

All operators associated with a construction site under this permit must develop a SWPPP consistent with the requirements in Part 7 prior to their submittal of the NOI.[83, 84, 85] The SWPPP must be kept up-to-date throughout coverage under this permit.

If a SWPPP was prepared under a previous version of this permit, the operator must review and update the SWPPP to ensure that this permit's requirements are addressed prior to submitting an NOI for coverage under this permit.

[82] If you receive coverage for a project prior to February 17, 2023, and construction activities for the same project will continue after February 17, 2023, the personnel conducting inspections do not need to take the additional training specified in Parts 6.3a and 6.3b for inspections conducted on the project site. If the same operator obtains coverage for a different project on or after February 17, 2023, personnel conducting inspections would be required to meet the requirements for a qualified person by completing the training in either Part 6.3a or Part 6.3b.

[83] The SWPPP does not establish the effluent limits and/or other permit terms and conditions that apply to your site's discharges; these limits, terms, and conditions are established in this permit.

[84] Where there are multiple operators associated with the same site, they may develop a group SWPPP instead of multiple individual SWPPPs. Regardless of whether there is a group SWPPP or multiple individual SWPPPs, each operator is responsible for compliance with the permit's terms and conditions. In other words, if Operator A relies on Operator B to satisfy its permit obligations, Operator A does not have to duplicate those permit-related functions if Operator B is implementing them such that both operators are in compliance with the permit. However, Operator A remains responsible for permit compliance if Operator B fails to take actions necessary for Operator A to comply with the permit. In addition, all operators must ensure, either directly or through coordination with other operators, that their activities do not cause a violation or compromise any other operators' controls and/or any shared controls. See also footnote 61.

[85] There are a number of commercially available products to assist operators in developing the SWPPP, as well as companies that can be hired to help develop a site-specific SWPPP. The permit does not state which are recommended, nor does EPA endorse any specific products or vendors. Where operators choose to rely on these products or services, the choice of which ones to use to comply with the requirements of this Part is a decision for the operator alone.

7.2 SWPPP CONTENTS

At a minimum, the SWPPP must include the information specified in this Part and as specified in other parts of this permit.

7.2.1 All Site Operators. Include a list of all other operators who will be engaged in construction activities at the site, and the areas of the site over which each operator has control.

7.2.2 Stormwater Team. Identify the personnel (by name and position) that you have made part of the stormwater team pursuant to Part 6.1, as well as their individual responsibilities, including which members are responsible for conducting inspections.

Include verification that each member of the stormwater team has received the training required by Part 6.2. Include documentation that members of the stormwater team responsible for conducting inspections pursuant to Part 4 have received the training required by Part 6.3. If personnel on your team elect to complete the EPA inspector training program pursuant to Part 6.3a, you must include copies of the certificate showing that the relevant personnel have completed the training and passed the exam. If personnel on your team elect to complete a non-EPA inspector training program pursuant to Part 6.3b, you must include documentation showing that these persons have successfully completed the program and their certification or license is still current. You must also confirm that the non-EPA inspector training program satisfies the minimum elements for such programs in Part 6.3b.

7.2.3 Nature of Construction Activities. Include the following:

- **a.** A description of the nature of your construction activities, including the age or dates of past renovations for structures that are undergoing demolition;
- **b.** The size of the property (in acres or length in miles if a linear construction site);
- **c.** The total area expected to be disturbed by the construction activities (to the nearest quarter acre or nearest quarter mile if a linear construction site);
- **d.** A description of any on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1c);
- **e.** The maximum area expected to be disturbed at any one time, including on-site and off-site construction support activity areas;
- **f.** A description and projected schedule for the following:[86]
  - **i.** Commencement of construction activities in each portion of the site, including clearing and grubbing, mass grading, demolition activities, site preparation (i.e., excavating, cutting and filling), final grading, and creation of soil and vegetation stockpiles requiring stabilization;
  - **ii.** Temporary or permanent cessation of construction activities in each portion of the site;
  - **iii.** Temporary or final stabilization of exposed areas for each portion of the site; and
  - **iv.** Removal of temporary stormwater controls and construction equipment or vehicles, and the cessation of construction-related pollutant-generating activities.

[86] If plans change due to unforeseen circumstances or for other reasons, the requirement to describe the sequence and estimated dates of construction activities is not meant to "lock in" the operator to meeting these dates. When departures from initial projections are necessary, this should be documented in the SWPPP itself, or in associated records, as appropriate.

g. A list and description of all pollutant-generating activities[87] on the site. For each pollutant-generating activity, include an inventory of pollutants or pollutant constituents (e.g., *sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels*) associated with that activity, which could be discharged in stormwater from your construction site. You must take into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed or removed during construction;

h. Business days and hours for the project;

i. If you are conducting construction activities in response to a public emergency (see Part 1.4), a description of the cause of the public emergency *(*e.g., *mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services)*, information substantiating its occurrence *(*e.g., *State disaster declaration or similar State or local declaration)*, and a description of the construction necessary to reestablish affected public services.

7.2.4 Site Map. Include a legible map, or series of maps, showing the following features of the site:

a. Boundaries of the property;

b. Locations where construction activities will occur, including:

i. Locations where earth-disturbing activities will occur (note any phasing), including any demolition activities;

ii. Approximate slopes before and after major grading activities (note any steep slopes (as defined in Appendix A));

iii. Locations where sediment, soil, or other construction materials will be stockpiled;

iv. Any receiving water crossings;

v. Designated points where vehicles will exit onto paved roads;

vi. Locations of structures and other impervious surfaces upon completion of construction; and

vii. Locations of on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1c).

c. Locations of any receiving waters within the site and all receiving waters within one mile downstream of the site's discharge point(s). Also identify if any of these receiving waters are listed as impaired or are identified as a Tier 2, Tier 2.5, or Tier 3 water;

d. Any areas of Federally listed critical habitat within the action area of the site as defined in Appendix A;

e. Type and extent of pre-construction cover on the site (e.g., vegetative cover, forest, pasture, pavement, structures);

f. Drainage patterns of stormwater and authorized non-stormwater before and after major grading activities;

[87] Examples of pollutant-generating activities include paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering activities.

g. Stormwater and authorized non-stormwater discharge locations, including:

i. Locations where stormwater and/or authorized non-stormwater will be discharged to storm drain inlets, including a notation of whether the inlet conveys stormwater to a sediment basin, sediment trap, or similarly effective control;[88]

ii. Locations where stormwater or authorized non-stormwater will be discharged directly to receiving waters (i.e., not via a storm drain inlet); and

iii. Locations where turbidity benchmark monitoring will take place to comply with Part 3.3, if applicable to your site.

h. Locations of all potential pollutant-generating activities identified in Part 7.2.3g;

i. Designated areas where construction wastes that are covered by the exception in Part 2.3.3e.ii because they are not pollutant-generating will be stored;

j. Locations of stormwater controls, including natural buffer areas and any shared controls utilized to comply with this permit; and

k. Locations where polymers, flocculants, or other treatment chemicals will be used and stored.

7.2.5 Non-Stormwater Discharges. Identify all authorized non-stormwater discharges in Part 1.2.2 that will or may occur.

7.2.6 Description of Stormwater Controls.

a. For each of the Part 2.2 erosion and sediment control requirements, Part 2.3 pollution prevention requirements, and Part 2.4 construction dewatering requirements, as applicable to your site, you must include the following:

i. A description of the specific control(s) to be implemented to meet these requirements;

ii. The design specifications for controls described in Part 7.2.6a.i (including references to any manufacturer specifications and/or erosion and sediment control manuals/ordinances relied upon);[89]

iii. Routine stormwater control maintenance specifications; and

iv. The projected schedule for stormwater control installation/implementation.

b. You must also include any of the following additional information as applicable.

i. Natural buffers and/or equivalent sediment controls (see Part 2.2.1 and Appendix F). You must include the following:

(a) The compliance alternative to be implemented;

(b) If complying with alternative 2, the width of natural buffer retained;

[88] The requirement to show storm drain inlets in the immediate vicinity of the site on your site map only applies to those inlets that are easily identifiable from your site or from a publicly accessible area immediately adjacent to your site.

[89] Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practice and must be explained in the SWPPP.

(c) If complying with alternative 2 or 3, the erosion and sediment control(s) you will use to achieve an equivalent sediment reduction, and any information you relied upon to demonstrate the equivalency;

(d) If complying with alternative 3, a description of why it is infeasible for you to provide and maintain an undisturbed natural buffer of any size;

(e) For "linear construction sites" where it is infeasible to implement compliance alternative 1, 2, or 3, a rationale for this determination, and a description of any buffer width retained and/or supplemental erosion and sediment controls installed; and

(f) A description of any disturbances that are exempt under Part 2.2.1 that occur within 50 feet of a receiving water.

ii. Perimeter controls for a "linear construction site" (see Part 2.2.3d). For areas where perimeter controls are not feasible, include documentation to support this determination and a description of the other practices that will be implemented to minimize discharges of pollutants in stormwater associated with construction activities.

Note: Routine maintenance specifications for perimeter controls documented in the SWPPP must include the Part 2.2.3c.i requirement that sediment be removed before it has accumulated to one-half of the above-ground height of any perimeter control.

iii. Sediment track-out controls (see Parts 2.2.4b and 2.2.4c). Document the specific stabilization techniques and/or controls that will be implemented to remove sediment prior to vehicle exit.

iv. Inlet protection measures (see Part 2.2.10a). Where inlet protection measures are not required because the storm drain inlets to which your site discharges are conveyed to a sediment basin, sediment trap, or similarly effective control, include a short description of the control that receives the stormwater flow from the site.

v. Sediment basins (see Part 2.2.12). In circumstances where it is infeasible to utilize outlet structures that withdraw water from the surface, include documentation to support this determination, including the specific conditions or time periods when this exception will apply.

vi. Treatment chemicals (see Part 2.2.13), you must include the following:

(a) A listing of the soil types that are expected to be exposed during construction in areas of the project that will drain to chemical treatment systems. Also include a listing of soil types expected to be found in fill material to be used in these same areas, to the extent you have this information prior to construction;

(b) A listing of all treatment chemicals to be used at the site and why the selection of these chemicals is suited to the soil characteristics of your site;

(c) If the applicable EPA Regional Office authorized you to use cationic treatment chemicals for sediment control, include the specific controls and implementation procedures designed to ensure that your use of cationic

treatment chemicals will not lead to a discharge that does not meet water quality standards;

(d) The dosage of all treatment chemicals to be used at the site or the methodology to be used to determine dosage;

(e) Information from any applicable Safety Data Sheet (SDS);

(f) Schematic drawings of any chemically enhanced stormwater controls or chemical treatment systems to be used for application of the treatment chemicals;

(g) A description of how chemicals will be stored consistent with Part 2.2.13c;

(h) References to applicable State or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer's specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems; and

(i) A description of the training that personnel who handle and apply chemicals have received prior to permit coverage, or will receive prior to use of the treatment chemicals at your site.

vii. Stabilization measures (see Part 2.2.14). You must include the following:

(a) The specific vegetative and/or non-vegetative practices that will be used;

(b) The stabilization deadline that will be met in accordance with Part 2.2.14;

(c) If complying with the deadlines for sites in arid, semi-arid, or drought-stricken areas, the beginning and ending dates of the seasonally dry period (as defined in Appendix A)[90] and the schedule you will follow for initiating and completing vegetative stabilization; and

(d) If complying with deadlines for sites affected by unforeseen circumstances that delay the initiation and/or completion of vegetative stabilization, document the circumstances and the schedule for initiating and completing stabilization.

viii. Spill prevention and response procedures (see Parts 1.3.5, 2.3.3c, 2.3.3d, and 2.3.6). You must include the following:

(a) Procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases. Identify the name or position of the employee(s) responsible for detection and response of spills or leaks; and

(b) Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity consistent with Part 2.3.6 and established under either 40 CFR part 110, 40 CFR part 117, or 40 CFR part 302, occurs

[90] See footnote 45.

during a 24-hour period. Contact information must be in locations that are readily accessible and available to all employees.

You may also reference the existence of SPCC plans developed for the construction activity under Section 311 of the CWA, or spill control programs otherwise required by an NPDES permit for the construction activity, provided that you keep a copy of that other plan on site.[91]

ix. Waste management procedures (see Part 2.3.3). Describe the procedures you will follow for handling, storing, and disposing of all wastes generated at your site consistent with all applicable Federal, State, Tribal, and local requirements, including clearing and demolition debris, sediment removed from the site, construction and domestic waste, hazardous or toxic waste, and sanitary waste. You must also include the following additional information:

(a) If site constraints prevent you from storing chemical containers 50 feet away from receiving waters or the other site drainage features as required in Part 2.3.3c.ii(b), document in your SWPPP the specific reasons why the 50-foot setback is not feasible, and how you will store containers as far away as the site permits; and

(b) If there are construction wastes that are subject to the exception in Part 2.3.3e.ii, describe the specific wastes that will be stored on your site.

x. Application of fertilizers (see Part 2.3.5). Document any departures from the manufacturer specifications where appropriate.

7.2.7 Procedures for Inspection, Maintenance, and Corrective Action. Describe the procedures you will follow for maintaining your stormwater controls, conducting site inspections, and, where necessary, taking corrective actions, in accordance with Part 2.1.4, Part 4, and Part 5 of this permit, accordingly. Also include:

a. The inspection schedule you will follow, which is based on whether your site is subject to Part 4.2 or Part 4.3, or whether your site qualifies for any of the reduced inspection frequencies in Part 4.4;

b. If you will be conducting inspections in accordance with the inspection schedule in Part 4.2.2, Part 4.3, or Part 4.4.1b, the location of the rain gauge or the address of the weather station you will be using to obtain rainfall data;

c. If you will be reducing your inspection frequency in accordance with Part 4.4.1b, the beginning and ending dates of the seasonally defined arid period for your area or the valid period of drought;

d. If you will be reducing your inspection frequency in accordance with Part 4.4.3, the beginning and ending dates of frozen conditions on your site; and

e. Any maintenance or inspection checklists or other forms that will be used.

7.2.8 Procedures for Turbidity Benchmark Monitoring from Dewatering Discharges (if applicable). If you are required to comply with the Part 3.3 turbidity benchmark

[91] Even if you already have an SPCC or other spill prevention plan in existence, your plans will only be considered adequate if they meet all of the requirements of this Part, either as part of your existing plan or supplemented as part of the SWPPP.

monitoring requirements, describe the procedures you will follow to collect and evaluate samples, report results to EPA and keep records of monitoring information, and take corrective action when necessary. Include the specific type of turbidity meter you will use for monitoring, as well as any manuals or manufacturer instructions on how to operate and calibrate the meter. Describe any coordinating arrangement you may have with any other permitted operators on the same site with respect to compliance with the turbidity monitoring requirements, including which parties are tasked with specific responsibilities. If EPA has approved of an alternate turbidity benchmark pursuant to Part 3.3.2b, include any data and other documentation you relied on to request use of the specific alternative benchmark.

7.2.9 Compliance with Other Requirements.

a. Threatened and Endangered Species Protection. Include documentation required in the Endangered Species Protection section of the NOI in NeT, or the ESA worksheet in Appendix D, supporting your eligibility with regard to the protection of threatened and endangered species and designated critical habitat.

b. Historic Properties. Include documentation required in Appendix E supporting your eligibility with regard to the protection of historic properties.

c. Safe Drinking Water Act Underground Injection Control (UIC) Requirements for Certain Subsurface Stormwater Controls. If you are using any of the following stormwater controls at your site, document any contact you have had with the applicable State agency[92] or EPA Regional Office responsible for implementing the requirements for underground injection wells in the Safe Drinking Water Act and EPA's implementing regulations at 40 CFR § 144 -147. Such controls would generally be considered Class V UIC wells:

i. Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system);

ii. Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow; and

iii. Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system).

7.2.10 SWPPP Certification. Your signatory must sign and date your SWPPP in accordance with Appendix G, Part G.11.

7.2.11 Post-Authorization Additions to the SWPPP. Once you are authorized for coverage under this permit, you must include the following documents as part of your SWPPP:

a. A copy of your NOI submitted to EPA along with any correspondence exchanged between you and EPA related to coverage under this permit;

b. A copy of the acknowledgment letter you receive from NeT assigning your NPDES ID (i.e.*, permit tracking number*);

[92] For State UIC program contacts, refer to the following EPA website: https://www.epa.gov/uic.

c. A copy of this permit (an electronic copy easily available to the stormwater team is also acceptable).

7.3 ON-SITE AVAILABILITY OF YOUR SWPPP

You must keep a current copy of your SWPPP at the site or at an easily accessible location so that it can be made available at the time of an on-site inspection or upon request by EPA; a State, Tribal, or local agency approving stormwater management plans; the operator of a storm sewer system receiving discharges from the site; or representatives of the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS).[93]

EPA may provide access to portions of your SWPPP to a member of the public upon request. Confidential Business Information (CBI) will be withheld from the public, but may not be withheld from EPA, USFWS, or NMFS.[94]

If an on-site location is unavailable to keep the SWPPP when no personnel are present, notice of the plan's location must be posted near the main entrance of your construction site.

7.4 SWPPP MODIFICATIONS

7.4.1 You must modify your SWPPP, including the site map(s), within seven (7) days of any of the following conditions:

a. Whenever new operators become active in construction activities on your site, or you make changes to your construction plans, stormwater controls, or other activities at your site that are no longer accurately reflected in your SWPPP. This includes changes made in response to corrective actions triggered under Part 5. You do not need to modify your SWPPP if the estimated dates in Part 7.2.3f change during the course of construction;

b. To reflect areas on your site map where operational control has been transferred (and the date of transfer) since initiating permit coverage;

c. If inspections or investigations by EPA or its authorized representatives determine that SWPPP modifications are necessary for compliance with this permit;

d. Where EPA determines it is necessary to install and/or implement additional controls at your site in order to meet the requirements of this permit, the following must be included in your SWPPP:

i. A copy of any correspondence describing such measures and requirements; and

[93] The SWPPP may be prepared, signed, and kept electronically, rather than in paper form, if the records are: (a) in a format that can be read in a similar manner as a paper record; (b) legally dependable with no less evidentiary value than their paper equivalent; and (c) immediately accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be, if the records were stored in paper form. For additional guidance on the proper practices to follow for the electronic retention of the SWPPP, refer to the Fact Sheet discussion related to Part 4.7.3.

[94] Information covered by a claim of confidentiality will be disclosed by EPA only to the extent of, and by means of, the procedures set forth in 40 CFR part 2, Subpart B. In general, submitted information protected by a business confidentiality claim may be disclosed to other employees, officers, or authorized representatives of the United States concerned with implementing the CWA. The authorized representatives, including employees of other executive branch agencies, may review CBI during the course of reviewing draft regulations.

ii. A description of the controls that will be used to meet such requirements.

e. To reflect any revisions to applicable Federal, State, Tribal, or local requirements that affect the stormwater controls implemented at the site; and

f. If applicable, if a change in chemical treatment systems or chemically enhanced stormwater control is made, including use of a different treatment chemical, different dosage rate, or different area of application.

7.4.2 You must maintain records showing the dates of all SWPPP modifications. The records must include the name of the person authorizing each change (see Part 7.2.9 above) and a brief summary of all changes.

7.4.3 All modifications made to the SWPPP consistent with Part 7.4 must be authorized by a person identified in Appendix G, Part G.11.b.

7.4.4 Upon determining that a modification to your SWPPP is required, if there are multiple operators covered under this permit, you must immediately notify any operators who may be impacted by the change to the SWPPP.

8 HOW TO TERMINATE COVERAGE

Until you terminate coverage under this permit, you must comply with all conditions and effluent limitations in the permit. To terminate permit coverage, you must submit to EPA a complete and accurate Notice of Termination (NOT), which certifies that you have met the requirements for terminating in Part 8.

8.1 MINIMUM INFORMATION REQUIRED IN NOT

8.1.1 NPDES ID (i.e*., permit tracking number)* provided by EPA when you received coverage under this permit;

8.1.2 Basis for submission of the NOT (see Part 8.2);

8.1.3 Operator contact information;

8.1.4 Name of site and address (or a description of location if no street address is available); and

8.1.5 NOT certification.

8.2 CONDITIONS FOR TERMINATING CGP COVERAGE

You may terminate CGP coverage only if one or more of the conditions in Parts 8.2.1, 8.2.2, or 8.2.3 has occurred. Until your termination is effective consistent with Part 8.5, you must continue to comply with the conditions of this permit.

8.2.1 You have completed all construction activities at your site and, if applicable, construction support activities covered by this permit (see Part 1.2.1c), and you have met all of the following requirements:

a. For any areas that (1) were disturbed during construction, (2) are not covered by permanent structures, and (3) over which you had control during the construction activities, you have met the requirements for final vegetative or non-vegetative stabilization in Part 2.2.14c.

