1 Plastics Avenue
Pittsfield, MA 01201
matthew.calacone@geaerospace.com
413-553-6614

Via Electronic Mail

October 8, 2025

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 Site Preparation Supplemental Information Package

Dear Mr. Fisher:

Enclosed for EPA's review and approval is the *Upland Disposal Facility Site Preparation Supplemental Information Package*.

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

Very truly yours,

Matthew Calacone / amm

Matthew Calacone
Senior Project Manager
GE Aerospace

Enclosure

Cc: (via electronic mail except where noted)
Joshua Fontaine, EPA
John Kilborn, EPA
Alexander Carli-Dorsey, EPA
Lisa Danek-Burke, EPA
Jeffrey Dewey, EPA
Christopher Ferry, ASRC Federal
Thomas Czelusniak, HDR Inc.
Scott Campbell, Taconic Ridge Environmental
Izabella Zapisek, Taconic Ridge Environmental
Michael Gorski, MassDEP

Tamara Cardona-Marek, MassDEP
Ben Guidi, MassDEP
Jason Perry, MassDEP
Michelle Craddock, MassDEP
Jeffrey Mickelson, MassDEP
Mark Tisa, MassDFW
Eve Schluter, MassDFW
MassDFW, Project Inbox
Betsy Harper, MA AG
Traci Iott, CT DEEP
Graham Stevens, CT DEEP
Carol Papp, CT DEEP
Lori DiBella, CT AG
Danielle Perry, NOAA
James McGrath, City of Pittsfield
Pittsfield Library at the Berkshire Atheneum (hard copy only)
Andrew Cambi, City of Pittsfield
Michael Coakley, PEDA
Melissa Provencher, BRPC
Jay Green, Town Administrator, Town of Lenox
Katherine O'Neil, Lenox Library (hard copy only)
R. Christopher Brittain, Town of Lee (plus hard copy)
Lee Library (hard copy only)
Town Manager, Great Barrington
Town Administrator, Stockbridge
Town Administrator, Sheffield
Jim Wilusz, Tri Town Health Dept.
Lance Hauer, GE
Eric Merrifield, GE
Andrew Inglis, GE
Kevin Mooney, GE
Robert Gibson, GE
Rachel Leary, GE
Mark Gravelding and Philip Batten, Arcadis
Michael Werth, Anchor QEA
Dennis Lowry, AECOM
James Bieke, Counsel for GE
Public Information Repository at David M. Hunt Library in Falls Village, CT (plus hard copy)
GE Internal Repository (plus hard copy)

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J.H. MAXYMILLIAN, INC.

General Electric Company

Upland Disposal Facility Site Preparation Supplemental Information Package

GE-Pittsfield/Housatonic River Site

October 2025

Upland Disposal Facility Site Preparation Supplemental Information Package

GE-Pittsfield/Housatonic River Site

October 2025

Prepared By:
Arcadis U.S., Inc.
One Lincoln Center, 110 West Fayette Street, Suite 300
Syracuse, New York 13202
Phone: 315 446 9120
Fax: 315 449 0017

Prepared For:
General Electric Company
1 Plastics Avenue
Pittsfield, Massachusetts 01201

In conjunction with:
J.H. Maxymillian, Inc.
1801 East Street
Pittsfield, MA 01201
413.499.3050

Our Ref:
30150026

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Abbreviations

BMP	best management practice
CEPP	Contingency and Emergency Procedures Plan
EPA	U.S. Environmental Protection Agency
GW	groundwater
HASP	Health and Safety Plan
HBM	hazardous building material
QOL	quality of life
Revised QOL Plan	Revised Quality of Life Plan
SIP	Supplemental Information Package
UDF	Upland Disposal Facility

1 Introduction and Background

1.1 Purpose

In accordance with the requirements of the Final Revised Rest of River Statement of Work specifying the deliverables and activities that GE will conduct to design and implement the Rest of River 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 the implementation of site preparation construction activities at the UDF site. This SIP includes construction-related information pertaining to the planned site preparation activities to be performed by the selected construction contractor for those activities (J.H. Maxymillian, Inc., the Contractor). The UDF site Preparation work associated with this SIP represents the initial phase of construction work for the UDF and is based on the design requirements of the UDF Revised Final Design Plan (Arcadis 2024a) with relevant updates incorporated in accordance with the U.S. Environmental Protection Agency's (EPA's) March 10, 2025 conditional approval letter for that design plan.

1.2 Report Organization

The report is organized into the sections listed below. Each section has been prepared based in information provided by the Contractor.

- Section 2 provides a summary of the site preparation operations plan that includes a general description of 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 preparation 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 site preparation work.
- Section 6 presents the anticipated project schedule for the UDF site preparation work.
- Section 7 discusses additional project activities and submittals, including information on backfill sources, a discussion of the decommissioning of certain piezometers and groundwater wells within the UDF footprint, and a discussion of GE's plans regarding the stockpiled debris materials present at the site.

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

- Appendix A contains the Contractor's site-specific Health and Safety Plan.
- Appendix B contains the technical specifications for this site preparation project.
- Appendix C contains project design drawings for this site preparation project.
- Appendix D contains logs for the piezometer and well decommissioning activities mentioned above.
- Appendix E contains a work plan for sampling the above-mentioned stockpiled debris materials.

2 Site Preparation Operations Plan

2.1 Work Tasks

The operations plan for site preparation activities is based on the Contractor's planned execution of the project work. Key aspects of the Contractor's planned operations are described in the following sections.

2.1.1 Mobilization

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

2.1.1.1 Property Access

The Contractor will access the UDF site from two locations. The first location will be from Woodland Road at the southern end of the site in the area of the former residential property. This (first) access location will serve as the project's main point of entry to the site. The second location will be from Woodland Road toward the northern end of the site near the vernal pool area. Use of this (second) access location will be limited to work pertaining to the vernal pool site preparation activities (described below). Waterline installation work will be accessed directly from Woodland Road. These locations are shown on Figure 1 and the design drawings in Appendix C.

2.1.1.2 Transportation Routes for Construction

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

2.1.1.3 Traffic Management

During work on Woodland Road for installation of the project waterline and for site preparation 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 areas. Contractor personnel will serve as flaggers when needed to manage traffic flow in the work areas. For work on Woodland Road associated with the utility pole relocation in the area of the former residential property, the separate contractor performing that pole relocation work for the utility owner will provide traffic management measures as required by the utility owner.

2.1.1.4 Erosion Control and Stormwater Management

During mobilization to the UDF site, the Contractor will install erosion control materials consisting of silt fence and/or straw wattles at the locations described and shown in the project design drawings provided in Appendix C. These will include erosion control materials associated with the two temporary construction entrances, the waterline in Woodland Road, the vernal pool, and the soil stockpile location. Due to the nature and type of site work anticipated for the project as well as recognition of existing site features and conditions, changes to or disruption of current site drainage patterns is not expected.

2.1.1.5 Equipment and Material Staging

Except for the waterline installation area on Woodland Road, all equipment and materials will be staged within the project work areas. Equipment and materials used for the waterline installation work will be staged within the UDF site near to the main (southern) UDF site access location. Equipment and materials used for site preparation work at the vernal pool area will be staged outside of the roadway area in a manner that does not hinder traffic flow.

2.1.1.6 Temporary Facilities

Due to the anticipated short duration for this site preparation project, temporary facilities will be limited to portable toilet(s), a construction equipment storage unit, and possibly a small office trailer. In the event that an office trailer is brought to the site, the Contractor will assess whether a small portable generator with appropriate sound shielding is best suited for use or whether a temporary electrical service should be established. At the time of mobilization, the Contractor will determine appropriate locations for the temporary facilities.

2.1.2 Tree Clearing

Tree clearing will include activities associated with tree cutting and felling, log gathering for off-site disposition, and wood chipping for on-site staging. Further description of these activities in the two UDF site areas designated for clearing is provided below.

2.1.2.1 UDF Area

Most of the tree felling will be performed using a feller buncher and/or excavator with grapple saw. In cases where directional tree felling is needed, an excavator will assist in guiding trees to the ground. Once the trees are felled, a skidder will transport the trees to a processing area centrally located within the UDF site, where limbs will be removed and trunks cut into log section lengths. Branches will be chipped directly into transport trucks or chipped in designated pile locations on the UDF Site for onsite use during the UDF construction. Sectioned logs will be loaded onto log transport trucks for off-site disposition.

When tree clearing work occurs within proximity of high-voltage electrical utilities either within or adjacent to the UDF site, a dedicated spotter will be present for the duration of the clearing work near energized powerlines and associated equipment. Clearance distances will be maintained in accordance with Occupational Safey and Health Administration and utility standards. Trees will be felled directionally away from power lines and associated equipment, with ropes and controlled cuts used as necessary to manage the felling work.

When beneficial for ground cover protection, the Contractor will spread wood chips in areas of the site (e.g., building demolition areas, areas potentially disturbed by tree clearing operations) to help stabilize surface soils and control erosion. Small woody vegetation will be mulched in-place using a mulching head mounted on an excavator or similar type equipment.

2.1.2.2 Vernal Pool Area

Tree felling work in the vernal pool area will be performed in the same manner as described in the UDF area but with added attention given to minimizing ground disturbance within the vernal pool and surrounding areas. All felled and sectioned trees will be loaded and transported for off-site disposition. All chipped materials will be loaded and taken to the UDF site area for staging in designated locations.

2.1.3 Fence Modifications

Fence modification work will include the removal of existing fence materials and installation of new fence materials or relocating of existing fencing as described in the project design specifications and drawings in Appendices B and C. Fence modification and tree clearing work will be coordinated to provide the maximum work efficiency and fence coverage at the perimeter of the UDF site. When fence modification work occurs within proximity of high-voltage electrical utilities within the UDF site, a dedicated spotter will be present for the duration of the work near energized powerlines and associated equipment. Certain sections of fencing that run along and within the high-voltage electrical utilities will require work with grounded fence sections. These grounded fence sections are shown on the project design drawings.

The fence modification work will also include the installation of new and relocation of existing gates along the UDF site fence line as described in the project design drawings. During the fence modification work, the Contractor will utilize temporary fencing as necessary to keep the site secure.

2.1.4 Temporary Construction Entrance

As noted above and shown on Figure 1 and the project design drawings (Appendix C), two temporary construction entrances will be installed at the UDF site. One entrance will be installed at the main UDF site access point off Woodland Road at the southern end of the site. This main entrance will require completed demolition and removal of the house and barn structures as well as decommissioning of the existing drinking water well located within the area of the entrance. Another feature that will be removed to allow for full access to the main construction entrance is the existing utility pole at the front of the entrance area. This pole will be relocated by Verizon in coordination with Eversource and is expected to be completed either during or following installation of the main construction entrance. In the meantime, the Contractor will establish and maintain measures to protect the utility pole. The second temporary construction entrance will be installed at the vernal pool area that is accessed from Woodland Road.

Both the main site and the vernal pool construction entrances will require excavation and removal of site soils to allow placement of the construction entrance geotextile and stone materials. Where needed, excavated soil will be used for backfilling of any remaining building foundation areas. Surplus excavated soil material will be transported to the UDF site area shown on the design drawings for soil stockpiling. The timing for installation of the two temporary construction entrances will be done in parallel with other site preparation work such as tree clearing to maximize schedule efficiency.

2.1.5 Utility Installations

The project utility work will include the installation of a new six-inch waterline in Woodland Road and into to UDF site. The new six-inch waterline will connect to an existing 16-inch waterline on Woodland Road near the October Mountain Campground entrance and extend northward along Woodland Road to the UDF site entrance location. A tee will be installed at the northern end of the new waterline, and a six-inch lateral waterline will be installed into the UDF site and capped with a valve or similar appurtenance to allow for pressure testing and disinfection. Installation of additional waterline equipment that will provide water service to the UDF site will occur during the UDF construction phase.

Following completion of the waterline installation, asphalt pavement removed to facilitate the waterline earthwork will be restored. Because the waterline work may not be finished in time for the use of conventional hot-mix asphalt material obtained from local suppliers, the subject road area may be temporarily filled with gravel of other

temporary material that is acceptable to the Town of Lee. In that instance, the final pavement restoration work will be completed when local asphalt suppliers reopen for the season.

Other project utility work will include the relocation of a utility pole on Woodland Road near the former residential property and the installation of electrical conduit into the UDF site for use during the UDF construction phase. The pole relocation will be performed by Verizon in coordination with Eversource. Installation of electrical conduits from the utility pole riser into the UDF site will be performed by the Contractor.

2.1.6 Demolition and Removal

Existing on-site features associated with the former residential property at the UDF site will be demolished and taken off-site for disposal. Features slated for demolition are described in the project design specifications and drawings (Appendices B and C). Further discussion of the planned demolition and removal activities is provided below.

2.1.6.1 Septic Tank and Drinking Water Well Decommissioning

Three underground septic tanks exist on the former residential property at the UDF site and will be decommissioned as part of the project demolition work. To simplify the interaction with the local towns, the Contractor will follow the typical process for obtaining permits and approvals (even if not legally required) for such decommissioning from the Tri-Town Health Department, which services the Towns of Lenox, Lee, and Stockbridge.

Tank decommissioning work performed by the Contractor will include the following activities:

- Initial pumping out of the tank contents followed by rinsing and final pump out by a licensed septic waste hauler;
- Removal of the tank structures for off-site disposal and backfilling of the remaining hole with suitable on-site soils obtained from construction of the temporary construction entrances; and
- Covering of the backfilled areas with a layer of wood chips sourced from on site.

The drinking water well, which is located at the front of the former residential property near Woodland Road, will be decommissioned by Hanson Well Drilling, Nassau, NY. Prior to well drilling work, the Contractor will follow the typical process to obtain permits and approvals from the Tri-Town Health Department.

2.1.6.2 Universal Waste Removal

Universal waste materials associated with the former residential property include items such as light bulbs, thermostats, furnace heating oil, etc. These items will be removed from the UDF site by Strategic Environmental Services prior to demolition of the residential building structures and taken off site for disposition at appropriate facilities licensed to manage universal waste materials.

2.1.6.3 Structure Demolition

A pre-demolition hazardous building materials (HBM) survey of the structures located on the former residential property at the UDF site was conducted by Arcadis in April 2025. The results of that HBM survey identified a limited amount of asbestos-containing materials (pipe vent caulk at bath house, sink undercoating and assumed wire wrap in house) that will require removal prior to the start of building structure demolition work.

To facilitate removal of asbestos-containing materials, the Contractor will file for the following notifications and permits:

- Asbestos notification with the Massachusetts Department of Environmental Protection (MassDEP);
- Demolition notification with MassDEP; and
- Demolition permit with the Town of Lee.

Once the notifications and permits have been filed, abatement work associated with the HBMs described above will be completed by Strategic Environmental Services. Demolition work will then commence and include demolishing of the three building structures on the former residential property (house, barn, and bath house) at the UDF site. The demolition work will be accomplished primarily with a suitably sized excavator equipped with a bucket thumb. Water spray will be used by the Contractor to manage potential dust generation during structure demolition work.

The building demolition is anticipated to include the following activities:

- The Contractor will confirm that electrical and communication service lines to the building structures have been disconnected.
- Tree and brush vegetation in the immediate area of the building structures will be removed and stockpiled for off-site disposition or chipping.
- The house and barn structures will be demolished with the resulting debris managed within the footprints of the building structures.
- The demolished building materials will be crushed and processed to a manageable size for loading into trucks.
- Piping, conduits, wires, etc., surrounding the building structures that may be visible will be removed.
- Demolition debris will be loaded into triaxle or dump trailers for transport to an off-site disposal facility.
- Building foundation materials consisting of stone and mortar will be used as backfill material in the remaining house structure basement area.
- Concrete slabs, steps, pavers, etc., will be loaded into trucks for transport to an off-site recycling facility.
- The remaining house structure basement area will be backfilled with suitable on-site soils obtained from construction of the temporary construction entrances.
- The backfilled areas will be covered with a layer of wood chips sourced from on site.

2.1.7 Waste Management

Waste materials requiring management during performance of the UDF site preparation work will include sectioned logs, general demolition-related waste, regulated HBM waste, potentially regulated universal waste, and Contractor-generated municipal solid waste. The locations where these types of waste material will be taken for offsite disposal are discussed below.

2.1.7.1 Disposal Locations

The following facilities have been identified by the Contractor for disposal of site-based waste materials.

- Sectioned logs from tree clearing: Supreme Industries – Harwinton, CT

- Septic tank clean out waste: Tri-Town Septic – Lenox Dale, MA;
- General demolition waste: Casella Waste Systems – Lenox, MA;
- Asbestos waste: Minerva Landfill – Waynesburg, OH;
- Metals recycling: Allied Recycling – Walpole, MA;
- Universal waste: Complete Recycling Solutions – Fall River MA;
- Contractor-generated municipal solid waste: Casella Waste Systems – Lenox, MA; and
- Concrete demolition materials: Century Aggregates – Lee, MA.

2.1.7.2 Transportation Routes for Disposal

Truck routes used for transportation of project-related waste materials will utilize vehicle travel routes established for the project. Where necessary, other truck travel routes beyond the project-established truck travel routes may be used to access specific disposal facility locations. (These other truck travel routes will be routes routinely used by waste disposal vendors to access disposal facilities).

2.1.8 Site Restoration and Demobilization

Once the site preparation work is nearing completion, the Contractor will schedule the removal of equipment from the UDF site that is no longer needed. Site areas where project work was conducted will be reviewed with the GE's on-site representative to confirm that any remaining work tasks are actively being completed or are scheduled for completion prior to the Contractor's final demobilization from the site. As part of demobilization activities, the Contractor and GE's on-site representative will review work areas where ground disturbance occurred to determine whether further soil stabilization measures are needed. If deemed necessary, the Contractor will place site-sourced wood chip materials over disturbed soil areas that may be subject to erosion and sediment transport to sensitive and/or offsite areas. As described on the project design drawings, the thickness and placement of chipped vegetation cover material will be sufficient to stabilize the disturbed ground areas. Finally, the Contractor will remove any remaining equipment and job trailers from the site and will conduct a final check of the site to ensure the site is left in a manner acceptable to GE's on-site representative.

3 Project Safety Plan

3.1 Health and Safety

The Contractor's site-specific Health and Safety Plan (HASP), provided in Appendix A, identifies the health and safety procedures, methods, and requirements to be implemented during the performance of site preparation activities. The Contractor's HASP provides contact information on key personnel (including training and medical surveillance requirements), task-specific hazard/risk analysis, personal protective equipment, construction control measures, emergency response plan, and material safety data sheets. This Contractor's HASP is provided to EPA for informational purposes only.

3.2 Site Security

Site security is currently provided by the previously installed perimeter fencing. The Contractor will be responsible for site security and will maintain perimeter site security during the fence modification work required for site preparation at the UDF. Perimeter site security will be maintained even if the Contractor reuses existing fence materials for new fence installations.

3.3 Spill Prevention, Control, and Countermeasures

The Contractor's spill prevention, control, and countermeasures plan is included as part of the Contractor's HASP provided in Appendix A. This section defines practices and procedures for the prevention of, control of, and countermeasures for addressing accidental discharges during site preparation activities at the UDF. These procedures are intended to address the accidental discharge of construction materials typically found on any construction site, such as lubricating fluids, diesel fuel, gasoline, etc. Spill prevention is the first and simplest approach to spill control and applies to all types of spills. The Contractor will maintain an awareness of spill consequences, preventive measures, and countermeasures to reduce spill occurrences, and implement a prevention program including careful work practices, constant inspection, and immediate notification and correction of deficiencies. In the event that a spill does occur, the Contractor will implement procedures for proper control, containment, and cleanup to reduce the effect of the spill.

Prevention measures for accidental spills are the first priority and will include the following:

- Copies of Safety Data Sheets for substances that are to be onsite (e.g., fuel, hydraulic fluid) will be stored in a conspicuous place onsite where they can be accessed by all site personnel. These Safety Data Sheets will be reviewed as needed to ensure that proper handling and storage procedures are followed.
- Employees handling materials with the potential to spill will be properly trained on the potential hazards associated with the handling of the materials.
- Routine inspections of equipment will be performed to identify and address maintenance issues proactively in an effort to avoid spills.
- Storage of liquids onsite will be limited to the minimum required volume. Fluids will be stored in containers appropriately sized and approved for the material. All containers will be properly labeled.

Spill control and response equipment will be available onsite during site preparation activities where the potential for a release of construction materials exists. The Contractor will have on hand a sufficient amount of sorbent materials (e.g., absorbent pads, speedy dry, absorbent booms) and other spill control/countermeasure materials

(e.g., plastic sheeting, broom, shovel, catch pan, containers to collect spill control and countermeasure materials, if used). Such equipment will be available in the event of a spill to contain and control released materials and mitigate their spread. Materials used for the cleanup of spills will be containerized and labeled appropriately for proper disposal.

In general, the techniques used for spill control and countermeasures will vary with the location, type of spill, and the materials spilled. If possible, the source of the spill will be secured, and actions will be taken to contain the spill. Only personnel with appropriate training will perform these initial response actions, and only when doing so will not endanger others. Protective equipment will be worn, as required, when attempting such actions.

If a spill or leak occurs, the following general procedures will be implemented; however, the methods used for spill response will vary on a case-by-case basis, depending on the type of material spilled, the extent of the spill, and the type of area at which the spill occurred.

- The Contractor's site supervisor will be notified.
- If the spill or leak is generated from a damaged container, material will be transferred from the container as soon as practical. Ruptured hose or pipe sections will be isolated by closing valves between the rupture and the material source(s).
- If the spill or leak is generated from a piece of equipment, the operator will immediately shut off the equipment to mitigate the potential for continued/future loss.
- If the conditions are safe, spill control measures (e.g., catch pan, sheet of plastic) will be placed immediately underneath the leak to capture as much of the liquid as possible and to prevent additional fluid from reaching the ground surface.
- To the extent practicable, the spill area will be cordoned off and the Contractor's site safety representative will determine the level of protection required for response activities in the spill area.
- A decision will be made on the need to use confinement techniques such as diversion, diking, and retention. To the extent that the nature of the spilled material is known, the decision will be made based upon a review of the mobility and potential harmful effects of the material.
- If applicable, the Contractor will prevent entry of spill materials into any waterway. If spilled material reaches an open waterway, booms will be placed downstream so that further migration of the released material does not occur.
- In the event of a large migrating spill (an unlikely circumstance), diversion techniques, such as placing a soil wall or absorbent boom ahead of the spill, will be implemented first. Subsequently, diking techniques, such as using material such as sand covered with a plastic liner, would be implemented as appropriate.

Following containment of a spill or release, the released material will be cleaned up with absorbents and placed into other containers for proper disposal.

The Contractor will contact the GE Project Manager and GE's on-site representative of any spill or release. If appropriate, the GE Project Manager and GE's on-site representative will coordinate with the first responder and/or Contractor emergency coordinator regarding the reporting of the incident to the other authorities, in accordance with the Contingency and Emergency Procedures Plan (CEPP) for the GE-Pittsfield/Housatonic River Site, which is Attachment F to GE's overall Project Operations Plan (Arcadis 2025).

3.4 Fire Prevention

Portable fire extinguishers of adequate size, class, number, and location as required by applicable sections of 29 CFR 1910 and 1926 will be present at all work locations. All extinguishers will be inspected monthly and undergo preventative maintenance on an annual basis.

In accordance with the CEPP for the GE-Pittsfield/Housatonic River Site, in the event of a fire or explosion, the observer will call 911 to alert emergency personnel and then the GE Project Manager and the Contractor's site supervisor. The GE Project Manager and GE's on-site representative will make additional notifications as required by the CEPP. Upon arrival of the local fire department, the Contractor's site supervisor will advise the fire fighters of the location and nature of the fire and identify whether any hazardous materials are involved. Additional details of the Contractor's fire and explosion protection and prevention plan are included as part of the HASP provided in Appendix A**.**

4 Project Quality Plan

4.1 Quality-of-Life Protection Measures

4.1.1 Dust Control

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

- Water application on site roads;
- Use of temporary surface coverings (e.g., mulch, vegetation, polyethylene liners) 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; and
- Possible use of certain road surface materials such as aggregates or pavement in high-traffic areas prone to dust generation.

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).

To verify that air quality is compliant with the established QOL standards for particulate matter, air monitoring for particulate matter smaller than 10 micrometers in diameter will be conducted during site preparation activities at the UDF site to assess potential impacts on air quality due to dust 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 site preparation activities for the UDF, such monitoring will be conducted at three fixed locations which are shown on Figure 1. Two additional work areas will be monitored for particulate matter, including the work area at the vernal pool and the work area for the waterline installation on Woodland Road. Monitoring at these two additional areas will be conducted using variable locations that will be determined each day on which work is performed in these areas and will vary based on where work is being performed on a given day. For example, as work progresses along Woodland Road, the monitoring location will be adjusted to maintain appropriate positioning between the work zone and potential receptors. Monitoring will be conducted throughout the duration of daily active construction activities between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday, unless otherwise approved by GE's on-site representative.

In addition to real-time particulate monitoring, qualitative visual observations of dust-related conditions in the work areas will be employed at least once daily or as conditions warrant, to assess conditions and the effectiveness of the routine controls and BMPs. If visible dust caused by UDF site preparation activities is observed leaving the work area, GE will comply with the visible dust QOL standard in Section 4.3.1.3 of the Revised QOL Plan.

4.1.2 Noise Control

The Contractor will work only during daylight hours to mitigate the potential to disturb the neighboring community during nighttime hours. To minimize unnecessary noise during the daytime, 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.

The Contractor will implement noise control measures to comply with the noise QOL standards presented in Section 4.4 of the Revised QOL Plan for daytime hours (i.e., 7:00 a.m. to 6:00 p.m.). As appropriate, based on monitoring results, additional control measures and BMPs (e.g., modify construction methods, sound-attenuating barriers) may be implemented to further minimize noise impacts.

To verify that noise levels are compliant with the established noise QOL standards, noise levels will be periodically monitored during UDF site Preparation activities, in accordance with the Revised UDF OMM Plan. Noise monitoring will be conducted 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 site preparation activities will generally be co-located with the air monitoring stations established for the project, as discussed in Section 4.1.1, and are illustrated on Figure 1. As described for air monitoring in Section 4.1.1, two additional locations will be monitored for noise that include the work area at the vernal pool and the work area for the waterline installation on Woodland Road. Monitoring at these two additional areas will be conducted at variable locations determined each work day based on where work is being performed on a given day. Again, for example, as work progresses along Woodland Road, the monitoring location will be adjusted to maintain appropriate positioning between the work zone and receptors.

Noise monitoring locations may be adjusted in the field during site preparation 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 site preparation 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 are acceptable, subsequent monitoring will be performed monthly during site preparation activities. Additional monitoring may be performed based on the following conditions:

- When a new activity, equipment, or reduced distance to receptors has the potential to increase noise levels; and
- In response to noise complaints (if any).

On each day of noise monitoring, monitoring will be conducted continuously during working hours, which are anticipated to be only during the daytime (i.e., generally 7:00 a.m. to 6:00 p.m.) so that one-hour averages can be computed throughout the entire construction day, for use in comparison to the noise QOL standards.

The noise monitoring to be conducted during the site preparation 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.

Details on the noise standards and responses to exceedances of those standards (including notifications and contingency measures) are included in Section 4.4 of the Revised QOL Plan.

4.1.3 Light Control

Since the Contractor will be working only during daylight hours, no light control measures are required or planned.

4.1.4 Odor Control

Sources of odor are not anticipated during site preparation activities. In the unlikely event of odor issues, the Contractor will protect the surrounding communities from nuisance odors, as described in the Contractor's HASP provided in Appendix A.

4.2 Construction Quality Control

The Contractor will be responsible for the enforcement of quality control in the field during site preparation activities, including surveillance of project activities to ensure conformance with the design documents and safety requirements, conducting and documenting certifying tests and qualifications, and documenting the occurrence of deficiencies and corrective actions (if they occur). To ensure construction quality control, the following activities will be completed by the Contractor:

- All design documents and related submitted plans will be reviewed by site personnel prior to starting work.
- Data sheets and/or analytical testing results for any required materials (e.g., waterline, backfill material) will be submitted prior to material delivery, and materials will be inspected for conformance upon delivery.
- Disposal tickets will track and document demolition waste generated during site preparation activities, as appropriate.

5 Project Technical Documents

The project technical documents used for the UDF site preparation 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 specifications sections prepared for the UDF site preparation 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 this initial UDF site preparation construction work phase and to improve continuity across the individual specification sections. As previously noted, the UDF site preparation technical specifications are provided in Appendix B.