To document that you have met these stabilization requirements, you must take either ground or aerial photographs that show your site's compliance with the Part 2.2.14 stabilization requirements and submit them with your NOT. If any portion of your

site is covered by one of the exceptions in Part 2.2.14c.iii, indicate which exception applies and include a supplementary explanation with your photographs that provides the necessary context for why this portion of the site is in compliance with the final stabilization criteria even though it appears to be unstabilized. You are not required to take photographs of every distinct part of your site that is being stabilized, however, the conditions of the site portrayed in any photographs that are submitted must be substantially similar[95] to those of the areas that are not photographed. You must also comply with the following related to these photographs:

i. Take photographs both before and after the site has met the final stabilization criteria in Part 2.2.14c;

ii. All photographs must be clear and in focus, and in the original format and resolution; and

iii. Include the date each photograph was taken, and a brief description of the area of the site captured by the photograph (e.g., photo shows application of seed and erosion control mats to remaining exposed surfaces on northeast corner of site).

b. You have removed and properly disposed of all construction materials, waste and waste handling devices, and have removed all equipment and vehicles that were used during construction, unless intended for long-term use following your termination of permit coverage;

c. You have removed all stormwater controls that were installed and maintained during construction, except those that are intended for long-term use following your termination of permit coverage or those that are biodegradable (as defined in Appendix A); and

d. You have removed all potential pollutants and pollutant-generating activities associated with construction, unless needed for long-term use following your termination of permit coverage; or

8.2.2 You have transferred control of all areas of the site for which you are responsible under this permit to another operator, and that operator has submitted an NOI and obtained coverage under this permit; or

8.2.3 Coverage under an individual or alternative general NPDES permit has been obtained.

8.3 HOW TO SUBMIT YOUR NOT

You must use EPA's NPDES eReporting Tool (NeT) to electronically prepare and submit an NOT for the 2022 CGP.

To access NeT, go to https://cdx.epa.gov/cdx.

Waivers from electronic reporting may be granted as specified in Part 1.4.2. If the EPA Regional Office grants you approval to use a paper NOT, and you elect to use it, you must complete the form in Appendix I.

[95] Stabilization conditions that are substantially similar would include areas that are using the same type of stabilization measures and that have similar slopes, soils, and topography, and have achieved the same level of stabilization.

8.4 DEADLINE FOR SUBMITTING THE NOT

You must submit an NOT within 30 calendar days after any one of the conditions in Part 8.2 occurs.

8.5 EFFECTIVE DATE OF TERMINATION OF COVERAGE

Your authorization to discharge under this permit terminates at midnight of the calendar day that a complete NOT is submitted to EPA.

9 PERMIT CONDITIONS APPLICABLE TO SPECIFIC STATES, INDIAN COUNTRY LANDS, OR TERRITORIES

The provisions in this Part provide additions to the applicable conditions of this permit to reflect specific additional conditions required as part of the State or Tribal CWA Section 401 certification process, or the Coastal Zone Management Act (CZMA) certification process, or as otherwise established by the permitting authority. The specific additional revisions and requirements only apply to activities in those specific States, Indian country, and areas in certain States with Federal Facilities or areas subject to construction projects by Federal Operators. States, Indian country, and other areas not included in this Part do not have any additions to the applicable conditions of this permit.

9.1 EPA REGION 1

9.1.1 NHR100000 State of New Hampshire

a. Should the permit coverage for an individual applicant be insufficient to achieve water quality standards, the New Hampshire Department of Environmental Services (NHDES) may prepare additional 401 certification conditions for that applicant. Any additional 401 certification conditions will follow all required NHDES public participation requirements.

b. If you disturb 100,000 square feet or more of contiguous area, you must also comply with RSA 485-A:17 and Env-Wq 1500, and, unless exempt, apply for an Alteration of Terrain (AoT) permit from NHDES. This requirement also applies to a lower disturbance threshold of 50,000 square feet or more when construction occurs within the protected shoreline under the Shoreland Water Quality Protection Act (see RSA 483-B and Env-Wq 1400). A permit application must also be filed if your project disturbs an area of greater than 2,500 square feet, is within 50 feet of any surface water, and has a flow path of 50 feet or longer disturbing a grade of 25 percent or greater. Project sites with disturbances smaller than those discussed above, that have the potential to adversely affect state surface waters, are subject to the conditions of an AoT General Permit by Rule (Env-Wq 1503.03).

c. You must determine that any excavation dewatering discharges are not contaminated before they will be authorized as an allowable non-stormwater discharge under this permit (see Part 1.2.2 of the Construction General Permit or CGP). In the absence of information demonstrating otherwise, the water is considered uncontaminated if there is no groundwater contamination within 1,000 feet of the groundwater dewatering location. Information on groundwater contamination can be generated over the Internet via the NHDES web site http:// des.nh.gov/ by using the One Stop Data Mapper. For a toxic substance included in the New Hampshire surface water quality standards, see Env-Wq 1703.21 (see https://www.des.nh.gov/sites/g/fi1es/ehbemt 341/files/documents/2020-01/Env-Wg

1700.pdf). If it is determined that the groundwater to be dewatered is near a remediation or other waste site, you must apply for the Remediation General Permit (see https://www3.epa.gov/region1/npdes/rgp.html)

d. As a minimum, you must treat any uncontaminated excavation "dewatering" discharges and "stormwater" discharges, as those terms are defined in Appendix A of the CGP, as necessary, to remove suspended solids and turbidity so that the surface waters receiving the construction discharges[96] meet New Hampshire surface water quality standards for turbidity (Env-Wq 1703.11 and Env-Wq 1703.03(c)(1)c), benthic deposits (Env-Wq 1703.03(c)(1)a), and Env-Wq 1703.08) and foam, debris, scum or other visible substances (i.e., plumes or visual turbidity)[97] (Env-Wq 1703.03(c)(1)b).

i. For all Construction Activities covered under this CGP, the following shall apply to ensure compliance with the aforementioned regulations for turbidity, benthic deposits and visible substances:

Unless otherwise specified, site inspection requirements shall comply with Part 4 of the CGP. As a minimum site inspection frequency shall be in accordance with Part 4.2.2 of the CGP (and Part 4.3.2 of the CGP for sites discharging dewatering water). Site inspection frequency may be reduced in accordance with Part 4.4 of the CGP (Reductions in Inspection Frequency). Monitoring of the receiving water for visible turbidity and benthic sediment deposits shall be conducted each site inspection and results reported in the Inspection Report required in Part 4.7 of the CGP. Should visible turbidity or benthic sediment deposits attributable or partly attributable to your construction activities be present in the receiving water, the "Corrective Actions" specified in Part 5 shall be immediately implemented to correct the water quality standard violations. In addition, daily monitoring (including photographs) of the receiving water shall be conducted until there is no visible turbidity or benthic deposits. Inspection Reports required in Part 4.7 of the CGP shall include, but not be limited to, the distance downstream and the percent of the river width[98] where visible turbidity was observed, and the period of time that the visible turbidity persisted. A copy of the Inspection Report(s) shall be made available to NHDES within 24 hours of receiving a written request from NHDES.

ii. For Construction Activities, disturbing 5 acres or more of land at any one time (excluding areas that have been completely stabilized in accordance with the final stabilization criteria specified in Part 2.2.14.c of the CGP), the following shall

[96] Construction Discharges include uncontaminated "dewatering" and "stormwater" discharges as those terms are defined in Appendix A of the CGP. Controlled construction discharges are construction discharges where the rate of flow can be regulated such as from a construction settling basin or NHDES approved flocculation system.

[97] For the definition of visual turbidity, see the definition for "Non-Turbid" in Appendix A of the CGP, which states the following:" "Non-Turbid" - a discharge that is free from visual turbidity. For the purposes of this permit, visual turbidity refers to a sediment plume or other cloudiness in the water caused by sediment that can be identified by an observer." *[EPA interprets the text of this footnote as intending to reference the Appendix A definitions of "visual turbidity" and "non-turbid" in the final permit.]*

[98] The distance downstream and the percent of river width where visible turbidity (i.e., plume) is observed is required to determine the extent of the river affected and to determine if there was a "zone of passage" (i.e., a portion of the receiving water where there was no visible turbidity where mobile organisms could pass without being adversely impacted). The percent of river width affected is equal 100 multiplied by the width of the plume (in feet) divided by the width of the receiving water (in feet).

apply to ensure compliance with the aforementioned regulations for turbidity, benthic deposits and visible substances.

Item 9.1.1.d.i) above shall apply to all construction discharges and the minimum site inspection frequency shall comply with Part 4.3.1 of the CGP (and Part 4.3.2 of the CGP for sites discharging dewatering water). Site inspection frequency may be reduced in accordance with Part 4.4 of the CGP (Reductions in Inspection Frequency).

With regards to controlled construction discharges, if there is no visible turbidity (i.e., plumes) or benthic deposits, and, in the absence of information demonstrating otherwise, turbidity measurements of less than or equal to 50 nephelometric turbidity units (NTU) in the controlled construction discharges at the outlet prior to mixing with the receiving surface waters, shall be presumed to meet New Hampshire surface water quality standards for the parameters listed above. As a minimum, the controlled construction discharges must be sampled at each site inspection.

If any controlled construction discharge exceeds 50 NTU, or if visible turbidity or benthic sediment deposits attributable or partly attributable to any construction discharge are observed in the receiving water, then the "Corrective Actions" specified in Part 5 of the CGP shall be immediately implemented.

In addition, should such violation occur, and, in order to determine compliance with surface water quality standards for turbidity (Env-Wq 1703.11 and Env-Wq 1703.03(c)(1)c), benthic deposits (Env-Wq 1703.03(c)(1)a), and Env-Wq 1703.08) and foam, debris, scum or other visible substances (Env-Wq 1703.03(c)(1)b)), turbidity monitoring shall be immediately implemented as specified below:

Turbidity samples of the receiving water shall be immediately taken in the receiving water upstream and beyond the influence of the construction activity, and, unless a mixing zone[99] is approved by NHDES, no more than 75 feet downstream of each controlled construction discharge that exceeded 50 NTU and no more than 75 feet downstream of each construction discharge that caused visible turbidity.

Downstream samples shall be taken at locations in the receiving water that are most likely influenced by the discharge (e.g., if visible turbidity (i.e., a plume) is present, the sample shall be taken in the plume). Samples shall be collected a minimum of 2 times per day during the daylight hours at times when construction activities are most likely to cause turbidity in the receiving water and shall continue until the turbidity water quality standards are met in the receiving water (i.e., the difference between the upstream and downstream turbidity level is no greater than 10 NTU).

[99] Permittees may request a distance greater than 75 feet downstream of a construction discharge for determining compliance with turbidity standards in Class B surface waters, by submitting a mixing zone request to NHDES that complies with Env-Wq 1707.02. If a mixing zone is approved, NHDES is required to include conditions to ensure that the criteria on which the approval is based are met (Env-Wq 1707.03).

If water quality standards are not met during daylight hours on any day, sampling shall resume the next day and continue no fewer than 2 times per day until water quality standards are met. The date, time, location and results of turbidity measurements, as well as a summary identifying the cause of the violations, corrective actions that were implemented, the period of time that the receiving water exceeded turbidity standards and the distance downstream and the percent of the river width where visible turbidity was observed, and the period of time that the visible turbidity persisted, shall be recorded and included in the Inspection Report required in Part 4.7 of the CGP. Turbidity measurements shall be conducted via a field meter in accordance with the requirements for turbidity specified in Table 1B in 40 CFR 136.3 (see 40 CFR §136.3 Identification of test procedures - Code of Federal Regulations ecfr.io). Field meters shall be calibrated every day sampling is conducted and prior to the first sample.

e. Construction site owners and operators are encouraged to consider opportunities for post- construction groundwater recharge using infiltration best management practices (BMPs) during site design and preparation of the SWPPP in order to assure compliance with Env-Wq 1703.03 and Env-Wq 1703.11. If your construction site is in a town that is required to obtain coverage under the NPDES General Permit for discharges from Municipal Separate Storm Sewer Systems (MS4) you may be required to use such practices. The SWPPP must include a description of any on-site infiltration that will be installed as a post-construction stormwater management measure or reasons for not employing such measures such as 1) The facility is located in a wellhead protection area as defined in RSA 485- C:2; or 2) The facility is located in an area where groundwater has been reclassified to GAA, GA1 or GA2 pursuant to RSA 485-C and Env-DW 901; or 3) Any areas that would be exempt from the groundwater recharge requirements contained in Env-Wq 1507.04, including all land uses or activities considered to be a "High-load Area" (see Env-Wq 1502.30). For design considerations for infiltration measures see Env-Wq 1508.06. Note that there may be additional local requirements that fall under the NH MS4 permittee's Authorization to Discharge Permit for those regulated areas.

f. Appendix F of the CGP contains information regarding Tier 2, or high quality waters in the various states. ***[EPA notes that this information has now been moved to https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates]*** Although there is no official list of tier 2 waters for New Hampshire, it can be assumed that all New Hampshire surface waters are tier 2 for turbidity unless 1) the surface water that you are proposing to discharge into is listed as impaired for turbidity in the states listing of impaired waters (see https://nhdes-surface-water-quality-assessment-site-nhdes.hub.arcgis.com/) or 2) sampling upstream of the proposed discharge location shows turbidity values greater than 10 NTU (Env-Wq 1703.11). A single grab sample collected during dry weather (no precipitation within 48 hours) is acceptable.

g. To ensure compliance with RSA 485-C, RSA 485-A, RSA 485-A:13, I(a), Env-Wq 1700 and Env-Wq 302, the following information may be requested by NHDES. This information must be kept on site unless you receive a written request from NHDES that it be sent to the address shown below in 9.1.1.h.

i. A list of all non-stormwater discharges that occur at the facility, including their source locations and the control measures being used (see Part 1.2.2 of the CGP).

ii. Records of sampling and analysis required for construction dewatering and stormwater discharges (see 9.1.1.d above).

h. All required or requested documents must be sent to: NH Department of Environmental Services, Watershed Management Bureau, P.O. Box 95 Concord, NH 03302-0095.

9.1.2 MAR100000 Commonwealth of Massachusetts (except Indian country)

a. All discharges covered by the Construction General Permit shall comply with the provisions pursuant to 314 CMR 3.00, 314 CMR 4.00, 314 CMR 9.00, including applicable construction stormwater standards and 310 CMR 10.00.

b. Pursuant to 314 CMR 3.11 (2)(a)6., and in accordance with MassDEP's obligation under 314 CMR 4.05(5)(e) to maintain surface waters free from pollutants in concentrations or combinations that are toxic to humans, aquatic life, or wildlife, permittees are prohibited from discharging dewatering water under the CGP from sites that are designated as Superfund/CERCLA or RCRA, and must make accommodations to dispose of the dewatering discharges appropriately, such as coverage under the Remediation General Permit (RGP).

c. Pursuant to 314 CMR 3.11 (2)(a), and in accordance with MassDEP's obligation to protect Outstanding Resource Waters under 314 CMR 4.04(3), applicants seeking coverage under the 2022 CGP that propose to carry out construction activities near Outstanding Resource Waters as identified in 314 CMR 4.06, shall submit to MassDEP for review:

i. a copy of the Stormwater Pollution Prevention Plan (SWPPP),

ii. a copy of the EPA NOI, and

iii. MassDEP's Stormwater BMP Checklist.

For purposes of this review, the permittee shall submit these documents to MassDEP at the same time they are submitted to EPA. Instructions on how to submit these documents to MassDEP and where to find the MassDEP Stormwater BMP Checklist and obtain authorization to discharge can be found here: https://www.mass.gov/how-to/wm-15-npdes-general-permit-notice-of- intent.

d. Pursuant to 314 CMR 3.11 (2)(a)6., and in accordance with MassDEP's obligation under 314 CMR 4.05(5)(e) to maintain surface waters free from pollutants in concentrations or combinations that are toxic to humans, aquatic life, or wildlife, applicants that propose to dewater under the 2022 CGP and plan to discharge to certain waters as described below, shall determine that any dewatering discharges are not contaminated by testing the proposed discharge as described below as part of the application for WM15 authorization. Unless otherwise specified, testing described in this section should be conducted using the methods in 40 CFR 136.

i. Applicants for sites that plan to discharge to Outstanding Resource Waters as identified in 314 CMR 4.06 shall test one sample of the proposed dewatering discharge water for pH, E. Coli (for discharges to freshwater), fecal coliform (for

discharges to salt water), Enterococci (for discharges to salt water), total suspended solids, oil and grease, total nitrogen, total phosphorus, and all parameters with numeric criteria listed in the Massachusetts Surface Water Quality Standards at 314 CMR 4.05(e). Results shall be reported to MassDEP as part of the WM15 application. To determine if the dewatering discharge could be covered under the 2022 CGP, the effluent at zero dilution must meet numeric water quality criteria. If the effluent does not meet numeric water quality criteria, the applicant shall contact EPA Region 1 to discuss coverage under the Remediation General Permit.

ii. Applicants for sites that propose to discharge to Public Water Supplies (314 CMR 4.06(1)(d)1) shall also test one sample of the proposed dewatering discharge water for per- and polyfluoroalkyl substances (PFAS), as outlined in the table below. Results shall be reported to MassDEP as part of the WM15 application. If any PFAS compounds are detected, the applicant shall apply for coverage under the NPDES Remediation General Permit for Massachusetts if required.

PFAS Testing Parameters for Discharges to Public Drinking Water Supplies[100]	
Perfluorohexanesulfonic acid (PFHxS), grab	Report ng/L
Perfluoroheptanoic acid (PFHpA), grab	Report ng/L
Perfluorononanoic acid (PFNA), grab	Report ng/L
Perfluorooctanesulfonic acid (PFOS), grab	Report ng/L
Perfluorooctanoic acid (PFOA), grab	Report ng/L
Perfluorodecanoic acid (PFDA), grab	Report ng/L

iii. Applicants for sites that propose to discharge to an impaired water as identified in the most recent final Massachusetts Integrated List of Waters,shall test one sample of the proposed dewatering discharge water for the parameter(s) for which the waterbody is impaired. To determine if the dewatering discharge could be covered under the 2022 CGP, the effluent at zero dilution must meet numeric water quality criteria. If the effluent does not meet numeric water quality criteria, the applicant shall contact EPA Region 1 to discuss coverage under the Remediation GeneralPermit and shall apply for RGP coverage if required.

iv. For dewatering discharges to all other waters, if any pollutants are knownor believed present in the proposed dewatering discharge water, the applicant shall apply for coverage under the NPDES Remediation General Permit for Massachusetts if required. For the purposes of this condition, a pollutant is "known present" if measured above the analytical detection limit using a sufficiently sensitive test method in an environmental sample, and "believed present" if a pollutant has not been measured in an environmental sample but will be added or generated prior to discharge, such as through a treatment process. Consequently, a pollutant is "known absent" if measured as non-detect relative to the analytical detection limit using a sufficiently sensitive test method in an environmental sample, and "believed absent" if a pollutant has not been measured in an environmentalsample but will not be added or generated prior to discharge and is not a parameter that applies to the applicable activity category for a site. If any pollutants are known or believed present in the

[100] PFAS testing shall follow established EPA methods 537 or 537.1 for drinking water until EPA Method 3512 for non-potable water becomes available.

proposed dewatering discharge water, the applicant shall test one sample of the proposed dewatering discharge water for the pollutants known or believed to be present. To determine if the dewatering discharge could be covered under the 2022 CGP, the effluent at zero dilution must meet numeric water quality criteria. If the effluent does not meet numeric water quality criteria, the applicant shall contact EPA Region 1 to discuss coverage under the Remediation General Permit.

e. Pursuant to 314 CMR 3.11 (2)(a), and in accordance with MassDEP's obligation to protect Outstanding Resource Waters under 314 CMR 4.04(3), applicants that propose to dewater under the 2022 CGP and discharge to Outstanding Resource Waters as identified in 314 CMR 4.06, shall submit the SWPPP and associated documents to MassDEP to review. MassDEP shall complete review within 30 daysof receipt.

f. Pursuant to 314 CMR 3.11 (2)(a)6., and in accordance with MassDEP's obligation under 314 CMR 4.05 to maintain surface waters free from color and turbidity in concentrations or combinations that are aesthetically objectionable or would impair any use assigned to the waterbody, permittees that have been authorized to dewater under the 2022 CGP and that discharge to Outstanding Resource Waters as identified in 314 CMR 4.06 shall carry out daily benchmark monitoring for turbidity[101] for the duration of dewatering. Permittees shall compare the weekly average of the turbidity monitoring results with the established benchmark turbidity value of 25 Nephelometric Turbidity Units (NTU). If a permittee's weekly average turbidity results exceed the benchmark, the operator shall conduct follow-up corrective action to determine the source of the problem and to make any necessary repairs or upgrades to the dewatering controls to lower the turbidity levels. The permittee shall document any corrective action taken in its corrective action log. Furthermore, permittees at these sites shall carry out inspections at higher frequency, specifically, daily inspections of the dewatering discharge treatment for the duration of the discharge. The permittee shall inspect the site for sediment plume or whether a hydrocarbon sheen is visible at the point of discharge, estimate the flow rate at the point of discharge, and inspect the site downstream to assess whether sedimentation is attributable to the dewatering discharges.

g. Pursuant to 314 CMR 3.11 (2)(a)6., and in accordance with MassDEP's obligation under 314 CMR 4.05 to maintain surface waters free from color and turbidity in concentrations or combinations that are aesthetically objectionable or would impair any use assigned to the waterbody, permittees shall store materials outside the Base Flood Elevation[102] when feasible to prevent displacing runoff and erosion.

h. Pursuant to 314 CMR 3.11 (2)(a), and in accordance with MassDEP's obligation to maintain surface waters free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses under 314 CMR 4.05(5)(c), all applicants who apply for coverage under the 2022 CGP shall follow guidelines on fertilizer application, including use of fertilizer containing no phosphorus, in accordance with 330 CMR 31.00 Plant Nutrient Application Requirements for

[101] Applicants shall follow EPA Method 180.1 to monitor for turbidity

[102] Base Flood Elevation (BFE) is the elevation of surface water resulting from a flood that has a 1% chance of equaling or exceeding that level in any given year. The BFE is shown on the Flood Insurance Rate Map (FIRM) for zones AE, AH, A1–A30, AR, AR/A, AR/AE, AR/A1– A30, AR/AH, AR/AO, V1–V30 and VE. (Source: https://www.fema.gov/node/404233).

Agricultural Land and Non-Agricultural Turf and Lawns. Further, fertilizer shall never be applied to a site when a rain event greater than 0.5 inches is forecast in the next 48 hours.

i. Pursuant to 314 CMR 3.11 (2)(a), all applicants who apply for coverage under the 2022 CGP and elect to carry out site inspections every 14 days shall also inspect sites within 24 hours of 0.25 inches of precipitation events or greater over 24 hours,or within 24 hours of a discharge that occurred due to snowmelt from 3.25 inches or greater of snow accumulation.[103] During the high flow periods in spring (i.e., months of April to June), inspection frequency shall be increased to once per week for all sites.

i. To determine whether 3.25 inches or greater of snow accumulation has occurred at a site, snowfall measurements can be taken at the site,[104] or theoperator can rely on similar information from a local weather forecast.

j. Implementing structural improvements, enhanced/resilient pollution prevention measures, and other mitigation measures can help to minimize impacts from stormwater discharges from major storm events such as hurricanes, storm surge, extreme/heavy precipitation,[105] and flood events. Pursuant to 314 CMR 3.11 (2)(a), if such stormwater control measures are already in place due to existing requirements mandated by other state, local or federal agencies, the SWPPP shall include a brief description of the controls and a reference to the existing requirement(s). If the site may be exposed to or has previously experienced suchmajor storm events[106], additional stormwater control measures that may be considered, and implemented as necessary, include, but are not limited to:

i. Reinforce materials storage structures to withstand flooding and additional exertion of force;

ii. Prevent floating of semi-stationary structures by elevating to the Base Flood Elevation (BFE) level or securing with non-corrosive device;

iii. When a delivery of exposed materials is expected, and a storm is anticipated within 48 hours, delay delivery until after the storm or storematerials as appropriate (refer to emergency procedures);

[103] This is the amount of snow that is equivalent to 0.25 inches of rain, based on information from the National Oceanic and Atmospheric Administration (NOAA) indicating that 13 inches of snow is, on average, equivalent to 1 inch of rain. See https://www.nssl.noaa.gov/education/svrwx101/winter/faq/.

[104] NOAA's National Weather Service has guidelines on snowfall measurements at https://www.weather.gov/jkl/snow_measurement. These guidelines recommend use of a "snowboard" (a piece of wood about 16 inches by 16 inches) that is placed in an unobstructed part of the site on a hard surface.

[105] Heavy precipitation refers to instances during which the amount of rain or snow experienced in a location substantially exceeds what is normal. What constitutes a period of heavy precipitation varies according to location and season. Heavy precipitation does not necessarily mean the total amount of precipitation at a location has increased— just that precipitation is occurring in more intense or more frequent events.

[106] To determine if your facility is susceptible to an increased frequency of major storm events that could impact the discharge of pollutants in stormwater, you may reference FEMA, NOAA, or USGS flood map products at https://www.usgs.gov/faqs/where-can-i-find-flood-maps?qt-news_science_products=0#qtnews_science_products.

iv. Temporarily store materials and waste above the Base Flood Elevation ***[EPA notes that it has deleted a footnote reference to the term "Base Flood Elevation" since the same footnote is already included in Part 9.1.2.g, above.]*** level;

v. Temporarily reduce or eliminate outdoor storage;

vi. Temporarily relocate any mobile vehicles and equipment to higher ground;

vii. Develop scenario-based emergency procedures for major storms that are complementary to regular stormwater pollution prevention planning andidentify emergency contacts for staff and contractors; and

viii. Conduct staff training for implementing your emergency procedures atregular intervals.

k. Pursuant to 314 CMR 3.11 (2)(a)6., and in accordance with MassDEP's obligation under 314 CMR 4.05(5)(e) to maintain surface waters free from pollutants in concentrations or combinations that are toxic to humans, aquatic life, or wildlife, permittees who seek coverage under the 2022 CGP and anticipate to carry out dust control shall limit their dust control methodology to using water only and specifically avoid using other techniques, such as solutions containing calcium chloride.

l. If MassDEP requests a copy of the Stormwater Pollution Prevention Plan (SWPPP) for any construction site at any time, the permittee shall submit the SWPPP to MassDEP within 14 days of such a request. MassDEP may conduct an inspection of any site covered by this permit to ensure compliance with state lawrequirements, including state water quality standards.

9.1.3 MTR10F000 Areas in the State of Vermont located at a federal facility

a. Earth disturbance at any one time is limited to five acres.

b. All areas of earth disturbance must have temporary or final stabilization within 14 days of the initial disturbance. After this time, disturbed areas must be temporarily or permanently stabilized in advance of any runoff producing event. A runoff producing event is an event that produces runoff from the construction site. Temporary stabilization is not required if precipitation is not forecast and work is to continue in the next 24-hours or if the work is occurring in a self-contained excavation (i.e. no outlet) with a depth of two feet or greater (e.g. house foundation excavation, utility trenches). Areas of a construction site that drain to sediment basins are not considered eligible for this exemption, and the exemption applies only to the excavated area itself.

c. Site inspections on active construction sites shall be conducted daily during the period from October 15 through April 15.

d. The use of chemical treatments (e.g. polymers, flocculants, and coagulants) for the settling and/or removal of sediment from stormwater runoff associated with construction and construction-related activities requires prior written approval and an approved site and project-specific plan, from the Vermont Agency of Natural Resources. In addition, the use of cationic polymers is prohibited unless approved by the Vermont Agency of Natural Resources under a site and project-specific plan.

e. Any applicant under EPA's CGP shall allow authorized Vermont Agency of Natural Resources representatives, at reasonable times and upon presentation of credentials, to enter upon the project site for purposes of inspecting the project and determining

compliance with this Certification.

f. The Vermont Agency of Natural Resources may reopen and alter or amend the conditions of this Certification over the life of the EPA 2022 Construction General Permit when such action is necessary to assure compliance with the VWQS.

9.2 EPA REGION 2

9.2.1 NYR10I000 Indian country within the State of New York

a. Saint Regis Mohawk Tribe

i. Any Responsible-Person/Decision-Maker required under the CGP to submit a Notice of Intent (NOI) to EPA for coverage under the CGP, must concurrently submit an electronic copy of the NOI to the SRMT Environmental Division, Water Resource Program Manager. Additionally, an electronic copy of the Notice of Termination (NOT) must be provided within three business days after electronic confirmation is received from EPA that the NOT has been accepted. The NOI and NOT must be electronically provided to the following addresses:

Mr. Tieman W. Smith
Water Resources Program Manager Saint Regis Mohawk Tribe
449 Frogtown Road
Akwesasne, NY 13655 Tiernan.Smith@srmt-nsn.gov 518.358.2272 ext. 5073

ii. Any Responsible-Person/Decision-Maker that is required as part of the CGP to prepare a Discharge Management Plan (OMP) or Storm Water Management Plan (SWMP) and/or Storm Water Pollution Prevention Plan (SWPPP) must submit an electronic copy of the DMP, SWMP and/or SWPPP to the SRMT Environment Division, Water Resources Program Manager IO business days prior to the start of construction of any work to be conducted under the CGP. The applicable documents must be provided to the electronic address listed above.

iii. Any Responsible-Person/Decision-Maker that is required under the CGP to submit an annual report to EPA must submit an electronic copy of the annual report concurrently to the SRMT Water Resource Program. Additionally, any correspondences between the applicant and EPA related to analytical data, written reports, corrective action, enforcement, monitoring, or an adverse incident must likewise be routed to the SRMT Water Resources Program at the above electronic address.

iv. An "Authorization to Proceed Letter" with site-specific mitigation requirements may be sent out to the permittee when a review of the NOI and OMP, SWMP and /or SWPPP on a case-by-case basis, is completed by the SRMT Environment Division, Water Resource Program. This approval will allow the application to proceed if all mitigation requirements are met.

b. Seneca Nation

i. Under Part 1.1.5 of the CGP, the Seneca Nation requests that an applicant must demonstrate that they meet the eligibility criteria listed in Appendix D (certify in your Notice of Intent (NOI) that you meet one of the eligibility criteria [Criterion A-F]) as well as species and critical habitats that are listed under the Seneca Nation's "Fishing and Conservation Laws" and the "Seneca Nation of Indians Comprehensive Conservation Law".

ii. The Tribal Historic Preservation Office (THPO) was established in 2000 after the Seneca Nation received a recognition letter from the National Park Service (NPS); therefore under Part 1.1.6 of the CGP (Appendix E) and prior to submitting a Notice of Intent (NOI) operators must complete the Nation's TPHO, Project Review Form (https://sni.org/media/246603/sni-thpo-project-review-form.pdf) and submit the completed form with associated information to the Tribal Historic Preservation Officer at 90 Ohi:yo' Way, Salamanca, NY 14779. Federal agencies engaging in construction activities must provide for construction review by a certified construction reviewer in accordance with 7 Del. C. §§4010 & 4013 and 7 DE Admin. Code 5101, subsection 6.1.6.

iii. Under Part 1.2 of the CGP, discharges must also follow the Section 13 of the Guide for Construction (Seneca Nation of Indians Source Water Code) and respectively, Council Resolution, dated April 13, 2013 (CN: R-04-13-13-11) to ensure that the health, safety and welfare of the citizens of the Seneca Nation, and all other within the Lands and Territories of the Seneca Nation of Indians, and to facilitate the adequate provisions of water through the elimination or prevention of ground water contamination in the vicinity of wells that supply drinking water for the Nation. The area is known as the Source Water Protection Area (SWPA) and specified activities are regulated within this SWPA, as cited in Section 13 of the Guide for Construction and Section VI, of CN: R-04-13-13-11.

iv. Under Part 1.4, any operator who seeks coverage of the CGP, and is required to submit a notice of intent NOI and Notice of Termination (NOT) (as necessary) to the EPA for coverage, under Part 1.4.2 must also submit a copy of the NOI to the Seneca Nation's Environmental Protection Department (EPD) within three business days of submittal to the EPA, (address shown below). Respectively, a copy of the NOT (as described under Part 8.3 of the CGP), which certifies that you have met the requirements of Part 8, must be provided within three business days after electronic confirmation is received from the EPA that the NOT has been accepted. In addition to a NOI and NOT, the Seneca Nation (Environmental Protection Department [EPD]) would require an Environmental Impact Assessment (EA) (Long Form), as shown in Section 2 of the Seneca Nation of Indians Laws, Ordinances & Policies (Guide for Construction), to be completed and submitted to the EPD prior to any project to determine whether the impacts from a project would create significant and detrimental effects to the Nation's lands, water (violate WQS), and environment. The NOI, NOT, and EA must be submitted electronically to epd@sni.org and provided to the following address:

Seneca Nation
Environmental Protection Department (EPD) Attn: Director of EPD
12837 Route 438
Irving, NY 14081

v. Under Part 3.0 of the CGP, discharges must be controlled as necessary to meet applicable WQS. The Seneca Nation is working actively towards finalizing and implementing the; therefore, the EPD would require an applicant to submit or grant access to the permit to obtain information on the impact of effluents on receiving waters, including the capability of receiving waters to support future designated uses and achieve the WQS of the Nation; and to advise prospective dischargers of discharge requirements, and coordinate with the appropriate

permitting agencies. As stated in the Decision Document, under Section 303(c) of the CWA, 33 U.S.C. § 1313(c), states develop, review, and revise (as appropriate) water quality standards for surface waters of the United States. At a minimum, such standards are to include designated water uses, water quality criteria to protect such uses, and an antidegradation policy. 40 C.F.R. § 131.6. In addition, under Section 401 of the CWA states may grant, condition, or deny "certification" for federally permitted or licensed activities that may result in a discharge to the waters of the United States 33 U.S.C. § 1341.

vi. Under Part 7.2.8(a)(b)(c) and for Part 9 of the CGP, the following Sections of the Seneca Nation's Guide for Construction shall be considered, in conjunction with the CGP:

(a) Section 1. Executive Order - To Establish a Policy for Governing Access to Nation Territories and Facilities by Officials of Foreign Government, dated March 31, 2011

(b) Section 3. Natural Resources Committee, Sand and Gravel Law (CN: R-06-24-05-08)

(c) Section 4. Fishing and Conservation Laws - Part 1.1.5 of the CGP

(d) Section 5. Seneca Nation of Indians Comprehensive Conservation Law, adopted January 14, 2012

(e) Section 9. Food is Our Medicine (FIOM) Program/Native Planting Policy (CN: R-03- 08-14-14)

(f) Section 10. Forestry Management Plan (CN: R-08-14-10-23)

(g) Section 11. Timber Ordinance #411-092, dated May 8, 1982

(h) Section 14. Flood Damage Prevention Local Law, dated September 27, 1988

(i) Section 16. Utilities Ordinance No. 87-100

(j) Authorizing Emergency Action and Contingency Plan to Restrain Pollution of Nations Waters, (Council Resolution: R-03-01-18-10), dated March 10, 2018 Seneca Nation of Indians Permit Application for Construction within Waterways Permit, Form NR98-01.00

9.3 EPA REGION 3

9.3.1 DCR100000 District of Columbia

a. Discharges authorized by this permit shall comply with the District of Columbia Water Pollution Control Act of 1984, as amended (DC Official Code § 8-103.01 and § 8-103.06, et seq.) to ensure that District of Columbia waters, waters in adjacent and downstream states, and the beneficial uses of these waters will not be harmed or degraded by the discharges.

b. Discharges authorized by this permit must comply with §§ 1104.1 and 1104.8 of Chapter 11 and the provisions of Chapter 19 of Title 21of District of Columbia Municipal Regulations in order to attain and maintain designated uses of the District of Columbia waters.

c. The permittee shall comply with the District of Columbia Stormwater Management and Soil Erosion and Sediment Control regulations in Chapter 5 of Title 21 of the District of Columbia Municipal Regulations.

d. The permittee shall comply with the District of Columbia Flood Management Control regulations in Chapter 31 of Title 20 of the District of Columbia Municipal Regulations.

e. The permittee shall submit a copy of the Stormwater Pollution Prevention Plan (SWPPP) to the Regulatory Review Division, Department of Energy & Environment, Government of the District of Columbia, 1200 First Street, NE, 5th Floor, Washington, DC 20002, during the review and approval of the permittee's DOEE Erosion and Sediment Control Plan in accordance with the provisions of Chapter 542 of Title 21 of the District of Columbia Municipal Regulations.

f. Upon request, the permittee shall submit all inspection and monitoring reports as required by this permit and 40 CFR § 122.41 to the Associate Director, Inspection and Enforcement Division, Department of Energy & Environment, Government of the District of Columbia, 1200 First Street, NE, 5th Floor, Washington, DC 20002; telephone (202) 535-2226, or by email at Joshua.Rodriguez@dc.gov.

g. In the event the permittee intends to discharge dewatering water, groundwater, or groundwater comingled with stormwater from a known contaminated site, the permittee shall contact the Regulatory Review Division, Department of Energy & Environment, Government of the District of Columbia, 1200 First Street, NE, 5th Floor, Washington, DC 20002; telephone (202) 535-2600, or by email at MS4DischargeAuthorization@dc.gov to request authorization to discharge dewatering water, groundwater, or groundwater comingled with stormwater to the District's Municipal Separate Storm Sewer System (MS4) or to a surface water body pursuant to §§ 8-103.02, 8-103.06, and 8-103.07 of the District of Columbia Water Pollution Control Act of 1984, as amended.

9.3.2 DER10F000 Areas in the State of Delaware located at a federal facility (as defined in Appendix A)

a. Federal agencies must submit a sediment and stormwater management plan (SSMP) and receive Department approval prior to undertaking any land clearing, soil movement or construction activity unless conducting an exempt activity.

b. Federal construction activities are required to have a third-party Certified Construction Reviewer (CCR) perform weekly reviews to ensure the adequacy of construction activities pursuant to the approved SSMP and regulations.

Implementation of approved SSMPs requires the daily oversight of construction activity by certified responsible personnel.

c. Implementation of approved SSMPs requires the daily oversight of construction activity by certified responsible personnel.

d. A current copy of the SSMP must be maintained at the construction site.

e. Unless authorized by the Department, not more than 20 acres may be disturbed at any one time.

9.4 EPA REGION 4

No additional conditions

9.5 EPA REGION 5

9.5.1 MIR10I000 Indian country within the State of Minnesota

a. Fond du Lac Reservation

i. New dischargers wishing to discharge to an Outstanding Reservation Resource Water (ORRW)[107] must obtain an individual permit from EPA for storm water discharges from large and small construction activities.

ii. A copy of the Storm Water Pollution Prevention Plan (SWPPP) must be submitted to the Office of Water Protection at least fifteen (15) days in advance of sending the Notice of Intent to EPA. The SWPPP can be submitted electronically to richardgitar@FDLREZ.com or by hardcopy sent to:

Fond du Lac Reservation
Office of Water Protection
1720 Big Lake Road
Cloquet, MN 55720

iii. Copies of the Notice of Intent (NOI) and the Notice of Termination (NOT) must be sent to the Fond du Lac Office of Water Protection at the same time they are submitted to EPA. [The condition helps the Office of Water Protection keep track of when a project is about to start and when it has ended. FDL Water Quality Certification Ordinance, Section 204 (a) (2)).

iv. If the project will entail a discharge to any watercourse or open water body, the turbidity limit shall NOT exceed 10% of natural background within the receiving water(s) as determined by Office of Water Protection staff. For such discharges, turbidity sampling must take place within 24 hours of a ½-inch or greater rainfall event. The results of the sampling must be reported to the Office of Water Protection within 7 days of the sample collection. All sample reporting must include the date and time, location (GPS: UTM/Zone 15), and NTU. CGP applicants are encouraged to work with the Office of Water Protection in determining the most appropriate location(s) for sampling. [This condition helps both the Office of Water Protection and the project proponent in knowing whether or not their erosion control efforts are effective. FDL Water Quality Certification, Section 204 (b) (1)).

v. Receiving waters with open water must be sampled for turbidity prior to any authorized discharge as determined by Office of Water Protection staff. This requirement only applies to receiving waters which no ambient turbidity data exists. [This condition allows the Office of Water Protection to obtain a baseline turbidity sample in which to compare to other samples. FDL Water Quality Certification Ordinance, Section 204 (b) (2)].

vi. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in the Water Quality Standards of the Fond du Lac Reservation, Ordinance #12/98, as amended. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of water of the Fond du Lac

[107] Although additional waters may be designated in the future, currently Perch Lake, Rice Portage Lake, Miller Lake, Deadfish Lake, and Jaskari Lake are designated as ORRWs.