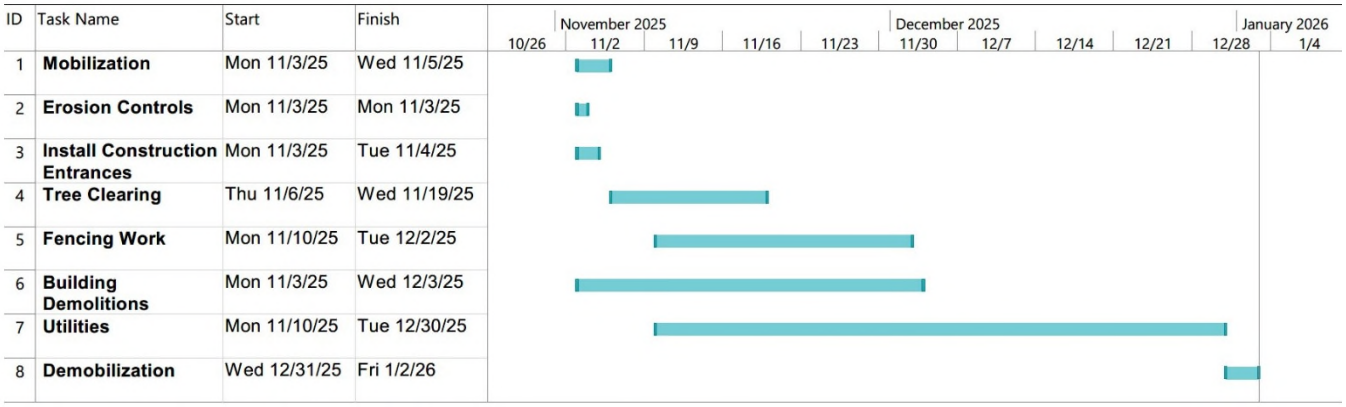
5.2 Design Drawings

Design drawings prepared for the UDF site preparation 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 this initial UDF site preparation phase. As previously noted, the UDF site preparation design drawings are provided in Appendix C.

6 Project Work Schedule

UDF site preparation work tasks and the Contractor's planned implementation schedule are presented in the following table.

Project Schedule



The project schedule shown above is based on the following considerations:

- The project schedule is based on information available at the time of schedule preparation. Any changes to project scope or site conditions may impact the project schedule.
- The schedule may be subject to change due to the occurrence of inclement weather conditions.
- All durations are based on typical productivity rates and working five days per week, up to 10 hours per day.
- The schedule assumes timely review and approval of the SIP by EPA.
- The sequence of activities is subject to change based on site conditions and coordination with other contractors.
- The schedule assumes timely coordination and communication with relevant utilities (water, electric, communications).
- The schedule assumes no delays in supply of key long-lead items or availability of materials.

Following mobilization to the UDF site and installation of erosion controls, the Contractor will prioritize the start of tree clearing work due to its scale and duration, which will commence as close to November 1, 2025 as possible, but no sooner, given that tree clearing work is allowed only between November 1 and March 31 to avoid adverse impacts to potential roosting rare bats.

The Contractor will coordinate with the Towns of Lee and Lenox to start work on the waterline installation in Woodland Road as the earliest time possible with the focus on completing the work at a time when local asphalt plants are still open and pavement materials can be obtained for restoration of the roadway pavement as described in Section 2.1.4.

Fence modification work will be closely coordinated with the tree clearing work and will commence as site areas are sufficiently cleared. The fence work will be conducted in a manner that prioritizes safety and considers tree

clearing progress. As such, the fence work will purposely lag behind the tree clearing work and will be conducted to effectively maintain fenced site security during the project work.

Demolition work will start with the abatement of asbestos-containing materials and removal of universal wastes described in Section 2.1.5 followed by demolition of the former residential building structures and features. Processing and loadout of the demolition debris and recyclable materials for off-site deposition will be completed followed by backfilling of the building foundations to safe grade levels and covering with wood chips.

Installation of the two temporary construction entrances will closely follow the completed demolition work. Depending on progress with the waterline installation work, installation of the construction entrance at the vernal pool location may occur before the demolition work is finished.

Relocation of the utility pole on Woodland Road at the UDF main site access location will be conducted by Verizon in coordination with Eversource. The timing for this pole relocation work is dependent on the utility companies' availability to perform the work but is anticipated to be completed by sometime in late November or early December 2025. Installation of the electrical conduit into the UDF site will run from an existing utility pole on Woodland Road that will not require relocation but will be affected by Verizon-Eversource re-wiring. It is therefore anticipated that conduit installation work will be performed on or about the time of the utility pole relocation work.

7 Additional Project Activities and Submittals

7.1 Backfill Sources

Imported backfill materials used for the UDF site preparation work will include stone material for construction of the temporary construction entrance at the main site entrance location and sand bedding material for installation of project utilities. The Contractor has identified Century Aggregates in Lee, MA, as a source for project backfill materials. As required in project specification 31 05 16.10 (Materials for Earthwork), an initial borrow source assessment will be conducted at the borrow source proposed by the Contractor.

Following approval of the Contractor's proposed borrow source by GE's on-site representative, representative samples of the project backfill materials from the borrow source will be obtained for laboratory geotechnical and chemical properties testing. The results of these laboratory tests will be reviewed and approved for use by GE's on-site representative prior to their delivery to the site. All laboratory testing of the site preparation backfill materials will be performed as specified in project specification 31 05 16.10 (Materials for Earthwork). Test reports obtained for the project backfill materials will be provided to EPA in a subsequent submittal.

7.2 Piezometer and Monitoring Well Decommissioning

Piezometers and selected groundwater (GW) monitoring wells installed at the UDF site as part of the pre-design investigation work for the UDF were recently decommissioned to facilitate upcoming construction of the UDF. These piezometers and monitoring wells were located within the footprint of the UDF and were planned for abandonment (decommissioning) as described in Section 3.5.1 of the Revised Final Pre-Design Investigation Summary Report for Upland Disposal Facility (Arcadis and AECOM 2024) and as shown in Design Drawings 3A-Site Preparation Plan (North) and 3B-Site Preparation plan (South) of the UDF Revised Final Design Plan.

Decommissioning of the piezometers and GW monitoring wells was conducted in accordance with Appendix V of GE's 2023 FSP/QAPP (Standard Operating Procedure for Monitoring Well Decommissioning). Decommissioning drilling work was conducted by Parratt-Wolff, Inc., with field oversight work performed by Arcadis. The piezometers and GW monitoring subject to decommissioning consisted of the following:

- PZ-2022-1;
- PZ-2022-2;
- PZ-2022-3;
- PZ-2022-5;
- PZ-2022-7;
- PZ-2022-8;
- MW-2022-8 Abandoned (formerly PZ-2022-4);
- MW-2022-8; and
- MW-2022-9 (formerly PZ-2022-6).

Decommissioning field work commenced on August 11, 2025, and continued thorough September 10, 2025. Prior to the start of decommissioning activities, water level transducers previously installed in each piezometer and in the two GW monitoring wells were removed and the depth to water and full casing depth were measured and

recorded. The piezometer and GW monitoring well decommissioning included the removal of protective casing, riser pipe, and screen pipe materials, as well as over-drilling of the piezometer and well installation boreholes to remove the emplaced well/piezometer materials. Once well/piezometer materials were removed, the over-drilled borehole was grouted from the bottom up with cement-bentonite grout to approximately three feet below surface grade. The top of the grouted borehole was then finished with a concrete surface seal and leveled to grade with native surface soil. Decommissioning logs, including additional information for each piezometer and GW monitoring well, are provided in Appendix D.

7.3 Stockpiled Debris Sampling

As discussed in the Revised UDF Final Design Plan, the UDF site contains stockpiled debris materials consisting primarily of crushed concrete, concrete slabs, pavement millings, and brick and rubble. To allow for assessment of options for the disposition of those stockpiled materials, GE plans to conduct sampling and laboratory testing of the debris materials. The sample test results will be used by GE to determine whether the debris materials can be considered for onsite use as part of UDF construction, or whether other options for their disposition will need to be considered. To facilitate sampling and testing of the stockpiled debris materials, GE has prepared a work plan (Stockpiled Debris Sampling Plan) that will be used to conduct sampling and testing of the debris materials. This sampling work plan is provided in Appendix E.

8 References

Anchor QEA, AECOM, and Arcadis U.S., Inc. 2021. Final Revised Rest of River Statement of Work. Prepared for General Electric Company, Pittsfield, Massachusetts. September.

Anchor QEA and Arcadis. 2025. Second Revised Quality of Life Compliance Plan. Housatonic River – Rest of River. Prepared for General Electric Company, Pittsfield, Massachusetts. May.

Arcadis and AECOM. 2024a. Revised Final Pre-Design Investigation Data Summary Report for Upland Disposal Facility Area, GE-Pittsfield/Housatonic River Site. Prepared for General Electric Company, Pittsfield, Massachusetts. January.

Arcadis 2023. Field Sampling Plan/Quality Assurance Project Plan. Prepared for General Electric Company, Pittsfield, Massachusetts. Revised December.

Arcadis. 2024a. Upland Disposal Facility Revised Final Design Plan. Prepared for General Electric Company, Pittsfield, Massachusetts. December.

Arcadis. 2024b. Upland Disposal Facility Revised Operation, Monitoring, and Maintenance Plan. Prepared for General Electric Company, Pittsfield, Massachusetts. December.

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

Figures

VERNAL POOL INSET

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE FOR VERNAL POOL ACCESS

PROPOSED VERNAL POOL ENHANCEMENTS

12" CMP INV. IN=966.62'±

12" CMP INV. OUT=995.68'±

BITUMINOUS

POND

12" CMP INV. OUT=1013.46'±

12" CMP INV. IN=1012.70'±

12" CMP INV. IN=1013.83'±

BM #2 TOP OF SK IRON PIPE ELEV.=1013.07

MW 2022-1S (ABANDONED)

MW 2023-1SR

MW 2022-1D

EXISTING PERSONNEL ACCESS GATE

BUILDING AREA

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

GRAVEL DRIVE

GRAVEL AREA

WET AREA (NO FIELD TOPO)

PZ 2022-7

PZ 2022-8

PZ 2022-3

PZ 2022-5

PZ 2022-2

PZ 2022-1

STRIPPED SOIL STAGING AREA

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

WOODLAND ROAD TO BE USED FOR ACCESS FOR WATERLINE INSTALLATION

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE FOR UDF ACCESS

1 UP-4

EXISTING UTILITY POLE AND OVERHEAD WIRES TO BE RELOCATED OUTSIDE LIMITS OF SITE ENTRANCE

RELOCATE PERSONNEL ACCESS GATE TO THIS LOCATION

EXISTING PERSONNEL ACCESS GATE (RELOCATE EAST WHERE SHOWN)

WOODLAND ROAD

PROPOSED UTILITIES

VEHICLE ACCESS SLIDE GATE

FENCE TO FOLLOW APPROXIMATE GRAVEL ROAD EDGE

RELOCATE VEHICLE ACCESS GATE TO THIS LOCATION

EXISTING GRAVEL PAD AT POLES

GRAVEL ROAD

EXISTING VEHICLE ACCESS GATE (AT EXISTING GRAVEL ROAD; RELOCATE SOUTH WHERE SHOWN)

MW 2022-9

MW 2022-8

MW 2022-7

PROPOSED FENCE ISOLATION GAP

PHRAGMITES (NO FIELD TOPO)

POND

MW 2022-2

MW 2022-3

PZ POND 2023

PZ POND 2022

EXISTING VEHICLE ACCESS GATE

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

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

MW 2022-6

MW 2022-5

MW 2022-4D

MW 2022-4S

RELOCATE VEHICLE ACCESS GATE TO THIS LOCATION

EXISTING VEHICLE ACCESS GATE (RELOCATE NORTH WHERE SHOWN)

PHRAGMITES (NO FIELD TOPO)

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
- EVERSOURCE RIGHT-OF-WAY
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- X — X — UDF SECURITY FENCE

DESIGN FEATURES LEGEND

- EROSION CONTROL MEASURE
- UDF SECURITY FENCE ADDITION
- UDF SECURITY FENCE REMOVAL
- APPROXIMATE TREE AND BRUSH CLEARING AREA
- FENCE ISOLATION GAP ADDITION
- E/C — UNDERGROUND ELECTRIC AND COMMUNICATIONS CONDUITS
- W — WATERLINE
- AIR AND NOISE MONITORING STATION

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

NOTES:

1. SITE PLAN INFORMATION BASED ON CONTRACT 10 - UDF SITE PREPARATION PLAN DRAWING UP-2.

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

UDF SITE LAYOUT FOR SITE PREPARATION ACTIVITIES

ARCADIS

FIGURE 1

Appendix A

Contractor's Health and Safety Plan

HEALTH AND SAFETY PLAN (HASP)

INCLUDING:
SPILL PREVENTION AND COUNTERMEASURES PLAN AND
DUST, ODOR, LIGHT, AND NOISE CONTROL PLANS

For

GENERAL ELECTRIC
UPLAND DISPOSAL FACILITY SITE PREPARATION
UDF CONTRACT 10
LEE, MA

SUBMITTED TO:

ARCADIS U.S., INC.
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NY 13202

SUBMITTED BY:

J.H. MAXYMILLIAN, INC.
GENERAL CONTRACTING

1801 EAST STREET
PITTSFIELD, MA 01201

HILLERY MAXYMILLIAN, SHO
SAFETY AND HEALTH OFFICER

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LIST OF ABBREVIATIONS AND ACRONYMS

CFR	Code of Federal Regulations
CM	Construction Project Manager
EPA	U.S. Environmental Protection Agency
HASP	Health and Safety Plan
JHM	J. H. Maxymillian, Inc.
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PM	Project Manager (JHM)
PPE	Personal Protective Equipment
RE	Arcadis Resident Engineer
SDS	Safety Data Sheet
SS	Site Supervisor (JHM)
SSR	Site Safety Representative (JHM)

1.0 PROJECT IDENTIFICATON

Site Name: GE Contract 10 – Upland Disposal Facility Site Preparation

Site Locations: 399 Woodland Road, Lee, MA

Scope of Work: Demolish existing building, including removal of asbestos, oil tank and septic tanks, clear trees on-site, water line work, build construction entrance, fence the site.

Arcadis Oversight:
Principal Engineering Design Manager:.....Philip Batten
Resident Engineer (RE): .....TBD

J.H. Maxymillian, Inc. (JHM):
Project Manager, Executive Sponsor:..... Glenn Houle
Site Supervisor(SS)/ Site Safety Rep (SSR). .....TBD
JHM's Safety and Health Officer .....Hillery Maxymillian

2.0 INTRODUCTION

2.1 Maxymillian Commitment to Safety

The JHM commitment to safety and health statement is as follows:

The health and safety of JHM employees, subcontractors, and the public is our priority. JHM will plan and conduct all tasks and activities focusing on the safety of all personnel involved. JHM will exercise all due diligence in identifying any potential hazards specific to this project. All work at the project will be conducted in a manner which minimizes the probability of spills, near misses, equipment/property damage or personal injury.

This Environmental Health and Safety Plan (HASP) is a key element in the proper planning of project work, which is necessary to assure that the goal of zero incidents is achieved. Prior to project start, JHM will provide a complete verbal HASP review, which will be documented, to all their employees and subcontractors prior to work commencing on site, Day 1, and as needed thereafter to review updates. As new workers arrive on site to work, they will also be given a complete verbal HASP review, which will be documented, (or as appropriate for the phase of work the project is in) prior to them starting work on site.

Each person entering the site will be required to acknowledge receipt of this information by signing the HASP (Attachment 1: HASP Compliance Agreement Form).

JHM will communicate each potential hazard to all personnel, including measures to reduce or eliminate the hazard. JHM and its subcontractors shall review these hazards at the mandatory morning meetings, as well as the documented "Toolbox Talk" and/or safety meetings.

2.2 Scope and Application of HASP

The purpose of this HASP is to define the requirements and designate protocols to be followed during the **Construction of the GE Contract 10 Sitework in Lee, MA** project. Applicability extends to contractors, subcontractors, governmental officials, and visitors that enter the site while construction activities are occurring. For the purposes of this HASP, the term "site" shall be used to identify construction work areas associated with this project and under direct control of JHM.

During development of this plan, consideration was given to current standards as defined by the EPA, OSHA, and the National Institute of Occupational Safety and Health (NIOSH), and the **Massachusetts Contingency Plan (310 CMR 40.0018).** Site-specific safety requirements and select JHM Corporate safety programs are also incorporated within the HASP. The GE-Pittsfield/Housatonic River Site HASP including Appendix A-D are incorporated with this HASP by reference. This plan is found in GE's RFP, Division 0, Section 00520.

This HASP will be implemented at a multi-employer work site. Information and references within this plan shall in no way alleviate any site subcontractor from their responsibility to comply with any and all applicable federal or state statutes or regulations regarding the completion of this project. It is the responsibility of each employer to communicate and coordinate work planning so as to prevent their work activities from becoming a potential hazard to other workers at the project site. Failure to communicate will not alter an employer's responsibilities or obligations for any resulting injuries to their employees. All JHM employees and subcontractors involved in this project shall adhere to this Plan, and to all revisions thereof. This Plan does not supersede any contractor safety and health policies, protocols, or requirements that may be more stringent.

In addition to compliance with this plan, all contractors and visitors at this site are expected to comply with all applicable government safety and environmental health regulations as well as JHM policies. Applicable standards include, but are not limited to:

- OSHA Hazard Communication (29 CFR 1910.1200)
  (See also JHM's Program in Appendix E of this HASP)
- OSHA Lockout/Tag out (29 CFR 1926.417 and 29 CFR 1910.147)
  (See also JHM's Program in Appendix F of this HASP)
- OSHA Respirable Crystalline Silica (29 CFR 1926.1153)
  (See also JHM's Program in Appendix G of this HASP)
- OSHA Safety and Health Regulations for Construction (29 CFR 1926), such as:
  - Trenching, Shoring and Excavation (Subpart P)

2.2.1 Changes to the HASP

This plan focuses on specific work activities that may arise during operations at this site. Due to the nature of work, this plan must be flexible as conditions may change and unforeseen situations may arise that require modifications to this plan. Therefore, JHM only makes representations or warranties as to the adequacy of the HASP for currently anticipated activities and conditions. This

flexibility allows for modification of the HASP by the Project Manager and the JHM's Safety and Health Officer.

2.2.2 Non-Compliance with the HASP

Disregard for the provisions of the HASP will be deemed just and sufficient cause for immediate stoppage of work and/or termination of activities without compromise or prejudice.

In the event that any project personnel, visitor, or inspector does not adhere to the provisions of the HASP, he/she will be requested to report immediately to the Site Supervisor (SS)/Site Safety Representative (SSR). All non-conformance incidents will be reported to the owner at the time of incident for determination of disciplinary action.

2.3 Applicability to Site Visitors

All visitors and inspectors entering the site will be required to receive an abbreviated HASP briefing covering site specific operational hazards and emergency procedures. In addition, visitors and inspectors will be expected to comply with all OSHA requirements. JHM shall provide and care for all personnel protective equipment (PPE) used by JHM employees. All visitors and inspectors will provide and care for their own PPE or arrange to acquire PPE from JHM.

3.0 KEY PERSONNEL AND MANAGEMENT

3.1 Personnel

Safety program development will occur as new situations unfold and will be accomplished through project management. Personnel associated with these material handling operations include the JHM Project Manager, Site Supervisor(s), Equipment Operators and Laborers. Management responsibilities, including compliance with federal, state, and local regulations, are assigned to the JHM Project Manager.

Specific personnel assigned to this project will be fully trained in the operations and safety considerations associated with excavation, construction and demolition activity. JHM employs a number of qualified personnel who are capable of fulfilling the responsibilities of each position. Responsibilities of each position are discussed below. The assigned staff to fill each position are found in Section 1.0 and 10.0 Emergency Phone numbers.

3.1.1 Project Manager

The JHM Project Manager (PM) will be responsible for the management of all aspects related to the performance of fieldwork. The PM will act as the JHM point of contact and, as such, will communicate with GE and Arcadis and oversee the maintenance of required records. He will also perform regularly scheduled inspections of the site and notify authorities of emergency situations.

The PM will direct task specific training and ensure that all JHM personnel are adequately trained to perform their responsibilities competently and safely. Lastly, he/she is responsible for submitting all required reports to the appropriate parties. All site personnel report, through their immediate supervisors, to the Project Manager.

3.1.2 Site Supervisor(s)

Site Supervisors (SS) will be responsible for workers on-site. The SS is the first line of contact for issues and concerns from workers onsite. The SS will also act as the Site Safety Representative (SSR). The PM may direct the SS to act on his/her behalf when necessary.

The SS will be responsible for conducting safety inspections and meetings. This person will also conduct safety meetings (Toolbox Talk Meetings). All JHM personnel will be required to attend any safety meetings conducted by the SS.

3.1.3 Site Safety Representative

The duties of the SSR include, but are not limited to:

- Implementation of the site HASP;
- Provide training protocols;
- Evaluating risks;
- Safety oversight;
- Determining levels of PPE required;
- Performing any required monitoring on the site.

The SSR will ensure that all health and safety monitoring is performed in accordance with 29 CFR 1910.120 and that health and safety documents are maintained on-site as required. She/he will ensure compliance with all safety requirements of OSHA, EPA, GE and JHM.

3.1.4 General Laborer and Equipment Operators

General laborers and equipment operators will be trained and experienced in the safe operation of construction equipment and will hold valid operating licenses for the piece(s) of equipment they are assigned to operate. **All JHM employees also hold OSHA 10 hour certificates.** Laborers and operators will work under the direction of the JHM SS and have the right to stop work should they feel a task is unsafe or need more instruction. If work is stopped, the JHM SS must be notified immediately.

3.1.5 Electrically Qualified Spotter

Supreme Tree Clearing, subcontractor, will provide EHAP Electrical Hazards Awareness Program trained employees for the entirety of the clearing work.

4.0 BUILDING DEMOLITION

This section of the HASP provides an overview of the scope of the building demolition required in this contract. JHM and Strategic Environmental, subcontractor, will demolish the existing building, including removal of asbestos, oil tank and septic tanks:

1. Asbestos removal and disposal, by subcontractor.
2. Universal waste removals, by subcontractor.
3. Oil tank pumped and removed and disposed, by subcontractor.
4. Septic tanks, pump, demolish and dispose of material.
5. Demolish house and dispose of waste at Lenox Transfer Station.
6. Remove any concrete off-site.

7. Stone foundation, reuse in hole.
8. Backfill cellar hole with onsite material.

4.1 Controlled Wastes from Building

The subcontractor performing asbestos abatement shall submit a current copy of a license to perform asbsestos abatement in the State of Massachusetts. Workers assigned to perform asbestos work shall be certified by the Department of Labor.

The universal wastes will be containerized and legally disposed of off-site.

Tanks will be pumped, cleaned, taken apart and legally disposed of off-site.

4.2 Training

All workers with the potential to come into contact with the contaminated materials at this site will be trained in accordance with the appropriate safety procedures consistent with the OSHA 40 hour HAZWOPER training and 8 hour refreshers. Supervisors hold the supervisor version of this training with supervisor refreshers. All JHM employees also hold OSHA 10 hour certificates at a minimum**.**

Asbestos staff will take part of a medical surveillance program in accordance with OSHA requirements.

4.3 Contamination Control Procedures

This site does not have historic contamination. No zoned work areas will be assigned. The abatement items are limited to small items from the building. Once the abatement is completed, the remaining building is considered uncontaminated ABC waste.

Any employees in contact with the wastes associated with the building demolition will wear appropriate PPE for each task.

Any equipment in contact with asbestos will be decontaminated with dry brush method.

5.0 WORK DESCRIPTION & HAZARD ANALYSIS

This section of the HASP provides an overview of the scope of project activity, as well as a historical analysis of the project areas. The purpose of this section is to review the potential project hazards to which workers may be exposed when working on or near the site.

5.1 Work Description

Work will begin with coordinating subcontractors for tree clearing, fencing, and asbestos removal, and installing environmental controls and mobilization. Tree clearing will be prioritized due to its scale and duration, with safety measures such as electrical spotters when near utilities. Felled trees will be processed and removed, with chips used for erosion control. Fencing work includes installing

chain link and stockade sections, gates, ground rods for electrical safety, and maintaining site security throughout. Utility work involves coordinating the relocation of utility poles and installing new underground electrical conduits and a water main/service line, including hydrants and a future meter vault. Three buildings—a bathhouse, a residence, and a barn—will be demolished after asbestos abatement and utility disconnection, with recyclable materials processed accordingly and foundations backfilled to safe grade levels. Finally, JHM will restore the site by stabilizing disturbed areas with wood chips, constructing permanent entrances, removing equipment, and ensuring a clean transfer to Arcadis and GE.

5.2 Safety Concerns and Potential Hazards

The purpose of this HASP is to ensure that all work is conducted in a safe manner. The planned activities could potentially pose safety concerns and health hazards for site personnel.

5.2.1 Site Personnel Safety

OSHA has identified general construction safety training requirements, 29 CFR 1926, and Hazardous Waste Operations and Emergency Response requirements, 29 CFR 1910, in order to ensure the health and safety of personnel. Adhering to these requirements, JHM will:

- Establish and implement a comprehensive training program.
- Define a "buddy system" approach for workers.
- Provide PPE.
- Target and promote safe work practices.
- Detail personal decontamination procedures.
- Identify personal hygiene requirements.
- Require adherence to general housekeeping rules.
- Provide and maintain emergency first-aid equipment.

5.3 Chemical & Potential Contaminated Hazards

The site itself is historically not contaminated. The abatement measures associated with the building are discussed in Section 4.0 Building Demolition.

5.3.1 Concrete/Asphalt Dust – Respirable Crystalline Silica

Certain site operations, such as concrete or asphalt cutting, may create dust that has the potential to contain respirable crystalline silica. Inhalation of dust containing respirable crystalline silica can cause serious health effects, including silicosis. Where cutting is required, JHM will assess the hazards and implement controls methods based on JHM's Respirable Crystalline Silica Exposure Program – Appendix G and 29 CFR 1926.1153, Table 1.

5.4 Physical & Safety Hazards

Construction sites may present numerous safety hazards such as:

- Energized electrical lines/equipment.
- Excavations, holes and ditches.
- Precariously positioned objects, such as boards/pieces of pipe that may fall.

- Sharp objects, such as nails, metal shards, and broken glass.
- Slip, trips and falls.
- Dangers related to working near heavy equipment/machinery.
- Exposure to environmental elements (Heat stress / Cold stress).
- Noise.
- Pedestrian and vehicle traffic.

As such, workers must be aware of these hazards and exercise caution at all times. All unsafe conditions must be reported immediately to the SS or PM.

5.4.1 Confined Space Entry Procedure

There are no confined spaces anticipated for GE Contract 10.

5.4.2 Safe Lifting Procedure

There are no critical lifts anticipated in GE Contract 10, and no proposed use of cranes. In the event of employing cranes, JHM will ensure that all procedures and personnel comply with OSHA requirements, certifications, and GE's Crane Safety and Hoisting Technical Standards.

5.4.3 Fall Protection and Prevention Procedure

There are no work tasks with a fall hazard of 6' anticipated for GE Contract 10.

5.4.4 Biological Hazards

Potential biological hazards on the site are relatively minor, yet not insignificant, and may include the following: ticks, bees, mosquitoes and other insects which may carry disease; rats/rodents, dogs, or other wildlife may be present posing the potential for bites and disease, such as rabies; poison ivy, oak, or sumac may be found in overgrown areas posing skin hazards.

5.4.5 Environmental Hazards

While working on this job site, there is potential for sun exposure. Employees are encouraged to liberally apply sunscreen, with a minimum sun protection factor (SPF) of 15, when working outdoors to avoid sunburn and potential skin cancer, which is associated with excessive sun exposure to unprotected skin. Additionally, employees should wear safety glasses that offer protection from UVA/UVB rays.

5.5 Job Safety Analysis

The evaluation of potential health and safety hazards related to the work on these sites is based upon the knowledge of site background and proposed scope of work. Anticipated risks posed by the specific operations are covered by this HASP.

Appendix D of the HASP provides a breakdown of the job hazards and control measures for each principal task. The JSAs will be reviewed by JHM's SSR on an ongoing basis and revised as necessary on-site. All revisions will be communicated to the work crew.

6.0 PERSONNEL TRAINING REQUIREMENTS

6.1 Standard Construction Operations

Workers and subcontractors performing non-contaminated work will be provided with a site orientation and safety overview by the PM. Topics covered in this safety briefing will include, but are not limited to, hazard communication, organizational responsibilities and contacts, emergency preparedness on-site, and general safety hazard prevention for the site. All employees have OSHA 10-hour Construction Safety Training. All foremen and supervisors have CPR/First Aid Training.

6.2 Competent Person

Prior to any excavation work commencing, a "competent person" must assess excavation conditions and determine actions in order to ensure worker safety. Per 29 CFR 1926.32, a competent person is an individual who, either through training or experience, is "capable of identifying existing and predictable hazards" in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees." Additionally, he/she will have authorization to take prompt corrective action to eliminate any hazards including, but not limited to, shutting down operations.

6.3 Initial Health & Safety Briefing

The SS shall conduct a site specific Health and Safety briefing for all employees of JHM, Subcontractor(s), MassDOT, visitors (e.g. inspectors), or any others who will work on site. The Health and Safety briefing shall include, at a minimum, the following:

- The contents of this site specific HASP.
- Names of personnel and alternates responsible for site health and safety.
- Project roles and responsibilities.
- Work practices which the employee can use to minimize risks of safety and health.
- Evacuation routes and signals.
- Health and safety emergency procedures.
- Reporting of fires, emergencies and first aid incidents.
- Emergency and contingency procedures.
- Location of first aid and emergency equipment.
- Location of Emergency Contact Phone List.
- Hospital Route.