Reservation for any of the uses designated in the Water Quality Standards of the Fond du Lac Reservation. These uses include wildlife, aquatic life, warm water fisheries, cold water fisheries, subsistence fishing (netting), primary contact recreation, secondary contact recreation, cultural, wild rice areas, aesthetic waters, agriculture, navigation, commercial and wetlands. It also includes the designated uses of wetlands including, but not limited to, baseflow discharge, cultural opportunities, flood flow attenuation, groundwater recharge, indigenous floral and fauna) diversity and abundance, nutrient cycling, organic carbon export/cycling, protection of downstream water quality, recreation, resilience against climactic effects, sediment/shoreline stabilization, surface water storage, wild rice, and water dependent wildlife. [In addition to listing the designated uses of waters of the Fond du Lac Reservation, this condition also limits the project proponent to discharges that will not violate our Water Quality Standards. FDL Water Quality Certification Ordinance, Section 204 (a) (7)).

vii. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the Fond du Lac Reservation. All spills must be reported to the appropriate emergency management Agency (National Response Center AND the State Duty Officer), and measures shall be taken immediately to prevent the pollution of waters of the Fond du Lac Reservation, including groundwater. The Fond du Lac Office of Water Protection must also be notified immediately of any spill regardless of size. [This condition helps protect water quality and also reminds project proponents of their responsibility in reporting spill events. FDL Water Quality Certification Ordinance, Section 204 (b) (3)).

viii. All seed mixes, whether used for temporary stabilization or permanent seeding, shall NOT contain any annual ryegrass (Lolium species). Wild rye (Elymus species) or Oats (Avena species) may be used as a replacement in seed mixes. [This condition prevents the use of annual ryegrass on the Reservation. Annual ryegrass is allelopathic, which means it produces biochemical in its roots that inhibit the growth of native plants. If used in seed mixes, annual ryegrass could contribute to erosion, especially on slopes. However, the condition also specifies substitute grasses that germinate almost as fast as annual ryegrass for use as a cover crop to help prevent erosion. FDL Water Quality Certification Ordinance, Section 204 (t) (1)).

ix. To prevent the introduction of invasive species, ALL contractors and subcontractors MUST disclose information stating prior equipment location(s) and ALL known invasive species potentially being transported from said location(s). All equipment MUST undergo a high pressure wash (including any equipment mats) BEFORE ENTERING the Fond du Lac Reservation. Personal equipment such as work boots, gloves, vest, etc. MUST be clean of debris, dirt and plant and animal material BEFORE ENTERING the Fond du Lac Reservation. Equipment being transported from known infested areas MUST undergo a high pressure wash as soon as possible after leaving the infested site and again BEFORE ENTERING the Fond du Lac Reservation, to avoid transport of invasive species into areas surrounding the Reservation. Written certification of equipment cleaning MUST be provided to the Fond du Lac Office of Water Protection. Upon arrival, ALL contractor and subcontractor equipment will be inspected by appointed Fond du Lac staff. If equipment is deemed unsatisfactory, the equipment MUST

undergo a high pressure washing until the equipment is cleared by the inspector, until such time, minimal travel will be allowed through the Reservation. The contractor shall be held responsible for the control of any invasive species introduced as a result of their project. [This condition requires the project proponent to prevent the inadvertent introduction of invasive species by taking an active role in cleaning all vehicles, equipment, and equipment mats before entering the Reservation. This condition has been placed in certifications since 2012, due to the introduction of Wild Parsnip in 2011 from a pipeline contractor. It is much easier to prevent the introduction of an invasive species than it is to eradicate it once it has been introduced. Many invasive plant species form monocultures, preventing native plants from growing. This situation often leads to cases of erosion, which in turn effects water quality. FOL Water Quality Certification Ordinance, Section 204 (g) (1)].

x. A copy of this certification MUST be kept by the contractor on-site at all times and be available for viewing by all personnel, including inspectors. [This condition ensures that the information contained in the certification, especially the conditions, is readily available onsite for reference. FOL Water Quality Certification Ordinance, Section 204 (a) (9)].

b. The Grand Portage Band of Lake Superior Chippewa

i. The CGP authorization is for construction activities that may occur within the exterior boundaries of the Grand Portage Reservation in accordance to the Grand Portage Land Use Ordinance. The CGP regulates stormwater discharges associated with construction sites of one acre or more in size. Only those activities specifically authorized by the CGP are authorized by this certification (the "Certification").

ii. All construction stormwater discharges authorized by the CGP must comply with the Water Quality Standards and Water Resources Ordinance, as well as Applicable Federal Standards (as defined in the Water Resources Ordinance).

iii. All appropriate steps must be taken to ensure that petroleum products or other chemical pollutants are prevented from entering the Waters of the Reservation. All spills must be reported to the appropriate emergency-management agency, and measures must be taken to prevent the pollution of the Waters of the Reservation, including groundwater.

iv. The 2022 CGP requires inspections and monitoring reports of the construction site stormwater discharges by a qualified person. Monitoring and inspection reports must comply with the minimum requirements contained in the 2022 CGP. The monitoring plan must be prepared and incorporated into the Storm Water Pollution Prevention Plan (the "SWPP"). A copy of the SWPP must be submitted to the Board at least 30 days in advance of sending the requisite Notice of Intent to EPA. The SWPP should be sent to:

Grand Portage Environmental Resources Board
P.O. Box 428
Grand Portage, MN 55605

Copies of the Notice of Intent and Notice of Termination required under the General Permit must be submitted to the Board at the address above at the same time they are submitted to the EPA.

v. If requested by the Grand Portage Environmental Department, the permittee must provide additional information necessary for a case-by-case eligibility determination to assure compliance with the Water Quality Standards and any Applicable Federal Standards. The burden is on the applicant to demonstrate compliance with the Water Quality Standards, the Water Resources Ordinance, and Applicable Federal Standards whether or not the application is ultimately eligible for the CGP.

vi. CGP discharges must not cause nuisance conditions as defined in Grand Portage Water Quality Standards.

vii. The Board retains full authority to ensure compliance with and to enforce the provisions of the Water Resource Ordinance and Water Quality Standards, Applicable Federal Standards, and these Certification conditions. Nothing herein affects the scope or applicability of other controlling tribal or federal requirements, including but not limited to impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for listing on the National Register of Historic Places under the National Historic Preservation Act, 54 U.S.C. §§ 300101 et seq.

viii. Appeals related to Board actions taken in accordance with any of the preceding conditions may be heard by the Grand Portage Tribal Court.

c. Leech Lake Band of Ojibwe

i. The water quality standards that apply to the construction site are the standards at the time the operator submits its Notice of Intent (NOI) to EPA and the LLBO WRP (see conditions # 2 and # 3).

ii. A copy of the Stormwater Pollution Prevention Plan (SWPPP) must be submitted to the LLBO WRP at least 30 days in advance of sending the NOI for the project to EPA. See attached LLBO 401 Water Quality Certification Ordinance. Section 304(a)(1). The SWPPP should be submitted electronically to Jeff.Harper@llojibwe.net and by hardcopy sent to:

Leech Lake Band of Ojibwe
ATTN: Water Resources Program - 401 Cert
Division of Resource Management
190 Sailstar Drive NW
Cass Lake, Minnesota 56633

iii. Copies of the NOI and the Notice of Termination (NOT) must be submitted to the LLBO WRP at the same time they are submitted to EPA. See attached LLBO 401 Water Quality Certification Ordinance, Section 304(a)(2). The NOI and NOT should be submitted electronically to Jeff.Harper@llojibwe.net and sent by hardcopy to the address cited in condition # 2.

iv. Any and all other conditions listed in Section 304 of the attached LLBO 401 Water Quality Certification Ordinance shall be observed unless the LLBO WRP deems that certain conditions therein are not applicable to the project in need of a permit under this certification.

v. A copy of this certification MUST be kept by the contractor on-site at all times and be available for viewing by all personnel, including inspectors.

vi. Upon consideration of the NOI, if the LLBO WRP finds that the discharge will not be controlled as necessary to meet applicable water quality standards, the LLBO

WRP may insist, consistent with Part 3.1 of the CGP, that additional controls are installed to meet applicable water quality standards, or recommend to EPA that the operator obtain coverage under an individual permit.

9.5.2 WIR10I000 Indian country within the State of Wisconsin

a. Bad River Band of Lake Superior Tribe of Chippewa Indians

i. Only those activities specifically authorized by the CGP are authorized by this Certification. This Certification does not authorize impacts to cultural properties, orhistorical sites, or properties that may be eligible for listing as such.

ii. All projects which are eligible for coverage under the CGP and are located within the exterior boundaries of the Bad River Reservation shall be implemented in such a manner that is consistent with the Tribe's Water Quality Standards (WQS). The Tribe's WQS can be viewed at: http://www.badriver-nsn.gov/wp-content/uploads/2020/01/NRD_WaterQualityStandards_2011.pdf

iii. Operators are not eligible to obtain authorization under the CGP for all new discharges to an Outstanding Tribal Resource Water (OTRW or Tier 3 water). OTRWs, or Tier 3 waters, include the following: Kakagon Slough and the lower wetland reaches of its tributaries that support wild rice, Kakagon River, Bad River Slough, Honest John Lake, Bog Lake, a portion of Bad River, from where it enters the Reservation through the confluence with the White River, and Potato River. OTRWs can be viewed at: https://www.arcgis.com/apps/View/index.html?appid=6f44c371217e4ee8b5f1c2c705c 7c7c5

iv. An operator proposing to discharge to an Outstanding Resource Water (ORW or Tier 2.5 water) under the CGP must comply with the antidegradation provisions of the Tribe's WQS. ORWs, or Tier 2.5 waters, include the following: a portion of Bad River, from downstream the confluence with the White River to Lake Superior, White River, Marengo River, Graveyard Creek, Bear Trap Creek, Wood Creek, Brunsweiler River, Tyler Forks, Bell Creek, and Vaughn Creek. ORWs can be viewed at: https://www.arcgis.com/apps/View/index.html?appid=6f44c371217e4ee8b5f1c2c705c 7c7c5. The antidegradation demonstration materials described in provision E.4.iii., and included on the antidegradation demonstration template found at: https://www.badriver-nsn.gov/natural-resources/projectreviews/, must be submitted to the following address:

Bad River Tribe's Natural Resources Department
Attn: Water Regulatory Specialist
P.O. Box 39 Odanah, WI 54861
WaterReg@badriver-nsn.gov

v. An operator proposing to discharge to an Exceptional Resource Water (ERW or Tier 2 water) under the CGP must comply with the antidegradation provisions of the Tribe's WQS. ERWs, or Tier 2 waters, include the following: any surface water within the exterior boundaries of the Reservation that is not specifically classified as an Outstanding Resource Water (Tier 2.5 water) or an Outstanding Tribal Resource Water (Tier 3 water). ERWs can be viewed at: https://www.arcgis.com/apps/View/index.html?appid=6f44c371217e4ee8b5f1c2c705c 7c7c5. The antidegradation demonstration materials described in provision

E.4.ii., and included on the antidegradation demonstration template found at: https://www.badriver-nsn.gov/natural-resources/projectreviews/, must be submitted to the following address:

Bad River Tribe's Natural Resources Department
Attn: Water Regulatory Specialist
P.O. Box 39 Odanah, WI 54861
WaterReg@badriver-nsn.gov

vi. Projects utilizing cationic treatment chemicals within the Bad River Reservation boundaries are not eligible for coverage under the CGP.

vii. A discharge to a surface water within the Bad River Reservation boundaries shall not cause or contribute to an exceedance of the turbidity criterion included in the Tribe's WQS, which states: Turbidity shall not exceed 5 NTU over natural background turbidity when the background turbidity is 50 NTU or less, or turbidity shall not increase more than 10% when the background turbidity is more than 50 NTU.

viii. All projects which are eligible for coverage under the CGP within the exterior boundaries of the Bad River Reservation must comply with the Bad River Reservation Wetland and Watercourse Protection Ordinance, or Chapter 323 of the Bad River Tribal Ordinances, including the erosion and sedimentation control, natural buffer, and stabilization requirements. Questions regarding Chapter 323 and requests for permit applications can be directed to the Wetlands Specialist in the Tribe's Natural Resources Department at (715) 682-7123 or wetlands@badriver-nsn.gov.

ix. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must notify the Tribe prior to the commencing earth-disturbing activities. The operator must submit a copy of the Notice of Intent (NOI) to the following addresses at the same time it is submitted to the U.S. EPA:

Bad River Tribe's Natural Resources Department
Attn: Water Regulatory Specialist
P.O. Box 39 Odanah, WI 54861
WaterReg@badriver-nsn.gov

Bad River Tribe's Natural Resources Department
Attn: Tribal Historic Preservation Officer (THPO)
P.O. Box 39 Odanah, WI 54861
THPO@badriver-nsn.gov

The operator must also submit a copy of the Notice of Termination (NOT) to the above addresses at the same time it is submitted to the U.S. EPA. Photographs showing the current site conditions must be included as part of the NOT to document the stabilization requirements have been met.

x. The THPO must be provided 30 days to comment on the project.

xi. The operator must obtain THPO concurrence in writing. This written concurrence will outline measures to be taken to prevent or mitigate effects to historic

properties. For more information regarding the specifics of the cultural resources process, see 36 CFR Part 800. A best practice for an operator is to consult with the THPO during the planning stages of an undertaking.

xii. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must submit a copy of the Stormwater Pollution Prevention Plan (SWPPP) to the following address at the same time as submitting the NOI:

Bad River Tribe's Natural Resources Department

Attn: Water Regulatory Specialist

P.O. Box 39 Odanah, WI 54861

WaterReg@badriver-nsn.gov

xiii. Any corrective action reports that are required under the CGP must be submitted to the following address within one (1) working day of the report completion:

Bad River Tribe's Natural Resources Department

P.O. Box 39 Odanah, WI 54861

WaterReg@badriver-nsn.gov

xiv. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must submit a copies of the inspection reports (including photographs) to the following address within 24 hours of completing any site inspection required:

Bad River Tribe's Natural Resources Department Attn: Water Regulatory Specialist

P.O. Box 39 Odanah, WI 54861

WaterReg@badriver-nsn.gov

xv. An operator shall be responsible for meeting any additional permit requirements imposed by the U.S. EPA necessary to comply with the Tribe's antidegradation policies if the discharge point is located upstream of waters designated by the Tribe.

9.6 EPA REGION 6

9.6.1 NMR100000 State of New Mexico, except Indian country

a. In Outstanding National Resource Waters (ONRWs) in New Mexico, no degradation is permitted except in limited, specifically defined instances. Therefore, Operators are not eligible to obtain authorization under this general permit for stormwater discharges to waters classified as ONRWs listed in Paragraph D of 20.6.4.9 New Mexico Administrative Code (NMAC), also referred to as "Tier 3 waters" as defined in Appendix A of this permit. Exception: When construction activities are in response to a public emergency (e.g., wildfire, extreme flooding, etc.) and the related work requires immediate authorization to avoid a threat to public health or safety.

i. Operators who conduct construction activities in response to a public emergency to mitigate an immediate threat to public health or safety shall adhere to the requirements in 20.6.4.8(A)(3)(c) NMAC, including notifying the New Mexico Environment Department (NMED) within seven days of initiation of

the emergency action and providing NMED with a summary of the action taken within 30 days of initiation of the emergency action.

ii. For all other scenarios, Operators with proposed discharges to ONRWs in New Mexico shall obtain coverage from EPA under an NPDES Individual Permit and will comply with the additional standards and regulations related to discharges to ONRWs in 20.6.4.8(A) NMAC. Additional information is available from:

New Mexico Environment Department Surface Water Quality Bureau
P.O. Box 5469
Santa Fe, NM 87502-5469 Telephone: 505-827-0187
https://www.env.nm.gov/surface-water-quality/wqs/
https://gis.web.env.nm.gov/oem/?map=swqb

b. If construction dewatering activities are anticipated at a construction site and non-stormwater discharges of groundwater, subsurface water, spring water, and/or other dewatering water are anticipated, the Operators/Permittees must complete the following steps:

1. Review the state's Ground Water Quality Bureau Mapper (https://gis.web.env.nm.gov/GWQB/) and Petroleum Storage Tank Bureau Mapper (https://gis.web.env.nm.gov/GWQB/).

   Check if the following sources are located within the noted distance from the anticipated construction dewatering activity. At a minimum, a list of the following potential sources of contaminants and pollutants at the noted distance is to be kept in the SWPPP.

Source of Potential Contamination or Pollutants*	Constituents likely to be required for testing*
Within 0.5 mile of an open Leaking Underground Storage Tank (LUST) site	BTEX (Benzene, Toluene, Ethylbenzene, and Xylene) plus additional parameters depending on site conditions**
Within 0.5 mile of an open Voluntary Remediation site	All applicable parameters or pollutants listed in 20.6.4.13, 20.6.4.52, 20.6.4.54, 20.6.4.97 thru 20.6.4.99, 20.6.4.101 through 20.6.4.899, and 20.6.4.900 NMAC (or an alternate list approved by the NMED-SWQB)*
Within 0.5 mile of an open RCRA Corrective Action Site	
Within 0.5 mile of an open Abatement Site	
Within 0.5 mile of an open Brownfield Site	
Within 1.0 mile or more of a Superfund site or National Priorities List (NPL) site with associated groundwater contamination.	
Construction activity contaminants and/or natural water pollutants	Additional parameters depending on site activities and conditions (Contact NMED- SWQB for an alternate list)*

*For further assistance determining whether dewatering may encounter contaminated sources, please contact the NMED Ground Water Quality Bureau at 505-827-2965 or NMED Surface Water Quality Bureau (SWQB) at 505-827-0187.

** EPA approved sufficiently sensitive methods must be used. For known PCB sources and analysis, EPA Method 1668C must be used (see https://www.epa.gov/cwa-methods).

2. If dewatering activities are anticipated, information on the flow rate and potential to encounter contaminated groundwater, subsurface water, spring water, or dewatering water must be provideddirectly to NMED at the following address:

   NMED Surface Water Quality Bureau

   Program Manager, Point Source Regulation
   SectionPO Box 5469, Santa Fe, NM 87502

   Please call the SWQB to obtain the appropriate email address (505-827-0187).

3. In addition, the Operator/Permittee must characterize the quality of the groundwater and subsurface water, spring water, or dewatering water being considered for discharge according to the table above and including dissolved hardness and pH. Considering the contaminant sources listed in the table above, water quality data may already be available. For further assistance, contactthe

NMED Surface Water Quality Bureau (505-827-0187), Ground Water Quality Bureau (505-827- 2965), Petroleum Storage Tank Bureau (505-476-4397), or Hazardous Waste Bureau (505-476- 6000).

i. The Operator/Permittee must submit recent analytical test results (i.e., within the past 5 years) according to the table above, and including dissolved hardness and pH, to the EPA Region 6 Stormwater Permit Contact and the NMED Surface Water Quality Bureau (see contact information in #2 above). If the test data exceed applicable water quality standards, then the groundwater, subsurface water, spring water, or dewatering water cannot be discharged into surface waters under this general permit. Operators/Permittees may submit an NPDES Individual Permit application to treat and discharge to waters of the U.S. or find alternative disposal measures. No discharges to surface waters are allowed until authorized.
ii. If the discharge has the potential to affect groundwater (e.g., land application), the Operator/Permittee must submit an NOI to the NMED Ground Water Quality Bureau (see 20.6.2.1201 NMAC – Notice of Intent to Discharge).

4. The Operator/Permittee must document any findings and all correspondence with NMED and EPA in the SWPPP.

c. Operators who intend to obtain authorization under this permit for new and existing storm water dischargesfrom construction sites must satisfy the following condition:

i. The SWPPP must include site-specific interim and permanent stabilization, managerial, and structural solids, erosion and sediment control best management practices (BMPs) and/or other controls that are designed to prevent to the maximum extent practicable an increase in the sediment yield and flow velocity from pre-construction, pre-development conditions to assure thatapplicable standards in 20.6.4 NMAC, including the antidegradation policy, and TMDL waste load allocations (WLAs) are met. This requirement applies to discharges both during construction and after construction operations have been completed. The SWPPP must identify and document the rationale for selecting these BMPs and/or other controls. The SWPPP must also describe design specifications, construction specifications, maintenance schedules (including a long-term maintenance plan), criteria for inspections, and expected performance and longevity of these BMPs.For sites greater than 5 acres in size, BMP selection must be made based on the use of appropriatesoil loss prediction models (i.e. SEDCAD, RUSLE, SEDIMOT, MULTISED, etc.) OR equivalent generallyaccepted (by professional erosion control specialists) soil loss prediction tools.

ii. For all sites, the Operator(s) must demonstrate, and include documentation in the SWPPP, that implementation of the site-specific practices will ensure that the applicable standards and TMDL WLAs are met, and will result in sediment yields and flow velocities that, to the maximum extent practicable, will not be greater than the sediment yield levels and flow velocities from preconstruction, pre-development conditions.

iii. All SWPPPs must be prepared in accordance with good engineering practices by qualified (e.g., CPESC certified, engineers with appropriate training) erosion control specialists familiar with the use of soil loss prediction models and design of

erosion and sediment control systems based on these models (or equivalent soil loss prediction tools). Qualifications of the preparer (e.g., professional certifications, description of appropriate training) must be documented in the SWPPP.The Operator(s) must design, implement, and maintain BMPs in the manner specified in the SWPPP.

NMED supports the use of EPA's small residential lot template if a site qualifies to use it as explained inthe permit, as long as it is consistent with the above requirements. NMED's requirement does not preclude small residential sites from using the template, but it may require an additional short paragraphto justify the selection of specific BMPs for the site.

d. Operators must notify NMED when discharges of toxic or hazardous substances or oil from a spill or other release occurs - see Emergency Spill Notification Requirements, Part 2.3.6 of the permit. For emergencies, Operators can call 505-827-9329 at any time. For non-emergencies, Operators can call 866-428-6535 (voice mail 24-hours per day) or 505-476-6000 during business hours from 8am-5pm, Monday through Friday. Operators can also call the NMED Surface Water Quality Bureau directly at 505-827-0187.

e. Operators of small construction activities (i.e., 1-5 acres) are not eligible to qualify for a waiver in lieu of needing to obtain coverage under this general permit based on Item C.3 of Appendix C (Equivalent Analysis Waiver) in the State of New Mexico.

9.6.2 NMR10I000 Indian country within the State of New Mexico, except Navajo Reservation Lands that are covered under Arizona permit AZR10000I and Ute Mountain Reservation Lands that are covered under Colorado permit COR10000I.

a. Nambe Pueblo

i. The operator must provide a copy of the Notice of Intent (NOI) and Notice of Termination (NOT) to the Nambe Pueblo Governor's Office at the same time it is provided to the US Environmental Protection Agency. The NOI and NOT should be provided to the following address:

Office of the Governor Nambe Pueblo

!SA NPI02 WEST

Nambe Pueblo, New Mexico 87506

ii. The operator must provide a copy of the Storm Water Pollution Prevention Plan (SWPPP) to Nambe Pueblo at the same time it is submitted to the EPA, either by email to governor@nambepueblo.org or mailed to the above address.

iii. The operator must provide copies of inspection reports, a copy of the corrective action log, and modifications made to the SWPPP as a result of inspection findings, upon request by the Nambe Pueblo Department of Environmental and Natural Resources or Nam be Governor.

b. Ohkay Owingeh Tribe

i. All operators obtaining permit coverage under the EPA CGP, must submit a copy of the certified (signed) Notice of Intent (NOI) to the Ohkay Owingeh Office of Environmental Affairs, a copy of NOI modifications and the Notice of Termination (NOT), must be provided within three business days after EPA provides electronic confirmation that the submission has been received. The NOI and NOT must be

provided to the following address:

Naomi L. Archuleta - Environmental Programs Manager Ohkay Owingeh Office of Environmental Affairs
P.O. Box 717
Ohkay Owingeh, NM 87566
naomi.archuleta@ohkay.org

Noah Kaniatobe - Environmental Specialist Ohkay Owingeh, Office of Environmental Affairs
P.O. Box 717
Ohkay Owingeh, NM 87566
noah.kaniatohe@ohkay.org

ii. All operators obtaining permit coverage under the EPA CGP, must submit an electronic copy of the Storm Water Pollution Prevention Plan (SWPPP) to Ohkay Owingeh Office of Environmental Affairsat the same time that the NOI is submitted to the tribe (see contact information listed above).

iii. Following each incident where the operator takes a corrective action the operator must provide thecorrective action log to the Ohkay Owingeh Office of Environmental Affairs.

iv. The operator must notify Ohkay Owingeh Office of Environmental Affairs within 24 hours, in the event of an emergency spill in addition to the notification requirements at Part 2.3.6 of the CGP. Please contact: Ohkay Owingeh Tribal Police Department at 505.852.2757.

Please contact:
Ohkay Owingeh
Tribal Police Department
505.852.2757

c. Pueblo of Isleta

i. All operators obtaining permit coverage under the EPA CGP must submit a copy of the certified Notice ofIntent (NOI) to the Pueblo of Isleta at the same time it is submitted to EPA for projects occurring within the exterior boundaries of the Pueblo of Isleta. Additionally, a copy of NOI modifications and the Notice of Termination (NOT), must be provided within three business days after EPA provides electronic confirmation that the submission has been received. The Notices must be provided to the following address:

Water Quality Control OfficerPueblo of Isleta
Environment DepartmentPO Box 1270
Isleta NM 87022
505-869-7565
WQCO@isletapueblo.com

ii. The operator must notify the Pueblo of Isleta's Dispatch at 505-869-3030 as soon as possible and thePueblo of Isleta Water Quality Control Officer within 10 hours, in the event of a spill of hazardous ortoxic substances or if health or the

environment become endangered in addition to the notification requirements at Part 2.3.6 and at I.12.6.1 of the CGP.

iii. All operators obtaining permit coverage under the EPA CGP must submit an electronic copy of the Stormwater Pollution Prevention Plan (SWPPP) to the Pueblo of Isleta Water Quality Control Officer atthe above address, 30 days prior to submitting the certified NOI to EPA. If the electronic file is too largeto send through e-mail, a zip file or flash drive may be submitted.

iv. All operators obtaining permit coverage under the EPA CGP must give 2 days advance notice to the Pueblo of Isleta Water Quality Control Officer of any planned changes in the permitted activity whichmay result in noncompliance with permit requirements.

v. All operators obtaining permit coverage under the EPA CGP must post a sign or other notice of permit coverage at a safe, publicly accessible location in close proximity to the construction site. The notice mustbe located so that it is visible from the public road or tribal road that is nearest to the active part of the construction site. The sign must be maintained on-site from the time construction activities begin until final stabilization is met.

vi. Erosion and sediment controls shall be designed to retain sediment on-site and project-generatedwaste materials that have the potential to discharge pollutants shall not be placed on open soil oron a surface that is not stabilized. Volumes of sediment over five (5) cubic yards must be removed from the active construction site; additionally, if sediment is placed for disposal withinthe exterior boundaries of the Pueblo of Isleta, disposal must be within a tribally approved sediment disposal site.

d. Pueblo of Laguna

i. All operators obtaining permit coverage under the EPA CGP must submit an electronic copy of the certified (signed) Notice of Intent (NOI) to the Pueblo of Laguna's Environmental & Natural Resources Department (ENRD) within three business days of submittal to the EPA. Additionally, a copy of NOI modifications and the Notice of Termination (NOT), must be provided within three business days after the EPA provides electronic confirmation that the submission has been received. The NOI and NOT must be electronically submitted to info.environmental@pol-nsn.gov.

ii. All operators obtaining permit coverage under the EPA CGP must submit an electronic copy of the Stormwater Pollution Prevention Plan (SWPPP) to the Pueblo of Laguna's ENRD 14 days prior to the submittal of the NOI (see contact information listed above).

iii. The operator must provide copies of corrective actions logs and modifications made to the SWPPP as a result of inspection findings to the Pueblo of Laguna ENRD (see contact information above).

iv. In addition to the notification requirements of Part 2.3.6 of the CPG ***[EPA interprets this intending to refer to the CGP]***, the operator must notify the Pueblo of Laguna ENRD at 505-552-7512 in the event of an emergency spill as soon as possible.

e. Pueblo of Sandia. The following conditions apply only to discharges on the Pueblo of Sandia Reservation:

i. All operators obtaining permit coverage under the EPA CGP, must submit a copy of the certified (signed) Notice of Intent (NOI) to the Pueblo of Sandia Environment Department concurrently with submittal to the EPA. Additionally, a copy of NOI modifications and the Notice of Termination (NOT), must be provided concurrently with submittal to the EPA. The NOI and NOT must be provided electronically to the following addresses:

Electronic Addresses:

Amy Rosebrough (Water Quality Manager): rosebrough@sanidapueblo.nsn.us
Greg Kaufman (Environment Director):gkaufman@sandiapueblo.nsn.us

ii. All operators obtaining permit coverage under the EPA CGP, must submit an electronic copy of the Stormwater Pollution Prevention Plan (SWPPP) to the Pueblo of Sandia Environment. Department at least 14 days prior to submittal of the NOI to the Pueblo (see contact information listed above).

iii. If requested by the Pueblo of Sandia Environment Department, the permittee must provide additional information necessary on a case-by-case basis to assure compliance with the Pueblo of Sandia Water Quality Standards and/or applicable Federal Standards.

iv. An "Authorization to Proceed Letter" with site specific mitigation requirements may be sent out to the permittee when a review of the NOI and SWPPP, on a case-by-case basis, is completed by the Pueblo of Sandia Environment Department. This approval will allow the application to proceed if all mitigation requirements are met.

v. The Pueblo of Sandia will not allow Small Construction Waivers (Appendix C) to be granted for any small construction activities.

vi. The operator must provide copies of inspection reports, a copy of the corrective action log, and modifications made to the SWPPP as a result of inspection findings to the Pueblo of Sandia Environment Department upon request. An inspection report and corrective action log must be submitted to the Pueblo within 3 days of any inspection that results in corrective action (see contact information listed above).

vii. The operator must notify the Pueblo of Sandia within 24 hours in the event of an emergency spill, in addition to the notification requirements at Part 2.3.6 of the COP (see contact information listed above).

viii. Before submitting a Notice of Termination (NOT) to the EPA, permittees must clearly demonstrate to the Pueblo of Sandia Environment Department through a site visit or documentation that requirements for site stabilization have been met and any temporary erosion control structures have been removed. A short letter stating that the NOT is acceptable and all requirements have been met will be sent to the permittee to add to the permittee's NOT submission to the EPA.

f. Pueblo of Santa Ana. The following conditions apply only to discharges on the Pueblo of Santa Ana Reservation:

i. All operators obtaining permit coverage under the EPA CGP, must submit a copy of the certified (signed) Notice of Intent (NOI) to the Pueblo's Department of Natural Resources within three business days of submittal to EPA. Additionally, a copy of NOI modifications and the Notice of Termination (NOT), must be

provided within three business days after EPA provides electronic confirmation that the submission has been received. The NOI and NOT must be provided to the following address:

Regular U.S. Delivery Mail:
Pueblo of Santa Ana
Department of Natural Resources Water Resources Division
Attn: Andrew Sweetman 02 Dove Rd
Santa Ana Pueblo, NM 87004

Electronically:
Andrew Sweetman
Water Resources Division Manager Andrew.Sweetman@santaana-nsn.gov
Tammy Montoya Hydrologist
Tammy.Montoya@santaana-nsn.gov

ii. All operators obtaining permit coverage under the EPA CGP, must submit an electronic copyof the Stormwater Pollution Prevention Plan (SWPPP) to the to the Pueblo's Department of Natural Resources at the same time that the NO! is submitted to the tribe (see contact information listed above).

iii. The operator must provide copies of inspection reports, a copy of the corrective action log, and modifications made to the SWPPP as a result of inspection findings, upon request by the Pueblo's Department of Natural Resources.

iv. The operator must notify the Pueblo's Department of Natural Resources within 24 hours in the event of an emergency spill, in addition to the notification requirements at Part 2.3.6 of the CGP.

g. Pueblo of Taos

i. All operators obtaining permit coverage under the EPA CGP, must submit a copy of the certified (signed) Notice of Intent (NOi) to the Taos Pueblo Environmental Office and Taos Pueblo Governor's Office within three business days of submittal to EPA. Additionally, a copy of NOi modifications and the Notice of Termination (NOT), must be provided within three business days after EPA provides electronic confirmation that the submission has been received. The NOi and NOTmust be provided to the following addresses:

Honorable Governor of Taos Pueblo PO Box 1846
Taos, New Mexico 87571

Taos Pueblo Environmental Office PO Box 1846
Taos, New Mexico 87571

ii. All operators obtaining permit coverage under the EPA CGP, must submit an electronic copy of theStormwater Pollution Prevention Plan (SWPPP) to the Taos Pueblo Environmental Office when the NOI is submitted to the tribe. Electronic copy of SWPPP downloaded on flash drive may be sent to the above address for the Taos Pueblo Environmental Office.

iii. The operator must provide a copy of the corrective action log following each corrective action undertaken and modifications made to the SWPPP as a result of

a corrective action to the Taos Pueblo Environmental Office at address listed above.

h. Pueblo of Tesuque.

i. All operators obtaining permit coverage under the EPA CGP, must submit a copy of the certified (signed) Notice of Intent (NOI) to the Pueblo of Tesuque Department of Environment and Natural Resources (DENR) and the Pueblo's Governor within three business days of submittal to EPA. Additionally, a copy of any NOi modifications and the Notice of Termination (NOT), must be provided within three business days after EPA provides electronic confirmation that the submission has been received. The NOI and NOT must be provided to the following address:

Governor Mark Mitchell Pueblo of Tesuque
20 TP 828
Santa Fe, NM 87506 governor@pueblooftesuque.org

Sage Mountain.flower Pueblo of Tesuque
Department of Environment and Natural Resources Director
20 TP 828

ii. All operators obtaining permit coverage under the EPA CGP, must submit an electronic copyof the Stormwater Pollution Prevention Plan (SWPPP) to Pueblo of Tesuque DENR and the Pueblo's Governor at the same time that the NO! is submitted to the EPA (see contact information listed above).

iii. The operator must provide a copy of the corrective action log, and any modifications made tothe SWPPP as a result of inspection findings, or upon request by the Pueblo of Tesuque DENR.

iv. The operator must notify the Pueblo of Tesuque DENR within 24 hours in the event of an emergency spill, in addition to the notification requirements at Part 2.3.6 of the CGP (seecontact information listed above).

i. Santa Clara Indian Pueblo.

i. All operators obtaining permit coverage under the EPA CGP, must submit a copy of the certified (signed) Notice of Intent (NOI) to the Santa Clara Pueblo Office of Environmental Affairs at the same time the NOI is submitted to the U.S. EPA. Additionally, a copy of the NOI modifications and the Notice of Termination (NOT), must be provided at the same time after electronic confirmation is received from EPA that the NOT has been accepted. The NOI and NOT shall be provided to the following address in electronic format:

Dino Chavarria,
Santa Clara Pueblo
Office of Environmental Affairs
dinoc@santaclarapueblo.org

ii. All operators obtaining permit coverage under the EPA CGP, must submit an electronic copy of the Stormwater Pollution Prevention Plan to the Santa Clara Pueblo Office of Environmental Affairs at the same time the NOI is submitted to the U.S. EPA (see contact information listed above).

iii. The operator must notify the Santa Clara Pueblo Office of Environmental Affairs at the address above within 24 hours, in the event of an emergency spill, in addition to the notification requirements at Part 2.3.6 of the CGP

9.6.3 OKR10I000 Indian country within the State of Oklahoma, except areas of Indian country covered by an extension of state program authority pursuant to Section 10211 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA).

a. Pawnee Nation. The following conditions apply only to discharges within Pawnee Indian country:

i. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Pawnee Nation at the same time it is submitted to the Environmental Protection Agency to the following address:

Pawnee Nation Department of Environmental Conservation and Safety
P.O. Box 470
Pawnee, OK 74058
Or email to dnrs@pawneenation.org

ii. An electronic copy of the Storm Water Pollution Prevention Plan (SWPPP) must be submitted to the Pawnee Nation Department of Environmental Conservation and Safety at the same time the NOI is submitted.

iii. The operator must provide access to the site for inspections and for copies of inspection reports, copy of the corrective action log and modifications, made to the SWPPP because of inspection findings, upon request by the Pawnee Nation DECS.

iv. The Pawnee Nation Department of Environmental Conservation and Safety must be notified at 918.762.3655 immediately upon discovery of any noncompliance with any provision of the permit conditions.

9.6.4 OKR10F000 Discharges in the State of Oklahoma that are not under the authority of the Oklahoma Department of Environmental Quality, or the Oklahoma Department of Agriculture and Forestry including activities associated with oil and gas exploration, drilling, operations, and pipelines (includes SIC Groups 13 and 46, and SIC codes 492 and 5171), and point source discharges associated with agricultural production, services, and silviculture (includes SIC Groups 01, 02, 07, 08, 09).

a. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Lee Creek or any water or watershed designated "ORW" in Oklahoma's Water Quality Standards, this permit may only be used to authorize discharges from temporary construction activities. Certification is denied for any on-going activities such as sand and gravel mining or any other mineral mining.

b. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Lee Creek or any water or watershed designated "ORW" in Oklahoma's Water Quality Standards, certification is denied for any discharges originating from support activities, including, but not limited to, concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, or borrow areas.

c. Dewatering discharges into sediment or nutrient-impaired waters, and waters identified as Tier 2, Tier 2.5, or Tier 3 (OAC 785:46-13) shall be controlled to meet water quality standards for turbidity in those waters as follows:

i. Cool Water Aquatic Community/Trout Fisheries: 10 NTUs (OAC 785: 45-5-12(f)(7)(A)(i)

ii. Lakes: 25 NTUs (OAC 785: 45-5-12(f)(7)(A)(ii)

iii. In waters where background turbidity exceeds these values, turbidity from dewatering discharges should be restricted to not exceed ambient levels (OAC 785: 45-5-12(f)(7)(B)

9.7 EPA REGION 7

No additional conditions.

9.8 EPA REGION 8

9.8.1 MTR10I000 Indian country within the State of Montana

a. Blackfeet Nation.

i. The Applicant and applicants for projects authorized under the NWPs should obtain all other permits, licenses, and certifications that may be required by federal, state, or tribal authority. Primary relevant tribal permit will be ALPO (Ordinance 117). Others may apply. It is the applicant's responsibility to know the tribal and local ordinances and complete all necessary permissions before they can commence work.

ii. If a project is unable to meet the enclosed conditions, or if certification is denied for an applicable NWP, the Applicant may request an individual certification from Blackfeet. An individual certification request must follow the requirements outlined in 40 CFR 121.5 of EPA's CWA § 401 Certification Rule, effective September 11, 2020.

iii. Copies of this certification should be kept on the job site and readily available for reference.

iv. If the project is constructed and/or operated in a manner not consistent with the applicable NWP, general conditions, or regional conditions, the permittee may be in violation of this certification.

v. Blackfeet and EPA representatives may inspect the authorized activity and any mitigation areas to determine compliance with the terms and conditions of the NWP.

vi. This NWP Reissuance does not reduce Tribal authority under any other rule.

vii. The project, including any stream relocations and restoration, must be built as shown and as otherwise described in the application, the construction plans, cross sections, mitigation plans and other supporting documents submitted to this office. Impacts to aquatic systems and restoration efforts will be monitored by an appropriate aquatic resource professional to ensure that disturbed areas are restored to at least their original condition.

viii. All existing water uses will be fully maintained during and after the completion of the project. (If applicable)

ix. Where practicable, perform all in-channel and wetland work during periods of low flow or drawn—down or when dry

x. Equipment staging areas must be located out of all delineated wetlands

xi. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during and immediately after construction, and all exposed soil and other fills, as well as any work below the ordinary high-water mark or in a wetland, must be permanently stabilized as soon as possible

xii. Materials such as piling, culverts, sandbags, fabric, mats, timbers used for temporary facilities in wetlands or below the high- water mark of Waters of the US must be free from oil, gas, excess dirt, loose paint and other pollutants.

xiii. Equipment staging areas in wetlands or in stream or river channels must be placed on mats, or other measures must be taken to minimize soil disturbance and compaction.

xiv. Clearing of riparian or wetland vegetation for the sole purpose of constructing work bridges, detours, staging areas or other temporary facilities must be limited to the absolute minimum necessary. When temporary impacts to native riparian or wetland vegetation are unavoidable, it must be mowed or cut above ground with the topsoil and root mass left intact.

xv. Remove all temporary fills and structures in the entirety when they are no longer needed. Restore affected areas to the appropriate original and planned contours where possible. Re-vegetate disturbed areas with appropriate native species when native species are impacted.

xvi. Construction methods and best management practices (BMPs) must minimize aquatic resource impacts to the maximum extent possible. Any BMPs described in the Joint Application must be followed. BMPs should include installation and maintenance of sediment control measures; separation, storage and reuse of any topsoil; and recovery of all disturbed areas where possible. All best management practices must in place prior to the onset of construction or as soon as practicable during the construction process.

xvii. Best available technology and/or best management practices must be utilized to protect existing water uses and maintain turbidity and sedimentation at the lowest practical level.

xviii. Applicant/contractor should manage disturbed streambank topsoil in a manner that optimizes plant establishment for the site.

xix. When operating equipment or otherwise undertaking construction in wetlands and water bodies the following conditions apply:

(k) Work should be done in dry conditions if possible.

(l) All equipment is to be inspected for oil, gas, diesel, anti-freeze, hydraulic fluid or other petroleum leaks. All such leaks will be properly repaired and equipment cleaned prior to being allowed on the project site. Leaks that occur after the equipment is moved to the project site will be fixed the same day or the next day or removed from the project area. The equipment is not allowed to continue operation once a leak is discovered.

(m) All equipment is to be inspected and cleaned before and after use to minimize the spread or introduction of invasive or undesirable species.

(n) Construction equipment shall not operate below the existing water surface except as follows:

- Impacts from construction should be minimized through the use of best management practices submitted in the permit application.
- Essential work below the waterline shall be done in a manner to minimize impacts to aquatic system and water quality.

(o) Containment booms and/or absorbent material must be available onsite. Any spills of petroleum products must be reported to the Army Corps, Blackfeet Nation BEO Office and the US EPA within 24 hours.

xx. Upland, riparian and in-stream vegetation should be protected except where its removal is necessary for completion of work. Revegetation should be completed as soon as possible. Applicant/contractor should revegetate disturbed soil in a manner that optimizes plant establishment for the site. Revegetation must include topsoil replacement, planting, seeding, fertilization, liming and weed-free mulching as necessary. Applicant must use native plant material and soils where appropriate and feasible. This certification does not allow for the introduction of non-native flora and fauna. All disturbed surface areas must be restored to pre-construction contours and elevation.

xxi. Spoils piles should not be placed or stored within the delineated wetlands or streams unless protected by a temporary structure designed to divert and handle high flows that can be anticipated during permit activity. Spoils piles should be placed on landscaping fabric or some other material to separate spoils material and allow retrieval of spoils material with minimal impact.

xxii. Impacts to wetlands shall not exceed 4.92 acres.

xxiii. Any unexpected and additional impacts to waters of the US should be reported to the

xxiv. Army Corps, Blackfeet Environmental Office Water Quality Coordinator and the US EPA.

xxv. All instream and stream channel reconstruction work must be completed before the stream is diverted into the new channel.

xxvi. Any temporary crossings, bridge supports, cofferdams, or other structures that are necessary during permit activity should be designed to handle high flows that can be anticipated during permit activity. All temporary structures should be completely removed from the water body at the conclusion of the permitted activity and the area restored to a natural function and appearance.

xxvii. The certification does not authorize any unconfined discharge of liquid cement into the waters of the United States. Grouting riprap must occur under dry conditions with no exposure of wet concrete to the water body.

xxviii. BMPs shall include application of certified weed-free straw or hay across all disturbed wetland areas that are temporarily impacted; installation and maintenance of sediment control measures during construction and if necessary, after construction is completed; use of heavy mud mats if necessary; separation,

storage and reuse of all streambank topsoil and wetland topsoil, as appropriate; and recovery of all disturbed wetland and streambank areas where possible. All conditions set by the Blackfeet Tribe and US Army Corps must be followed.

xxix. All applicants, including federal agencies, must notify EPA and the Blackfeet Environmental Office of the use of all NWPs for which certification has been granted prior to commencing work on the project. Notifications must include:

(p) project location (lat. Long., exact point on map);

(q) NWP that will be used and the specific activity that will be authorized under the NWP;

(r) amount of permanent and temporary fills;

(s) a short summary of the proposed activity, and all other federal, state, tribal or local permits or licenses required for the project;

(t) complete contact information of both the applicant and contractor (name, name of the company or property if applicable, telephone, mobile, and email); and,

(u) Summary of best management practices that will be used.

(v) A summary of communications with the affected Tribe's water quality staff regarding the project, including any concerns or issues.