6.4 Daily Activity Meetings and Toolbox Talks

JHM will conduct a daily safety meeting with all assigned JHM personnel prior to the start of any construction activities. The SS will lead a discussion on any ongoing safety concerns based on activities to be conducted that day and any incidents or items identified during previous days. These topics shall include, but are not limited to: PPE requirements, environmental hazards, struck-by or caught-in or between hazards, emergency procedures, near miss incidents, and injury or mishap analysis, and any other special site-specific considerations. At the conclusion of the meeting, each individual is required to sign a Toolbox Talk/Safety Meeting Attendance Sheet (Appendix A).

Toolbox Talks will be presented weekly by the SS and are mandatory for all project personnel. At the conclusion of the meeting, each individual will be required to sign a Toolbox Talk/Safety Meeting Attendance Sheet (Appendix A).

JHM will keep on file, at the job site, records of safety meetings that have occurred, including topics covered, safety related concerns, and action follow-up items resulting from those meetings. The OSHA Information Poster will be conspicuously displayed on-site on at least an 11" x 17" size paper. This poster will normally be made available in JHM's site trailer.

7.0 PERSONAL PROTECTIVE EQUIPMENT

The health and safety of site personnel is of primary concern to JHM. The level of personnel protection, relative to respiratory and dermal hazards, will be subject to modification by the Site Safety Representative based on changing site and weather conditions and the following factors:

- Type of operations or activities.
- Chemical compounds identified on the site.
- Concentration of chemicals.
- Dexterity required to perform work.
- Decontamination procedures.
- Necessary personnel and equipment.
- Types of equipment utilized during a certain operation or activity.

7.1 Description of Levels of Protection

Personal protective equipment (PPE) will be used when project and support activities involve known or suspected atmospheric contamination, when vapors, gases, or particulate may be generated by site activities, or when direct contact with skin affecting substances may occur. Full-face piece respirators protect lungs, gastrointestinal tract, and eyes against airborne contaminants. Chemical resistant clothing protects skin from contact with skin destructive and absorbent chemicals.

The specific levels of protection that may possibly be required on this site are as follows:

Level D: Provides minimal protection against chemical hazards. It is normally worn only as a work uniform and not in any area with significant respiratory or skin contact hazards.

Modifications of these levels are permitted and routinely employed during site work activities to maximize efficiency. Likewise, the type of chemical protective ensemble will depend upon contaminants, concentration and extent of contact.

The level of protection selected is based upon the following:

- Potential for exposure to substances in air, splashes of liquids, or other direct contact with materials due to work executed.

- Knowledge of chemicals on site along with properties such as toxicity, route of exposure and contaminant matrix.

- Understanding of chemical, physical and biological hazards that may be encountered.

In situations where the type of chemical, concentration and possibilities of contact are unknown, or if unforeseen conditions are encountered, the appropriate level of protection will be selected based on professional experience and judgment of the SSR until the hazards can be better identified.

7.1.1 Level D

Level D will be utilized on the entire project, except when handling the asbestos removal from the building.

PPE	Description
Respiratory Protection:	None required.
Clothing:	Cloth coverall or short sleeve shirts and full length pants.
Gloves (outer):	None required.
Gloves (inner):	None required.
Boots:	Construction work boots.
Boot Covers (outer):	None required.
Eye/Face Protection:	Chemical splash goggles or safety glasses with side shields at all time.
Head Protection:	Hard Hat
Other:	Warning vests at all times; fall protection devices, as needed; hearing protection, as needed.

7.2 Standard Operating Procedures for Personal Protective Equipment

7.2.1 Inspection

Proper inspection of PPE features several sequences of inspection depending upon specific articles of PPE and its frequency of use. The different levels of inspection are as follows:

- Inspection and operational testing of equipment received from the factory or distributor.

- Inspection of equipment as it is issued to workers.

- Inspection before each use.

- Inspection after use training and prior to maintenance.

- Periodic inspection of stored equipment.

- Periodic inspection when a question arises concerning the appropriateness of the selected equipment or when problems with similar equipment arise.

7.2.2 Hearing Conservation Program

Per 29 CFR 1926.101, hearing protective devices will be provided to personnel working in areas of high decibel noise. Hearing protective devices will be worn during periods of high decibel noise exposure, as per 29 CFR 1926.52.

A Hearing Conservation Program. The program shall meet the requirements of OSHA 1910.95 and shall be implemented when noise levels exceed eighty-five (85) decibels on an eight (8) hour Time Weighted Average (TWA). Noise assessments shall be completed within the project site work areas or on personnel where noise that exceeds the applicable OSHA standard is present.

7.2.3 Respiratory Protection

During contaminated soil handling, or any other dust-producing task, airborne particulates shall be minimized by the use of safe work practices and watering down of work areas. **Visual dust monitoring will be performed during excavation of all soils. JHM will wet soils on-site to eliminate dust will protect from exposure as needed.**

Contractor employees required to wear a respirator shall be trained, medically qualified and fit tested as per 29 CFR 1910.134.

8.0 MEDICAL SURVEILLANCE REQUIREMENTS

Medical monitoring programs are designed to track the physical condition of all personnel on a regular basis as well as survey pre-employment or baseline conditions prior to potential exposures.

8.1 Heat Stress

Temperatures inside protective equipment can be as much as 25% over external ambient temperatures with humidity near 100%. Excessive temperatures and loss of body fluids can result in a range of health conditions ranging from heat rash, cramps, exhaustion, heat stroke and possibly death.

Heat stress can be caused by a number of factors including workload, weather conditions, personal protective equipment, and physical condition of the individual. Work activities related to materials handling will require the use of personal protective equipment, increasing the risk of worker heat stress. Heat stress includes several types of heat related illnesses, each with specific symptoms, listed below:

- Heat rash caused by continuous exposure to heat and humid air. Decreases the body's ability to tolerate heat.
- Heat cramps, caused by excessive perspiring without proper and adequate electrolyte replacement. Symptoms include:
  - pain in the hands, feet, and abdomen
  - muscle spasms
- Heat exhaustion, caused from inadequate blood circulation due to cardiovascular dehydration. Symptoms include:

- pale, cool skin
- excessive perspiring
- fainting
- nausea
- dizziness

- Heat stroke, most serious form of heat stress, body temperature regulation fails and body temperature rises rapidly. Immediate action must be taken to cool the body. Medical attention is required. Symptoms include:

  - red, hot, dry skin
  - lack of perspiration
  - nausea
  - dizziness
  - rapid pulse
  - coma

8.1.1 Heat Stress Management

When necessary, these general controls will be used to control heat stress:

- Workers will be given verbal instructions and reminders during tailgate safety meetings.

- The drinking of water in small volumes (about 1 cup) throughout the day will be encouraged.

- Worker will be allowed to self-limit their exposures if they detect signs and symptoms of heat strain in themselves or others.

- Individuals taking medications which may put them at greater risk, such as for blood pressure, cardiovascular medication, body temperature regulation, renal or sweat gland functions, and those who abuse or are recovering from alcoholism, will be counseled on the dangers. A healthy lifestyle will be encouraged.

- Employees are encouraged to liberally apply sunscreen, with a minimum SPF of 15, when working outdoors to avoid sunburn and potential skin cancer, which is associated with excessive sun exposure to unprotected skin.

- Employees should wear safety glasses that offer protection from UVA/UVB rays.

- Individuals returning to work after an extended absence from heat exposure will be encouraged to consume salty foods.

- Personnel must be able to recognize signs and symptoms of heat stress and administer immediate attention.

- Work/rest schedules planned according to weather conditions, workload, and level of personal protective equipment.

- Provide shaded rest area on sunny or hot days.

- Allow personnel to become acclimated to site conditions, personal protective equipment, and workload. Rotate teams of personnel in hot weather.

- Utilize cooling devices to assist body cool down (i.e., showers, cooling jackets, etc.).

- Encourage personnel to maintain their physical fitness.

8.2 Cold Stress

Personnel working in extreme cold, even for a short time, may experience severe injury to the surface of the body (frostbite), or profound generalized cooling (hypothermia). Frostbite usually occurs to parts of the body having high surface to volume ratios, such as fingers, toes, ears, and nose. Incipient frostbite is characterized by a blanching or whitening of the skin. Superficial frostbite is characterized by skin with a waxy or white appearance that is firm to the touch, but the skin underneath is resilient. Deep frostbite is characterized by cold pale skin that is solid to the touch.

Systematic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms include shivering, apathy, listlessness, sleepiness, unconsciousness, freezing of the extremities, and even death.

The extent of frostbite and hypothermia are influenced greatly by wind speed, wind chill and wetness of the skin. Thus the body can cool rapidly when chemical protective equipment is removed and the clothing underneath is soaked with perspiration. Workers experiencing signs of hypothermia should be immediately removed from the environment, placed in a warm location, covered with dry blankets and provided with warm liquids. Wet clothing should be removed and replaced with dry clothing and outerwear.

8.3 Drug Testing

A pre-work test and negative result for controlled substances and alcohol is required for all contractor employees prior to starting work. JHM's screening program will include a 10-panel drug screen for the following constituents:

- PCP;
- Marijuana;
- Cocaine;
- Opiates;
- Methamphetamine;
- Methadone;

- Amphetamines;
- Barbiturates;
- Benzodiazepines; and
- Tricyclic antidepressants.

Per specifications, unless an approved field test kit is used, a DHHS certified laboratory will perform the screening and lab results will be reviewed by a qualified medical officer. Workers not on the project for 8 weeks or more will require re-testing at JHM's expense prior to their return.

Post incident drug and alcohol testing shall be performed, including incidents involving property damage or personal injury requiring medical treatment.

Drug and alcohol testing shall be performed on Contractor employees when there is reasonable suspicion. A trained Contractor supervisor shall document any case of reasonable suspicion.

Contractor employees with a confirmed positive test result for controlled substances or a detectable blood alcohol concentration (BAC) will be banned from working on the Project.

All controlled substance and alcohol test results shall be maintained by the Contractor.

9.0 CONSTRUCTION CONTROL MEASURES

The following section defines measures and procedures for maintaining site control. Site control is an essential component in the implementation of the site health and safety program.

9.1 Buddy System

During intrusive activities, the implementation of a buddy system is mandatory. A buddy system requires at least two people who work as a team, each looking out for each other, via voice or visual contact.

9.2 Site Communications

Successful communications between project site personnel is essential. The following communications systems may be available during activities on the site:

- Two way radios;
- Personal Air Horn;
- Hand signals;
- Cellular phones.

9.2.1 Hand Signals

Hand Signals

Signal	Definition

Hands clutching throat	Out of air – cannot breathe
Hands on top of head	Need assistance
Thumbs up	OK / I am OK / I understand
Thumbs down	No / Negative
Arms waiving upright	Trouble / Send backup support
Grip partner's wrist	Exit area immediately

9.3 Hazard Communication Standard

As required by 29 CFR 1910.1200 and 29 CFR 1926.59, a company Hazard Communication Standard will be available at the site. This program is in Appendix E of this plan. Related training will be provided by the Project Manager.

A written Hazard Communication Procedure for chemicals at the Project Site that complies with the requirements of 29 CFR 1910.1200, Hazard Communication. No chemical is to be brought on Site until approved by GE and CM. A *GE New Chemical Introduction Form*, documenting the purpose, quantity, use frequency, use location, and a Safety Data Sheet (SDS) (less than three (3) years old or most current from the manufacturer), must be submitted for approval by the CM as part of submittals, in accordance with the Contract documents. SDSs for products used and/or stored on Site must be kept on the Project Site.

9.3.1 Container Labeling

All containers received on-site will be inspected to ensure the following:

- All containers are clearly labeled as to the contents.
- The appropriate hazard warnings are noted.
- The name and address of the manufacturer is listed.

All secondary containers will be labeled with either an extra copy of the original manufacturers' label or with generic labels, which have a space for identification and a space for the hazard warning.

9.3.2 Safety Data Sheets

Copies of SDSs for hazardous chemicals will be maintained on site, at the main office and will be available to all employees for their review.

9.4 Dust Prevention and Control Plan

The Construction Manager, or a third party under the direction of the Construction Manager, will perform monitoring to demonstrate compliance with the applicable QOL Standards.

Air Quality QOL Standard for Visible Dust:

1. The QOL Standard for Visible Dust is to mitigate project related visible dust from leaving the Work area.

2. The Construction Manager will investigate, with assistance by the Contractor, the cause of visible dust if observed leaving the Work area. If warranted, the Construction Manager will notify the Contractor if corrective action is required to address observations of visible dust.

9.5 Noise Control Plan

JHM will comply with the following Noise QOL Standards (of note, JHM will be working only during daylight hours for Contract 10):

1. The primary objective of the Noise QOL Standards is to limit potential impacts of noise generated by the project on the surrounding communities.
2. For residential areas, separate Noise QOL Standards were established for daytime and nighttime periods, and the residential daytime noise standard includes both a Notification Level and an Action Level. The residential nighttime noise standard and non- residential noise standard (applicable any time of day) are both Action Levels.
3. The Daytime Noise QOL Standards are listed on the table below. All sound levels are presented in decibels on an A-weighted scale (dBA).

Type	**Numerical Standard (Maximum Hourly Average)**
Notification Level: Residential Daytime (7:00 a.m. to 6:00 p.m.)	75 dBA
Action Level: Residential Daytime (7:00 a.m. to 6:00 p.m.)	80 dBA

Compliance with the Noise QOL Standards will be determined based on noise monitoring conducted by the Construction Manager or a third party in accordance with the QOL Compliance Plan and the Construction Monitoring Plan (Attachment G to the POP).

9.6 Odor Control Plan

JHM does not anticipate any sources of odor on Contract 10. In the unlikely event of odor issues, JHM will adhere to the odor QOL standard. This includes protecting the surrounding communities from nuisance odors that unreasonably interfere with the comfortable enjoyment of life and property or the conduct of business.

9.7 Light Control Plan

JHM will be working only during daylight hours for Contract 10.

10.0 EMERGENCY RESPONSE PLAN

This section describes contingencies and emergency procedures to be implemented at the site. This plan should be coordinated with the local authorities disaster and emergency management plans

as appropriate. Directions to the hospital (Section 10.8) will be posted on site when this HASP is in effect. Emergency procedures will be posted and covered in daily site briefings.

10.1 Pre-emergency Planning

The Site Supervisor will establish appropriate lines of communications with local hospitals, government agencies and other emergency response organization prior to site activities. During the site briefings held periodically, all employees will be trained in and reminded of provisions of the emergency response plan, communications systems, and evacuation routes.

10.2 Emergency Equipment & Facilities

For the protection of all JHM personnel, the appropriate safety equipment will be available on site. The equipment will be properly identified at all times and all personnel will be made aware of the locations of these pieces of equipment. First Aid stations will be readily identifiable and adequately lighted. The SSR will be responsible for inspecting and maintaining the availability of these items:

- First Aid Handbook
- Eyewash stations
- Handwash stations
- First Aid kits
- Emergency escape self-contained breathing capsules (when SCBAs are required)
- Telephone with emergency telephone number directory
- Self-contained breathing apparatus (if required)
- Type ABC multipurpose fire extinguishers
- Chemical absorbent material

10.3 Personnel Roles and Lines of Authority

The SS has primary responsibility for responding to and correcting emergency situations. This includes taking appropriate measures to ensure the safety of site personnel and the public, including evacuation of adjacent personnel as necessary. Additionally, they are responsible for ensuring that corrective measures have been implemented, appropriate authorities notified, and follow up reports completed.

10.3.1 First Aid & CPR

JHM employees are American Red Cross First-Aid and CPR trained.

The SS will identify the individuals certified (at least two employees per site) in First Aid and CPR in order to ensure that emergency medical treatment is available during field operations and activities. A copy of these certifications are kept on site, as well in the main office located in Pittsfield, MA.

Any injuries requiring First Aid treatment will be reported to the injured party's immediate supervisor, who will report the incident to the PM. All injuries and illnesses will be recorded in the company OSHA Form 300 log within 6 working days of the incident, as per 29 CFR 1904. If a question exists as to whether the injury might require additional medical attention beyond minor First Aid treatment, the SS will immediately arrange for transport of the injured party to the hospital.

10.4 Personnel Accidents and Injuries

In the event of a worker-related accident, it is JHM's primary concern to provide immediate assistance without placing additional site personnel at risk. All accidents and injuries are reported to the Project Manager.

All worker injuries will require First Aid procedures to be implemented. If the severity of the injury is beyond on-site First Aid procedures, the employee must be transported to an off-site medical facility. Transportation to a local emergency medical facility will be provided.

If the injury involves chemical exposure, the following situations will require First Aid procedures as listed:

1. Eye exposure – Consult SDS for proper response action. If the element is not reactive with water, thoroughly rinse at the eye wash station or portable eye wash unit using water and/or eyewash solution. Obtain medical attention immediately.

2. Dermal exposure - rinse affected area immediately using water. Obtain medical attention, if necessary.

3. Ingestion - refer to SDS and administer emetic, if required. Obtain medical attention immediately.

4. Inhalation - move to fresh air. If breathing has stopped, perform CPR. Obtain medical attention immediately.

10.5 Incident Reports

The JHM PM will be notified of any incidents including; near-miss, injuries, spills, crime, vandalism, evacuation or personal or property damage to any site worker or the general public. The OSHA First Report of Incident Form (Attachment 2) shall be completed and submitted to JHM's Health and Safety Department at the main office as required.

All incidents will be investigated to determine root cause and corrective actions.

10.6 Alternative Return to Work Program

For individuals who are injured on the job and are then ready to return to work on-site, the Contractor will submit to CM a written statement from a physician indicating the employee's fitness (ability to return to work), prior to allowing the employee to return to work.

10.7 Evacuation Procedures

If anyone discovers a fire, chemical spill or release, or other process upset necessitating emergency action, he or she will immediately notify the SS. An immediate decision will be made as to whether to evacuate the site or other actions to be taken. The SS is primarily responsible for this decision.

The primary response to any emergency will be to protect the health and safety of employees, contractors and visitors on site, as well as the community and environment. Steps will be taken to identify, contain, treat, and properly dispose of the materials involved as a secondary response.

In the event of an emergency that necessitates an evacuation of the site, the following alarm procedures will be implemented:

10.7.1 Alerting System

On site – Utilize air horns or radios as appropriate. Contact 911, alert office personnel to wait at site entrance to direct emergency response units to the emergency.

Outside of the work areas – Contact 911.

When notified to evacuate, all personnel will be expected to proceed to the closest site exit with their buddy, and mobilize to the predetermined safe distance area associated with the evacuation route. Personnel will remain at that area until the re-entry alarm is sounded or an authorized individual provides further instructions. Air horns will be located in the work area near the supervisor's office.

In general, employees should proceed to a designated meeting location as directed by the SS during the periodic safety meetings. This project has mobile operations so these locations will be set each morning by the SS.

10.8 Emergency Contacts & Notification Systems

The following list provides names and telephone numbers for emergency contact personnel and key project contacts. It will be kept on site for the duration of the project. In the event of a medical emergency, personnel will take direction from the SS and notify the appropriate emergency organization. In the event of a fire or spill, the site supervisor will ensure that the appropriate local, state, and federal agencies are notified.

Emergency Phone Numbers

EMERGENCY NUMBERS

POLICE, AMBULANCE, FIRE, HOSPITAL 911

- Lee Police Department ..... (413) 243-5530
- Lee Fire Department ..... (413) 243-5547
- Lee Department of Public Works ..... (413) 243-5520

- **Hospital/Urgent Care**
  Hospital (Berkshire Medical Center) ..... (413) 447-2000
  725 North Street
  Pittsfield, MA
- **Urgent Care – 489 Pittsfield Road, Lenox……..(413) 551-5035**

- USEPA National Response Center ..... (800) 424-8802
- NIOSH Technical Information Line ..... (800) 356-4674
- New England Poison Center ..... (800) 222-1222
- MassDEP Emergency Response ..... (888) 304-1133

UTILITY NUMBERS

- Berkshire Gas ..... (800) 292-5012
- Eversource (WMECO) ..... (800) 662-7764
- Spectrum ..... (833) 949-0036
- Verizon ..... (800) 949-0036

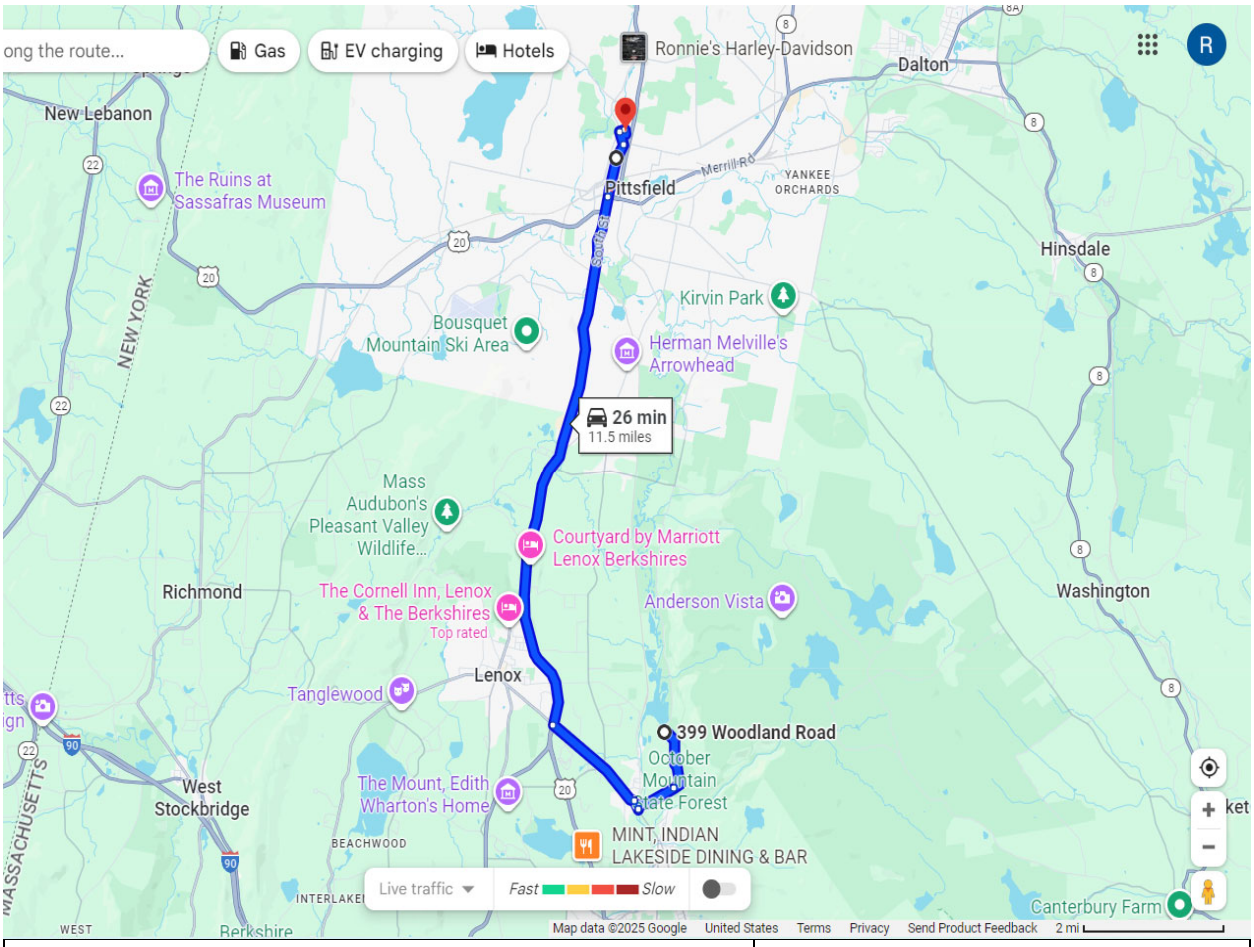
PERSONNEL PHONE NUMBERS

J.H. Maxymillian, Inc. Personnel:

- Main Office: ..... (413) 499-3050
- Site Supervisor and Site Safety Rep: ..... TBD
- JHM's Safety and Health Officer: Hillery Maxymillian ..... (617) 529-3958
- Project Manager: Glenn Houle…….. (413) 770-6161
- Project Engineer: Sara Kelley ..... (413) 829-1912

10.9 Directions and Map to Hospital

Figure 10-1 Hospital Route Map
Route US-20 W/US-7 N to Berkshire Medical Center



HOSPITAL DIRECTIONS:	**HOSPITAL INFORMATION:**
1. Take **Woodland Rd** & **Walker St** to **US-20 W/US-7 N** in **Lenox** 2. Turn **right** onto **US-20 W/US-7 N** 3. Continue on **North St** 4. Turn **left** onto **Wahconah St** 5. Turn **right** onto **Charles St** 6. Turn **right** toward **Berkshire Medical Center** Estimated Distance: 11.5 miles, Estimated Time: 26 minutes	**Berkshire Medical Center** **725 North Street** **Pittsfield, Massachusetts** **Phone: (413) 447-2000**

10.10 Fire & Explosion Protection and Prevention Plan

In the event of a fire or explosion, the local Fire Department will be summoned immediately. Upon their arrival, the SS will advise the fire commander of the location, nature, and identification of the hazardous materials on site.

If it is safe to do so, site personnel may:

1. Use firefighting equipment available on site to control or extinguish the fire, and;
2. Remove or isolate flammable or other hazardous materials that may contribute to the fire.

10.11 Spill Control and Countermeasures Plan

In the event of a spill or leak that may enter any sanitary sewerage pipeline, storm sewer or other off-site conveyance, site personnel will:

1. Inform JHM Site Supervisor immediately.
2. Terminate work activities (at the discretion of the SS).
3. Prevent entry of spill materials into any waterways.
4. Follow site emergency notification and evacuation procedures, when necessary.
5. Locate the source of spillage and stop the flow if it can be done safely.
6. Begin containment of the spilled materials if it can be done safely.

If the spill or release is expected to pose significant hazards or is beyond the capabilities of the immediate personnel, then the PM will be contacted immediately. When contacted, the PM will obtain and assess the following information:

1. The type of material spilled or released.
2. Location of the release or spill.
3. An estimate of the quantity released and the rate at which it is being released.
4. Any injuries involved.
5. Fire and/or explosion or possibility of these events occurring.
6. The area and materials involved in the location of the fire or explosion.

In the event of a chemical spill that is not contained within a dike or bermed area, an area of isolation will be established around the spill and the material(s) involved. When any spill occurs,

only those persons involved in the oversight or performance of the emergency cleanup operations will be allowed within the designated hazard area. If possible, this area will be roped or otherwise blocked off.

If an incident may threaten the health or safety of the surrounding community, the public will be informed and possibly evacuated from the area. The PM will inform the proper agencies in the event that this is necessary. The telephone numbers of emergency response organizations are listed in Section 10.

If the control and cleanup of the spill or release is within the capabilities of onsite personnel and the release does not migrate beyond the perimeter of the site, JHM site personnel will determine reporting requirements and will report as necessary.

10.12 Incident Follow-up and Critique

Following all emergency response actions and activation of this plan, the PM will conduct a debriefing session of all key personnel involved. The response will be critiqued, documented, and response plans revised, if necessary. Corrective actions will be discussed where procedures were inadequate or need improvement. Responsible persons will be listed and held accountable for follow-up.

11.0 INSPECTION PROGRAM

11.1 Inspections Reporting and Recordkeeping

JHM's PM and SS will coordinate inspections of JHM's operations. Inspections will be conducted according to the schedule outlined in the following sections.

General Site: Personnel will be observed to ensure compliance with health and safety requirements, in particular the use of personal protective equipment. The availability of usable safety and emergency equipment will be verified.

11.1.1 Safety Inspections

Periodic site safety inspections will be performed by the PM during the operational phase of the site. The purpose of these safety inspections is to ensure personnel are performing their duties in the safest manner possible and provide continuing analysis and modification to the safety program.

The focus of these inspections is listed below, General Site Inspection Schedule. The frequency of these inspections may be altered/amended as deemed necessary by JHM’s PM.

General Site Inspection Schedule

SPECIFIC ITEMS	TYPES OF PROBLEMS	FREQUENCY
Electrical lines	Frays, splices, trip hazards	Weekly
All personnel trained	New workers may not know emergency procedures	Once per work shift
All personnel using appropriate PPE	May not be complying with PPE requirements	Before use
Fire extinguishers	Broken seal, inadequate pressure, access blocked	Every 30 days /After use
Face shields, safety glasses	Inadequate supply, damaged or scratched lenses	Before use
Hard hats, boot covers, construction boots	Inadequate supply, damaged	Before use
Gloves, glove liners	Inadequate supply, damaged	Before use
Ladders	Damaged, cracked, dented	Before use / Weekly
First-aid supplies	Low stock	Weekly/After use

ATTACHMENT 1

On Site Personnel Health and Safety Plan Compliance Agreement

On Site Personnel Health and Safety Plan (HASP) Compliance Agreement

I have been informed of the JHM Health and Safety Plan for activities at the site. My signature indicates that I have been notified of the on-site location of the above stated Plan, have been provided the opportunity to review the contents of the Plan and have been provided with on-site training. I will comply with the requirements and protocols outlined in the HASP when working at or visiting the site.