(w) Notify Blackfeet and EPA at least 7 days before the completion of construction and operations begin.

xxx. Point source discharges may not occur: (1) in fens, bogs or other peatlands; (2) within 100 feet of the point of discharge of a known natural spring source; or (3) hanging gardens.

xxxi. Except as specified in the application, no debris, silt, sand, cement, concrete, oil or petroleum, organic material, or other construction related materials or wastes shall be allowed to enter into or be stored where it may enter into waters of the U.S.

xxxii. Silt fences, straw wattles, and other techniques shall be employed as appropriate to protect waters of the U.S. from sedimentation and other pollutants.

xxxiii. Water used in dust suppression shall not contain contaminants that could violate water quality standards.

xxxiv. Erosion control matting that is either biodegradable blankets or loose-weave mesh must be used to the maximum extent practicable.

xxxv. All equipment used in waters of the U.S. must be inspected for fluid leaks and invasive species prior to use on a project. All fluid leaks shall be repaired and cleaned prior to use or when discovered, or if the fluid leak can't be repaired, the equipment shall not be used on site. Equipment used in waters with the possibility of aquatic nuisance species infestation must be thoroughly cleaned and effectively decontaminated before they are used on the project.

xxxvi. Vegetation should be protected except where its removal is necessary for completion of the work. Locations disturbed by construction activities should be revegetated with appropriate native vegetation in a manner that optimizes plant establishment for the specific site.

xxxvii. Revegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching, as necessary. Where practical, stockpile weed- seed-free topsoil and replace it on disturbed areas. All revegetation materials, including plants and plant seed shall be on site or scheduled for delivery prior to or upon completion of the earth moving activities.

xxxviii. Activities may not result in any unconfined discharge of liquid cement into waters of the U.S. Grouting riprap must occur under dry conditions with no exposure of wet concrete to the waterbody.

xxxix. Activities that may result in a point source discharge shall occur during seasonal low flow or no flow periods to the extent practicable.

xl. The placement of material (discharge) for the construction of new dams is not certified, except for stream restoration projects.

xli. Any decision-maker that is required under 7.0 of the CGP to prepare a Stormwater Pollution Prevention Plan (SWPPP), must submit an electronic copy of the SWPPP to the Blackfeet Environmental Office at least 30 days before construction starts for review and approval. Any modifications to the SWPPP should be submitted to the Blackfeet Environmental Office.

xlii. Any Decision-maker required under Part 1.4 of the CGP to submit a Notice of Intent (NOI) to EPA for coverage under the CGP, must submit a copy of the NOI to the Blackfeet Environmental Office within three business days of submittal to EPA. Additionally, a copy of the Notice of Termination (NOT) must be provided within three business days after electronic confirmation is received from EPA that the NOT has been accepted. The NOI and NOT must be provided to the following address Gerald Wagner, Blackfeet Environmental Office Director.

62 Hospital Drive, Browning, MT 59417

beo.director@gmail.com

b. Fort Peck Tribes.

i. Any Decision-maker required under Part 1.4 of the CGP to submit a Notice of Intent (NOI) to EPA for coverage under the CGP, must submit a copy of the NOI to the Fort Peck Tribes Office of Environmental Protection within three business days of submittal to EPA. Additionally, a copy of the Notice of Termination (NOT) must be provided within three business days after electronic confirmation is received from EPA that the NOT has been accepted. The NOI and NOT must be provided to the following address:

Martina Wilson, Office of Environmental Protection Director

501 Medicine Bear Rd Poplar, MT 59255

martinawilson@fortpecktribes.net

ii. Any Decision-maker that is required under Part 7.0 of the CGP to prepare a Stormwater Pollution Prevention Plan (SWPPP), must submit an electronic copy of the SWPPP to the Fort Peck Tribes Office of Environmental Protection at least 30 days before construction starts for review and approval. Any modifications to the

SWPPP should be submitted to the Fort Peck Tribes Office of Environmental Protection.

iii. Any Decision-maker that is required under Part 8.0 of the CGP to submit a weekly, bi-weekly, and/or annual report to EPA, must submit an electronic copy of the annual report to the Fort Peck Tribes Office of Environmental Protection within three business days after submittal to EPA.

9.9 EPA REGION 9

9.9.1 CAR10I000 Indian country within the State of California

a. Morongo Band of Mission Indians

i. A copy of the Stormwater Pollution Prevention Plan (SWPPP) must be submitted (either mailed or electronically) to the MEPD no less than thirty (30) days before commencing construction activities:

Morongo Band of Mission Indians
Environmental Protection Department
12700 Pumarra Road
Banning, CA 92220
Email: epd@morongo-nsn.gov

ii. Copies of the Notice of Intent (NOI) and the Notice of Termination (NOT) must be sent to the MEPD at the same time they are submitted to EPA.

iii. Operators of an "emergency-related project" must submit notice to the MEPD within twenty- four (24) hours after commencing construction activities.

iv. Spills, leaks, or unpermitted discharges must be reported to the MEPD within twenty-four (24) hours of the incident, in addition to the reporting requirements of the CGP.

v. Projects utilizing cationic treatment chemicals (as defined in Appendix A of the CGP) within the Morongo Reservation are not eligible for coverage under this certification of the CGP.

vi. Facilities covered under the CGP will be subject to compliance inspections by MEPD staff, including compliance with final site stabilization criteria prior to submitting an NOI ***[EPA assumes this intended to refer to an NOT]***.

9.9.2 GUR100000 Island of Guam

a. For purposes of this Order, the term "Project Proponent" shall mean U.S. Environmental Protection Agency, and its agents, assignees, and contractors.

b. For purposes of this Order, the permit "Operator" shall mean any party associated with a construction project that meets either of the following two criteria:

i. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications (e.g. in most cases this is the owner of the site); or

ii. The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the permit; in most cases this is the general contractor of the project).

Subcontractors generally are not considered operators for the purposes of this permit.

c. The Project Proponent shall enforce the proposed 2022 CGP and ensure that the Operator complies with the conditions of the permit at all times.[108] (40 CFR §121.11(c))

d. All submittals required by this Order shall be sent to the Guam Environmental Protection Agency Attn: 401 Federal Permit Manager, Non-Point Source Program, EMAS Division, 3304 Mariner Avenue, Bldg. 17-3304, Barrigada, Guam 96913, AND via email to jesse.cruz@epa.guam.gov. The submittals shall be identified with WQC Order #2021- 04 and include the COP Permit Number, certifying representative's name, title, mailing address and phone number. (§51060)(4) 2017 GWQS)

e. A copy of the Operator's signed Stormwater Pollution Prevention Plan (SWPPP) and signed Notice of Intent (NOI) and Notice of Termination (NOT) submitted to EPA for review and approval, shall concurrently be submitted to Guam EPA, consistent with condition A4. Coordination with Guam EPA is encouraged when the receiving water(s) for the proposed discharge is/are being identified. (§10105.B.5.d.) GSESCR; (§51060)(4) 2017 GWQS)

f. The Operator must comply with the conditions and requirements set forth in 22 GAR 10, Guam Soil Erosion and Sediment Control Regulations (GSESCR).

g. Before submitting the NOT to EPA, Operators shall comply with GSESC regulations at §10105.B10. (Stabilization of Affected Areas) and §10107.B. {Final Inspection and Approval)

h. All operators/owners shall comply with the general design criteria for best management practices (BMPs) acceptable for meeting the Construction and Post-construction stormwater criteria in the 2006 CNMI and Guam Stormwater Management Manual. (E.O. 2012-02)

i. Operating reports and monitoring and analytical data (e.g. Discharge Monitoring Reports (DMRs), follow-up monitoring reports, Exceedance Reports for Numerical Effluent Limits, etc.) submitted to EPA shall be concurrently submitted to Guam EPA, consistent with condition A4. §51060)(4) 2017 GWQS

j. The Operators who install a sediment basin or similar impoundment shall maintain the storage capacity of five thousand cubic feet {5,000 cu. ft.) per acre of project area tributary to the basin. (§10105.B.5.i.) GSESCR

k. (1) This Order does not authorize EPA to qualify Rainfall Erosivity Waivers to stormwater discharges associated with small construction activities (i.e. 1-5 acres). Operators are required to apply for an NOI for those projects eligible for coverage under the proposed 2022 CGP. An Erosion and Sediment Control Plan is required for every site that would be covered by the proposed 2022 CGP. (22 GAR §10104) The average annual rainfall for Guam and the CNMI exceeds I00 inches per year in many locations. These climatic conditions combined with the region's unique limestone, volcanic geologic formations, sensitive water resources and significant land

[108] By incorporating this condition into the permit, EPA acknowledges receipt of Guam's certification conditions.

development forces make stormwater discharges a very significant environmental and economic issue. (2006 CNMJ/Guam Stormwater Management Manual) E.O. 2012-02

(2) This Order does not authorize EPA to approve a Sediment TMDL Waiver for the Ugum River. Operators of construction activities eligible for a TMDL Waiver in lieu of coverage under the proposed 2022 CGP, shall submit a complete and accurate waiver certification as described in C.2., Appendix C - (Small Construction Waivers) to Guam EPA per condition A4., prior to notifying EPA of its intention to obtain a waiver. §51060)(4) 2017 GWQS

l. The Project Proponent shall submit to Guam EPA a signed Statement of Understanding of Water Quality Certification Conditions.[109] (see Attachment A for an example) per condition A4. §51060)(4) 2017 GWQS

m. The Operator shall comply with applicable provisions of the Guam Pesticides Act of2007 (10 GCA Chapter 50) and implementing regulations at Title 22 GAR Chapter 15 for any use and application of pesticides.

n. Point source discharge(s) to waterbodies under the jurisdiction of Guam EPA must be consistent with the antidegradation policy in 22 GAR §510l(b).

o. The operator shall carry out construction activities in such a manner that will not violate Guam Water Quality Standards (GWQS). Proposed 2022 CGP discharges are prohibited as follows:

- **i.** In Marine Waters, Category M-1 Excellent 22 GAR Chapter 5 §5102(b)(I); and
- **ii.** In Surface Waters, Category S-1 High 22 GAR Chapter 5 §5102(c)(I)

p. In addition to complying with construction dewatering requirements in Part 2.4 and site inspection requirements for all areas where construction dewatering is taking place in Part 4 of the proposed 2022 CGP, Operators shall comply with all dewatering conditions and requirements set forth in 22 GAR 7, Water Resources Development and Operating Regulations, to include securing Guam EPA permits prior to any dewatering activities.

q. The Operator shall develop and implement a Spill Prevention and Containment Plan.

r. The Operator shall have adequate and appropriate spill response materials on hand to respond to emergency release of oil, petroleum or any other material into waters of the territory.

s. Any unpermitted discharge into territorial waters or onto land with a potential for entry into territorial waters, is prohibited. If this occurs, the Operator shall immediately take the following actions:

- **i.** Cease operations at the location of the violation or spill.
- **ii.** Assess the cause of the water quality problem and take appropriate measures to correct the problem and/or prevent further environmental damage.
- **iii.** Notify Guam EPA of the failure to comply. All petroleum spills shall be reported immediately to:

[109] By incorporating this condition into the permit, EPA acknowledges receipt of Guam's certification conditions.

(x) Guam's Emergency 911 system

(y) Guam EPA's 24-Hour Spill Response Team at (671) 888-6488 or during working hours (671) 300-4751

(z) US Coast Guard Sector Guam (671) 355-4824

(aa) National Response Center 1-800-424-8802

iv. Submit a detailed written report to Guam EPA within five days of noncompliance that describes the nature of the event corrective action taken and/or planned, steps to be taken to prevent a recurrence, results of any samples taken, and any other pertinent information.

t. Compliance with this condition does not relieve the Operator from responsibility to maintain continuous compliance with the terms and conditions of this Order or the resulting liability from failure to comply.

u. Submittal or reporting of any of this information does not provide relief from any subsequent enforcement actions for unpermitted discharges to waters of the United States.

v. This Order is valid for five (5) Years from Date of Certification, unless otherwise approved by the Guam EPA Administrator.

w. The Operator shall be required to adhere to the current Guam Coral Spawning Moratorium dates for both hard and soft corals where in-water activities and/or construction activity in close proximity with marine waters may impair water quality. These dates can be obtained from the Guam Department of Agriculture, Division of Aquatic and Wildlife Resources, or the NOAA NMFS Pacific Islands Regional Office Habitat Conservation Division.

x. The Operator shall provide notice to Guam EPA consistent with Condition A4:

(a) Immediately upon discovery of noncompliance with the provisions of this Order.

y. A Notice of Violation/Work Stop Order will be issued if certification conditions are not adhered to or when significant or sustained water quality degradation occurs. Work or discharge shall be suspended or halted until the Operator addresses environmental problems/concerns to Guam EPA's satisfaction. Guam EPA may also levy penalties and fines (10 GCA §47111). Invalidity or enforceability of one or more provisions of this certification shall not affect any other provision of this certification.

9.10 EPA REGION 10

9.10.1 IDR10I000 Indian country within the State of Idaho, except Duck Valley Reservation lands (see Region 9)

a. Shoshone-Bannock Tribes

i. Copies of the following information must be sent to the SBT-WRD:

(a) Notice of Intents (NOI)

The Notice of Intent shall be forwarded to the SBT-WRD within thirty (30) days of receipt of submitting NOI to the USEPA.

Shoshone-Bannock Tribes Water Resources Department
PO Box 306 Pima Drive
Fort Hall, ID 83203 Phone: (208) 239-4582
Fax: (208) 239-4592
Or Email ctanaka@sbtribes.com

ii. If requested by the SBT-WRD, the permittee must submit a copy of the SWPPP to SBT- WRD within fourteen (14) days of the request.

9.10.2 ORR10I000 Indian country within the State of Oregon, except Fort McDermitt Reservation lands (see Region 9)

a. Confederated Tribes of Coos, Lower Umpqua, and Siuslaw

i. No activities allowed under the CGP shall result in the degradation of any Tribal waters or affect resident aquatic communities or resident or migratory wildlife species at any life stage.

ii. The operator shall be responsible for achieving compliance with CTCLUSI Water Quality Standards and all other tribal codes, regulations, and laws as they exist at the time that the permit is submitted.

iii. The operator shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to the CTCLUSI Water Quality Program before, or at the same time as, it is submitted to EPA.

iv. The operator shall be responsible for submitting all Stormwater Pollution Prevention Plans (SWPPP) required under this general permit to the CTCLUSI Water Quality Program for review and determination that the SWPPP is sufficient to meet Tribal Water Quality Standards, prior to the beginning of any discharge activities taking place.

v. The operator shall be responsible for reporting an exceedance to Tribal Water Quality Standards to the CTCLUSI Water Quality Program at the same time it is reported to EPA.

vi. The THPO will be provided 30 days to comment on the APE as defined in the permit application.

vii. If the project is an undertaking, a cultural resource assessment must occur. All fieldwork must be permitted by the THPO (as appropriate), conducted by qualified personnel (as outlined by the Secretary of Interior's Standards and Guidelines; http://www.nps.gov/history/local-law/arch_stnds_O.htm) and documented according to Oregon Reporting Standards (Reporting_Guidelines.pdf) (oregon.gov). The resulting report must be submitted to the THPO and the THPO must concur with the finding of effect and recommendations before any ground disturbing work can occur. The THPO requires 30 days to review all reports.

viii. The operator must obtain THPO concurrence in writing. If historic properties are present, this written concurrence will outline measures to be taken to prevent or mitigate adverse effects to historic properties.

b. Confederated Tribes of the Umatilla Indian Reservation

i. The operator shall be responsible for achieving compliance with the Confederated Tribes of the Umatilla Indian Reservation's (CTUIR) Water Quality

Standards.

ii. The operator shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to the CTUIR Water Resources Program at the address below, at the same time it is submitted to EPA.

iii. The operator shall be responsible for submitting all Stormwater Pollution Prevention Plans (SWPPP) required under this general permit to the CTUIR Water Resources Program for review and determination that the SWPPP is sufficient to meet Tribal Water Quality Standards, prior to the beginning of any discharge activities taking place.

iv. The operator shall be responsible for reporting an exceedance to Tribal Water QualityStandards to the CTUIR Water Resources Program at the same time it is reported to EPA.

Confederated Tribes of the Umatilla Indian Reservation
Water Resources Program
46411 Timíne Way
Pendleton, OR 97801
(541) 429-7200

v. The THPO will be provided 30 days to comment on the APE as defined in the permit application.

vi. If the project is an undertaking, a cultural resource assessment must occur. All fieldwork must be permitted by the Tribal Historic Preservation Office (as appropriate), conducted by qualified personnel (as outlined by the Secretary of Interior's Standards and Guidelines; http://www.nps.gov/history/local-law/arch_stnds_0.htm) and documented according to Oregon Reporting Standards (Reporting_Guidelines.pdf (oregon.gov). The resulting report must be submitted to the THPO and the THPO must concur with the finding of effect and recommendations before any ground disturbing work can occur. The THPO requires 30 days to review all reports.

vii. The operator must obtain THPO concurrence in writing. If historic properties are present, this written concurrence will outline measures to be taken to prevent or mitigate adverse effects to historic properties.

9.10.3 WAR10F000 Areas in the State of Washington, except those located on Indian country, subject to construction activity by a Federal Operator

a. For purposes of this Order, the term "Project Proponent" shall mean those that are seeking coverage under this permit, and its agents, assignees and contractors.

b. The Federal Agency shall mean the US Environmental Protection Agency. The Federal Agency shall enforce the permit and ensure that the Project Proponent complies with the conditions of the permits at all times.

c. Failure of any person or entity to comply with this Certification may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce the terms of this Certification.

d. The Certification conditions within this Order must be incorporated into EPA's final NPDES permit. Per 40 CFR 121.10(a), all certification conditions herein that satisfy the requirements of 40 CFR 121.7(d) must be incorporated into the permit. Per 40 CFR

121.10(b), the permit must clearly identify all certification conditions.

e. This Certification does not authorize exceedances of water quality standards established in chapter 173-201A WAC.

f. Discharges from construction activity must not cause or contribute to violations of the Water Quality Standards for Surface Water of the State of Washington (chapter 173-201A WAC), Ground Water Quality Standards (chapter 173- 200 WAC), Sediment Management Standards (chapter 173-204 WAC), and standards in the EPA's Revision of certain Federal water quality criteria applicable to Washington (40 CFR 131.45). Discharges that do not comply with these standards are prohibited.

g. Prior to discharge of stormwater and non-stormwater to waters of the State, the Permittee must apply all known, available, and reasonable methods of prevention, control, and treatment (AKART). This includes the preparation and implementation of an adequate Stormwater Pollution Prevention Plan (SWPPP), with all appropriate Best Management Practices (BMPs) installed and maintained in accordance with the SWPPP and the terms and conditions of the permit.

i. BMPs must be consistent with:

(a) The Stormwater Management Manual for Western Washington (most current approved edition at the time this permit was issued), for sites west of the crest of the Cascade Mountains; or

(b) The Stormwater Management Manual for Eastern Washington (most current approved edition at the time this permit was issued), for sites east of the crest of the Cascade Mountains; or

(c) Revisions to either manual, or other stormwater management guidance documents or manuals which provide equivalent level of pollution prevention, that are approved by Ecology and incorporated into this permit in accordance with the permit modification requirements of WAC 173-226-230. (For purposes of this section, the stormwater manuals listed in Appendix 10 of the Phase I Municipal Stormwater Permit are approved by Ecology); or

(d) Documentation in the SWPPP that the BMPs selected provided an equivalent level of pollution prevention, compared to the applicable stormwater management manuals, including:

- The technical basis for the selection of all stormwater BMPs (scientific, technical studies, and/or modeling) that support the performance claims for the BMPs being selected.
- An assessment of how the selected BMP will satisfy AKART requirements and the applicable federal technology-based treatment requirements under 40 CFR part 125.3.

The Stormwater Management Manuals for Eastern and Western Washington can be found at: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Stormwater-manuals.

ii. An adequate SWPPP must include a narrative and drawings. All BMPs must be clearly referenced in the narrative and marked on the drawings. The SWPPP narrative must include documentation to explain and justify the pollution

prevention decisions made for the project. Documentation must include:

(a) Information about existing site conditions (topography, drainage, soils, vegetation, etc.).

(b) Potential erosion problem areas.

(c) The 13 elements of a SWPPP, including BMPs used to address each element. Unless site conditions render the element unnecessary and the exemption is clearly justified in the SWPPP, the 13 elements are as follows:

- Preserve Vegetation/Mark Clearing Limits
- Establish Construction Access
- Control Flow Rates
- Install Sediment Controls
- Stabilize Soils
- Protect Slopes
- Protect Drain Inlets
- Stabilize Channels and Outlets
- Control Pollutants
- Control Dewatering
- Maintain BMPs
- Manage the Project
- Protect Low Impact Development (LID) BMPs

h. Discharges of stormwater and authorized non-stormwater must be monitored for turbidity (or transparency) and, in the event of significant concrete work or engineered soils, pH must also be monitored. As applicable based on project specifics, monitoring, benchmarks, and reporting requirements contained in Condition S.4. (pp.10-16) of the Washington State Construction Stormwater General Permit, effective January 1, 2021, shall apply.

i. Discharges to segments of waterbodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, phosphorus, or pH must comply with the following numeric effluent limits:

Parameter identified in 303(d) listing	Parameter Sampled	Unit	Analytical Method	Numeric Effluent Limit
• Turbidity • Fine Sediment • Phosphorus	Turbidity	NTU	SM2130	25 NTUs at the point where the stormwater is discharged from the site.
High pH	pH	su	pH meter	In the range of 6.5 – 8.5

All references and requirements associated with Section 303(d) of the Clean Water Act mean the most current EPA-approved listing of impaired waters that exists on the

effective date of the permit, or the date when the operator's complete permit application is received by EPA, whichever is later.

The EPA approved WQ Assessment can be found at: https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-improvement/Assessment-of-state-waters-303d

j. Discharges to a waterbody that is subject to a Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus must be consistent with the TMDL.

- **i.** Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges shall be consistent with any specific waste load allocations or requirements established by the applicable TMDL.
- **ii.** Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but no specific requirements have been identified, compliance with this permit will be assumed to be consistent with the approved TMDL.
- **iii.** Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with this permit will be assumed to be consistent with the approved TMDL.
- **iv.** Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.

Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus which has been completed and approved by EPA as of the effective date of the permit, or prior to the date of the operator's complete application for permit coverage is received by EPA, whichever is later.

k. Discharges to waters of the state from the following activities are prohibited:

- **i.** Concrete wastewater.
- **ii.** Wastewater from washout and clean-up of stucco, paint, form release oils, curing compounds and other construction materials.
- **iii.** Process wastewater as defined by 40 Code of Federal Regulations (CFR) 122.2.
- **iv.** Slurry materials and waste from shaft drilling, including process wastewater from shaft drilling for construction of building, road, and bridge foundations unless managed to prevent discharge to surface water.
- **v.** Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.
- **vi.** Soaps or solvents used in vehicle and equipment washing.
- **vii.** Wheel wash wastewater, unless managed to prevent discharge to surface water.
- **viii.** Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, unless managed according to appropriate controls described within the permit.

l. This Certification is valid until the expiration date including any administrative extension or termination date of the NPDES 2022 Construction General Permit. (40 CFR § 122.46)

m. The Federal Agency shall enforce and the Project Proponent must comply with all the reporting and notification conditions of the NPDES 2022 Construction General Permit in order to comply with this Order and the certification conditions herein (40 CFR § 121.11).

n. You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do all of the following within 30 days of the date of receipt of this Order:

- File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person (see addresses below). E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503 **Pollution Control Hearings Board** 1111 Israel RD SW STE 301 Tumwater, WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

CONTACT INFORMATION

Please direct all questions about this Order to:

Noel Tamboer
Department of Ecology
P.O. Box 47600
Olympia, WA 98503-7600

(360) 701-6171
noel.tamboer@ecy.wa.gov

9.10.4 WAR10I000 Indian country within the State of Washington

a. Lummi Nation

i. This certification does not exempt and is provisional upon compliance with other applicable statutes and codes administered by federal and Lummi tribal agencies. Pursuant to Lummi Code of Laws (LCL) 17.05.020(a), the operator must also obtaina land use permit from the Lummi Planning Department as provided in Title 15 of theLummi Code of Laws and regulations adopted thereunder.

ii. Pursuant to LCL 17.05.020(a), each operator shall develop and submit a Storm WaterPollution Prevention Plan to the Lummi Water Resources Division for review and approval by the Water Resources Manager prior to beginning any discharge activities.

iii. Pursuant to LCL Title 17, each operator shall be responsible for achieving compliance with the Water Quality Standards for Surface Waters of the Lummi

iv. Indian Reservation (Lummi Administrative Regulations [LAR] 17 LAR 07.010 through 17 LAR 07.210 together with supplements and amendments thereto).

v. Each operator shall submit a signed copy of the Notice of Intent (NOI) to the Lummi Water Resources Division at the same time it is submitted electronically to the Environmental Protection Agency (EPA) and shall provide the Lummi Water Resources Division the acknowledgement of receipt of the NOI from the EPA and the associated NPDES tracking number provided by the EPA within 7 calendar days of receipt from the EPA.

vi. Each operator shall submit a signed copy of the Notice of Termination (NOT) to the Lummi Water Resources Division at the same time it is submitted electronically to the EPA and shall provide the Lummi Water Resources Division the EPA acknowledgement of receipt of the NOT.

vii. Storm Water Pollution Prevention Plans, Notice of Intent, Notice of Termination and associated correspondence with the EPA shall be submitted to:

Lummi Natural Resources Department
ATTN: Water Resources Manager 2665 Kwina Road
Bellingham, WA 98226-9298

b. Port Gamble S'Klallam Tribe

i. No discharge from the project site shall cause exceedances of Port Gamble S'KlallamSurface Water Quality Standards narrative or numeric criteria in Tribal waters. This includes activities outside of Tribal lands that occur upstream of Tribal waters.

(a) If any exceedance of these water quality standards occurred, the Natural Resources Department shall be notified immediately.

- The Department shall additionally be provided a complete draft of the proposed corrective action within a reasonable timeframe and its approval will be required before any corrective action may be taken.

ii. Operators performing activities under the CGP that may affect Tribal waters will requirea permit and shall submit their plans to the Port Gamble S'Klallam Natural Resources Department for review.

- The Department has the right to require conditions outside of this Water QualityCertification prior to permit approval.

iii. No activities allowed under the CGP shall result in the degradation of any Tribal

watersor change in designated uses.

iv. No activities allowed under the CGP shall affect resident aquatic communities or resident/migratory wildlife species at any life stage.
- Biological assessment methods used to determine the effect of an activity allowedunder the CGP shall be approved by the PGST Natural Resources Department.

v. No activities allowed under the CGP shall be conducted within wetland and stream bufferzones, nor shall said activities affect in any way wetland or stream buffers, as defined by *PGST Law and Order Code 24.08.01(c)*.

vi. Concentrations for substances listed within the table in *Water Quality Standards for Surface Waters* sec. 7(7) shall not be exceeded by activities allowed under the CGP.

c. Spokane Tribe of Indians

i. Pursuant to Tribal Law and Order Code (TLOC) Chapter 30 each operator shall be responsible for achieving compliance with the Surface Water Quality Standards of the Spokane Tribe. The operator shall notify the Spokane Tribe, Water Control Board (WCB) of any spills of hazardous material and;

ii. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the WCB at the same time it is submitted to EPA.

iii. The permittee shall allow the Tribal Water Control Board or its designee to inspect and sample at the construction site as needed.

iv. Each operator shall submit a signed copy of the Notice of Termination (NOT) to the WCB at the same time it is submitted to EPA

The correspondence address for the Spokane Tribe Water Control Board is:

Water Control Board c/o Brian Crossley PO Box480
Wellpinit WA 99040
(509)626-4409
crossley@spokanetribe.com

d. Swinomish Tribe

i. Owners and operators seeking coverage under this permit must submit a copy of the Notice of Intent (NOI) to the DEP at the same time the NOI is submitted to EPA.

ii. Owners and operators must also submit to the DEP changes in NOI and/or Notices of Termination at the same time they are submitted to EPA.

iii. Owners and operators seeking coverage under this permit must also submit a Stormwater Pollution Prevention Plan to the DEP for review and approval by DEP prior to beginning any discharge activities.

e. Tulalip Tribes

i. Submission of NOI: Copies of the Notice of Intent (NOI),) Certification shall be submitted to the Tribe's Natural Resources Department to notify the Tribes of the pending project and in order for the Tribes to review the projects potential impacts to endangered or threatened species.

ii. Submission of SWPPP: A copy of the Stormwater Pollution Plans (SWPPPs) shall be submitted to the Tribe's Natural Resources Department along with the NOI during the 30 day waiting period.

iii. Submission of Monitoring Data and Reports: The results of any monitoring required by this permit and reports must be sent to the Tribe's Natural Resources Depa1tment,

iv. The Tulalip Tribes are federally recognized successors in the interest to the Snohomish, Snoqualmie, Skykomish, and other allied tribes and bands signatory to the Treaty of Point Elliott.

v. including a description of the corrective actions required and undertaken to meet effluent limits or benchmarks (as applicable).

vi. Authorization to Inspect: The Tribe's Natural Resources Department may conduct an inspection of any facility covered by this permit to ensure compliance with tribal water quality standards. The Department may enforce its certification conditions.

vii. Submission of Inspection Reports: Inspection reports must be sent to the Tribe's Natural Resources Department, including a description of the corrective actions required and undertaken to meet effluent limits or benchmarks (as applicable).

viii. Permits on-site: A copy of the pe1mit shall be kept on the job site and readily available for reference by the construction supervisor, construction managers and foreman, and Tribal inspectors.

ix. Project Management: The applicant shall ensure that project managers, construction managers and foreman, and other responsible parties have read and understand conditions of the permit, this certification, and other relevant documents, to avoid violations or noncompliance with this certification.

x. Emergency Spill Notification Requirements: In the event of a spill or the contractor shall immediately take action to stop the violation and correct the problem, and immediately repo1t spill to the Tulalip Tribes Police Department (425) 508-1565. Compliance with this condition does not relieve the applicant from responsibility to maintain continuous compliance with the tem1S and conditions of this certification or the resulting liability from failure to comply.

xi. Discharges to CERCLA Sites: This permit does not autho1ize direct stormwater discharges to certain sites undergoing remedial cleanup actions pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) unless first approved by the appropriate EPA Regional office. In the case of the Tulalip Landfill site (WAD980639256), the Tulalip Tribes also requests notification by the facility and consultation with EPA prior to discharge. Contaminants at this site may include but are not limited to: dioxins, furans, arsenic, copper, lead, zinc, 4- methyl-phenol, Hex-CB, HPAHs, PCBs, PCE, cadmium, mercury, and LPAHs.

xii. Discharge-related Activities that have Potential to Cause an Adverse Effect on Historic Properties: Installation of stormwater controls that involve subsurface disturbances may potentially have an adverse impact on historic properties.

xiii. Procedures detailed in the permit shall be completed. Richard Young, of the Tulalip Tribe's Cultural Resources Department shall be contacted prior to initiating

discharge- related activities that may have an impact on historic properties. His contact information is (360) 716-2652, ryoung@tulaliptribes-nsn.gov.

xiv. Invalidation: This certification will cease to be valid if the project is constructed and/or operated in a manner not consistent with the project description contained in

xv. the permit. This certification will also cease to be valid and the applicant must reapply with an updated application if info1mation contained in the permit is voided by subsequent submittals.

xvi. Modification: Nothing in this certification waives the Tulalip Tribes of Washington's authority to issue modifications to this ce1iification if additional impacts due to operational changes are identified, or if additional conditions are necessary to protect water quality or further protect the Tribal Communities interest.

xvii. incorporation by reference: TI1is certification does not exempt the applicant from compliance with other statues and codes administered by the Tribes, county, state and federal agencies.

xviii. Compliance with Tribe's I996 Water Quality Standards: Each permittee shall be responsible for controlling discharges and achieving compliance with the T1ibe's Water Quality Standards.

xix. Compliant with Tulalip Tribes Tidelands Management Policy: Permittee shall be responsible for achieving compliance with applicable sections of the Tulalip Tribe's Tidelands Management Policy. (Tulalip Tribal Code Title 8 Chapter 8.30).

xx. Compliant with Tulalip Tribes Environmental Infractions: Permittee shall be responsible for achieving compliance with applicable sections of the Tulalip Tribe's Environmental Infractions. (Tulalip Tribal Code Title 8 Chapter 8.20).

xxi. Where to Submit information and for further Coordination: All requested documents should be sent to the: Tulalip Tribes Natural Resources Environmental Department c/o Kurt Nelson and Valerie Streeter, 6704 Marine Drive, Tulalip, Washington 98271. For further 40 I Certification coordination with the Tulalip Tribes Natural Resources Department, please contact Mr. Kurt Nelson (360) 716-4617 knelson@tu1aliptribes- nsn.gov. 6406 Marine Dr., Tulalip WA 98271.

f. Makah Tribe

i. The permittee shall be responsible for meeting any additional permit requirements imposed by EPA necessary to comply with the Makah Tribe's Water Quality Standards if the discharge point is located within the Makah's U&A treaty reserved areas.

ii. Each permittee shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to Makah Fisheries Management, Water Quality Department at the address listed below at the same time it is submitted to the EPA.

Makah Water Quality
Makah Fisheries Management (MFM)
ray.colby@makah.com
PO Box 115
Neah bay, WA 98357

iii. All supporting documentation and certifications in the NOI related to coverage under the general permit for Endangered Species Act purposes shall be submitted to the Tribe's Habitat programs for their review.

iv. If EPA requires coverage under an individual or alternative permit, the permittee shall submit a copy of the permit to Assistant Fisheries Director, ray.colby@makah.com.

v. The permittee shall submit all Stormwater Pollution Prevention plan (SWPP) to MFM for review and approval prior to beginning any activities resulting in a discharge to Makah tribal waters.

vi. The permittee shall notify Ray Colby, ray.colby@makah.com (360) 645-3150 prior to conducting inspections at construction sites generating stormwater discharges to tribal waters.

vii. The operator shall treat dewatering discharges with controls necessary to minimize discharges of pollutants to surface waters, or ground waters, and from stormwater runoff onsite from excavations, trenches, foundations, or storage areas. To the extent feasible, at all points where dewatering is discharged, comply with the velocity dissipation using check dams, sediment traps, and grouted outlets.

g. Puyallup Tribe of Indians

i. The permittee shall be responsible for meeting any additional permit requirements imposed by EPA necessary to comply with the Puyallup Tribe's antidegradation procedures.

ii. Each permittee shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to Char Naylor, Tribal Water Quality Manager at the following e-mail address: (char.naylor@puyalluptribe-nsn.gov) at the same time it is submitted to EPA.

iii. All supporting documentation and certifications in the NOI related to coverage under the general permit for Endangered Species Act purposes shall be submitted to Char Naylor, Tribal Water Quality Manager/Assistant Fisheries Director (char.naylor@puyalluptribe-nsn.gov) for review.

iv. If EPA requires coverage under an individual or alternative permit, the permittee shall submit a copy of the permit to Char Naylor at the email address listed above.

v. The permittee shall submit all stormwater pollution prevention plans to Char Naylor for review and approval prior to beginning any activities resulting in a discharge to Puyallup tribal waters.

vi. The permittee shall contact Brandon Reynon (Brandon.reynon@puyalluptribe-nsn-gov), Tribe's Historic Preservation Officer or Jennifer Keating (Jennifer.keating@puyalluptribe-nsn.gov), Tribe's Assistant Historic Preservation Officer regarding historic properties and cultural resources.

vii. To minimize the discharge of pollutants to groundwater or surface waters from stormwater that is removed from excavations, trenches, foundations, vaults, or other storage areas, treat dewatering discharges with controls necessary to minimize discharges of pollutants. Examples of appropriate controls include sediment basins or sediment traps, sediment socks, dewatering tanks, tube

settlers, weir tanks, and filtration systems (e.g., bag or sand filters) that are designed to remove sediment.

To the extent feasible, utilize vegetated, upland areas of the site to infiltrate dewatering water before discharge. At all points where dewatering water is discharged, utilize velocity dissipation controls. Examples of velocity dissipation devices include check dams, sediment traps, riprap, and grouted riprap at outlets.

viii. The permittee shall provide and maintain natural buffers to the maximum extent possible (and/or equivalent erosion and sediment controls) when tribal waters are located within 100 feet of the boundaries. If infeasible to provide and maintain an undisturbed 100 foot natural buffer, erosion and sediment controls to achieve the sediment load reduction equivalent to a 100-foot undisturbed natural buffer shall be required.

10 ADDITIONAL PERMIT CONDITIONS APPLICABLE TO LANDS OF EXCLUSIVE FEDERAL JURISDICTION

All projects that discharge to receiving waters located within Lands of Exclusive Federal Jurisdiction must comply with the provisions in this Part in addition to Parts 1, 2, and 3.2 thru 8 of this permit.[110] [111] [112]

10.1 INSPECTION FREQUENCIES

You must comply with the increased inspection frequencies specified in Part 4.3.1.

10.2 STABILIZATION DEADLINES

You must comply with the stabilization deadlines specified in Part 2.2.14b.iv.

10.3 TURBIDITY BENCHMARK MONITORING FOR DEWATERING DISCHARGES

You must comply with the benchmark monitoring requirements in Part 3.3 for sites discharging dewatering water.

10.4 ADDITIONAL WATER QUALITY-BASED LIMITATIONS FOR STORMWATER AND AUTHORIZED NON-STORMWATER DISCHARGES

Your discharge must not contain:

a. Observable deposits of floating solids, scum, sheen, or other substances;

b. An observable film, sheen, or discoloration from oil and grease; or

c. Foam or substances that produce an observable change in color, odor, or cloudiness in the discharge.

[110] The requirements of Part 9 do not apply to projects within Lands of Exclusive Federal Jurisdiction.

[111] This section does not apply to projects within Denali National Park and Preserve or projects that are eligible for coverage in Appendix B for federal facilities in Vermont, Delaware, and Colorado and for areas in Washington where construction activities are carried out by a Federal Operator.

[112] EPA notes that reference to water quality standards in Part 7.2.6(b)(vi)(c) for projects that discharge to receiving waters in Lands of Exclusive Federal Jurisdiction means the requirements of Part 10.4.a-c.

If any of these conditions are observed, except with respect to dewatering discharges, you must treat this as triggering corrective action under Part 5, which requires that you take corrective action and document the corrective actions as required in Part 5.2.[113]

For sites discharging from dewatering operations, you must implement corrective actions if any of the conditions described in Part 5.1.5 occur and comply with the requirements of Part 5.2.2 for responding to these conditions.

[113] Consistent with this requirement, with respect to projects discharging to receiving waters in Lands of Exclusive Federal Jurisdiction, the triggering condition in Part 5.1.3 relating to water quality standards means that one of the discharge conditions in this section (Part 10.4.a-c) has occurred.

APPENDIX C

SWPPP Inspection Report Form

This page is left blank intentionally.

Section A – General Information (If necessary, complete additional inspection reports for each separate inspection location.)	
Inspector Information	
Inspector Name:	**Title:**
Company Name:	**Email:**
Address:	**Phone Number:**
Inspection Details	
Inspection Date:	**Inspection Location:**
Inspection Start Time:	**Inspection End Time:**
Current Phase of Construction:	**Weather Conditions During Inspection:**

Did you determine that any portion of your site was unsafe for inspection per CGP Part 4.5? ☐ Yes ☐ No

If "Yes," provide the following information:

Location of unsafe conditions:

The conditions that prevented you inspecting this location:

Indicate the required inspection frequency: (Check all that apply. You may be subject to different inspection frequencies in different areas of the site.)

Standard Frequency (CGP Part 4.2):

☐ At least once every 7 calendar days; **OR**

☐ Once every 14 calendar days *and* within 24 hours of the occurrence of either:

- A storm event that produces 0.25 inches or more of rain within a 24-hour period, or
- A snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period

Increased Frequency (CGP Part 4.3.1) (If site discharges to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3):

☐ Once every 7 calendar days *and* within 24 hours of the occurrence of either:

- A storm event that produces 0.25 inches or more of rain within a 24-hour period, or
- A snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period

Reduced Frequency (CGP Part 4.4):

☐ For stabilized areas: Twice during first month, no more than 14 calendar days apart; then once per month after first month until permit coverage is terminated

☐ For stabilized areas on "linear construction sites": Twice during first month, no more than 14 calendar days apart; then once more within 24 hours of the occurrence of either:

- A storm event that produces 0.25 inches or more of rain within a 24-hour period, or
- A snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period

☐ For arid, semi-arid, or drought-stricken areas during seasonally dry periods or during drought: Once per month and within 24 hours of the occurrence of either:

- A storm event that produces 0.25 inches or more of rain within a 24-hour period, or
- A snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period

☐ For frozen conditions where construction activities are being conducted: Once per month

Was this inspection triggered by a storm event producing 0.25 inches or more of rain within a 24-hour period? ☐ Yes ☐ No

If "Yes," how did you determine whether the storm produced 0.25 inches or more of rain?

☐ On-site rain gauge

☐ Weather station representative of site.
Weather station location:

Total rainfall amount that triggered the inspection (inches):

Was this inspection triggered by a snowmelt discharge from a storm event producing 3.25 inches or more of snow within a 24-hour period? ☐ Yes ☐ No

If "Yes," how did you determine whether the storm produced 3.25 inches or more of snow?

☐ On-site rain gauge

☐ Weather station representative of site.
Weather station location:

Total snowfall amount that triggered the inspection (inches):

Section B – Condition and Effectiveness of Erosion and Sediment (E&S) Controls (CGP Part 2.2) (Insert additional rows if needed)					
Type and Location of E&S Control	**Conditions Requiring Routine Maintenance?[1]**	**If "Yes," How Many Times (Including This Occurrence) Has This Condition Been Identified?**	**Conditions Requiring Corrective Action?[2, 3]**	**Date on Which Condition First Observed (If Applicable)?**	**Description of Conditions Observed**
1.	☐ Yes ☐ No		☐ Yes ☐ No		
2.	☐ Yes ☐ No		☐ Yes ☐ No		
3.	☐ Yes ☐ No		☐ Yes ☐ No		
4.	☐ Yes ☐ No		☐ Yes ☐ No		
5.	☐ Yes ☐ No		☐ Yes ☐ No		
If the same routine maintenance was found to be necessary three or more times for the same control at the same location (including this occurrence), follow the corrective action requirements and record the required information in your corrective action log, or describe here why you believe the specific condition should still be addressed as routine maintenance:					

[1] Routine maintenance includes minor repairs or other upkeep performed to ensure that the site's stormwater controls remain in effective operating condition, not including significant repairs or the need to install a new or replacement control. Routine maintenance is also required for specific conditions: (1) for perimeter controls, whenever sediment has accumulated to half or more the above-ground height of the control (CGP Part 2.2.3.c.i); (2) where sediment has been tracked-out from the site onto paved roads, sidewalks, or other paved areas (CGP Part 2.2.4.d); (3) for inlet protection measures, when sediment accumulates, the filter becomes clogged, and/or performance is compromised (CGP Part 2.2.10.b); and (4) for sediment basins, as necessary to maintain at least half of the design capacity of the basin (CGP Part 2.2.12.f)

[2] Corrective actions are triggered only for specific conditions (CGP Part 5.1):

1. A stormwater control needs a significant repair or a new or replacement control is needed, or, in accordance with Part 2.1.4.c, you find it necessary to repeatedly (i.e., three (3) or more times) conduct the same routine maintenance fix to the same control at the same location (unless you document in your inspection report under Part 4.7.1.c that the specific reoccurrence of this same problem should still be addressed as a routine maintenance fix under 2.1.4); or
2. A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly; or
3. Your discharges are not meeting applicable water quality standards; or
4. A prohibited discharge has occurred (see CGP Part 1.3); or
5. During the discharge from site dewatering activities:
   a. The weekly average of your turbidity monitoring results exceeds the 50 NTU benchmark (or alternate benchmark if approved by EPA pursuant to Part 3.3.2.b); or
   b. You observe or you are informed by EPA, State, or local authorities of the presence of the conditions specified in Part 4.6.3.e.