Employee Name [print]	*Employee Signature*	*Date*

ATTACHMENT 2

OSHA First Report of Injury or Illness Form

OSHA's Form 301
Injury and Illness Incident Report

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

This *Injury and Illness Incident Report* is one of the first forms you must fill out when a recordable work-related injury or illness has occurred. Together with the *Log of Work-Related Injuries and Illnesses* and the accompanying *Summary*, these forms help the employer and OSHA develop a picture of the extent and severity of work-related incidents.

Within 7 calendar days after you receive information that a recordable work-related injury or illness has occurred, you must fill out this form or an equivalent. Some state workers' compensation, insurance, or other reports may be acceptable substitutes. To be considered an equivalent form, any substitute must contain all the information asked for on this form.

According to Public Law 91-596 and 29 CFR 1904, OSHA's recordkeeping rule, you must keep this form on file for 5 years following the year to which it pertains.

If you need additional copies of this form, you may photocopy and use as many as you need.

Completed by _____

Title _____

Phone (____) _____ Date ____/____/____

Information about the employee

1) Full name _____

2) Street _____

City _____ State _____ ZIP _____

3) Date of birth ____/____/____ **> (Office)**

4) Date hired ____/____/____

5) ❒ Male
❒ Female

Information about the physician or other health care professional

6) Name of physician or other health care professional _____

_____

7) If treatment was given away from the worksite, where was it given?

Facility _____

Street _____

City _____ State _____ ZIP _____

8) Was employee treated in an emergency room?
❒ Yes
❒ No

9) Was employee hospitalized overnight as an in-patient?
❒ Yes
❒ No

9a) **Was there any blood or body fluid?**
□ **Yes** **(Anyone exposed to blood should file a**
□ **No** **report with the field coordinator immediately)**

Information about the case **(Office Use)**

10) Case number from the *Log* _____ *(Transfer the case number from the Log after you record the case.)*

11) Date of injury or illness ____/____/____

12) Time employee began work _____ AM / PM

13) Time of event _____ AM / PM ☐ Check if time cannot be determined

14) ***What was the employee doing just before the incident occurred?*** Describe the activity, as well as the tools, equipment, or material the employee was using. Be specific. *Examples:* "climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."

15) ***What happened?*** Tell us how the injury occurred. *Examples:* "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."

16) ***What was the injury or illness?*** Tell us the part of the body that was affected and how it was affected; be more specific than "hurt," "pain," or "sore." *Examples:* "strained back"; "chemical burn, hand"; "carpal tunnel syndrome."

17) ***What object or substance directly harmed the employee?*** *Examples:* "concrete floor"; "chlorine"; "radial arm saw." *If this question does not apply to the incident, leave it blank.*

18) ***If the employee died, when did death occur?*** Date of death ____/____/____

APPENDIX A

Checklists and Inspection Forms

- Toolbox Talk / Safety Meeting Report
- Equipment Inspection Form
- Safety Inspection Checklist
- Construction Equipment Inspection Form
- Ladder Inspection Form

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DAILY MORNING / TOOLBOX TALK SAFETY MEETING REPORT

JOB SITE:	**TOPIC:**
JOB NUMBER:	**CONDUCTED BY:**
MEETING DATE: (MM/DD/YYYY)	**TIME:**

PERSONNEL ATTENDING

PRINT NAME	*SIGNATURE*
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

DAILY MEETING ITEMS TO DISCUSS/REVIEW:

1. Expected jobsite tasks & possible vehicle/equipment struck-by hazards.
2. Available methods to control, reduce, or abate the identified hazards.
3. Vehicle/equipment vs. pedestrian movement restricted areas.
4. All/any vehicle or equipment on-site with an obstructed view to the rear must have a functioning reverse signal alarm, a spotter assigned, or remain parked until repaired.

DIG SAFE ACTIONS – AS REQUIRED:

1. Obtained a Dig Safe ticket for this area.
2. Took photos/GPS of the pre-marked areas.
3. Will preserve any disturbed Dig Safe pre-marks (Supervisor/Laborer/or Operator take photos of area).

SAFETY COMMENTS, QUESTIONS, OR CONCERNS:

Please email completed forms to safety@maxymillian.com.

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Equipment Inspection Checklist

Job Name: _____ **Job #:** _____

Equipment ID #: _____

Equipment Name: _____

Inspectors Name: _____

Date: _____ **Time:** _____

Items Inspected	Check if Satisfactory	Comments
Falling Object Protective Structure (FOP)	☐	
Roll-Over Protection Structure (ROP)	☐	
Seat Belts	☐	
Operator Seat Bar(s)	☐	
Side Shields, Screens or Cab	☐	
Lift Arm Device	☐	
Grab Handles	☐	
Back up Alarm	☐	
Lights	☐	
Guards	☐	
Horn	☐	
Windshield Wipers	☐	
Glass, Mirror	☐	
Anti-Skid Treat Clear of Mud	☐	
Safety Signs (Swing Area)	☐	
Fire Extinguisher	☐	
General Condition	☐	
Fuel Connection Oil (Fuel & No Leaks)	☐	
Clear of Extra Material	☐	
Controls Function Properly	☐	

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Items Inspected	Check if Satisfactory	Comments
Hydraulic System (Full & No Leaks)	☐	
Parking Brake	☐	
Life Arm and Bucket	☐	
Tires/Tracks	☐	
Steering	☐	
Breathing Air System	☐	
Blast Shields	☐	
Gallons of Fuel Added		
Quarts of Oil Added		

Operators Signature: _____

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Jobsite Safety Inspection Report

Job Site: _____ **Supervisor/Foreman:** _____

Date: _____ **Inspector:** _____

1. General / Hazard Communication	Yes	No	N/A	Comments
OSHA 300 forms posted and complete				
OSHA and State required posters posted				
Emergency procedures, phone numbers and route to nearest hospital displayed				
Jobsite Safety Meetings recorded and available on-site				
Written H&S Plan on-site and available, if required				
Complete Hazards Communication Plan, SDS Manual, Employee certificates/training, Material Lists, maintained on-site/available				
Are first aid supplies readily accessible?				
Emergency Air Warning Horn on-site; all employees know where to gather when sounded				
Awareness/Warning Signs posted where required on-site				

2. Housekeeping / Sanitation	Yes	No	N/A	Comments
General work areas neat and orderly				
All temporary storage of materials and supplies neat and organized				
Scrap/Waste material well controlled, nails removed and disposed of properly				
Waste containers properly labeled, provided and used				
Passageways and walkways clear of obstructions				
Sanitation facilities and drinking water available on-site				
Appropriate amounts of lighting supplied to work areas				

3. Fire Prevention	Yes	No	N/A	Comments
Adequate fire extinguishers inspected, mounted and accessible				
All employees are properly trained in the use of a fire extinguisher				
“No Smoking” signs posted and enforced near flammables				
Flammable and combustible liquids are marked and properly stored in appropriate containers				
Properly labeling for full and empty containers/cylinders				

4. Electrical	Yes	No	N/A	Comments
All equipment is either grounded or double insulated				
Damaged extension cords or attachment cords (i.e. bare wires, missing ground prongs, etc.) taken out of service				
Ground fault circuit interrupters (GFCI) in use				
Sufficient number of temporary outlets and no visual signs of overload				
Circuit breaker panels are clearly labeled and secured				
Electrical outlets are provided with a face plate				
5. Hand and Power Tools	**Yes**	**No**	**N/A**	**Comments**
Hand and power tools are in good working order				
Tools are free from splinters, cracks, and mushroom heads				
All shields and guards in place on machines (i.e. saws)				
Operators of powder actuated tools are licensed				
Defective tools are turned in and tagged unsafe				
6. Fall Protection	**Yes**	**No**	**N/A**	**Comments**
Holes or openings are barricaded or covered securely and marked				
Guard Rail Systems - top rails, mid-rails and toe boards installed and secured properly				
Employees working more than 6' above a lower level are protected by guardrails, safety nets, or personal fall arrest system				
Employees exposed to fall hazards are tied off				
Employees below are protected from falling objects				
7. Ladders	**Yes**	**No**	**N/A**	**Comments**
Is the proper ladder for the job being used?				
Ladder is free of oil, grease, and debris				
The ladder extends at least 36" above the landing or grab rails				
Ladders are tied off/secured				
Ladders with split or missing rungs are taken out of service				
Stepladders are used in fully open position				
Ladder properly used with a 4:1 pitch				
No metal ladders used within 10 feet of electrical power lines				

8. Scaffolding	Yes	No	N/A	Comments
Scaffolding is constructed by a qualified person & per OSHA				
All scaffolding inspected daily and free of splits, twists & bows				
Erected on sound rigid footing with all pins and braces in place and locked				
Guardrails, intermediate rails, toe boards and screens in place				
Planking is sound and sturdy and in scaffold grade, 6”- 18” overhang				
Proper access provided to scaffold work (i.e. ladders or stairs)				
The distance between the scaffold and the working surface is less than 14”				
Employees below are protected from falling objects				
Minimum of 10’ from power lines				
Height to width ratio 4:1				
9. Trenches, Excavation & Shoring	**Yes**	**No**	**N/A**	**Comments**
Underground utilities have been located and marked				
Soil Classification? Type: Stable, A, B, C				
Excavations over 5' in depth are correctly sloped, benched, shored or a trench box is used				
Ladders, stairways, or ramps are provided every 25' in trench > 4' deep and ladders are 3’ above top edge of trench				
Materials are stored at least 2 feet from trench				
Excavations have proper barricades and/or stop logs properly placed				
10. Burning, Cutting & Welding	**Yes**	**No**	**N/A**	**Comments**
Welding Lead Inspection Forms were completed prior to work beginning				
Hot Work Permit completed				
Welding goggles, gloves, and proper clothing being used by operator				
Gas cylinders stored upright and secure				
Proper separating distance between fuels and oxygen (Minimum of 20 ft.)				

11. Cranes	Yes	No	N/A	Comments
(Critical) Lift Plan completed prior to work beginning				
Pre-Lift Checklist completed prior to work beginning				
Activity Hazard Analysis (AHA) reviewed and acknowledged by all involved in lifting and rigging work				
Rigging Equipment marked and inspected				
12. Silica	**Yes**	**No**	**N/A**	**Comments**
OSHA Table 1 or an Alternative Controls Method being used for Dust and Silica exposure				
Control plan in use and available on-site				
Proper PPE worn as needed (i.e. Dust Mask, Respirator, Tyvek Suit, Gloves				
Good housekeeping practices being implemented on-site				
13. Concrete & Masonry	**Yes**	**No**	**N/A**	**Comments**
Employees are protected with proper PPE from cement dust				
Formwork designed, fabricated, erected, supported, braced and maintained to support vertical and lateral loads				
All protruding reinforcing rods covered and/or guarded				
14. Personal Protective Equipment	**Yes**	**No**	**N/A**	**Comments**
Hard hats worn by all on-site personnel				
Steel Toe Work Boots worn by all on-site personnel				
Safety Gloves, Safety Vests, Safety Glasses, Hearing Protection and similar PPE readily available and worn by all on-site personnel and visitors (as needed)				
NIOSH/MSHA Respirators readily available/used as required				
Safety harnesses, lifelines, and shock absorbing lanyards readily available/used as required				
15. Confined Space	**Yes**	**No**	**N/A**	**Comments**
Entry procedure and rescue plan completed				
Permit posted and Fire Department notified				
Oxygen levels are between 19.5 – 23.5				
Notification signs posted outside the CS area				
16. Working Over and/or Near Water	**Yes**	**No**	**N/A**	**Comments**
Each employee near the water has a life vest				
Ring buoys with minimum of 90 feet of rope every 200 feet				
Minimum of 1 lifesaving boat immediately available				

17. Roadway Safety	Yes	No	N/A	Comments
Traffic patterns are controlled				
Signs, flagmen, police detail and other controls in use				
Proper high-vis clothing				
Barricades, fences and gates in place around site				
Barricades or fences well marked and lighted				
General area illumination (for night work)				
18. Vehicles & Equipment	**Yes**	**No**	**N/A**	**Comments**
Inspected and maintained on a regular schedule				
All equipment/vehicle mounted directional and emergency signals, horns, reverse signal alarms all functioning properly				
If not equipped with a reverse signal audible alarm, a spotter used to signal to the driver/operator when it is safe to move				
Seat belts in good order and used				
Only those who are authorized to operate machinery are permitted				
Chains, lifting devices and rigging marked and inspected				
19. Morning Meeting	**Yes**	**No**	**N/A**	**Comments**
Reviewed daily tasks, struck-by hazards, and controls				
Designated site access is established. All vehicle/equipment/pedestrian entry/exit is controlled				
Backup alarm checklist completed and in truck				
Third party trucks checked for backup alarm upon arrival				
Road crossing procedure, location established				
Checking for broken backup alarm				
20. Training	**Yes**	**No**	**N/A**	**Comments**
Employees on-site have been trained in pedestrian/operator awareness communication; backup alarm awareness; backup only when necessary; operator verifies clear travel path; report any broken backup alarm; set road crossing location/procedure; any new employee was trained.				

Notes:

Signature _____ **Date** _____

CONSTRUCTION TOOLS & EQUIPMENT SAFETY

J.H. MAXYMILLIAN, INC.

OVER 50 YEARS STRONG

Revision Number: 2

Revised: 2024
CIH Reviewed: 2012

Construction Tools & Equipment Safety
TABLE OF CONTENTS

ATTACHMENTS

1.0 Purpose

The purpose of the Construction Tools & Equipment Safety program is to ensure the safe use and operations of construction tools and equipment.

2.0 General Tools and Equipment Safety Rules

2.1 Manufacturer Operating and Safety Manuals

Before operating any construction tools and equipment, you should be familiar with the manufacturer's operation and safety manuals. These manuals will contain the proper operating procedures, inspection schedules, maintenance requirements, personal protective equipment, and other information to operate the equipment safely.

2.2 Inspections

All construction tools and equipment will be inspected and tested prior to use. Any deficiencies should be fixed prior to use.
Construction tools and equipment may have different inspection criteria. Operators should verify the inspection criteria upon receiving.

2.3 Maintenance and Use

1. All tools and equipment shall be maintained to ensure it is always in proper working order. If not in proper working order, it will be removed from service until fully repaired. Instruments shall be calibrated according to manufacturer's specifications.
2. It shall be the project manager or site supervisor's responsibility to be certain that all repairs and general maintenance are scheduled and affected properly.
3. Tools and equipment will not be used without appropriate guards in place.
4. Proper PPE will be worn based on the hazard assessment of the tool and task.
5. It shall be the project manager or site supervisor's responsibility to be certain that all tools and equipment in need of repair are not operated until such repairs are completed to their satisfaction.
6. Employees shall report any operational problem with construction tools and equipment to the project manager or site supervisor.
7. Safe work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts when working near, or on, equipment or circuits that are/may be energized. Conductive items of jewelry or clothing shall not be worn unless they are rendered non-conductive by covering, wrapping or other insulating means.
8. All electrical tools and equipment shall be properly grounded, and electric wiring shall be free of defects, unnecessary or defective extension cords, and loose or broken fixtures. If employees handle long dimensional conductor objects (ducts or pipes), they must follow safe work practices.

9. JHM's electrical safety program and Lockout/Tagout procedures shall be followed where applicable on all equipment maintenance operations. (*Refer to Appendix 3: Electrical Safety Program and Appendix 6: Lockout/Tagout Program* for more information).
10. Equipment delivered to site in a state of disrepair will be immediately repaired or returned.

3.0 Crane and Rigging Safety

3.1 Crane Safety Measures

1. Operators and assemblers/disassemblers of cranes and lifting equipment shall be qualified to operate such equipment and able to demonstrate competency upon request. Crane operators will be licensed as required.
2. Cranes will be assembled, operated and/or disassembled per manufacturer's specifications and instructions.
3. The work zone in which the crane will operate will be assessed prior to operation in order to determine maximum working radius, possible encroachment of power lines and other potential hazards.
4. The crane's swing radius area will be marked/barricaded to prevent people entering the area.
5. All cranes and rigging equipment shall be inspected daily, prior to any work, and on an as used basis. If any issues are found, do not begin work until taken care of, or the item is removed from use. Inspections shall be required regularly after malfunctions and major repairs. Serious malfunctions will require intervention by the manufacturer. Equipment may not be modified without the manufacturer's written approval.
6. Cranes will not be used unless the ground conditions are stable, solid and graded to a level that will sufficiently support the crane and load per the manufacturer's specifications.
7. The Crane (Critical) Lift Plan provided by JHM will be filled out and discussed with all personnel involved.
8. Written documentation of all inspections shall be maintained in project files.
9. Crane charts are readily available in-house for design and posted within the cranes for operator reference. Crane charts will be followed in order to not exceed the manufacturer's specifications and limitations.
10. Employees will follow all manufacturer instructions and procedures contained in the Operator's Manual. JHM also posts the manufacturer rated load capacities, and recommended operating speeds, special hazard warnings, or instruction, on all equipment. Instructions, warnings and the Operator's Manual will be visible/available to the operator while he/she is at his control station.

11. Employees must use signals to crane and derrick operators as prescribed by the applicable ANSI standard for the type of crane in use. (See Section 4.0 Signaling for more information.)
12. If the operator's view becomes obstructed, a signal person will be used.
13. JHM's master mechanic serves as the competent person who inspects all machinery and equipment prior to field use (or at a minimum monthly) and annually. Inspection records with results and dates are maintained in JHM's main office. The certified operators on-site also inspect the crane prior to each use, and during use, to make sure it is in safe operating condition. Any deficiencies are immediately repaired, and defective parts replaced before continued use.
14. In the event that a crane or other piece of equipment is used in an enclosed space, JHM will test and record air quality to ensure that employees are not exposed to unsafe concentrations of toxic gases or oxygen deficient atmospheres.
15. An accessible fire extinguisher of ABC rating, or higher, is required at all operator stations or cabs of equipment.
16. The operator has the authority to stop and refuse to lift any load if there is a safety concern until a qualified person has assured the lift is safe.
17. No modifications that could affect safe operation of the crane will be made without written approval from the manufacturer or a Professional Engineer.

3.2 Working near Power Lines

Always determine if any part of the equipment, load line, or load (including rigging and lifting accessories), could get closer than a trigger distance:

- 20 feet from power lines rated up to 350 kV
- 50 feet for power lines rated over 350 kV

If there is a possibility that there will be a need to get closer, then requirements for additional action will be triggered – ***See Below***;

NOTE: JHM must meet the requirements of one of the following three options:

Option (1) – De-energize and ground; or

Option (2) – 20 FT clearance, ***if the voltage cannot be properly identified***; or

Option (3) – **Table A Minimum Clearance**. Determine the line's voltage and the minimum clearance distance and determine if any part of the equipment, load line, or load, while operating up to the equipment's maximum working radius in the work zone, could get closer than the minimum clearance distance.

Table T Minimum Clearance is for traveling with no load and boom lowered.

Table A- Minimum Clearance Distance for Crane near Power lines

VOLTAGE (kV)	MIN. CLEARANCE DISTANCE (ft)
Up to 50	10
Over 50 to 200	15
Over 200 to 350	20
Over 350 to 500	25
Over 500 to 750	35
Over 750 to 1,000	45

Table T- Minimum Clearance Distance While Traveling with No Load and Boom Lowered

VOLTAGE (kV)	MIN. CLEARANCE DISTANCE (ft)
Up to 0.75	4
Over 0.75 to 50	6
Over 50 to 345	10
Over 345 to 750	16
Over 750 to 1,000	20
Over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person)

3.3 Rigging Safety Measures

1. All rigging equipment will be inspected prior to use. Any damaged or defective equipment will be taken out of service.
2. Inspections shall be required regularly after malfunctions and major repairs. Serious malfunctions shall require intervention by the manufacturer. Documentation of all inspections shall be maintained in project files.
3. All rigging equipment shall be maintained in compliance with ANSI and OSHA standards and must have legible manufacturer's tag. Damaged or defective equipment will not be used and will be removed immediately.
4. Tag lines will be used unless they present a dangerous working condition.

5. Rigging equipment will not be loaded beyond its recommended safe working load and load identification shall be attached to the rigging.
6. The rigging equipment will include one of the following safety measures: an alloy anchor type shackle with the proper bolt, nut and retaining pin, OR hooks on overhaul ball assemblies, lower load blocks, or other attachment assemblies that can be closed and locked, eliminating the hook throat opening.
7. All employees shall be kept clear of loads about to be lifted and of suspended loads.
8. When not in use, rigging equipment will be removed from the immediate work area.

4.0 Signaling

When an operator's view has the potential to be obstructed during load placement, picking or traveling, a signal person must be used with the following guidelines:

- A signal person may use hand signals (See Attachment B - Hand Signals) or radio communications, whichever is suitable for current site conditions.
- If at any time signals between the operator and the signal person are interrupted, the operator must safely stop operations until communication is re-established.
- Only one person may give signals at a time, with the exception of emergency stop signals.
- If utilizing radio communication, devices must be tested on-site to ensure they are in good working order and reliable, prior to use.

4.1 Signal Person Training Requirements

Each signal person must:

- Be competent: knowing and understanding which type of signals will be used.
- Have a basic understanding of the equipment operation and limitations.
- Demonstrate that he/she meets the qualification requirements through and oral or written test and through a practical test.

5.0 Construction Vehicles and Traffic

1. All applicable employees shall adhere to the company Fleet Safety Program.
2. Only vehicles in safe operating condition will be allowed on site.
3. Vehicles shall be properly lighted during dark hours.
4. All construction vehicles shall be equipped with a backup alarm.
5. Each vehicle on construction sites shall be equipped with an audible horn, in addition to the backup alarm.

6. Pedestrians shall always have the right of way.
7. Overhanging loads shall be properly flagged or a flagman provided.
8. Every effort shall be made to avoid blocking roadways and access to fire protection equipment.
9. Employees are prohibited from riding on loads, fenders, running boards, and tailgates.
10. Seat belts will be worn if available in trucks or equipment.
11. Employees shall not ride in beds of trucks or other equipment containing unsecured materials that may shift.
12. Equipment and vehicle speed on the site shall not exceed ten miles per hour.
13. All attachments will be grounded and wheels chocked as necessary when leaving a vehicle unattended.
14. Any discrepancies, such as cracked glass, must be reported to the supervisor or repaired as soon as possible.

6.0 When Working Around Moving Machinery

1. No loose clothing may be worn.
2. Ties are permissible, for supervising personnel, but should be kept inside jacket or otherwise constrained.
3. Rings are permissible if they do not increase the risk of accident. It is recommended that all rings be covered with tape if worn on the site.
4. Dangling, loose jewelry is prohibited.
5. The project manager or site supervisor shall use his best judgment in determining if a net is advisable to confine long hair.

7.0 Powder Actuated Tools

1. Only trained operators are authorized to utilize power actuated tools.
2. The project manager or site supervisor shall be informed prior to operations and will ensure adequate safety measures are in place, including relevant personal protective equipment.
3. Guards shall be in place and operable at all times while the power tool is in use. The guard may not be manipulated in such way that will compromise its integrity or compromise the protection in which intended. Guarding shall meet the requirements set forth in ANSI B15.1.
4. All hand and power tools will be kept and maintained in safe condition. If a tool is rendered unsafe, it will be identified as unsafe by tagging or locking the controls to make them inoperable, or it will be physically removed from its place of operation.

Attachment A

Equipment Inspection Form

J.H. MAXYMILLIAN, INC.

OVER 50 YEARS STRONG

Equipment Inspection Checklist

Job Name: _____ **Job #:** _____

Equipment ID #: _____

Equipment Name: _____

Inspectors Name: _____

Date: _____ **Time:** _____

Items Inspected	Check if Satisfactory	Comments
Falling Object Protective Structure (FOP)	☐	
Roll-Over Protection Structure (ROP)	☐	
Seat Belts	☐	
Operator Seat Bar(s)	☐	
Side Shields, Screens or Cab	☐	
Lift Arm Device	☐	
Grab Handles	☐	
Back up Alarm	☐	
Lights	☐	
Guards	☐	
Horn	☐	
Windshield Wipers	☐	
Glass, Mirror	☐	
Anti-Skid Treat Clear of Mud	☐	
Safety Signs (Swing Area)	☐	
Fire Extinguisher	☐	
General Condition	☐	
Fuel Connection Oil (Fuel & No Leaks)	☐	
Clear of Extra Material	☐	
Controls Function Properly	☐	

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Items Inspected	Check if Satisfactory	Comments
Hydraulic System (Full & No Leaks)	☐	
Parking Brake	☐	
Life Arm and Bucket	☐	
Tires/Tracks	☐	
Steering	☐	
Breathing Air System	☐	
Blast Shields	☐	
Gallons of Fuel Added		
Quarts of Oil Added		

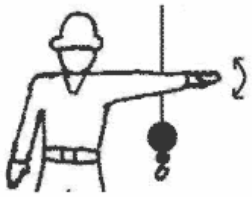
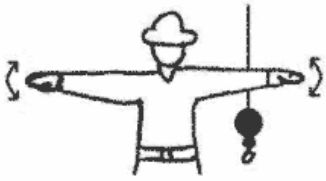
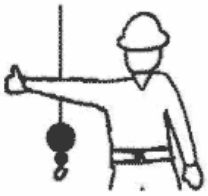
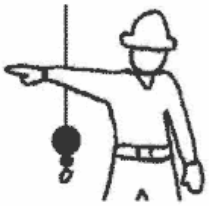
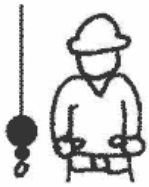
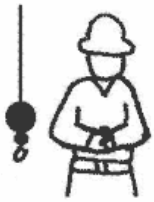
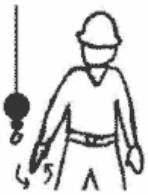
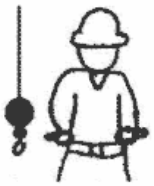
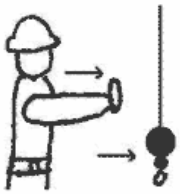
Operators Signature: _____

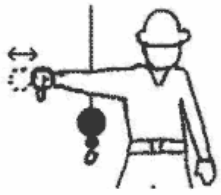
Attachment B

Hand Signals

Hand Signals for Crane Operation

When there is a lot of traffic at a worksite, it is essential for workers to be able to use hand signals. Here are some standard hand signals for crane operation.

 **STOP** – With arm extended horizontally to the side, palm down, arm is swung back and forth.	 **EMERGENCY STOP** – With both arms extended horizontally to the side, palms down, arms are swung back and forth.	 **HOIST** – With upper arm extended to the side, forearm and index finger pointing straight up, hand and finger make small circles.
 **RAISE BOOM** – With arm extended horizontally to the side, thumb points up with other fingers closed.	 **SWING** – With arm extended horizontally, index finger points in direction that boom is to swing.	 **RETRACT TELESCOPING BOOM** – With hands to the front at waist level, thumbs point at each other with other fingers closed.
 **RAISE THE BOOM AND LOWER THE LOAD** – With arm extended horizontally to the side and thumb pointing up, fingers open and close while load movement is desired.	 **DOG EVERYTHING** – Hands held together at waist level.	 **LOWER** – With arm and index finger pointing down, hand and finger make small circles.
 **LOWER BOOM** – With arm extended horizontally to the side, thumb points down with other fingers closed.	 **EXTEND TELESCOPING BOOM** – With hands to the front at waist level, thumbs point outward with other fingers closed.	 **TRAVEL/TOWER TRAVEL** – With all fingers pointing up, arm is extended horizontally out and back to make a pushing motion in the direction of travel.

 **LOWER THE BOOM AND RAISE THE LOAD** – With arm extended horizontally to the side and thumb pointing down, fingers open and close while load movement is desired.	 **MOVE SLOWLY** – A hand is placed in front of the hand that is giving the action signal.	 **USE AUXILIARY HOIST** (whipline) – With arm bent at elbow and forearm vertical, elbow is tapped with other hand. Then regular signal is used to indicate desired action.
 **CRAWLER CRANE TRAVEL, BOTH TRACKS** – Rotate fists around each other in front of body; direction of rotation away from body indicates travel forward; rotation towards body indicates travel backward.	 **USE MAIN HOIST** – A hand taps on top of the head. Then regular signal is given to indicate desired action.	 **CRAWLER CRANE TRAVEL, ONE TRACK** – Indicate track to be locked by raising fist on that side. Rotate other fist in front of body in direction that other track is to travel.
 **TROLLEY TRAVEL** – With palm up, fingers closed and thumb pointing in direction of motion, hand is jerked horizontally in direction trolley is to travel.		

J.H. MAXYMILLIAN, INC.
OVER 50 YEARS STRONG

LADDER INSPECTION FORM

☐ STEPLADDER

Size: _____ ft.

☐ Fiberglass
☐ Aluminum
☐ Wood

Circle Areas of Damage

	YES	NO
Steps: Loose, cracked, bent, or missing	☐	☐
Rails: Cracked, bent, split or frayed rail shields	☐	☐
Labels: Missing or not readable	☐	☐
Pail Shelf: Loose, bent, missing, or broken	☐	☐
Top: Cracked, loose, or missing	☐	☐
Spreader: Loose, bent, or broken	☐	☐
General: Rust, corrosion, or loose	☐	☐
Other: Bracing, shoes, or rivets	☐	☐

ACTIONS:

☐ Ladder tagged as damaged and removed from use
☐ Ladder is in good condition

☐ PODIUM

Size: _____ ft.

☐ Fiberglass
☐ Aluminum

Circle Areas of Damage

	YES	NO
Steps: Loose, cracked, bent, or missing	☐	☐
Rails: Cracked, bent, split or frayed rail shields	☐	☐
Labels: Missing or not readable	☐	☐
Top: Cracked, loose, or missing	☐	☐
Spreader: Loose, bent, or broken	☐	☐
Platform: Cracked or bent	☐	☐
General: Rust, corrosion, or loose	☐	☐
Other: Bracing, shoes, or rivets	☐	☐

ACTIONS:

☐ Ladder tagged as damaged and removed from use
☐ Ladder is in good condition

☐ LEANSAFE

Size: _____ ft.

☐ Fiberglass
☐ Aluminum

Circle Areas of Damage

	YES	NO
Steps: Loose, cracked, bent, or missing	☐	☐
Rails: Cracked, bent, split or frayed rail shields	☐	☐
Labels: Missing or not readable	☐	☐
Hinge Mechanism: Loose, bent, missing, or broken	☐	☐
Top: Cracked, loose, or missing	☐	☐
Spreader: Loose, bent, or broken	☐	☐
General: Rust, corrosion, or loose	☐	☐
Other: Bracing, shoes, or rivets	☐	☐

ACTIONS:

☐ Ladder tagged as damaged and removed from use
☐ Ladder is in good condition

Site Name: _____ Date: _____

Inspector: _____

J.H. MAXYMILLIAN, INC.
OVER 50 YEARS STRONG

LADDER INSPECTION FORM

☐ LEANSAFE X3

Size: _____ ft.

☐ Fiberglass
☐ Aluminum

Circle Areas of Damage

	YES	NO
Steps: Loose, cracked, bent, or missing	☐	☐
Rails: Cracked, bent, split or frayed rail shields	☐	☐
Labels: Missing or not readable	☐	☐
Hinge Mechanism: Loose, bent, missing, or broken	☐	☐
Top: Cracked, loose, or missing	☐	☐
Spreader: Loose, bent, or broken	☐	☐
General: Rust, corrosion, or loose	☐	☐
Other: Bracing, shoes, or rivets	☐	☐

ACTIONS:

☐ Ladder tagged as damaged and removed from use

☐ Ladder is in good condition

☐ EXTENSION LADDER

Size: _____ ft.

☐ Fiberglass
☐ Aluminum

Circle Areas of Damage

	YES	NO
Rungs: Loose, cracked, bent, or missing	☐	☐
Rails: Cracked, bent, split, or frayed	☐	☐
Labels: Missing or not readable	☐	☐
Rung Locks: Loose, bent, missing, or broken	☐	☐
Hardware: Damaged, loose, or missing	☐	☐
Shoes: Worn, broken, or missing	☐	☐
Rope / Pulley: Loose, bent, or broken	☐	☐
General: Rust, corrosion, or loose	☐	☐
Other: Bracing rivets	☐	☐

ACTIONS:

☐ Ladder tagged as damaged and removed from use

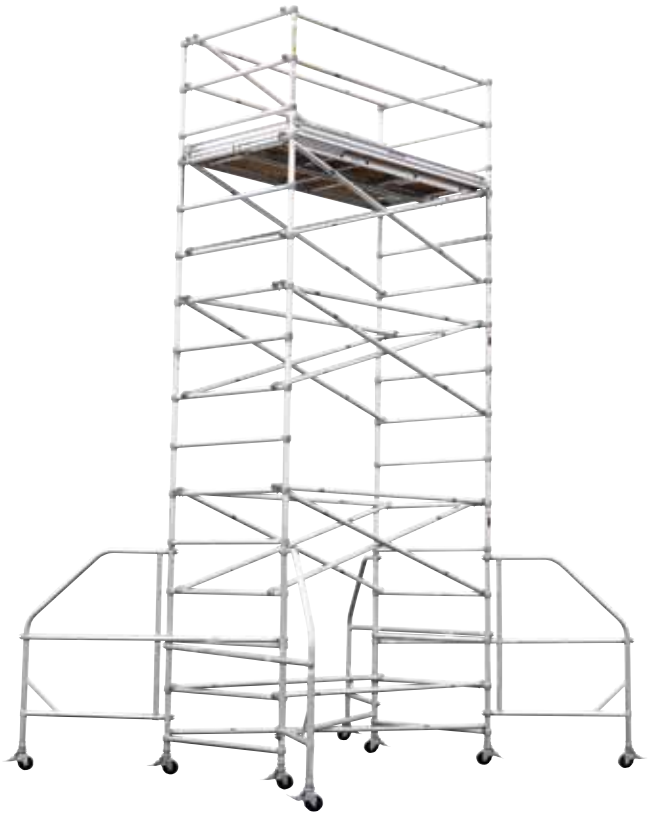
☐ Ladder is in good condition

J.H. MAXYMILLIAN, INC.
OVER 50 YEARS STRONG

LADDER INSPECTION FORM

☐ **SPECIALTY LADDER** Model Number: _____

☐ Fiberglass
☐ Aluminum
☐ Wood



Mark all that apply	YES	NO
Steps / Rungs: Loose, cracked, bent, or missing	☐	☐
Rails: Cracked, bent, split, or frayed	☐	☐
Labels: Missing or not readable	☐	☐
Hardware: Missing, loose, or broken	☐	☐
Fasteners: Rust, corrosion, loose, or missing	☐	☐
Top: Cracked, loose, or missing	☐	☐
Spreader: Loose, bent, or broken	☐	☐
Outriggers: Missing, rust, corrosion, or loose for scaffolding	☐	☐
General: Rust, corrosion, or loose	☐	☐
Hinges: Loose, bent, or missing	☐	☐
Locks: Loose, bent, broken, or missing	☐	☐
Bracing Front, Rear: Loose, bent, broken, or missing	☐	☐
Rivets: Rust, corrosion, loose, or missing	☐	☐
Shoes: Worn, broken, or missing	☐	☐
Platform: Loose, bent, broken, or missing	☐	☐
Rail Shield: Missing or loose	☐	☐
Shoulder Bolt: Rust, corrosion, or loose	☐	☐
Casters: Rust, corrosion, or loose for scaffolding	☐	☐

ACTIONS:

☐ Ladder tagged as damaged and removed from use

☐ Ladder is in good condition

APPENDIX B

Safety Data Sheets

Table of Contents – only

SDS BINDER - TABLE OF CONTENTS

Updated: October 2024

Material	Can ID	Company	Edition
(A) Antifreeze			
Antifreeze - Air Brake Antifreeze & Conditioner, CRC		CRC Industries, Inc.	Mar-15
Antifreeze - Extended Life Coolant/Concentrate, Zerex ZXED2		Ashland	Dec-07
Antifreeze - PX-99 Gas Line, Splash		Splash Products	Nov-16
Antifreeze - Security Extended Life		Houghton Chemical Corp	Sep-20
Antifreeze - RV and Marine, Splash 100		Splash Products	Jul-21
ISO Heet Gas Line Antifreeze		Gold Eagle Company	Mar-13
Naviguard (Green)		Old World Industries	Mar-12
(C G) Compressed Gases			
Acetylene; dissolved		Airgas, Inc.	Jun-21
Isobutylene		Airgas, Inc.	May-18
Oxygen; compressed		Airgas, Inc.	Sep-20
Propane		Irving Oil	May-19
(C) Cleaners			
Big Orange-E-Industrial Solvent Degreaser		Zep	Aug-15
Bleach, Regular, Clorox		Clorox	Feb-19
Dawn Blue Dish Soap		Proctor & Gamble Company	Oct-15
Degreaser – Soy Power (liquid)		Zep	Oct-18
Fantastik® Antibacterial Heavy Duty All Purpose Cleaner		S.C. Johnson & Sons Inc.	May-15
GOJO® Natural *Orange Pumice Hand Cleaner		GOJO Industries	Apr-21
Hand Cleaner – Abrasive, Cherry Bomb		Zep	May-16
PavePro Green - Asphalt Solvent & Release Agent		Chemtek	Jun-15
Simple Green – Industrial Cleaner & Degreaser		Sunshine Makers, Inc.	Jun-21
Windex Orginal Glass Cleaner		SC Johnson	Mar-18
Zep-A-Lume (Aluminum Cleaner)		Zep	Apr-18
Zep Preserve NC		Zep	Jan-18
(FFO) Fluids, Fuels and Oils - Vehicles\Equipment			
2 Stroke Engine Oil LS+		Husqvarna	Feb-15
Ultra Pure Def (Diesel Exhaust Fluid – Emissions)		Brentag N/A	Dec-13
Brake Fluid, CARQUEST DOT 3		Warren Unilube, Inc.	May-15

Material	Can ID	Company	Edition
Citgo; Bar and Chain Oil		CITGO Petroleum Corporation	Dec-14
Citgo; Clarion® Green A/W Oil 46		CITGO Petroleum Corporation	Oct-21
Diesel 9-1-1		Power Service Products, Inc.	Oct-20
Diesel Fuel: On-Road - GN MV 2D BIO 5%(S-15 PPM)		Shell Trading (US) Company	May-15
Diesel Fuel: Off-Road - GN NR 2D BIO 5%(S-15 PPM) DYED		Shell Trading (US) Company	May-15
Diesel Fuel Supplement +Cetane Boost		Power Service	Nov-16
Diesel Fuel Treatment - FuelPower		FPPF Chemical Co., Inc.	Mar-20
Engine Priming Fuel		Kbi/Kold-Ban International	Sep-19
ExxonMobil, No. 2 Diesel Fuel		ExxonMobil	Jul-20
ExxonMobil; Gasoline, Unleaded Automotive		ExxonMobil	Sep-20
Kerosene		Global Companies LLC	May-16
Komatsu Genuine Hydraulic Oil HO56 (BH#103 & BH#89)		Komatsu Ltd.	Dec-14
Motor Oil - Non-Detergent		Kendall Motor Oil	Oct-15
Power Steering Fluid (A590)		Advanced Auto Parts (Carquest)	Jan-15
Pyroil Starting Fluid		Nitco Products LLC	Oct-19
R134A - A.C. Refrigerant		Weitron	May-15
SAE 15W-40 (Engine Oil) Mobil Delvac 1300		Mobil	Nov-21
10W-30 (Engine Oil) Mobil Delvac 10W 30		Mobil	Feb-22
Shell SAE - 30 (Engine Oil)		Shell/SOPUS Products	Aug-16
Mobil Trans HD10 (Transmission Fluid)	HD10	Mobil	May-22
Mobil Trans HD30 (Transmission Oil)	HD30	Mobil	Jul-21
Powers All THF 052 (Transmission Fluid)	052	L.F. Powers	Mar-20
Powers All Premium 046 (Hydraulic Oil)	046	L.F. Powers	Apr-19
Shell Tellus S3 V 46		Shell/SOPUS Products	Jan-16
Spray Starting Fluid		Spray Products Corp.	Jun-15
Windshield Washer Fluid. Deicer - Elite Performance		James Austin	Mar-19
Yamaha 4M FC-W 20w-40 (Outboard Engine Oil)		Spectrum Lubricants Corp.	May-10
(GL) Grease and Lubricants			
Airtool Lubricant - Kilfrost		Total Fina Elf Lubricants USA, Inc.	Dec-19
Blaw-Kote-Metal Lubricant		Volvo Construction Equipment North	Jun-10
ExxonMobil Almo 529 (Rock drill Oil)		ExxonMobil Corporation	Aug-18
ExxonMobil ATF D/M		ExxonMobil Corporation	Jan-21
ExxonMobil Tac 375 NC (Open gear lube)		ExxonMobil	Jun-20

Material	Can ID	Company	Edition
ExxonMobil; Mobilgrease XHP 222 Special		ExxonMobil	Oct-21
ITASCA chain saw bar lubricant		Warren Oil Company	Oct-12
Johnsen's Brake Clean (VOC compliant)		TCC (Technical Chemical Co)	Oct-17
LGHP 2 (Grease for screening plant)		SKF Maintenance Products	Mar-21
Lubricant - Drill Chill		Zep	Jul-15
Mac's Chain & Cable Lube		Balkamp Inc.	Apr-15
PB Blaster Penetrating Catalyst(penetrating oil/lube)		The Blaster Corporation	Jun-22
Rock Drill Thread Grease		Atlas Copco Drilling Solutions	Apr-05
Shell Omala (Hydraulic Gear Lubricant)		Shell Oil	Jun-20
Mobil XHP 222 (Grease for Crushers)		Mobil	Jun-22
Mobil XHP 321 (Winter Grease)		Mobil	Jun-22
Mobil XHP 322 (Summer Grease)		Mobil	Jun-22
Mobilube HD Plus 80W-90		ExxonMobil	Oct-21
Mobilube HD Plus 85W-140		ExxonMobil	Jan-22
WD-40 (Bulk Liquid)		WD-40 Company	Aug-21
Zep 40 Glass Cleaner		Zep	Nov-15
(M) Metals			
Carbon Steel		Nucor	Dec-15
Welding Rod - E7018		Lincoln Electric	Mar-15
(MJM) Misc Jobsite Materials			
Great Stuff Foam Sealant		Dow Chemical Company	Jan-16
Harris Construction Grout (AH Harris)		BASF: The Chemical Company	May-12
Hilti HIT-RE 500		Hilti, Inc.	May-15
Keligrout 101-P		Kelken Construction Systems	Jan-20
Loctite PL400 Adhesive		Henkel Corporation	May-18
MasterKure ER 50 (Confilm) - Evaporation Reducer		BASF: The Chemical Company	Dec-20
Plastic Pipe Primer (Purple or Clear) - Bill PR-3L		The RectorSeal Corporation	Jan-15
Portland Cement		Lehigh Company	Jan-22
PVC Gray Sch. 80 Heavy Bodied Cement		J.C Whitlam Manufacturing Company	Feb-20
Ready Mix Concrete		Lehigh Company	Jan-22
Rebar Epoxy Spray (J-62)		Dayton Superior	Apr-20
RS-1 Asphalt Emulsion (Tack Coat)		All States Material Group	Dec-20
Sikaflex-1A Sealant		Sika Corporation	Jan-20

Material	Can ID	Company	Edition
Super X VOC Form Release Agent		A.H. Harris & Sons, Inc.	Mar-14
Vita-Crete Type S Mortar		Vita-Crete	May-15
Hot Mix Asphalt		Century Aggregates	May-16
(S) Safety			
ABC Dry Chemical Fire Extinguishant		Amerex Corporation	Jul-20
Absorbent, Granular		Oil Dri	Jul-15
Calcium Chloride Flakes		Oxy Occidental Chemical Corp	Aug-16
Floc Log - APS 706B		Applied Polymer Systems, Inc.	Nov-15
Sperian Water Additive – For Eye Wash Stations		Honeywell	Sep-16
Spray Marking Paint: M1800 System – Water Based 203031 Caution Blue 1675838 Gloss Black 203032 Fluorescent Green 203034 High Visibility Yellow 203036 Fluorescent Orange 203039 White		Rust-Oleum Corp.	12/21; 6/20; 12/21; 8/18; 12/21; 12/21
Super Water Wetter		Abatement Technologies	May-15
(E) Environmental Jobsites			
A-284 SO4 Ion Exchange Resin – Water Treatment Systems		EVOQUA	Jun-15
Activated Carbon – Water Treatment Systems		EVOQUA	May-15
Cement Kiln Dust		Lafarge North America, Inc.	Jan-22
Long Duration Foam – AC 645		RUSMAR Foam Technologies	May-15
Long Duration Foam – AC 900 Series		RUSMAR Foam Technologies	May-15
Perlite		The Whittemore Company	May-15
(RR) Railroad Site Contaminants			
Arsenic		Sigma-Aldrich	Apr-17
Lead		GSC International	Dec-14
Polycyclic Aromatic Hydrocarbons (PAHs)		Cayman Chemical	Jul-14

Please Note: These products are not kept on all sites. These products will not be utilized on sites without client's approval.

APPENDIX C

Emergency Response & Hazardous Waste Operations Program

EMERGENCY RESPONSE & HAZARDOUS WASTE OPERATIONS PROGRAM

J.H. MAXYMILLIAN, INC.

OVER 50 YEARS STRONG

Revision Number: 8

Revised: 2024
CIH Reviewed: April 2012

Emergency Response & Hazardous Waste Operations Program
TABLE OF CONTENTS

ATTACHMENTS

1.0 Purpose

This Emergency Response Program, in conjunction with JHM's Company Safety Program, provides guidelines to ensure that standardized procedures are followed while JHM employees are engaged in emergency response (i.e. namely petroleum spill response work) site operations. This program, in addition to the Company Safety Program, shall be reviewed by all emergency response workers prior to engaging in emergency response activities.

2.0 Scope

This policy applies to all JHM employees who perform work on hazardous waste sites and respond to emergencies involving hazardous waste. Training as outlined herein is required by all hazardous waste operations and emergency response workers. These workers will be trained prior to engaging in any hazardous waste or spill response work.

3.0 Plan Administration & Responsibilities

The task of administering and organizing the plan is vital to its effectiveness. The person who has this task will normally be the person in charge of the emergency response operation. It is their task to ensure:

- That everyone clearly understands their roles and responsibilities within the emergency response plan (an organizational chart may be helpful in this regard);
- That emergency resources, whether people or equipment, are kept at adequate levels in step with the progress of the project.

It is very important to review the emergency plan on a regular basis and especially after an emergency has occurred. Changes may be necessary if deficiencies in the plan become apparent.

3.1 Project Manager/Site Supervisor

The project manager/site supervisor is responsible for the following:

- They are responsible for controlling all operations at the site.
- They are in charge of a site-specific Incident Command System (ICS) (i.e. all emergency responders and their communications shall be coordinated and controlled through this specific person).
- Assess the situation and determine the extent of the release.
- Inform the generator about MADEP reporting requirements.
- Mobilize the appropriate personnel and equipment to the site. Be sure all equipment is in good working order.

- When the work crew is on site, hold an informational meeting to give the workers all the necessary information for them to safely and properly carry out the cleanup/remediation work. Ensure that all workers have signed in on the job-site and for the meeting. *(See Attachment A: Sign-In Sheet Spill Response Meeting*). Note: daily sign in sheet are only required on large, multi-day sites.
- Obtain an emergency DIGSAFE if immediate excavation is required.

3.2 Trained Emergency Care Provider

The role of the emergency care provider(s) (ECP) is to administer First Aid/CPR to injured person, as needed. At least one ECP will be present on each job at all times.

3.3 Communicator (i.e. a Forman or Laborer)

The role of the communicator is to maintain contact with appropriate emergency services and to provide as much information as possible, such as the number injured, the type and extent of injuries, known hazards and the exact location of the accident scene. The communicator will be located as close to the scene as possible to transmit to the emergency care providers any additional instructions that may be given by emergency services personnel en route.

4.0 Emergency Response Procedures

This Emergency Response Plan covers a number of events that may occur at a work site by natural causes, equipment failure or by human mistake. The following is a list of potential events:

- Minor injuries
- Major injuries
- Spill or leak
- Fire or explosion
- Project evacuation

A list of emergency contact phone numbers must always be posted in a convenient viewing area for all workers to easily access. This may include the supervisor's work vehicle.

If JHM is responding to an emergency spill, a listing of emergency numbers may not be available. In this case, contact 911.

4.1 Minor Injuries

If a minor medical incident occurs (small cuts, abrasions, etc.) personnel should:

- Perform first aid, as necessary; and
- Consult the accident/injury reporting procedure to report the incident to the appropriate personnel (Supervisor, HSO, etc).

4.2 Major Injuries

If a medical emergency exists, including the need for hospitalization or emergency services, personnel should:

- Contact the designated project manager or site supervisor and HSO.
- Consult the emergency phone number list and request assistance immediately.
- Perform first aid/CPR, as needed.
- Stabilize the injured; decontaminate if necessary, and extricate only if the environment of the injured/ill person is dangerous or unsafe and if the rescuers are appropriately protected from potential hazards that might be encountered during the rescue.
- Communicate directly with the 911 operators to determine the most appropriate way to transfer the injured person to the hospital.
- When site emergency services personnel arrive, communicate all first aid activities that have occurred.
- Transfer responsibility for the care of the injured/ill to the site emergency care providers.
- Consult the accident/injury reporting procedure to report the incident to the appropriate personnel.

4.3 Spill or Leak

In the event of a spill or leak that may enter any sanitary sewerage pipeline, storm sewer or other offsite conveyance, site personnel will:

- Inform supervisor immediately.
- Terminate work activities (at the discretion of the HSO).
- Prevent entry of spill materials into any waterways.
- Follow site emergency notification and evacuation procedures, when necessary.
- Locate the source of spillage and stop the flow if it can be done safely.
- Begin containment and recovery of the spilled materials if it can be done safely.

If the spill or release is expected to pose significant hazards or is beyond the capabilities of the immediate personnel, then the HSO will be contacted immediately. When contacted, the HSO will obtain and assess the following information:

- The material spilled or released.
- Location of the release or spill.
- An estimate of the quantity released and the rate at which it is being released.
- Any injuries involved.

- Fire and/or explosion or possibility of these events occurring.
- The area and materials involved in the location of the fire or explosion.

In the event of a chemical spill that is not contained within a dike or bermed area, an area of isolation will be established around the spill and the material(s) involved. When any spill occurs, only those persons involved in the oversight or performance of the emergency cleanup operations will be allowed within the designated hazard area. If possible, this area will be roped or otherwise blocked off.

4.3.1 Notifications

If an incident may threaten the health or safety of the surrounding community, the public will be informed and possibly evacuated from the area. The PM will inform the proper agencies in the event that this is necessary.

If a spill exceeds the material Reportable Quantity, and/or a hazardous material (oil or chemical) is released into a waterway, JHM will notify the following:

1. The Client and inform them of the reporting requirements to appropriate agency.
2. Appropriate agency if not contractually prohibited.

If the volume of the hazardous chemical release is such that JHM cannot handle, JHM will have to notify a third party environmental contractor.

4.4 Fire or Explosion

- Use fire alarms to initiate building evacuation procedures.
- Use on-site fire extinguishers to contain the fire, within reason.
- Consult the accident/injury reporting procedure to report the incident to the appropriate personnel.

4.5 Project Evacuation

It is not anticipated that evacuation procedures will be implemented. However, in the event of adverse weather conditions, damage to the site from fire or other catastrophic event, or other unforeseen conditions, personnel will be evacuated from the site.

An alarm will be activated (i.e. fire alarm, air horn, etc.) to alert all personnel to meet at the designated evacuation location (established in each Site Specific Health & Safety Plan).

5.0 Potential Health and Safety Hazards

Hazards associated with spill cleanup and site remediation may include contact with oil or hazardous materials, working in confined spaces, working in and around waterways, working in the roadway and on the roadside, working in close proximity to operating heavy equipment, including the drill rig or Earth Probe, and carbon monoxide released in the exhaust from the equipment engines.

Medical consultation will be provided for emergency response employees who exhibit signs or symptoms that may have resulted from exposure to hazardous substances during the course of an emergency.

6.0 Hazard and Contaminant Control

JHM will implement engineering controls, PPE, and work zones and practices to reduce and maintain exposure limits whenever possible. The PPE level will be determined by the project manager or site supervisor. ***(See JHM Personal Protective Equipment Program - Appendix 7 for further information).***

If entry into a confined space is required, only those employees with confined space entry training will be utilized. Air monitoring with a photoionization detector (PID) meter or LEL/oxygen meter may be necessary. Air monitoring will identify unsafe airborne levels of hazardous substances. The monitoring will address initial entry, periodic monitoring, possible IDLH and wherever exposure may be a possibility. ***(Refer to JHM Confined Space Entry Program - Appendix 2 and Respirator Program – Appendix 8 for further information).***

Life vests, safety rings, and lifesaving skiffs will be used when working on or near water. All marine safety procedures will be followed.

Personnel must wear hearing protection and hard hats when working near operating heavy machinery. Loose clothing will be secured. All safety protocols for drilling and excavation will be followed ***(Refer to JHM Trenching, Shoring & Excavation Program – Appendix 9 and Drilling/Well Installation Program – Appendix 14 for further information).***

6.1 Work Zone Definition

The three general work zones that may be established at the site as needed are: the Exclusion Zone (EZ), Contamination Reduction Zone (CRZ), and Support Zone (SZ).

The EZ, also known as the Hot Zone, is defined as the area where contamination is either known or likely to be present, or because of activity, will provide a potential to cause harm to personnel. Generally, the location and limits of the EZ vary during the remediation period, and occur only in those specific areas where potential for over exposure to the identified contaminants exists.

Entry into the EZ requires the use of PPE and proper training. The EZ may be established with fencing surrounding the work area. The EZ is typically established within 10 feet of work zone. No eating, drinking, or smoking is permitted in that area. Unauthorized employees shall not remove protective clothing or equipment from the EZ or CRZ areas.

The CRZ is also referred to as the Warm Zone. This is the area where personnel conduct personal and equipment decontamination. It is essentially a buffer zone between contaminated areas and clean areas. Activities conducted in this zone will require PPE. When necessary, JHM will provide showers & change rooms outside of a contaminated area per 29 CFR 1910.141. All employees leaving the CRZ will be appropriately decontaminated. All contaminated clothing and equipment leaving the CRZ will be appropriately disposed of or decontaminated. No eating drinking or smoking is permitted in this area. Decontamination procedures are monitored by the site safety & health supervisor or supervisor. If decontamination procedures are found to be ineffective, appropriate steps shall be taken to correct any deficiencies.

The SZ, also known as the Cold Zone, is situated outside the EZ and the CRZ in a clean area in which the chance to encounter hazardous materials or conditional is minimal. PPE is, therefore, not required. All external roadways leading to the site, other than those identified as possibly contaminated, are considered to be in the clean zone. The SZ will generally be positioned upwind of the EZ when possible.

6.2 Decontamination Procedures

Decontamination procedures used by JHM personnel are developed prior to the commencement of operations and are detailed in Site Specific Health and Safety Plans. The purpose of the decontamination process is to prevent, remove, or neutralize chemical contaminants that have accumulated on personnel and equipment.

A decontamination plan should be developed (as part of the Site Specific Health & Safety Plan) and set up before any personnel or equipment enters hazardous or potentially hazardous areas.

A decontamination plan allows personnel to effectively:

- Determine the number, layout, and location of decontamination stations.
- Determine decontamination equipment that is needed.
- Determine appropriate decontamination methods.
- Establish procedures to prevent contamination of clean areas.
- Establish methods to minimize worker contact with contaminants during removal of PPE.
- Establish methods for disposal of clothing and equipment that cannot be decontaminated.
- Keep unauthorized individuals from entering decontamination areas.
- Inform commercial laundry facilities of potential contaminants and their health effects.

- Properly dispose of all solvents and equipment used for decontamination.

The Contamination Reduction Zone (CRZ) is a buffer zone between contaminated areas and clean areas. Decontamination stations will be located in the CRZ to minimize the geographical spread of contaminants to the environment, equipment, and personnel.

6.3 Roadway Work Safety

Roadway work will comply with the requirements outlined in 29 CFR 1926.200, Safety and Health Regulations for Construction, Subpart G, Signs Signals and Barricades and the Manual of Uniform Traffic Control Devices, Part VI. In addition to the safety procedures outlined in JHM's Company Safety Program, roadway work on Interstate Highways, such as the New York State Thruway and the Massachusetts Turnpike, will be performed in accordance with specific Thruway and Turnpike regulations and/or requirements.

Roadway work can pose additional hazards to workers and the public. Prior to working on roadways, a hazard and risk assessment must be conducted to determine proper traffic control and safety. During your assessment, consider the following potential hazards:

- Road hazards:
    - Limited space between work area and roadway.
    - Curves in road, parked vehicles, equipment, trees, etc. that could limit the view of either workers or oncoming traffic.
    - Overhead wires.
    - Pedestrian walkways or bike lanes.
- Traffic hazards:
    - Intersections with traffic lights or traffic coming from various directions.
    - Merging traffic.
    - Bus stops.
    - Pedestrians.
    - Wide load vehicles or emergency vehicles.
- Weather and lighting:
    - Reduced visibility due to rain, fog, or the setting sun.
    - Slippery conditions for ice or snow.
    - Bright lights at night causing distraction to oncoming traffic.
- Work Hazards:
    - Entering and exiting work area, crossing traffic lanes.
    - Keeping unauthorized vehicles out of work area.