[3] If a condition on your site requires a corrective action, you must also fill out a corrective action log found at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates. See CGP Part 5.4 for more information.

Section C – Condition and Effectiveness of Pollution Prevention (P2) Practices and Controls (CGP Part 2.3) (Insert additional rows if needed)					
Type and Location of P2 Practices and Controls	**Conditions Requiring Routine Maintenance?[1]**	**If "Yes," How Many Times (Including This Occurrence) Has This Condition Been Identified?**	**Conditions Requiring Corrective Action?[2, 3]**	**Date on Which Condition First Observed (If Applicable)?**	**Description of Conditions Observed**
1.	☐ Yes ☐ No		☐ Yes ☐ No		
2.	☐ Yes ☐ No		☐ Yes ☐ No		
3.	☐ Yes ☐ No		☐ Yes ☐ No		
4.	☐ Yes ☐ No		☐ Yes ☐ No		
5.	☐ Yes ☐ No		☐ Yes ☐ No		
If the same routine maintenance was found to be necessary three or more times for the same control at the same location (including this occurrence), follow the corrective action requirements and record the required information in your corrective action log, or describe here why you believe the specific condition should still be addressed as routine maintenance:					

Section D – Stabilization of Exposed Soil (CGP Part 2.2.14) (Insert additional rows if needed)					
Specific Location That Has Been or Will Be Stabilized	**Stabilization Method and Applicable Deadline**	**Stabilization Initiated?**	**Final Stabilization Criteria Met?**	**Final Stabilization Photos Taken?**	**Notes**
1.		☐ Yes ☐ No If "Yes," date initiated:	☐ Yes ☐ No If "Yes," date criteria met:	☐ Yes ☐ No	
2.		☐ Yes ☐ No If "Yes," date initiated:	☐ Yes ☐ No If "Yes," date criteria met:	☐ Yes ☐ No	
3.		☐ Yes ☐ No If "Yes," date initiated:	☐ Yes ☐ No If "Yes," date criteria met:	☐ Yes ☐ No	
4.		☐ Yes ☐ No If "Yes," date initiated:	☐ Yes ☐ No If "Yes," date criteria met:	☐ Yes ☐ No	
5.		☐ Yes ☐ No If "Yes," date initiated:	☐ Yes ☐ No If "Yes," date criteria met:	☐ Yes ☐ No	

Section E – Description of Discharges (CGP Part 4.6.2) (Insert additional rows if needed)	
Was a discharge (not including dewatering) occurring from any part of your site at the time of the inspection?[4] ☐ Yes ☐ No **If "Yes," for each point of discharge, document the following:** • The visual quality of the discharge. • The characteristics of the discharge, including color; odor; floating, settled, or suspended solids; foam; oil sheen; and other indicators of stormwater pollutants. • Signs of the above pollutant characteristics that are visible from your site and attributable to your discharge in receiving waters or in other constructed or natural site drainage features.	
Discharge Location	**Observations**
1.	
2.	
3.	
4.	
5.	

[4] If a dewatering discharge was occurring, you must conduct a dewatering inspection pursuant to CGP Part 4.3.2 and complete a separate dewatering inspection report.

Section F – Signature and Certification (CGP Part 4.7.2)	
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."	
MANDATORY: Signature of Operator or "Duly Authorized Representative:"	
Signature:	**Date:**
Printed Name:	**Affiliation:**
OPTIONAL: Signature of Contractor or Subcontractor	
Signature:	**Date:**
Printed Name:	**Affiliation:**

General Tips for Using This Template

This Site Inspection Report Template is provided to assist you in preparing site inspection reports for EPA's 2022 Construction General Permit (CGP). If you are covered under the 2022 CGP, you can use this template to create a site inspection report form that is customized to the specific circumstances of your site and that complies with the minimum reporting requirements of Part 4.7 of the permit. Note that the use of this form is optional; you may use your own site inspection report form provided it includes the minimum information required in Part 4.7 of the CGP.

This template does not address the CGP's inspection reporting requirements related to dewatering activities. A separate inspection template has been developed specifically for dewatering activities and is available at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates.

Keep in mind that this document is a template and not an "off-the-shelf" inspection report that is ready to use without some modification. You must first customize this form to include the specifics of your project in order for it to be useable for your inspection reports. Once you have entered all of your site-specific information into the blank fields, you may use this form to complete inspection reports.

The following tips for using this template will help you ensure that the minimum permit requirements are met:

- **Review the inspection requirements.** Before you start developing your inspection report form, read the CGP's Part 4 inspection requirements. This will ensure that you have a working understanding of the permit's underlying inspection requirements.
- **Complete all required blank fields.** Fill out all blank fields. Only by filling out all fields will the template be compliant with the requirements of the permit. (Note: Where you do not need the number of rows provided in the template form for your inspection, you may delete these or cross them off as you see fit. Or, if you need more space to document your findings, you may insert additional rows in the electronic version of this form or use the bottom of the page in the field version of this form.)
- **Use your site map to document inspection findings.** In several places in the template, you are directed to specify the location of certain features of your site, including where stormwater controls are installed and where you will be stabilizing exposed soil. You are also asked to fill in location information for unsafe conditions and the locations of any discharges occurring during your inspections. Where you are asked for location information, EPA encourages you to reference the point on your SWPPP site map that corresponds to the requested location on the inspection form. Using the site map as a tool in this way will help you conduct efficient inspections, will assist you in evaluating problems found, and will ensure proper documentation.
- **Complete the inspection report within 24 hours of completing a site inspection.** You must complete an inspection report in accordance with Part 4.7.1 of the CGP.
- **Include the inspection form with your SWPPP.** Once your form is complete, make sure to include a copy of the inspection form in your SWPPP in accordance with Part 7.2.7.e of the CGP.
- **Retain copies of all inspection reports with your records.** You must also retain in your records copies of all inspection reports in accordance with the requirements in Part 4.7.3 of the CGP. These reports must be retained for at least 3 years from the date your permit coverage expires or is terminated in accordance with the requirements in Part 4.7.4 of the CGP.

Instructions for Section A

Inspector Name

Enter the name of the person that conducted the inspection. Include the person's contact information (title, affiliated company name, address, email, and phone number).

Inspection Date and Time
Enter the date you performed the inspection and the time you started and ended the inspection.

Weather Conditions During Inspection
Enter the weather conditions occurring during the inspection, e.g., sunny, overcast, light rain, heavy rain, snowing, icy, windy.

Current Phase of Construction
If this project is being completed in more than one phase, indicate which phase it is currently in.

Inspection Location
If your project has multiple locations where you conduct separate inspections, specify the location where this inspection is being conducted. If only one inspection is conducted for your entire project, enter "Entire Site." If necessary, complete additional inspection report forms for each separate inspection location.

Unsafe Conditions for Inspection (CGP Part 4.5.7)
Inspections are not required where a portion of the site or the entire site is subject to unsafe conditions. These conditions should not regularly occur and should not be consistently present on a site. Generally, unsafe conditions are those that render the site (or a portion of it) inaccessible or that would pose a significant probability of injury to applicable personnel. Examples could include severe storm or flood conditions, high winds, and downed electrical wires.

If your site, or a portion of it, is affected by unsafe conditions during the time of your inspection, provide a description of the conditions that prevented you from conducting the inspection and what parts of the site were affected. If the entire site was considered unsafe, specify the location as "Entire Site."

Inspection Frequency
Check all the inspection frequencies that apply to your project. Note that you may be subject to different inspection frequencies in different areas of your site.

Inspection Triggered by a Storm Event
If you were required to conduct this inspection because of a storm event that produced 0.25 inches or more of rain within a 24-hour period, indicate whether you relied on an on-site rain gauge or a nearby weather station (and where the weather station is located). Also, specify the total amount of rainfall for this specific storm event.

If you were required to conduct this inspection because of a snowmelt discharge from a storm event that produced 3.25 inches or more of snow within a 24-hour period, then indicate whether you relied on an on-site measurement or a nearby weather station (and where the weather station is located). Also, specify the total amount of snowfall for this specific storm event.

Instructions for Section B

Type and Location of Erosion and Sediment (E&S) Controls
Provide a list of all erosion and sediment (E&S) controls that your SWPPP indicates will be installed and implemented at your site. This list must include at a minimum all E&S controls required by CGP Part 2.2. Include also any natural buffers established under CGP Part 2.2.1. Buffer requirements apply if your project's earth-disturbing activities will occur within 50 feet of a discharge to receiving water. You may group your E&S controls on your form if you have several of the same type of controls (e.g., you may group "Inlet Protection Measures," "Perimeter Controls," and "Stockpile Controls" together on one line), but if there are any problems with a specific control, you must separately identify the location of the control, whether routine maintenance or corrective action is necessary, and in the notes section you must describe the specifics about the problem you observed.

Conditions Requiring Routine Maintenance?
Answer "Yes" if the E&S control requires routine maintenance as defined in footnote 1 of this template. Note that in many cases, "Yes" answers are expected and indicate a project with an active operation and maintenance program. You should also answer "Yes" if work to fix the problem is still ongoing from the previous inspection, though necessary work must be initiated immediately and completed by the end of the next business day or within seven calendar days if documented in accordance with CGP Part 2.1.4.b.

If "Yes," How Many Times (Including this Occurrence) Has this Condition Been Identified?
Indicate how many times the routine maintenance has been required for the same control at the same location.

Conditions Requiring Corrective Action?
Answer "Yes" if you found any of the conditions listed in footnote 2 in this template to be present during your inspection (CGP Part 5.1). If you answer "Yes," you must take corrective action and complete a corrective action log, found at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates. You should also answer "Yes" if work to fix the problem from a previous inspection is still ongoing, though the operator must comply with the corrective action deadlines in CGP Part 5.2.

Date on Which Condition First Observed (If Applicable)?
Provide the date on which the condition that triggered the need for routine maintenance or corrective action was first identified. If the condition was just discovered during this inspection, enter the inspection date. If the condition is a carryover from a previous inspection, enter the original date of the condition's discovery.

Description of Conditions Observed
For each E&S control and the area immediately surrounding it, describe whether the control is properly installed and whether it appears to be working to minimize sediment discharge. Indicate also whether a new or modified control is necessary to comply with the permit. Describe any problem condition(s) you observed such as the following:

1. Failure to install or to properly install a required E&S control
2. Damage or destruction to an E&S control caused by vehicles, equipment, or personnel, a storm event, or other event
3. Mud or sediment deposits found downslope from E&S controls, including in receiving waters, or on nearby streets, curbs, or open conveyance channels
4. Sediment tracked out onto paved areas by vehicles leaving construction site
5. Noticeable erosion or sedimentation at discharge outlets or at adjacent streambanks or channels
6. Erosion of the site's sloped areas (e.g., formation of rills or gullies)

7. E&S control is no longer working due to lack of maintenance
8. Other incidents of noncompliance

Describe also why you think the problem condition(s) occurred as well as actions (e.g., routine maintenance or corrective action) you will take or have taken to fix the problem.

For buffer areas, make note of whether they are marked off as required, whether there are signs of construction disturbance within the buffer, which is prohibited under the CGP, and whether there are visible signs of erosion resulting from discharges through the area.

If routine maintenance or corrective action is required, briefly note the reason. If routine maintenance or corrective action has been completed, make a note of the date it was completed and what was done. *If corrective action is required, note that you will need to complete a separate corrective action log describing the condition and your work to fix the problem*.

Routine Maintenance Need Has Been Found to be Necessary Three (3) or More Times for the Same Control at the Same Location (Including this Occurrence)
If routine maintenance has been required three (3) or more times for the same control at the same location, the permit requires (CGP Part 2.1.4.c) you to fix the problem using the corrective action procedures in CGP Part 5 or to document why you believe the reoccurring problem can be addressed as a routine maintenance fix. If you believe the problem can continue to be fixed as routine maintenance, describe why you believe the specific condition should still be addressed as routine maintenance.

Instructions for Section C

Type and Location of Pollution Prevention (P2) Practices and Controls
Provide a list of all pollution prevention (P2) practices and controls that are implemented at your site. This list must include all P2 practices and controls required by CGP Part 2.3 and those that are described in your SWPPP.

Conditions Requiring Routine Maintenance?
Answer "Yes" if the P2 practice or control requires routine maintenance as defined in footnote 1of this template. Note that in many cases, "Yes" answers are expected and indicate a project with an active operation and maintenance program. You should also answer "Yes" if work to fix the problem is still ongoing from the previous inspection, though necessary work must be initiated immediately and completed by the end of the next business day or within seven calendar days if documented in accordance with CGP Part 2.1.4.b.

If "Yes," How Many Times (Including this Occurrence) Has this Condition Been Identified?
Indicate how many times the routine maintenance has been required for the same practice or control at the same location.

Conditions Requiring Corrective Action?
Answer "Yes" if you found any of the conditions listed in footnote 2 in this template to be present during your inspection (CGP Part 5.1). If you answer "Yes," you must take corrective action and complete a corrective action log, found at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates. You should also answer "Yes" if work to fix the problem from a previous inspection is still ongoing, though the operator must comply with the corrective action deadlines in CGP Part 5.2.

Date on Which Condition First Observed (If Applicable)?

Provide the date on which the condition that triggered the need for maintenance or corrective action was first identified. If the condition was just discovered during this inspection, enter the inspection date. If the condition is a carryover from a previous inspection, enter the original date of the condition's discovery.

Description of Conditions Observed

For each P2 control and the area immediately surrounding it, describe whether the control is properly installed, and whether it appears to be working to minimize or eliminate pollutant discharges. Indicate also whether a new or modified control is necessary to comply with the permit. Describe any problem condition(s) you observed such as the following:

1. Failure to install or to properly install a required P2 control
2. Damage or destruction to a P2 control caused by vehicles, equipment, or personnel, or a storm event
3. Evidence of a spill, leak, or other type of pollutant discharge, or failure to have properly cleaned up a previous spill, leak, or other type of pollutant discharge
4. Spill response supplies are absent, insufficient, or not where they are supposed to be located
5. Improper storage, handling, or disposal of chemicals, building materials or products, fuels, or wastes
6. P2 control is no longer working due to lack of maintenance
7. Other incidents of noncompliance

Describe also why you think the problem condition(s) occurred as well as actions (e.g., routine maintenance or corrective action) you will take or have taken to fix the problem.

If routine maintenance or corrective action is required, briefly note the reason. If routine maintenance or corrective action has been completed, make a note of the date it was completed and what was done. *If corrective action is required, note that you will need to complete a separate corrective action log describing the condition and your work to fix the problem*.

Routine Maintenance Need Was Found to be Necessary Three (3) or More Times for the Same Control at the Same Location (Including this Occurrence)

If routine maintenance has been required three (3) or more times for the same control at the same location, the permit requires (CGP Part 2.1.4.c) you to fix the problem using the corrective action procedures in CGP Part 5 or to document why you believe the reoccurring problem can be addressed as a routine maintenance fix. If you believe the problem can continue to be fixed as routine maintenance, describe why you believe the specific condition should still be addressed as routine maintenance.

Instructions for Section D

Specific Location That Has Been or Will Be Stabilized

List all areas where soil stabilization is required to begin because construction work in that area has permanently stopped or temporarily stopped (i.e., work will stop for 14 or more days), and all areas where stabilization has been implemented (CGP Part 2.2.14).

Stabilization Method and Applicable Deadline

For each area, specify the method of stabilization (e.g., hydroseed, sod, planted vegetation, erosion control blanket, mulch, rock).

Specify also which of the following stabilization deadlines apply to this location:

1. 5 acres or less of land disturbance occurring at any one time at site: Complete no later than 14 calendar days after stabilization initiated.
2. More than 5 acres of land disturbance occurring at any one time at site: Complete no later than 7 calendar days after stabilization initiated.
3. Arid, semi-arid, and drought-stricken areas: See CGP Part 2.2.14.b.i.
4. Unforeseen circumstances: See CGP Part 2.2.14.b.ii.
5. Discharges to a sediment- or nutrient-impaired water or to a water identified as Tier 2, 2.5, or 3 for antidegradation purposes: Complete no later than 7 days after stabilization initiated.

Stabilization Initiated?
For each area, indicate whether stabilization has been initiated. If "Yes," then enter the date stabilization was initiated.

Final Stabilization Criteria Met?
For each area, indicate whether the final stabilization criteria in CGP Part 2.2.14.c have been met. If "Yes," then enter the date final stabilization criteria were met.

Final Stabilization Photos Taken?
Answer "Yes" if you have taken photos before and after meeting the stabilization criteria as required in CGP Part 8.2.1.a.

Notes
For each area where stabilization has been initiated, describe the progress that has been made and what additional actions are necessary to complete stabilization. Note the effectiveness of stabilization in preventing erosion. If stabilization has been initiated but not completed, make a note of the date it is to be completed. If stabilization has been completed, make a note of the date it was completed. If stabilization has not yet been initiated, make a note of the date it is to be initiated and the date it is to be completed.

Instructions for Section E

You are only required to complete this section if a discharge is occurring at the time of the inspection (CGP Part 4.6.2).

Was a discharge (not including dewatering) occurring from any part of your site at the time of the inspection?
During your inspection, examine all points of discharge from your site, and determine whether a discharge is occurring. If a dewatering discharge was occurring, you must conduct a dewatering inspection pursuant to CGP Part 4.3.2. If there is a discharge, answer "Yes" and complete the questions below regarding the specific discharge. If there is not a discharge, answer "No" and skip to the next page.

Discharge Location (Repeat as necessary if there are multiple points of discharge.)
Specify the location on your site where the discharge is occurring. The location may be an outlet from a stormwater control or constructed stormwater channel, a discharge into a storm sewer inlet, or a specific point on the site. Be as specific as possible; it is recommended that you refer to a precise point on your site map.

Observations
Document the visual quality of the discharge and take note of the characteristics of the stormwater discharge, including color; odor; floating, settled, or suspended solids; foam; oily sheen; and other indicators of stormwater pollutants. Also, document signs of these same pollutant characteristics that are visible from your site and attributable to your discharge in receiving waters or in other constructed or natural site drainage features.

Instructions for Section F

Each inspection report must be signed and certified to be considered complete (CGP Part 4.7.2).

Operator or "Duly Authorized Representative" – MANDATORY (CGP Appendix G Part G.11.2 and CGP Appendix H Section X)

At a minimum, the site inspection report must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply:

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation*: By a responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship*: By a general partner or the proprietor, respectively.
- *For a municipality, State, Federal, or other public agency*: By either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a Federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

Sign, date and print your name and affiliation.

Contractor or Subcontractor - OPTIONAL

Where you rely on a contractor or subcontractor to complete the site inspection report, you should consider requiring the individual(s) to sign and certify each report. Note that this does not relieve you, the permitted operator, of the requirement to sign and certify the site inspection report as well. If applicable, sign, date, and print your name and affiliation.

Note

While EPA has made every effort to ensure the accuracy of all instructions contained in this template, it is the permit, not this template, that determines the actual obligations of regulated construction stormwater discharges. In the event of a conflict between this template and any corresponding provision of the CGP, you must abide by the requirements in the permit. EPA welcomes comments on this Site Inspection Report Template at any time and will consider those comments in any future revision. You may contact EPA for CGP-related inquiries at cgp@epa.gov

APPENDIX D

SWPPP Training Log Form

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Stormwater Pollution Prevention (SWPPP) Training Log

Project Name:	General Electric – Upland Disposal Facility Construction
Project Location:	339 Woodland Road, Lee, MA 01238
Instructor's Name:	
Instructor's Title:	
Course Location:	
Course Date:	
Course Duration:	
Stormwater Training Topics:	☐ Sediment and Erosion Controls ☐ Stabilization Controls ☐ Pollution Prevention Measures ☐ Emergency Procedures ☐ Inspections/Corrective Actions
Training Objective:	

Attendee Name	Company

APPENDIX E

SWPPP Delegation of Authority Form

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Stormwater Pollution Prevention (SWPPP) Delegation of Authority

I, _____ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the Construction General Permit (CGP), at the General Electric Upland Disposal Facility Construction Site. The designee is authorized to sign any reports, stormwater pollution prevention plans, and all other documents required by the permit.

Name of Person or Position:	
Company:	
Address:	
City, State, Zip Code:	
Phone:	

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in Appendix I of EPA's CGP, and that the designee above meets the definition of a "duly authorized representative" as set forth in Appendix I.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name:	
Company:	
Title:	
Signature:	
Date:	

APPENDIX F

Corrective Action Report Log

This page is left blank intentionally.

Corrective Action Log

TO BE FILLED OUT BY SITE OPERATOR

Describe repair, replacement, and maintenance of control measures, actions taken, date completed, and note the person that completed the work.

	Location/Station	Corrective Action	Date Completed	Person Responsible
Operator Signature:			**Date:**	

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