- Storage of materials and equipment.

When working in a roadway or on a roadside, reflective garments will be worn at all times. ANSI Class 2 high-visibility clothing is acceptable for working around traffic that is traveling between 25 – 50 miles per hour. ANSI Class 3 high-visibility will be worn in high risk environments: high-speed roadways, congested areas, complex lane shifts, complex work zones or night work.

A designated individual will be responsible for placing traffic cones, signs, or barriers along the workspace. Traffic controls will take into consideration factors such as lateral clearance of workers from adjacent traffic, speed of traffic, duration of operation, and volume of traffic. This individual will also be responsible for directing and diverting traffic away from the work area until police arrive and assume traffic control.

If working in a multi-lane road, one lane may be closed temporarily to reduce worker vulnerability.

For nighttime work, the work zone and approaches may be lighted to improve worker safety.

Special devices may be helpful for difficult work zone situations. These may include rumble strips, message boards, hazard identification beacons, flags and warning lights. Intrusion warning devices may be used to alert workers to the approach of errant vehicles.

6.4 Post-Emergency Response Operations

The PM or Supervisor will direct post-emergency response operations in accordance with all applicable federal and state regulations, including the removal of hazardous substances and/or contaminated material, and assessing potential health hazards.

7.0 Training & Employees

JHM's highly experienced staff may work in conjunction with MADEP and/or a third party Licensed Site Professional as needed, to respond to, assess, implement and oversee all of JHM's Emergency Response Operations.

Trainers who teach JHM employees shall have the training and/or academic credentials and instructional experience necessary to demonstrate competent instructional skills. In addition, all JHM employees performing spill cleanup and site remediation activities must have completed at least three days of field training and must meet at least one of the following requirements prior to the start of the work:

a) Attend an approved training course of at least 40 hours meeting the requirements of OSHA 29 CFR 1910.120 (e) on safety and health at hazardous waste operations within the last 12 months, including a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor or;

b) If training was completed more than 12 months prior to the date of site work, completion of the above course and an off-site refresher course of at least 8 hours meeting the requirements of 29 CFR 1910.120 (e) on safety and health at hazardous waste operations within the last 12 months.

c) Supervisory personnel must complete an off-site training course of at least 8 hours meeting the requirements of 29 CFR 1910.120 (e) on supervisor responsibilities for safety and health at hazardous waste operations within the last 12 months. Certification is required.

A record of the training must be maintained both on-site and at the main office. This record identifies the name of each employee who has been trained, the type of equipment he/she was trained to use, fit test results, and the date of training.

7.1 Re-Training of Employees

Re-training of authorized and affected employees shall be performed: 1) annually or whenever there is a change in employee job assignments; 2) whenever a new hazard is introduced due to a change in machines, equipment or process; and, 3) whenever a periodic inspection by the employer reveals inadequacies in company procedures or in the knowledge of the employees.

ATTACHMENT A

Sign-In Sheet Spill Response Meeting

J.H. MAXYMILLIAN, INC.
OVER 50 YEARS STRONG

SIGN-IN SHEET
SPILL RESPONSE MEETING

Date: _____

Time: _____

Location: _____

_____

Supervisor: _____

Present: _____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Items discussed:

1. **Health & Safety Plan Review**
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

APPENDIX D

JHM Job Safety Analysis

J.H. MAXYMILLIAN, INC. - JOB HAZARD ANALYSIS (JHA)
ACCESS ROAD CONSTRUCTION

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Check for existing utilities	Damages to Existing Utility Service	• Locate and mark all existing utilities on-site • Get Dig Safe ticket and document marks • Follow Dig Safe protocol
	Possible Electrical Shock	• Establish clearance distance around utilities and overhead power lines
	Fire/Water Damage	• Fire extinguishers will be placed, marked and readily accessible
Equipment & Materials Delivery	Injury/ Damage while Unloading Equipment	• Only trained operators allowed in equipment following establish procedures • Organize safe lay down area before material arrives • Ensure equipment and trucks are leveled
	On-site Traffic Accidents	• Always make eye contact with Operators • Establish regulated speed limits for traffic; 10 mph
	Equipment Striking Personnel	• Personnel must be aware of surroundings at all times • Minimize personnel in area of operations • All equipment will have working back up alarms • Operators and personnel make eye contact when working in proximity
	Falling Objects	• Proper PPE shall be worn at all times by all personnel • Secure & cover loads at all times when being offloaded/ transported

Clearing & Grubbing Access Road Area	Injuries during tree & stump removal	• All operators/personnel will be physically qualified accordance with the machinery or hand held tool being operated • Operators using heavy equipment will be protected in enclosed operating environments (with roll protection) • Any growth will be removed in the direction away from personnel • Proper PPE shall be worn at all times
	Overhead Hazards	• Ensuring equipment maintains a 10 ft. clearance of power lines in a 360 degree area (always assumed lines are energized)
	Falling Objects	• Personnel not directly involved with the operation shall keep clear & must be aware of surroundings at all times.
	Slip, Trips & Falls / Uneven Surfaces	• Pathways and area where work is executed must be kept clear • Personnel will immediately communicate slip/trip/fall hazards (i.e. grade stakes, etc.) to other on-site employees • Debris will not be allowed to accumulate where it becomes a hazard • Always make sure equipment is leveled when operating
	Biological Hazards (i.e. Poison Ivy, Bees, Ticks)	• Work Areas will be inspected for Biological Hazards • Stay away from any wild animals on site • Personnel will be aware for the potential for insects, ticks and mosquitoes may carry bacteriological diseases ○ Use insect repellants with DEET

		○ Secure pant legs to avoid dermal contact with plants/bugs ○ Wear light colored clothing ○ Watch for bee or wasp nests in any enclosed areas.
	Loud Noise	• Personnel will be required to wear hearing protection with noise levels 85 dB or higher • Turn off any equipment that is not in active use; avoid idling.
	Back /Muscle Strains	• Proper manual lifting methods are being used (i.e. bending at the knees) • Mechanical devices used to reduce manual material handling • No person should lift more than 50 lbs. alone • Team lifting will be utilized in lieu of mechanical devices.
	Severe Weather / Temperature Conditions	• Be cautious of wind, rain, heat, and snow hazards • In the event of lightning in the area, work will cease at the direction of the Supervisor and 30/30 rule will be followed. • Site personnel will be familiar with signs and symptoms of heat and cold stress. • Controls will be implemented to minimize exposure to temperatures extremes including work/rest regimens, warm/cool rest areas, staying hydrated, protective clothing and minimizing exposure time.
Spread, Grade & Compact Material for Access Road Area	Dust Issues	• Visible dust may be present in the work area, and air monitoring will be put in place to make sure action levels are not reached.

		• Use water trucks or other dust suppressing engineering controls to control dust on work site
	Roll overs / Tip overs	• Ensure trucks are leveled when being loaded and dumping • material • Operators using heavy equipment will be protected in enclosed operating environments (with roll protection) • Equipment will have rollover protective structures and seat belts.
	Heavy Equipment striking Personnel	• All equipment will have working back up alarms • Proper PPE shall be worn at all times (Safety Vest, Hard Hat, Work Gloves, Eye & Hear Protection, etc.)
	Noise	• Turn off any equipment/trucks that are not in active use; avoid idling. • Personnel will be required to wear hearing protection with noise levels 85 dB or more
	Traffic	• Establish regulated speed limits for traffic; 10 mph
	Slip, Trips and Falls	• Tripping and poor footing hazards will be repaired as they are discovered or will be clearly identified • Other obstructions will be marked, identified or barricaded.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
BACKFILLING

PRINCIPLE STEPS/TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Backfilling Operations • ***Material delivery*** • ***Backfill excavated areas*** • ***Compact placed materials***	Struck By/Against	• Spotters will stand at the rear of the vehicle, a safe distance away from the dumping area. They will not stand alongside any dumping truck, loader, etc. • High visibility safety vest will be worn at all times. • Eye contact with operators will be made before approaching equipment. • Equipment will not be approached on blind sides. • Personnel will avoid equipment swing areas and blind sides. • Operators of all heavy equipment and vehicles will look before backing. • Personnel will understand and review hand signals. • All machines will be equipped with backup alarms.
	Rollovers	• Equipment will have rollover protective structures and seat belts. • Operators will wear seat belts when operating equipment. • Equipment will not be operated on grades which exceed manufacturer recommendations.
	Flying Objects and Debris	• ANSI approved safety glasses will be worn. • Front windshields will be closed during equipment operation. • Ground personnel will maintain a safe distance during all excavation and stockpiling operations.
	Overhead Hazards	• All equipment will be provided with guards, canopies, hard cabs or grills to protect the operator from falling or flying objects. • All ground personnel will wear hard hats. • All slings, chains and ropes will be rated (tagged/labeled accordingly) for the load in which it is expected to lift and will be inspected prior to use. • All ground personnel will stay clear of all suspended loads. • All equipment will stay a minimum of 10 feet from power lines. This distance will increase as the voltage of the power lines increase.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
BACKFILLING

PRINCIPLE STEPS/TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
		• All hand tools, materials, etc. will be stored away from edge of excavations (2' or more) to prevent them from falling on personnel in excavated areas.
	Open Excavations/ Cave In	• Any excavation 4' and deeper will be monitored for oxygen, combustible gases, and toxic atmospheres prior to personnel entry and at regular intervals during entry. • Any excavation 4' and deeper will be provided with ladders or ramps to allow for means of egress in such a way as to require no more than 25 feet of lateral travel. • The excavated areas will be barricaded to prevent field personnel from falling into the open area. • Sloping or shoring will be utilized as a protective measure to prevent trench cave-in on all excavations 5' or greater. • All trenching/excavation will be in accordance with the provisions of 29 CFR 1926 Subpart P. • The Competent Person will inspect excavations and soil conditions initially and whenever the soil condition changes. • Excavation spoils will be staged a minimum of two feet back from the edge of all excavations. • All personnel will keep back a minimum of two feet from the edge of all excavations • The competent person will regularly inspect the edges of the excavation for cracks fissure and subsidence and he/she can increase the minimum distance to edge as needed. • All trucks dumping or being loaded will stay a minimum of three feet from the edge of any excavation.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
BACKFILLING

PRINCIPLE STEPS/TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Slip/Trip/Falls	• Personnel will immediately communicate slip/trip/fall hazards to employees and supervisors. • Work over 6 feet requires fall protection. • Personnel will clear walkways of equipment and materials. • Other obstructions will be marked, identified or barricaded. • Tripping and poor footing hazards will be repaired and clearly identified. • Debris will not be allowed to accumulate where it becomes a hazard. • Personnel will use care on or near any steep slopes • Holes will be barricades or covered appropriately.
	Back Injuries	• Site personnel will be instructed on proper lifting techniques. • Mechanical devices will be utilized to reduce manual material handling. • Team lifting will be utilized in lieu of mechanical devices. • No person should lift more than 50 lbs. alone.
	Noise	• Personnel will wear hearing protection if necessary to maintain personal exposure below 85dBA • Personnel will wear hearing protection when utilizing the vibratory compactor.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)

DEMOLITION

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Demolition Pre-Operations • Survey for potential hazardous materials • Contact Dig Safe • Review demolition plan. • Secure demolition area and post any required signage. ***Mechanical demolition, debris removal*** • Excavators • Cranes ***Backfilling Operations*** • Backfill excavated areas • Compact placed materials	Impact/Penetration/Crush or pinch	• Spotters will stand at the rear of the vehicle, a safe distance away from the dumping area. They will not stand alongside any dumping truck/loader/etc. • High Visibility Vest's will be worn at all times. • Eye contact with operators will be made before approaching equipment. • Equipment will not be approached on blind sides. • Personnel will avoid equipment swing areas and blind sides. • Operators of all heavy equipment and vehicles will look before backing up. • All heavy equipment, dump truck and tractor trailer activity in the work zones will employ a spotter. • Personnel on the ground will stand clear of active demolition equipment. • Personnel will not work where structural collapse hazards exists. • Personnel will not work under loads. • Personnel will understand and review hand signals. • All machines will be equipped with backup alarms.
	Rollovers	• Equipment will have rollover protective structures and seat belts. • Operators will wear seat belts when operating equipment. • Equipment will not be operated on grades that exceed manufacturer's recommendations. • Cranes will be setup on suitable surface based on manufacturer's recommendations.

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Flying Objects and Debris	• ANSI approved safety glasses and hard hats will be worn. • Front windshields will be closed during equipment operation. • All equipment will be provided with guards, canopies, hard cabs or grills to protect the operator from falling or flying objects. • All roof cornices or other ornamental stonework must be removed prior to pulling walls down. • Demolition of exterior walls and floors must begin at the top of the structure and proceed downward. • Ground personnel will maintain a safe distance during all demolition and debris removal operations.
	Overhead Hazards	• All equipment will be provided with guards, canopies, hard cabs or grills to protect the operator from falling or flying objects. • All ground personnel will wear hard hats. • All slings, chains and ropes will be rated (tagged/labeled accordingly) for the load in which it is expected to lift and will be inspected prior to use. • All ground personnel will stay clear of all suspended loads. • All equipment will stay a minimum of 10’ from power lines. Distance increases power line voltage increases.

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Open Excavations/trenches - Cave In	• Any excavation 4’ and deeper will be provided with ladders or ramps to allow for means of egress in such a way as to require no more than 25’ of lateral travel. • The excavated areas will be barricaded to prevent people from falling into the open area. • Sloping or shoring will be utilized as a protective measure to prevent trench cave-in on all excavations 5’ or greater. • All trenching/excavation will be in accordance with the provisions of 29 CFR 1926 Subpart P. • Smoking or open flames will not be allowed near work areas, if open flames must be used, procedures for hot work will be followed. • The Competent Person will inspect excavations and soil conditions initially and whenever the soil condition changes. • Excavation spoils will be staged a minimum of two feet back from the edge of all excavations. • All personnel will keep back a minimum of two feet from the edge of all excavations. • The competent person will regularly inspect the edges of the excavation for cracks fissure and subsidence and he/she can increase the minimum distance to edge as needed. • All trucks dumping or being loaded will stay a minimum of three feet from the edge of any excavation.

	Existing Utility Contact	• Follow JHM Dig Safe protocol, including:
		  ○ Obtain a Dig Safe ticket for this area.
		  ○ Take photos/GPS of the pre-marked areas.
		  ○ Preserve any disturbed Dig Safe pre-marks (Supervisor/Laborer/or Operator take photos of area).
		• Existing utilities will be shut off and/or relocated.
		• Call 911 immediately if you hit a gas line.

	Atmospheric Hazards	• Any excavation four feet and deeper will be monitored for oxygen, combustible gases, and toxic atmospheres prior to personnel entry and at regular intervals during entry.

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Dust - Silica	• Dust will be monitored and controlled by wet methods. • Where water cannot be used to control dust and personnel exposure, respiratory protection will be implemented.
	Slips/Trips/Falls	• Personnel will immediately communicate slip/trip/fall hazards to employees and supervisors. • Work over 6 feet requires fall protection. • Personnel will clear walkways of equipment and materials. • Other obstructions will be marked, identified or barricaded. • Tripping and poor footing hazards will be repaired as they are discovered or will be clearly identified. • Debris will not be allowed to accumulate where it becomes a hazard. • Personnel will use care on or near any steep slopes. • Holes will be barricades or covered appropriately.
	Back Injuries	• Site personnel will be instructed on proper lifting techniques before beginning work. • Mechanical devices will be utilized to reduce manual material handling. • Team lifting will be utilized in lieu of mechanical devices. • No person should lift more than 50 lbs. alone.
	Noise	• Personnel will wear hearing protection if necessary to maintain personal exposure below 85dBA. • Personnel will wear hearing protection when utilizing any saws, hi-ram, and/or vibratory compactor.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
EXCAVATION

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Loading & Unloading Excavating Materials and Equipment	Slip, Trips and Falls	• Organize safe lay down and level area before material arrives • Organize safe lay down and level areas for stockpiling material • Personnel will clear walkways of equipment and materials. • Other obstructions will be marked, identified or barricaded. • Tripping and poor footing hazards will be repaired as they are discovered or will be clearly identified. • Debris will not be allowed to accumulate.
	Traffic	• Operators and all site personnel stay aware of surroundings • Regulated driving speeds set in place; 10 mph.
	Electric Shock	• Ensure equipment maintains a 10 ft. clearance of power lines in a 360 degree area (always assumed lines are energized).
	Manual Handling /Lifting Injuries	• Proper PPE shall be worn at all times • Proper manual lifting methods are being used (i.e. bend at knees). • Use mechanical devices to reduce manual material handling. • No person should lift more than 50 lbs. alone – use team lifting when possible.
	Struck by falling/flying objects and debris	• Proper PPE shall be worn at all times. • All employees will be clear of pinch point during initial lift off of trucks. Rigging will be inspected again to ensure load is level and secure. • No one will allowed to work under suspended loads.
Prior to Excavating Activities	Damages to active/existing above or below ground utilities	• Locate and pre-mark all existing utilities on-site. • Call Dig Safe to mark and document markings before digging • Follow Dig Safe protocol (i.e. hand dig to locate utilities, use offsets, etc.)

	Overhead Hazards/ Electrical Shock	• Establish clearance distance around utilities. • Ensuring equipment maintains a 10 ft. clearance of power lines in a 360 degree area (always assumed lines are energized)
	Severe Weather/ Temperature Conditions	• Be cautious of wind, rain, snow, etc. • In the event of Lightning in the area, work will cease at the direction of the Supervisor; 30/30 rule will be followed. • Site personnel will be familiar with signs and symptoms of heat/cold stress. • Controls will be implemented to minimize exposure to temperatures extremes including work/rest regimens, warm/cool rest areas, staying hydrated, protective clothing and minimizing exposure time.
	Biological Hazards (i.e. Poison Ivy, Bees, Ticks)	• Work Areas will be inspected to any Biological Hazards • Stay away from any wild animals on site • Personnel will be aware for the potential for insects, ticks and mosquitoes may carry bacteriological diseases
Operating Heavy Equipment & Using Hand Tools	Struck by/ Caught in Equipment	• Always make eye contact with Operators and use standard hand signals when noise levels inhibit auditory communication • Personnel must be aware of surroundings at all times and maintain a safe distance from heavy equipment • Personnel not directly involved with operators shall keep clear • Proper PPE shall be worn at all times.
	Tip Overs / Overloading	• Only Qualified and Licensed Operators operating heavy equipment. • Work Area for heavy equipment will be set up on leveled ground and angle limits will be checked.
	Flying/Falling Objects and Debris	• No one will allowed to work under suspended loads • Doors and window of equipment operating will be closed
	Dust	• Apply water (or other dust suppression engineering controls) on roads and/or wet equipment (i.e. buckets, tracks, etc.) and work areas to reduce dust. • Use dust mask as needed

	Overhead Hazards	• Ensure equipment is a minimum 10 ft. clearance of overheard power lines in a 360 degree area (always assume power lines are energized).
	Electric Shock	• Consider weather conditions (wind, rain) • Cords and cables will be inspected before and after use • Remove any standing water.
	Injury due to wrong or defective tool	• All employees trained in how to handle and operate hand tool properly • Proper PPE shall be worn at all times (Hard hat, hand and hearing protection, eyewear, etc.) • All hand tools (including cords, and cables) shall be in good repair (inspected frequently) and used only for the purpose for which designed.
Working Near or Within Trenches/Excavations	Collapse or Cave Ins	• Competent Person must assess trench prior to work activities. • Spotters will be required for any personnel entering excavation. • Provide and maintain safe/clear access.
	Unsafe access/egress for workers	• Utilize proper shoring, sloping, shielding and plates at ends of shields per OSHA standards for all excavations 4 ft. deep or greater. • Proper use of ladders will be in place; accessible every 25 ft. and should extended a minimum of 3ft above ground level. • Bench or slope sides as site conditions allow.
	Falling in	• Visible barriers shall be secured around all open excavation where leading edges are no visible.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)

GENERAL HAZARDS AND PRECAUTIONS

Potential Hazards	Preventative Measures
Back Strain	• Use proper lifting techniques. • Use 2 or more employees for lifting large, heavy items. • Take sufficient rest breaks.
Heat stress	• HSO shall monitor heat stress. • Take sufficient rest breaks and drink fluids.
Eye Injuries	• Safety glasses shall be worn. • Goggles or face shield shall be worn as appropriate.
Hand Injuries	• Employees handling debris or sharp objects will wear leather gloves.
Foot Injuries	• Work boots with impact resistant toes will be used.
Head Injuries	• Hard hats will be worn on site.
Ear Damage	• Hearing protection shall be required in operations at 85 dB and above.
Slips, Trips and Falls	• Good housekeeping shall be implemented. • Walkways and aisles shall be kept clear. • Wiring, plumbing and hoses, etc. shall be kept untangled and neat. • Be alert while walking. • Tripping and poor footing hazards will be repaired as they are discovered or will be clearly identified.
Electrical Shock	• Lockout/Tagout procedures shall be followed. • Tools and cord shall be inspected prior to use. • GFCI electrical outlets shall be utilized.
Falling Hazards	• Fall protection such as harnesses, hand rails, temporary fences shall be utilized.

Potential Hazards	Preventative Measures
Fire Hazards/ Burns	• Air monitoring for flammable atmospheres. • Smoking in designated areas only. • Combustible chemicals shall be stored properly. • Firefighting equipment will be stored on site. • No fueling operations will be left unattended. • Personnel will be aware of mufflers and other hot parts of equipment while operating the equipment. • Personnel will not attempt to service/fuel any piece of equipment until it has sufficiently cooled down.
Biological Hazards	• Avoid wildlife when possible. • Wear insect repellant as necessary. • Use good personal hygiene. • Personal inspections for ticks should be performed.
Accidents with Moving Vehicles	• Employees will be aware of surroundings at all times.
Hot Work Hazards	• Fire extinguishers will be available. • Supervisors must obtain a hot work permit prior to hot work being performed. • Appropriate PPE shall be worn. • Compressed gases shall be stored properly.
Chemical Exposure Hazards	• Proper PPE shall be work to minimize exposure to contaminants. • Vapor controls, as necessary shall be implemented on site. • Proper decontamination procedures shall be followed.

J.H MAXYMILLIAN – JOB HAZARD ANALYSIS
MATERIAL LOADING & TRANSPORTING

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Loading & Transporting Soil	Noise	• Personnel will be required to wear ear protection with noise levels of 85dB or more. • Turning off equipment/trucks that are not in active use
	Dust or Flying Particles Eyes	• Personnel will be required to wear eye protection • Apply water or other forms of dust suppressing engineering controls to haul roads, wetting equipment (i.e. buckets, tracks, etc.), and work areas to reduce dust. • Visible dust may be present in the work area, and air monitoring will be put in place to make sure action levels are not reached.
	Injuries due to Falling Debris and Objects	• Personnel will be required to wear hard hats at all time • No personnel will be allowed to work under suspended loads • Personnel not directly involved with operators shall keep clear • Doors and window of equipment operating will be closed • No one shall be permitted in body of the truck when loading operations are taking place • Ensuring all wet material is secured, tarped or enclosed in watertight containers when transporting
	Uneven or Shifting Loads	• Every load loaded into dump trucks or roll offs will be evenly distributed, covered/tarped, and secured for transportation
	Pinched, Caught in, Struck By	• Personnel will understand and review hand signals. • All machines will be equipped with backup alarms. • Only essential people will be allowed in the loading/unloading

		areas and site access roads. • Personnel will avoid placing themselves between heavy equipment and stationary objects. • Eye contact with operators and truck drivers will always be made before approaching equipment. • Operators of all heavy equipment and vehicles will be aware of their surroundings at all times. • Proper PPE will be worn at all times. • Operators of all heavy equipment and vehicles will look at all sides before backing up • Trucks will not back up unless a spotter is present and positioned such that they can see the rear of the vehicle. • Equipment will not be approached on blind sides. • All exposed utilities on site (monitoring wells, etc.) will be clearly identified with stakes and high visibility flagging tape, orange safety cones or orange safety barrels.
	If Hazardous Material - Operators & Personnel Not Physically Qualified	• All operators will be physically qualified accordance with the machinery being operated • All personnel working around contaminated material will be medically physically fit, as well as HAZMAT OSHA 40 trained. • See HazCom standards in JHM's Health and Safety Plan
	Manual Handling / Lifting Injuries	• Use required PPE (Hard Hat, Safety Glasses, Safety vest, gloves, etc.) • Proper manual lifting methods are being used (i.e. bending at the knees) • Mechanical devices will be utilized to reduce manual material handling. • No person should lift more than 50 lbs. alone. • Team lifting will be utilized in lieu of mechanical devices.

	Overhead Hazards	• All personnel will stay clear of all suspended loads. • Where applicable, overhead wires will be appropriately marked. • All equipment will stay a minimum of 10’ from power lines. This distance will increase as the voltage of the power lines increase. • All equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects. • All ground personnel will stay clear of truck loading/ unloading areas. • All ground personnel will avoid standing adjacent to trucks being loaded, or beds raised.
	Vehicle Traffic & Accidents	• Always make eye contact with Operators • Personnel must be aware of surroundings at all times • Regulated driving speeds set in place; 10 mph • Heavy equipment shall have back up alarms • Spotters will be present when moving equipment • Limiting the amount of equipment used at one time while on-site.
	Severe Weather/ Temperature Conditions	• Be cautious of Wind, Rain, Snow, etc. • In the event of Lightning in the area, work will cease at the direction of the Supervisor or HSO; 30/30 rule will be followed. • Site personnel will be familiar with signs and symptoms of heat and cold stress. • Controls will be implemented to minimize exposure to temperatures extremes including work/rest regimens, warm/cool rest areas, staying hydrated, protective clothing and minimizing exposure time.

	Slips, Trips & Falls	• Personnel will immediately communicate slip/trip/fall hazards (i.e. grade stakes, etc.) to employees and supervisors. • Debris will not be allowed to accumulate where it becomes a hazard. • Maintain good housekeeping • Keep walkways & aisles clear at all times • Clear all mud or debris from equipment leaving site • Be aware of surroundings, and stay alert while walking

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
MOBILIZATION & DEMOBILIZATION

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Unloading/Loading Equipment from Trucks ***Relocating Equipment***	Slips/Trips/Falls	• Maintain work areas in a safe and orderly condition. • Locate unloading areas on even terrain. • Use extreme caution when walking on debris or unsteady terrain. • Mark tripping hazards and remediate if possible.
	Back Injuries	• Instruct personnel on proper lifting and working techniques. • Workers should not lift more than 50 lbs. unassisted. • Use mechanical devices, such as forklifts, hand trucks and power tailgates, to reduce/eliminate manual materials handling. • Employ team lifting if mechanical means are not available. • Ensure proper footing prior to manual lifting.
	Vehicular/Equipment Traffic Accidents	• Spotters will be used when backing up trucks and moving equipment. • High Visibility ANSI approved traffic vests will be worn in all work areas. • Heavy Equipment and large trucks will be equipped with backup alarms. • Personnel will be aware of their surroundings at all times. • All vehicles and equipment will be operated at a reasonable speed. • Truck traffic will be restricted to speeds of 5 MPH while on site. • Have traffic officers when required. • Talk to truckers daily about the internal traffic control plan for the site.
	Eye Injury	• Site personnel must wear safety glasses that meet ANSI Standard Z-87. • Confirm glasses have proper fit and are in good condition. • Do not rub eyes in work areas or with dirty hands or clothing. • Use engineering controls to minimize dust and flying debris. • Use water to flush eyes if any foreign body has entered the eye(s).

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Dropped Objects/Overhead Hazards	• All personnel must wear hard hats meeting ANSI Standard Z-89. • Heavy equipment/trucks must stay at least 15' away from overhead lines. • Identify hazards posed by nearby workers and falling/shifting debris. • Delineate areas as necessary to keep people out of hazardous areas.
	Criminal or Suspicious Activity	• Personnel will not be confrontational with any unauthorized persons on- site, or attempting to enter the site. • Personnel will report suspicious activities to their supervisor immediately. • The Supervisor will inform management who may need to call the Police. • All gates and trailers will be locked and all open excavations secured at the end of the work day.
	Equipment Unloading	• Unload equipment on level ground. • Chock trailers and vehicles as needed to prevent unexpected rolling. • Personnel will not stand next to any truck that is offloading. • Personnel will demarcate a control zone around any crane/heavy equipment that is unloading. • All vehicles and equipment will be operated at a reasonable speed. • Spotters will be used when backing up trucks and moving equipment. • Personnel not in the immediate vicinity of a dumping or offloading truck should be aware that loads, rocks, piping can roll considerable distances if not unloaded/dumped properly. • Compact and raise to grade any soft spots in the dumping/offloading area.
	Temperature Extremes	• Personnel will be familiar with signs and symptoms of heat/cold stress. • Controls will be implemented to minimize exposure to temperatures extremes including work/rest regimens, warm/cool rest areas, protective clothing and minimizing exposure time.
	Trailer Placement and Setup	• Two spotters (one on each side) must be utilized when positioning office trailers. • Personnel will not go under trailer until all jacks are in place.

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Struck By/Against	• Personnel will understand and review hand signals. • Spotters will be used when backing up trucks and moving equipment. • Equip machines/tractor trailers with backup alarms. • Personnel will avoid placing themselves between heavy equipment/trucks and stationery objects. • Personnel will establish eye contact with operators prior to approaching any vehicle or heavy equipment. • Operate vehicles and equipment at a reasonable speed. • The swing area of all cranes and backhoes will be demarcated by caution tape or fencing. • Personnel will not stand next to trucks that are dumping or offloading. • Even personnel not in the immediate vicinity of a dumping or offloading truck should be aware that loads, rocks, piping can roll considerable distances if not unloaded/dumped properly. • Trucks will be dumped by qualified operators familiar with terrain. • Any soft spots in the dumping/offloading area should be compacted and brought up to grade. • Review the lift plan and proper lifting points before beginning the lift. • Know the weight of the load and the rating capacity of the rigging.
Equipment Set Up Operations/Shutdown	Struck By/Against	• Equip heavy equipment with a mechanical system that protects the operator from the hazards of flying debris. • Mechanical systems shall have a quick stop within easy reach of the operator. • Workers must wear ANSI approved safety glasses, hard hat and Class 2 high visibility vests during equipment unloading/loading and by any operators when outside the machine cab. • Clearly demarcate the swing area for cranes and excavators to prevent activity within those zones. • Secure the work area to prevent unauthorized persons from entering during set up operations. • Train employees in manufacturer recommended startup/operating procedures prior to commencing work.

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Uneven Terrain/Rolling	• Locate heavy equipment on even terrain free of obstruction. • Check and secure heavy equipment prior to beginning activities. • Only qualified operators may conduct initial start-up of all heavy equipment. • No personnel will be within 20 feet of the dump zone/offload zone or adjacent to the sides of any truck that is dumping or offloading.
	Accidental Startup	• Equip all equipment with a locking device on the ignition system and/or implement lockout/tag out procedures to prevent unauthorized startup of the equipment.
Heavy Equipment Fueling/Greasing	Fire	• Smoking and open flames are not permitted in fueling/greasing areas. • All equipment is equipped with 10-lb ABC type fire extinguishers. • 10-lb. ABC type fire extinguishers readily available during fuel/greasing operations.
	Fuel/Grease Exposure	• Protective clothing (i.e., gloves and safety glasses) will be worn during fueling operations. • Skin will be rinsed with water if contact with hazardous material occurs.
	Spills	• Spill and absorbent materials will be readily available. • Employees will be instructed as to proper fueling techniques. • Fueling activities will be attended. • Nozzles should never be chocked open. • Use containment when fueling. • Fuel nozzle and hose will be secured in holder after use. • Fuel caps will be secured after fueling operations.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
PIPE/CONDUIT INSTALLATION

Major Steps	Potential Hazards	Recommended Controls
Pipe/Conduit Installation - Excavate trench for utilities - Install various pipe types ***Pre-cast Structure Installation*** - Excavation - Setting structures (with back hoe, not crane)	Slip/Trip/Falls	• Personnel will communicate slip/trip/fall hazards to employees and supervisors. • Tripping and poor footing hazards will be repaired as they are discovered or will be clearly identified. • Work over 6 feet requires fall protection. • Personnel will clear walkways of equipment and materials. • Debris will not be allowed to accumulate where it becomes a hazard. • Personnel will use care on or near any steep slopes. • Work areas and means of access shall be maintained safe and orderly. • Even terrain will be utilized as unloading areas.
	Struck By/Against	• Eye contact with operators shall be made before approaching equipment. • Operators of heavy equipment and vehicles will be aware of surroundings at all times. • Personnel will avoid equipment swing areas and blind sides. • Personnel will understand and review hand signals. • Spotters will not be alongside any dumping truck, loader, etc. • High Visibility traffic vests will be worn at all times. • All machines will be equipped with backup alarms. • All swing capable equipment will have proper warning signs. • All Heavy Equipment, Dump truck and Tractor-Trailer activity in the work zones will employ a trained spotter. • When installing new section of pipe into bell end of previously laid pipe “bringing pipe home”, personnel will not stand in front of or in line of machine bucket. • All piping will be chocked when stored to prevent rolling.
	Rollovers	• Equipment will have rollover protective structures and seat belts. • Operators will wear seat belts when operating equipment. • Equipment will not be operated on grades that exceed manufacturer recommendations.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
PIPE/CONDUIT INSTALLATION

	Musculoskeletal Injuries	• Watch pipe for twisting & turning while lifting. • Utilization of mechanical devices will be the 1st option considered on all appropriate lifting tasks. • Team lifting will be used in lieu of mechanical devices, if necessary. • Site personnel will be instructed on proper lifting techniques. • No person should lift more than 50 lbs. alone. • If manual lifting is required, have proper footing prior to lifting. • Use proper bending and lifting procedures.
	Overhead Hazards	• Where applicable overhead wires will be appropriately marked. • Site personnel and visitors must wear Hard Hats. • Tag lines will be utilized to control materials (pipe, manholes, etc.) during lifting/hoisting activities. • All equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects. • All slings, chains and ropes will be rated for the load in which it is expected to lift. • Slings with tears or rips are prohibited from use and will be removed from the site immediately if discovered. • All ground personnel will stay clear of all suspended loads. • All equipment will stay a minimum of 15 feet from power lines. This distance will increase as the voltage of the power lines increase. • All hand tools, materials, etc. will be stored away from trench edge (2' or more) to prevent them from falling on personnel in trench.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
PIPE/CONDUIT INSTALLATION

	Open Excavations/ Cave In	• Any excavation 4’ and deeper will be provided with ladders or ramps to allow for means of egress in such a way as to require no more than 25’ of lateral travel. • The excavated areas will be barricaded a minimum of 3’ from trench to prevent field personnel from falling into the open area. • Protective systems (sloping, benching or shoring) to prevent trench/excavation cave-in will be affected in excavations greater than 5’ in depth, or if deemed necessary by a Competent Person. • Trench boxes will be inspected in the field by the Supervisor prior to use. • All trenching/excavation will be in accordance with the provisions of 29 CFR 1926 Subpart P. • The Competent Person will inspect excavations and soil conditions initially and whenever the soil conditions change. • The excavation Competent Person will regularly inspect the trench edges for cracks and signs of potential cave in. • Excavation spoils will be staged a minimum of two feet back from the edge of all excavations. • All personnel will keep back a minimum of 2’ from the edge of all excavations-the Competent Person will regularly inspect the edges of the excavation for cracks fissure. S/he can increase the minimum distance to edge as needed. • All trucks dumping or being loaded will stay a minimum of 3’ from the edge of any excavation. • All non-essential personnel will be kept out of the excavation work zones. • Excavations will be barricaded with orange safety fence and warning signs if left open at end of work shift.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
PIPE/CONDUIT INSTALLATION

	Existing Utility Contact	• Locate and pre-mark all existing utilities on-site. • Call Dig Safe to mark and document markings before digging • Follow Dig Safe protocol (i.e. hand dig to locate utilities, use offsets, etc.) • Hand dig to locate existing lines.
	Chemical Exposure (conduit glue, water plug/grout, etc.)	• Read and understand the SDS for chemical used. • Properly ventilate the work area when applying chemical products. • Wear chemical resistant gloves to ensure no skin exposure to hands. • Wash skin with soap and water if chemical contact occurs.
	Noise	• Personnel will wear hearing protection if necessary to maintain personal exposure below 85 dBA. • All machines will be equipped with manufacturers required mufflers.
	Dropped Pipe	• Watch pipe for twisting & turning while lifting. • Handle carefully from top to man below in trench. • Standard construction footwear will be worn. • ANSI Standard Z89.1 approved Hard Hats will be worn. • Use tag lines to control pipe, manholes, etc. during lifting/hoisting activities. • Chock piping when stored to prevent rolling.
Cutting Pipe with chop saw or other power saw ***(Ductile Iron, PVC, HDPE)*** • Pipe is chocked with dunnage while cutting.	Hand Injuries/Cutting Hazards	• Cut resistant work gloves will be worn during all cutting activities. • Proper cutting techniques and methods will be utilized. • Guards will be kept in place on all power tools. • First aid kits will be made readily available in work areas • Pipe will always be choked prior to starting cutting activities.
	Flying objects and debris	• Safety glasses meeting ANSI Z87 will be worn. • Protective face shields (plastic or steel mesh) will be worn when utilizing chop saw to cut pipe. • Establish a safe work area before cutting pipe, non-essential personnel will stay clear of pipe cutting location.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
PIPE/CONDUIT INSTALLATION

	Noise	• Wear hearing protection when utilizing saws (chop, power, etc.)
	Fire	• Spark-producing activities are considered hot work. A competent person will complete hot work permits prior to any spark producing cutting activities. • A 10-lb. ABC fire extinguisher shall be present during all spark-producing cutting activities.
	Chop saw exhaust	• Adequate ventilation is required when using chop saws for cutting activities. • Chop saws will not be utilized inside trench. • Ensure that no personnel are immediately down wind from chop saw cutting activity.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
SITE PREPARATION & EARTH MOVING

Major Steps	Potential Hazards	Recommended Controls
Site Preparation ***Heavy Equipment Operations*** - Stripping of topsoil - Excavate high areas down to proper grade - Clear trees and brush - Backfill areas below grade to meet proper grade - Spread material over areas to bring site to proper grade - Restoration of site	Struck By/Against	• Spotters will stand at the rear of the dumping vehicle, at a safe distance. • High Visibility ANSI approved traffic vests will be worn at all times. • Eye contact with operators will be made before approaching equipment. • Equipment will not be approached on blind sides. • Personnel will avoid equipment swing areas and blind sides. • Swing areas of equipment will be demarcated. • Operators of all heavy equipment and vehicles will look before backing up. • All heavy equipment, dump truck and tractor trailer activity in the work zones will employ a trained spotter. • Personnel will understand and review hand signals. • All machines will be equipped with backup alarms. • All operators will be aware of grade stake locations. • All grade stakes will be marked with high visibility flagging tape and/or high visibility paint.
	Rollovers	• Equipment will have rollover protective structures and seat belts. • Operators will wear seat belts when operating equipment. • Equipment will not be operated on grades which exceed manufacturer recommendations. • Trucks must be on even, stable ground before raising the bed to dump the load. • If the load fails to exit the bed properly or becomes stuck, the bed will be immediately lowered. • Trucks will not depart from the dumping area until the bed is in the down position.
	Flying Objects and Debris	• ANSI approved safety glasses will be worn. • Front windshields will be closed during equipment operation. • Ground personnel will maintain a Safe Distance during all clearing, excavation and stockpiling operations.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
SITE PREPARATION & EARTH MOVING

Major Steps	Potential Hazards	Recommended Controls
	Overhead Hazards	• All equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects. • All ground personnel will wear hard hats. • All equipment will stay a minimum of 15 feet from power lines. This distance will increase as the voltage of the power lines increases. • Personnel operating equipment without enclosed cabs or overhead guards, canopies, or grills (i.e. rollers & paving machines) are required to wear hard hats meeting ANSI Standard Z89.1.
	Slip/Trip/Falls	• Personnel will immediately communicate slip/trip/fall hazards (i.e. grade stakes, etc.) to employees and supervisors. • Personnel will clear walkways of equipment and materials. • Other obstructions will be marked, identified or barricaded. • Tripping and poor footing hazards will be repaired as they are discovered or will be clearly identified. • Debris will not be allowed to accumulate where it becomes a hazard.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
TREE CLEARING

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Feller Buncher Shear	Roll overs / Tip overs	• Ensure equipment is leveled when felling trees. • Operators using heavy equipment will be protected in enclosed operating environments with rollover protective structures (ROPS). • Operators will wear seat belts as required.
	Impact – struck by load /debris	• High Visibility ANSI approved traffic vests will be worn at all times. • Eye contact with operators will be made before approaching equipment. • Personnel will stay a minimum or 2x the tree height away from the equipment while in operation. • Equipment will not be approached on blind sides. • Personnel will understand and review hand signals.
Wood recycling operations	Attachment inspection	• Check that wood recycler is properly and securely attached to excavator (all nuts and bolts are secure and that all safety shields are in place); • Do not operate wood recycler unless shields and guards are in place and in good condition. Replace if damaged.

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Wood recycler protocol	• Walk around and inspect the work area to make sure it's safe for operations; • Check whether there is sufficient area for the machine and operator; • Look for and clear the area of sizeable rocks and debris, old columns, pipes, bricks, glass, nails; • Check for underground utilities such as water & gas pipes, and sprinkler lines, property markers, metal, fencing, etc.
	Impact – struck by	• Eye contact with operators will be made before approaching equipment. • During operation the discharge shoot will be placed in the downward position. • Personnel will stay a minimum or 100' away from the equipment while in operation. • Equipment will not be approached on blind sides. • Personnel will understand and review hand signals. • Check for personnel and sound warning horn before engaging clutch and chipper. • High Visibility ANSI approved traffic vests will be worn at all times.
	Flying Objects and Debris	• ANSI approved safety glasses will be worn. • Front windshields will be closed during equipment operation. • Ground personnel will maintain a safe distance during all clearing, excavation and stockpiling operations.

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS

	Biological Hazards
	(i.e. Poison Ivy, Bees, Ticks)
		• Work Areas will be inspected to any Biological Hazards
		• Stay away from any wild animals on site.
		• Personnel will be aware for the potential for insects, ticks and mosquitoes may carry bacteriological diseases
		  ○ Wear Insect repellants with DEET,
		  ○ Secure pant legs to avoid dermal contact with hazards
		  ○ Wear light colored clothing.
		  ○ Watch for bee or wasp nests in any enclosed areas.
		  ○ Complete a self-inspection for ticks daily.

	Loud Noise	• Personnel required to wear hearing protection with noise levels 85 dB or more • Turning off any equipment that is not in active use; avoid idling.
	Back / Muscle Strains	• Proper manual lifting methods are being used (i.e. bending at the knees) • Mechanical devices will be utilized to reduce manual material handling. • No person should lift more than 50 lbs. alone. • Team lifting will be utilized in lieu of mechanical devices.
	Protection of public	• Work area will be secured to prevent access from public using fencing, barricades and/or spotters.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
TRENCHING

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Trenching Operations - Trench Excavation for conduit or piping installation/repair ***Dewatering*** ***Rock Removal*** - Mechanical excavation - Hi-ramming ***Backfilling Operations*** - Backfill excavated areas - Compact placed materials	Hitting underground utilities	• See JHM Dig Safe Protocol • Obtain a Dig Safe ticket for this area. • Take photos/GPS of the pre-marked areas. • Preserve any disturbed Dig Safe pre-marks (Supervisor/Laborer/or Operator take photos of area). • Hand dig within 18" of Dig Safe markings. • Hand dig around existing lines to prevent damage. • Call 911 immediately if you hit a gas line.
	Struck By/Against	• Spotters will stand at the rear of the vehicle, a safe distance away from the dumping area. They will not stand alongside any dumping truck, loader, etc. • High Visibility Vests will be worn at all times. • Eye contact with operators will be made before approaching equipment. • Equipment will not be approached on blind sides. • Personnel will avoid equipment swing areas and blind sides. • Operators of all heavy equipment and vehicles will look before backing up. • All heavy equipment, dump truck and tractor trailer activity in the work zones will employ a spotter. • Personnel will not work under loads. • Personnel will understand and review hand signals. • All machines will be equipped with backup alarms.

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Rollovers	• Equipment will have rollover protective structures and seat belts. • Operators will wear seat belts when operating equipment. • Equipment will not be operated on grades which exceed manufacturer recommendations.
	Flying Objects and Debris	• ANSI approved safety glasses and hard hats will be worn. • Front windshields will be closed during equipment operation. • Ground personnel will maintain a Safe Distance during all excavation and stockpiling operations. • Personnel will stay a safe distance away from equipment and rock when hi-ramming operations are occurring.
	Overhead Hazards	• All equipment will be provided with guards, canopies, hard cabs or grills to protect the operator from falling or flying objects. • All ground personnel will wear hard hats. • All slings, chains and ropes will be rated (tagged/labeled accordingly) for the load in which it is expected to lift and will be inspected prior to use. • All ground personnel will stay clear of all suspended loads. • All equipment will stay a minimum of 10 feet from power lines. This distance will increase as the voltage of the power lines increase. • All hand tools, materials, etc. will be stored away from edge of excavations (2’ or more) to prevent them from falling on personnel in excavated areas.

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Open Excavations/Trenches - Cave In	• Any excavation four feet and deeper will be provided with ladders or ramps to allow for means of egress in such a way as to require no more than 25 feet of lateral travel. • The excavated areas will be barricaded to prevent field personnel from falling into the open area. • Sloping or shoring will be utilized as a protective measure to prevent trench cave-in on all excavations 5' or greater (Main Building Sump, footings, & foundation), or if deemed necessary by the SS. • All trenching/excavation will be in accordance with the provisions of 29 CFR 1926 Subpart P. • Smoking or open flames will not be allowed near work areas, if open flames must be used, procedures for hot work will be followed. • The Competent Person will inspect excavations and soil conditions initially and whenever the soil condition changes. • Excavation spoils will be staged a minimum of two feet back from the edge of all excavations.
		• All personnel will keep back a minimum of two feet from the edge of all excavations. • The competent person will regularly inspect the edges of the excavation for cracks fissure and subsidence and he/she can increase the minimum distance to edge as needed. • All trucks dumping or being loaded will stay a minimum of three feet from the edge of any excavation. • All non-essential personnel will be kept out of the excavation work zones.
	Atmospheric Hazards	• Any excavation four feet and deeper will be monitored for oxygen, combustible gases, and toxic atmospheres prior to personnel entry and at regular intervals during entry.

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Slip/Trip/Falls	• Personnel will immediately communicate slip/trip/fall hazards to employees and supervisors. • Work over 6 feet requires fall protection. • Personnel will clear walkways of equipment and materials. • Other obstructions will be marked, identified or barricaded. • Tripping and poor footing hazards will be repaired as they are discovered or will be clearly identified. • Debris will not be allowed to accumulate where it becomes a hazard. • Personnel will use care on or near any steep slopes. • Holes will be barricades or covered appropriately.
	Back Injuries	• Site personnel will be instructed on proper lifting techniques by the Supervisor before beginning work. • Mechanical devices will be utilized to reduce manual material handling. • Team lifting will be utilized in lieu of mechanical devices. • No person should lift more than 50 lbs. alone.
	Noise	• Personnel will wear hearing protection if necessary to maintain personal exposure below 85dBA. • Personnel will wear hearing protection when utilizing the vibratory compactor. • Personnel will wear hearing protection when utilizing the hi-ram.

J.H. MAXYMILLIAN - JOB HAZARD ANALYSIS (JHA)
WORKING IN ROADWAY

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Determine Traffic Control Requirements		• Designate a Competent person or persons • Assess traffic conditions • Review MUTCD (Manual of Uniform Traffic Control Devices) • Prepare Internal Traffic Control Plan and review with crew
Set up traffic control devices: ***1) Signs first*** ***2) Cones, barrels, barricades second*** ***3) Position flaggers***	Personnel struck by traffic	• Use flashers and lights on pick ups • High Visibility ANSI approved traffic vests will be worn in all work areas. • Keep an eye on on-coming traffic • Be sure flaggers are positioned where they will be highly visible to traffic and have a good escape route • Ensure flaggers are using paddles and/or hi vis flags
Perform work in roadway with traffic controls in place	Personnel struck by trucks or equipment	• Ensure back up & travel alarms are working and loud enough • Keep spectators out of the work area • All employees wear high-visibility vests at all times • Maintain eye contact with operators and drivers • Give machines and trucks the right of way
	Traffic vehicle veers into work area	• Use Jersey or vehicle barriers where feasible • Shout warning to crew
	Hit by vehicle outside work area	• Position tools and supplies inside the work area – plan to stay in work area most of the time • Always be ALERT and aware of traffic
	Equipment or excavated materials hits vehicle or pedestrian	• All personnel need to be alert and aware of vehicles and pedestrians • Make sure the delineated work area is large enough for equipment and excavation to stay inside the work space • Stop traffic when necessary to bring trucks or equipment into the work area

PRINCIPLE STEPS / TASKS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Cave-ins due to vehicle vibrations	• Use trench shoring at 4’ or less if conditions warrant
	Impaired visibility due to dusty conditions	• Use water to control dust
	Poor visibility due to line of sight or other blind spots	• Use trained flaggers, spotters, and radio communication as needed
	On-site Vehicular/Equipment Traffic Accidents	• Spotters will be used when backing up trucks and moving equipment. • High Visibility ANSI approved traffic vests will be worn in all work areas. • Heavy Equipment and large trucks will be equipped with backup alarms. • Personnel will be aware of their surroundings at all times. • All vehicles and equipment will be operated at a reasonable speed. • On-site truck traffic will be restricted to speeds of 5 MPH while on site. • Talk to truckers daily about the internal traffic control plan for the site.
Remove traffic control devices	Hit by oncoming traffic	• Remain alert about surroundings • Use strobe lights or flashers on pickup • Work in teams and watch on-coming traffic continuously

APPENDIX E

Hazard Communication Program

HAZARD COMMUNICATION PROGRAM

J.H. MAXYMILLIAN, INC.

OVER 50 YEARS STRONG

Revision Number: 8

Revised: 2024
CIH Reviewed: July 2013

Hazard Communication Program

TABLE OF CONTENTS

ATTACHMENTS

SEE ALSO - SAFETY DATA SHEET BINDER

1.0 Purpose

The purpose of this program is to ensure that the all chemicals used on JHM job sites are identified and labeled, and that all employees are trained in the use and potential hazards per OSHA 29 CFR 1926.59 and 1910.1200 Hazard Communication Standard.

The Hazard Communication Standard is intended to satisfy requirements of various federal and state agencies. In particular, the Occupational Safety and Health Administration (OSHA) 29 CFR part 1926 and state Right-To-Know laws require employers to make this information available to employees. This standard contains information about categories of potentially hazardous materials that workers might encounter on a jobsite.

1.1 Globally Harmonized System (GHS)

On March 26, 2012, the Hazard Communication Standard (HCS) aligned with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). The GHS provides a common and coherent approach to classifying chemicals and communicating hazard information on labels and safety data sheets:

- **Hazard classification**: Provides specific criteria for classification of health and physical hazards, as well as classification of mixtures;
- **Labels**: Chemical manufacturers and importers provide a label that includes a harmonized signal word, pictogram, and hazard statement for each hazard class and category, as well as precautionary statements;
- **Safety Data Sheets (SDS):** Have a specified 16-section format.

1.2 Information Availability

A copy of this program and SDS's are available for each job-site supervisor. **It is your responsibility to understand the contents of this standard, its purpose, and how to find information about hazardous materials.** Master copies of this program will be maintained at the home office. This program and the SDS's that represent each category are intended for use at all company job-sites and each job-site may also have specific SDSs. *(See separate Safety Data Sheet book.)*

1.3 Classification of Hazardous Materials

Classification of hazardous material is made by the manufacturer or importer of the material, and not by JHM, Inc.

An evaluation of chemical hazards considers the available scientific evidence concerning such hazards. The HCS has specific criteria for each health and physical hazard, along with detailed instructions for hazard evaluation and determinations as to whether mixtures or substances are covered. It also establishes both hazard classes and hazard categories. Hazard classes are divided into categories that reflect the relative severity of the effect. They also provide additional

information that can be related to the appropriate response to address the hazard and the criteria for each health or physical effect.

2.0 Training

It is your right as an employee to be trained to recognize hazardous materials and to understand the importance of performing your job safely. You should receive training in how to safely work with hazardous materials in general and those specific to the job-site before you begin working. This provision for being trained prior to performing work notably applies to the performance of non-routine tasks. It is the joint responsibility of the Safety Officer and the job-site supervisor to ensure that such training is provided. Training will cover the following:

- Physical, health, simple asphyxiation, combustible dust, and pyrophoric gas hazards, as well as hazards not otherwise classified, of the chemicals in the work area.
- Methods and observations for detecting the presence of hazardous chemicals in the workplace.
- Interpreting SDSs and labels.
- Protective measures.
- Understanding this program.
- Operations at worksites with hazardous chemicals;
- Right to request SDSs.
- Right to refuse to work with a substance.
- Standard location and availability, including SDS Book.

2.1 Non-Routine Tasks

Non-routine tasks at job-sites require special training. Be sure you are trained before you begin to perform any non-routine task. It is the responsibility of the job-site supervisor to ensure that employees are trained to safely perform non-routine tasks before they begin performance of the non-routine task.

3.0 Supervisor Responsibility

As a supervisor, it is your responsibility to ensure that:

- All members of their crew have been trained on the provisions of this program.
- A list of hazardous materials is maintained, specific to your job site.
- All containers containing hazardous substances are properly labeled with the material and appropriate hazard.
- Safety Data Sheets (SDSs) are available for every product at your job-site.
- All employees at the job-site have been made aware of this standard and have received the standard training described in this text.
- All employees are trained in the safe performance of non-routine tasks prior to performance of the task.

4.0 Definitions

Hazard Warning - Any picture, symbol, or combination of pictures and/or symbols that convey the hazard(s) of the substance(s) in the container(s). These hazard warnings are provided by the manufacturer of the substance.

Label – An appropriate group of written, printed or graphic information elements concerning a hazardous chemical that is affixed to, printed on, or attached to the immediate container of a hazardous chemical, or to the outside packaging.

NFPA - National Fire Protection Agency; a non-profit organization whose aim is to safeguard against fires. The NFPA is responsible for the nationally accepted NFPA 704 Fire Hazard Marking System.

OSHA - Occupational Safety and Health Administration; the federal agency responsible for the establishment and enforcement of safety and health standards in industry.

Pictogram - A composition that may include a symbol plus other graphic elements, such as a border, background pattern, or color, that is intended to convey specific information about the hazards of a chemical. Eight pictograms are designated under this standard for application to a hazard category.

Precautionary Statement - A phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical or improper storage or handling.

Safety Data Sheet (SDS) - *Formally known as Material Safety Data Sheets (MSDSs).* A printed form that provides information about health, fire and safety risks associated with a particular substance or compound. The information contained in the SDS is largely the same as the MSDS, except SDSs are presented in a consistent user-friendly, 16-section format. This brief provides guidance to help workers who handle hazardous chemicals to become familiar with the format and understand the contents of the SDS. These forms are provided by the manufacturer of the substance.

UN Classification Numbers - Those numbers located on some hazard warnings to identify the type and degree of a particular hazard. For details on UN Classification Numbers, refer to Attachment E.

UN ID Numbers - The four-digit identification system used for shipping hazardous materials. For details on this identification system, refer to the Emergency Response Guide Book (Department of Transportation Publication Number 5800.4).

5.0 Labels and Hazard Warnings

5.1 Label Requirements

When a chemical is received from a manufacturer or distributor, the employee responsible for its receipt will verify that the container is properly labeled with the following information:

- Product identifier;
- Signal word;
- Hazard statement(s);
- Pictogram(s);
- Precautionary statement(s); and,
- Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party.

An example of an OSHA compliant label is found in Attachment A.

All original labels, warnings, and other printed information must be maintained intact and plainly visible at all times. Original labels shall not be defaced. Hazardous materials will not be allowed on a project site if they are not in the original or approved containers, or if the containers are unlabeled or improperly labeled. When stationary process containers, such as tanks that cannot

be moved, are used on a project, the suppling company may elect to use signs, placards, operating procedures, or other such written materials instead of affixing labels to individual

stationary containers as long as the required label information is conveyed. If written materials are used, then this information shall be readily available to employees in the area.

5.2 Other Hazard Warnings

In addition to labels, other product identifier and words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which, in conjunction with the other information immediately available to employees under the hazard communication program, may also provide employees with the specific information regarding the physical and health hazards of the hazardous chemical. Other hazard warnings could include the following:

- NFPA label; the details and descriptions of the NFPA Marking System are found in Attachment B.
- UN Classification System; the details and descriptions of the UN Classification System are found in Attachment E.

6.0 Safety Data sheets (SDS) - General Information

6.1 Suppliers

SDSs are supplied by the distributor or manufacturer, either with the first or with every delivery of the hazardous substance(s). If an SDS for a substance is not on file, a responsible person appointed by the Safety Officer will make a written request of the distributor for the SDS. That person will retain a copy of the written request for safety records on the specific job site where the product is being utilized.

6.2 File Maintenance

An SDS for each substance with which an employee might come into contact is kept on file at the home office. Each site supervisor is responsible for ensuring that his or her book contains an SDS for each substance at the job-site. The Safety Officer will appoint a responsible person to ensure the proper and accurate maintenance of SDS files.

6.3 Distribution Responsibility

Responsibility for SDSs is shared by the person who accepts shipment, the person who delivers shipment, and the person who maintains SDS files. If you accept or deliver a shipment that includes an SDS, it is your responsibility to deliver the SDS to the home office. A responsible person at the home office will file and distribute the SDS.

6.4 Availability at Job-sites

The site supervisor or an appointed employee will be responsible for making this program available to all employees at that job-site. In the event the individual who maintains the standard is unavailable, copies of this program, as well as a complete set of SDSs can be found at the home office.

6.5 Contents

The Hazard Communication Standard requires chemical manufacturers, distributors, or importers to provide Safety Data Sheets to communicate the hazards of hazardous chemical products. SDS's include the section numbers, the headings, and associated information.

Please refer to the Safety Data Sheet Quick Card found in Attachment F.

7.0 Multi-Employer Worksites

OSHA regulations and state Right-To-Know laws require us to coordinate information about hazardous materials used by our workers and those of subcontractors at a job-site.

We recognize the importance of making this information available to all persons who may come in contact with hazardous materials, and we will make available to our contractors and subcontractors copies of this Hazard Communication Program. **OTHER CONTRACTORS AND SUBCONTRACTORS AT A JOB-SITE ARE REQUIRED TO PROVIDE FOR USE OF ALL EMPLOYEES AT A JOB-SITE THEIR OWN Hazard Communication Program, OR SAFETY DATA SHEETS FOR ALL HAZARDOUS SUBSTANCES USED BY THEIR CREWS.**

To this end, a responsible person appointed by the Safety Officer will make a written request for SDSs from each subcontractor or contractor whose employees will share our job-site.

8.0 Health/Safety Emergency Information

Emergency procedures may be unique to each site, but all job-sites should include these standard practices in their emergency procedures:

1. Emergency telephone numbers must be prominently displayed near a working telephone. These numbers include:
    a. Fire;
    b. Ambulance;
    c. Police;
    d. Additional emergency phone numbers should be posted before any non-routine task involving hazardous materials begins.

2. First aid kits and eye wash stations will be maintained in a convenient location on each site. These locations will be identified to all employees.

3. Emergency evacuation procedures should be developed for each job-site, as necessary. Such procedures should include evacuation routes and designated meeting spots for employee check-in. It is the responsibility of the job-site supervisor to notify the appropriate authorities in the event any employee does not check in at the designated meeting spot.

4. In the event of an exposure to a chemical or hazardous substance, refer to the SDS for proper medical treatment. Should an employee need to be transported to a medical facility a copy of the SDS should accompany them.

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ATTACHMENT A

OSHA Hazard Communication Standard Pictogram

OSHA Hazard Communication Standard Label

OSHA® QUICK CARD™

Hazard Communication Standard Pictogram

The Hazard Communication Standard (HCS) requires pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification.

HCS Pictograms and Hazards

Health Hazard  • Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity	**Flame**  • Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides	**Exclamation Mark**  • Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder  • Gases Under Pressure	**Corrosion**  • Skin Corrosion/ Burns • Eye Damage • Corrosive to Metals	**Exploding Bomb**  • Explosives • Self-Reactives • Organic Peroxides
Flame Over Circle  • Oxidizers	**Environment** (Non-Mandatory)  • Aquatic Toxicity	**Skull and Crossbones**  • Acute Toxicity (fatal or toxic)

For more information:

U.S. Department of Labor

OSHA® Occupational Safety and Health Administration

www.osha.gov (800) 321-OSHA (6742)

OSHA 3491-01R 2016

OSHA® QUICK CARD™

Hazard Communication Standard Labels

OSHA has updated the requirements for labeling of hazardous chemicals under its Hazard Communication Standard (HCS). All labels are required to have pictograms, a signal word, hazard and precautionary statements, the product identifier, and supplier identification. A sample revised HCS label, identifying the required label elements, is shown on the right. Supplemental information can also be provided on the label as needed.

U.S. Department of Labor

For more information:

OSHA® Occupational Safety and Health Administration

www.osha.gov (800) 321-OSHA (6742)

SAMPLE LABEL

CODE _____
Product Name_____

Product Identifier

Company Name_____
Street Address_____
City_____ State_____
Postal Code_____Country_____
Emergency Phone Number_____

Supplier Identification

Hazard Pictograms

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor.
May cause liver and kidney damage.

Precautionary Statements
Keep container tightly closed. Store in a cool, well-ventilated place that is locked.
Keep away from heat/sparks/open flame. No smoking.
Only use non-sparking tools.
Use explosion-proof electrical equipment.
Take precautionary measures against static discharge.
Ground and bond container and receiving equipment.
Do not breathe vapors.
Wear protective gloves.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.
Dispose of in accordance with local, regional, national, international regulations as specified.

In Case of Fire: use dry chemical (BC) or Carbon Dioxide (CO_2) fire extinguisher to extinguish.

First Aid
If exposed call Poison Center.
If on skin (or hair): Take off immediately any contaminated clothing. Rinse skin with water.

Supplemental Information

Directions for Use
_____
_____
_____

Fill weight:_____ Lot Number:_____
Gross weight:_____ Fill Date:_____
Expiration Date:_____

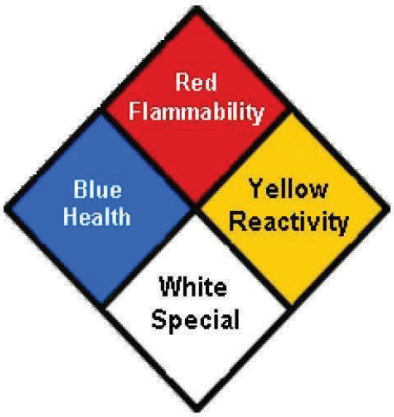
OSHA 3492-01R 2016

ATTACHMENT B

NFPA Marking System

National Fire Protection Agency (NFPA) Marking System

FIXED SITE LABELING OF TANKS AND STORAGE CONTAINERS



N.F.P.A 704 SYSTEM

This National Fire Protection Association (N.F.P.A) diamond is the standard label that is displayed on large capacity storage tanks at fixed site chemical manufacturing and Oil refineries and other storage facilities. The significance of this label is its ability to give a "Quick Look" at the potential hazards that exist if the stored substance is released to the environment.

The Blue, Red and Yellow inter-diamonds specify what KIND of hazards are present and how GREAT those hazards can be. Each colored area will display a NUMBER ranging from 0 to 4. 0 represents MINIMAL hazard, while 4 signifies MAXIMUM hazard. The White area denotes special information that is usually written in words or special symbols, such as:

OX = Oxidizer ; ACID = Acid ; ALK = Alkali ; COR = Corrosive

HAZARD	HEALTH	FLAMMABILITY Flash Point	REACTIVITY
4	Deadly	Below 73 F	May Detonate
3	Extreme Danger	Below 100 F	Explosive
2	Dangerous	Below 200 F	Unstable
1	Slight Hazard	Above 200 F	Normally Stable
0	No Hazard	Will Not Burn	Stable

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OVER 50 YEARS STRONG

ATTACHMENT C

Hazardous Materials Definition

Hazardous Materials Definitions

Department of Transportation (DOT) – Definitions of Hazardous Materials

A hazardous material if defined as any substance or material that could adversely affect the safety of the public, handlers or carriers during transportation. The following text is the hazardous materials definitions and abbreviations listed in 49 CFR §171.8.

NOTE: Last update May 30, 2013.

§171.8 – Definitions and Abbreviations.

Administrator means the Administrator, Pipeline and Hazardous Materials Safety Administration.

Aerosol means any non-refillable receptacle containing a gas compressed, liquefied or dissolved under pressure, the sole purpose of which is to expel a nonpoisonous (other than a Division 6.1 Packing Group III material) liquid, paste, or powder and fitted with a self-closing release device allowing the contents to be ejected by the gas.

Aggregate lithium content means the sum of the grams of lithium content or equivalent lithium content contained by the cells comprising a battery.

Agricultural product means a hazardous material, other than a hazardous waste, whose end use directly supports the production of an agricultural commodity including, but not limited to a fertilizer, pesticide, soil amendment or fuel. An agricultural product is limited to a material in Class 3, 8 or 9, Division 2.1, 2.2, 5.1, or 6.1, or an ORM-D material.

Approval means a written authorization, including a competent authority approval, from the Associate Administrator or other designated Department official, to perform a function for which prior authorization by the Associate Administrator is required under subchapter C of this chapter (49 CFR parts 171 through 180.)

Approved means approval issued or recognized by the Department unless otherwise specifically indicated in this subchapter.

Asphyxiant gas means a gas which dilutes or replaces oxygen normally in the atmosphere.

Associate Administrator means the Associate Administrator for Hazardous Materials Safety, Pipeline and Hazardous Materials Safety Administration.

Atmospheric gases means air, nitrogen, oxygen, argon, krypton, neon and xenon.

Authorized Inspection Agency means:
(1) A jurisdiction which has adopted and administers one or more sections of the ASME Boiler and Pressure Vessel Code as a legal requirement and has a representative serving as a member of the ASME Conference Committee; or
(2) an insurance company which has been licensed or registered by the appropriate authority of a State of the United States or a Province of Canada to underwrite boiler and pressure vessel insurance in such State or Province.

Authorized Inspector means an Inspector who is currently commissioned by the National Board of Boiler and Pressure Vessel Inspectors and employed as an Inspector by an Authorized Inspection Agency.

Bag means a flexible packaging made of paper, plastic film, textiles, woven material or other similar materials.

Bar means 1 BAR = 100 kPa (14.5 psi).

Barge means a non-self-propelled vessel.

Biological product. See § 173.134 of this subchapter.

Biological substances, Category B. See § 173.134 of this subchapter.

Bottle means an inner packaging having a neck of relatively smaller cross section than the body and an opening capable of holding a closure for retention of the contents.

Bottom shell means that portion of a tank car tank surface, excluding the head ends of the tank car tank, that lies within two feet, measured circumferentially, of the bottom longitudinal center line of the tank car tank.

Box means a packaging with complete rectangular or polygonal faces, made of metal, wood, plywood, reconstituted wood, fiberboard, plastic, or other suitable material. Holes appropriate to the size and use of the packaging, for purposes such as ease of handling or opening, or to meet classification requirements, are permitted as long as they do not compromise the integrity of the packaging during transportation, and are not otherwise prohibited in this subchapter.

Break-bulk means packages of hazardous materials that are handled individually, palletized, or unitized for purposes of transportation as opposed to bulk and containerized freight.

Btu means British thermal unit.

Bulk packaging means a packaging, other than a vessel or a barge, including a transport vehicle or freight container, in which hazardous materials are loaded with no intermediate form of containment. A Large Packaging in which hazardous materials are loaded with an intermediate form of containment, such as one or more articles or inner packagings, is also a bulk packaging. Additionally, a bulk packaging has:
(1) A maximum capacity greater than 450 L (119 gallons) as a receptacle for a liquid;
(2) A maximum net mass greater than 400 kg (882 pounds) and a maximum capacity greater than 450 L (119 gallons) as a receptacle for a solid; or
(3) A water capacity greater than 454 kg (1000 pounds) as a receptacle for a gas as defined in § 173.115 of this subchapter.

Bundle of cylinders means assemblies of UN cylinders fastened together and interconnected by a manifold and transported as a unit. The total water capacity for the bundle may not exceed 3,000 L, except that a bundle intended for the transport of gases in Division 2.3 is limited to a water capacity of 1,000 L.

Bureau of Explosives means the Bureau of Explosives (B of E) of the Association of American Railroads.

C means Celsius or Centigrade.

Captain of the Port (COTP) means the officer of the Coast Guard, under the command of a District Commander, so designated by the Commandant for the purpose of giving immediate direction to Coast Guard law enforcement activities within an assigned area. As used in this subchapter, the term ***Captain of the Port*** includes an authorized representative of the Captain of the Port.
Carfloat means a vessel that operates on a short run on an irregular basis and serves one or more points in a port area as an extension of a rail line or highway over water, and does not operate in ocean, coastwise, or ferry service.

Cargo aircraft only means an aircraft that is used to transport cargo and is not engaged in carrying passengers. For purposes of this subchapter, the terms ***cargo aircraft only***, ***cargo-only aircraft*** and ***cargo aircraft*** have the same meaning.

Cargo tank means a bulk packaging that:
(1) Is a tank intended primarily for the carriage of liquids or gases and includes appurtenances, reinforcements, fittings, and closures (for the definition of a tank, see 49 CFR 178.320, 178.337-1, or 178.338-1, as applicable);
(2) Is permanently attached to or forms a part of a motor vehicle, or is not permanently attached to a motor vehicle but which, by reason of its size, construction or attachment to a motor vehicle is loaded or unloaded without being removed from the motor vehicle; and
(3) Is not fabricated under a specification for cylinders, intermediate bulk containers, multi-unit tank car tanks, portable tanks, or tank cars.

Cargo tank motor vehicle means a motor vehicle with one or more cargo tanks permanently attached to or forming an integral part of the motor vehicle.

Cargo vessel means:
(1) Any vessel other than a passenger vessel; and
(2) Any ferry being operated under authority of a change of character certificate issued by a Coast Guard Officer-in-Charge, Marine Inspection.

Carrier means a person who transports passengers or property in commerce by rail car, aircraft, motor vehicle, or vessel.

CC means closed-cup.

Character of vessel means the type of service in which the vessel is engaged at the time of carriage of a hazardous material.

Class means hazard class. See ***hazard class.***

Class 1 . See § 173.50 of this subchapter.

Class 2 . See § 173.115 of this subchapter.

Class 3 . See § 173.120 of this subchapter.

Class 4 . See § 173.124 of this subchapter.

Class 5 . See § 173.128 of this subchapter.

Class 6 . See § 173.132 of this subchapter.

Class 7 . See § 173.403 of this subchapter.

Class 8 . See § 173.136 of this subchapter.

Class 9 . See § 173.140 of this subchapter.

Closure means a device which closes an opening in a receptacle.

COFC means container-on-flat-car.

Combination packaging means a combination of packaging, for transport purposes, consisting of one or more inner packagings secured in a non-bulk outer packaging. It does not include a composite packaging.

Combustible liquid. See § 173.120 of this subchapter.

Commerce means trade or transportation in the jurisdiction of the United States within a single state; between a place in a state and a place outside of the state; that affects trade or transportation between a place in a state and place outside of the state; or on a United States-registered aircraft.

Compatibility group letter means a designated alphabetical letter used to categorize different types of explosive substances and articles for purposes of stowage and segregation. See § 173.52 of this subchapter.

Competent Authority means a national agency responsible under its national law for the control or regulation of a particular aspect of the transportation of hazardous materials (dangerous goods). The term ***Appropriate Authority***, as used in the ICAO Technical Instructions (IBR, see § 171.7), has the same meaning as ***Competent Authority.*** For purposes of this subchapter, the Associate Administrator is the Competent Authority for the United States.

Composite packaging means a packaging consisting of an outer packaging and an inner receptacle, so constructed that the inner receptacle and the outer packaging form an integral packaging. Once assembled it remains thereafter an integrated single unit; it is filled, stored, shipped and emptied as such.

Compressed gas. See § 173.115 of this subchapter.

Consignee means the person or place shown on a shipping document, package marking, or other media as the location to which a carrier is directed to transport a hazardous material.

Consumer commodity means a material that is packaged and distributed in a form intended or suitable for sale through retail sales agencies or instrumentalities for consumption by individuals for purposes of personal care or household use. This term also includes drugs and medicines.

Container ship means a cargo vessel designed and constructed to transport, within specifically designed cells, portable tanks and freight containers which are lifted on and off with their contents intact.

Corrosive material. See § 173.136 of this subchapter.

Crate means an outer packaging with incomplete surfaces.

Crewmember means a person assigned to perform duty in an aircraft during flight time.

Cryogenic liquid. See § 173.115(g) of this subchapter.

Cultures and stocks. See § 173.134 of this subchapter.

Cylinder means a pressure vessel designed for pressures higher than 40 psia and having a circular cross section. It does not include a portable tank, multi-unit tank car tank, cargo tank, or tank car.

Dangerous when wet material. See § 173.124 of this subchapter.
Design Certifying Engineer means a person registered with the Department in accordance with subpart F of part 107 of this chapter who has the knowledge and ability to perform stress analysis of pressure vessels and otherwise

determine whether a cargo tank design and construction meets the applicable DOT specification. A Design Certifying Engineer meets the knowledge and ability requirements of this section by meeting any one of the following requirements:

(1) Has an engineering degree and one year of work experience in cargo tank structural or mechanical design;
(2) Is currently registered as a professional engineer by appropriate authority of a state of the United States or a province of Canada; or
(3) Has at least three years' experience in performing the duties of a Design Certifying Engineer prior to September 1, 1991.

Designated facility means a hazardous waste treatment, storage, or disposal facility that has been designated on the manifest by the generator.

District Commander means the District Commander of the Coast Guard, or his authorized representative, who has jurisdiction in the particular geographical area.

Division means a subdivision of a hazard class.

DOD means the U.S. Department of Defense.

Domestic transportation means transportation between places within the United States other than through a foreign country.

DOT or ***Department*** means U.S. Department of Transportation.

Drum means a flat-ended or convex-ended cylindrical packaging made of metal, fiberboard, plastic, plywood, or other suitable materials. This definition also includes packaging of other shapes made of metal or plastic (e.g., round taper-necked packagings or pail-shaped packaging) but does not include cylinders, jerricans, wooden barrels or bulk packaging.

Electronic data interchange (EDI) means the computer-to-computer exchange of business data in standard formats. In EDI, information is organized according to a specific format (electronic transmission protocol) agreed upon by the sender and receiver of this information, and transmitted through a computer transaction that requires no human intervention or retyping at either end of the transmission.

Elevated temperature material means a material which, when offered for transportation or transported in a bulk packaging:
(1) Is in a liquid phase and at a temperature at or above 100 °C (212 °F);
(2) Is in a liquid phase with a flash point at or above 38 °C (100 °F) that is intentionally heated and offered for transportation or transported at or above its flash point; or
(3) Is in a solid phase and at a temperature at or above 240 °C (464 °F).

Engine means a locomotive propelled by any form of energy and used by a railroad.

EPA means U.S. Environmental Protection Agency.

Equivalent lithium content means, for a lithium-ion cell, the product of the rated capacity, in ampere-hours, of a lithium-ion cell times 0.3, with the result expressed in grams. The equivalent lithium content of a battery equals the sum of the grams of equivalent lithium content contained in the component cells of the battery.

Etiologic agent. See § 173.134 of this subchapter.

EX number means a number preceded by the prefix "EX" , assigned by the Associate Administrator, to an item that has been evaluated under the provisions of § 173.56 of this subchapter.

Explosive. See § 173.50 of this subchapter.

F means degree Fahrenheit.

Farmer means a person engaged in the production or raising of crops, poultry, or livestock.

Federal hazardous material transportation law means 49 U.S.C. 5101 ***et seq.***

Ferry vessel means a vessel which is limited in its use to the carriage of deck passengers or vehicles or both, operates on a short run on a frequent schedule between two points over the most direct water route, other than in ocean or coastwise service, and is offered as a public service of a type normally attributed to a bridge or tunnel.

Filling density has the following meanings:
(1) For compressed gases in cylinders, see § 173.304a (a)(2) table note 1.
(2) For compressed gases in tank cars, see § 173.314(c) table note 1.
(3) For compressed gases in cargo tanks and portable tanks, see § 173.315(a) table note 1.
(4) For cryogenic liquids in cylinders, except hydrogen, see § 173.316(c)(1).
(5) For hydrogen, cryogenic liquid in cylinders, see § 173.316(c)(3) table note 1.
(6) For cryogenic liquids in cargo tanks, see § 173.318 (f) (1).
(7) For cryogenic liquids in tank cars, see § 173.319 (d)(1).

Flammable gas. See § 173.115 of this subchapter.

Flammable liquid. See § 173.120 of this subchapter.

Flammable solid. See § 173.124 of this subchapter.

Flash point. See § 173.120 of this subchapter.

Freight container means a reusable container having a volume of 64 cubic feet or more, designed and constructed to permit being lifted with its contents intact and intended primarily for containment of packages (in unit form) during transportation.

Fuel cell means an electrochemical device that converts the energy of the chemical reaction between a fuel, such as hydrogen or hydrogen rich gases, alcohols, or hydrocarbons, and an oxidant, such as air or oxygen, to direct current (d.c.) power, heat, and other reaction products.

Fuel cell cartridge or fuel cartridge means an article that stores fuel for discharge into the fuel cell through a valve(s) that controls the discharge of fuel into the fuel cell.

Fuel cell system means a fuel cell with an installed fuel cell cartridge together with wiring, valves, and other attachments that connect the fuel cell or cartridge to the device it powers. The fuel cell or cartridge may be so constructed that it forms an integral part of the device or may be removed and connected manually to the device.

Fuel tank means a tank other than a cargo tank, used to transport flammable or combustible liquid, or compressed gas for the purpose of supplying fuel for propulsion of the transport vehicle to which it is attached, or for the operation of other equipment on the transport vehicle.

Fumigated lading. See §§ 172.302(g) and 173.9.

Gas means a material which has a vapor pressure greater than 300 kPa (43.5 psia) at 50 °C (122 °F) or is completely gaseous at 20 °C (68 °F) at a standard pressure of 101.3 kPa (14.7 psia).

Gross weight or ***Gross mass*** means the weight of a packaging plus the weight of its contents.

Hazard class means the category of hazard assigned to a hazardous material under the definitional criteria of part 173 of this subchapter and the provisions of the § 172.101 table. A material may meet the defining criteria for more than one hazard class but is assigned to only one hazard class.

Hazard zone means one of four levels of hazard (Hazard Zones A through D) assigned to gases, as specified in § 173.116(a) of this subchapter, and one of two levels of hazards (Hazard Zones A and B) assigned to liquids that are poisonous by inhalation, as specified in § 173.133(a) of this subchapter. A hazard zone is based on the LC50 value for acute inhalation toxicity of gases and vapors, as specified in § 173.133(a).

Hazardous material means a substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and has designated as hazardous under section 5103 of Federal hazardous materials transportation law (49 U.S.C. 5103). The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (see 49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions in part 173 of this subchapter.

Hazardous substance for the purposes of this subchapter, means a material, including its mixtures and solutions, that–

(1) Is listed in the appendix A to § 172.101 of this subchapter;

(2) Is in a quantity, in one package, which equals or exceeds the reportable quantity (RQ) listed in the appendix A to § 172.101 of this subchapter; and

(3) When in a mixture or solution–

(i) For radionuclides, conforms to paragraph 7 of the appendix A to § 172.101.

(ii) For other than radionuclides, is in a concentration by weight which equals or exceeds the concentration corresponding to the RQ of the material, as shown in the following table:

RQ pounds (kilograms)	Concentration by weight	
	Percent	PPM
5000 (2270)	10	100,000
1000 (454)	2	20,000
100 (45.4)	0.2	2,000
10 (4.54)	0.02	200
1 (0.454)	0.002	20

The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance in appendix A to § 172.101 of this subchapter, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).

Hazardous waste, for the purposes of this chapter, means any material that is subject to the Hazardous Waste Manifest Requirements of the U.S. Environmental Protection Agency specified in 40 CFR part 262.

Hazmat means a hazardous material.

Hazmat employee means:
(1) A person who is:
(i) Employed on a full-time, part time, or temporary basis by a hazmat employer and who in the course of such full time, part time or temporary employment directly affects hazardous materials transportation safety;
(ii) Self-employed (including an owner-operator of a motor vehicle, vessel, or aircraft) transporting hazardous materials in commerce who in the course of such self-employment directly affects hazardous materials transportation safety;
(iii) A railroad signalman; or
(iv) A railroad maintenance-of-way employee.
(2) This term includes an individual, employed on a full time, part time, or temporary basis by a hazmat employer, or who is self-employed, who during the course of employment:
(i) Loads, unloads, or handles hazardous materials;
(ii) Designs, manufactures, fabricates, inspects, marks, maintains, reconditions, repairs, or tests a package, container or packaging component that is represented, marked, certified, or sold as qualified for use in transporting hazardous material in commerce.
(iii) Prepares hazardous materials for transportation;
(iv) Is responsible for safety of transporting hazardous materials;
(v) Operates a vehicle used to transport hazardous materials.

Hazmat employer means:
(1) A person who employs or uses at least one hazmat employee on a full-time, part time, or temporary basis; and who:
(i) Transports hazardous materials in commerce;
(ii) Causes hazardous materials to be transported in commerce; or
(iii) Designs, manufactures, fabricates, inspects, marks, maintains, reconditions, repairs or tests a package, container, or packaging component that is represented, marked, certified, or sold by that person as qualified for use in transporting hazardous materials in commerce;
(2) A person who is self-employed (including an owner-operator of a motor vehicle, vessel, or aircraft) transporting materials in commerce; and who:
(i) Transports hazardous materials in commerce;
(ii) Causes hazardous materials to be transported in commerce; or
(iii) Designs, manufactures, fabricates, inspects, marks, maintains, reconditions, repairs or tests a package, container, or packaging component that is represented, marked, certified, or sold by that person as qualified for use in transporting hazardous materials in commerce; or
(3) A department, agency, or instrumentality of the United States Government, or an authority of a State, political subdivision of a State, or an Indian tribe; and who:
(i) Transports hazardous materials in commerce;
(ii) Causes hazardous materials to be transported in commerce; or
(iii) Designs, manufactures, fabricates, inspects, marks, maintains, reconditions, repairs or tests a package, container, or packaging component that is represented, marked, certified, or sold by that person as qualified for use in transporting hazardous materials in commerce.

Hermetically sealed means closed by fusion, gasketing, crimping, or equivalent means so that no gas or vapor can enter or escape.
Household waste means any solid waste (including garbage, trash, and sanitary waste from septic tanks) derived from households (including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas). This term is not applicable to consolidated shipments of household hazardous materials transported from collection centers. A collection center is a central location where household waste is collected.

HMR means the Hazardous Materials Regulations, Parts 171 through 180 of this chapter.

IAEA means International Atomic Energy Agency.

IATA means International Air Transport Association.

ICAO means International Civil Aviation Organization.

IMO means International Maritime Organization.

Incorporated by reference or ***IBR*** means a publication or a portion of a publication that is made a part of the regulations of this subchapter. See § 171.7.

Infectious substance (etiologic agent). See § 173.134 of this subchapter.

Inner packaging means a packaging for which an outer packaging is required for transport. It does not include the inner receptacle of a composite packaging.

Inner receptacle means a receptacle which requires an outer packaging in order to perform its containment function. The inner receptacle may be an inner packaging of a combination packaging or the inner receptacle of a composite packaging.

Intermediate bulk container or ***IBC*** means a rigid or flexible portable packaging, other than a cylinder or portable tank, which is designed for mechanical handling. Standards for IBCs manufactured in the United States are set forth in subparts N and O of part 178 of this subchapter.

Intermediate packaging means a packaging which encloses an inner packaging or article and is itself enclosed in an outer packaging.

Intermodal container means a freight container designed and constructed to permit it to be used interchangeably in two or more modes of transport.

Intermodal portable tank or ***IM portable tank*** means a specific class of portable tanks designed primarily for international intermodal use.

International transportation means transportation-
(1) Between any place in the United States and any place in a foreign country;
(2) Between places in the United States through a foreign country; or
(3) Between places in one or more foreign countries through the United States.

Irritating material. See § 173.132(a)(2) of this subchapter.

Jerrican means a metal or plastic packaging of rectangular or polygonal cross-section.

Large packaging means a packaging that—
(1) Consists of an outer packaging that contains articles or inner packaging;
(2) Is designated for mechanical handling;
(3) Exceeds 400 kg net mass or 450 liters (118.9 gallons) capacity;
(4) Has a volume of not more than 3 cubic meters (m^3) (see § 178.801(i) of this subchapter); and
(5) Conforms to the requirements for the construction, testing and marking of Large Packaging as specified in subparts P and Q of part 178 of this subchapter.

Lighter means a mechanically operated flame-producing device employing an ignition device and containing a Class 3 or a Division 2.1 material. For design, capacity, and filling density requirements for lighters containing a Division 2.1 material, see § 173.308.

Lighter refill means a pressurized container that does not contain an ignition device but does contain a release device and is intended for use as a replacement cartridge in a lighter or to refill a lighter with a Division 2.1 flammable gas fuel. For capacity limits, see § 173.306(h) of this subchapter.

Limited quantity, when specified as such in a section applicable to a particular material, means the maximum amount of a hazardous material for which there is a specific labeling or packaging exception.

Liquid means a material, other than an elevated temperature material, with a melting point or initial melting point of 20 °C (68 °F) or lower at a standard pressure of 101.3 kPa (14.7 psia). A viscous material for which a specific melting point cannot be determined must be subjected to the procedures specified in ASTM D 4359 "Standard Test Method for Determining Whether a Material is Liquid or Solid" (IBR, see § 171.7).

Liquid phase means a material that meets the definition of liquid when evaluated at the higher of the temperature at which it is offered for transportation or at which it is transported, not at the 38 °C (100 °F) temperature specified in ASTM D 4359 (IBR, see § 171.7).

Lithium content means the mass of lithium in the anode of a lithium metal or lithium alloy cell. The lithium content of a battery equals the sum of the grams of lithium content contained in the component cells of the battery. For a lithium-ion cell see the definition for "equivalent lithium content".

Loading incidental to movement means loading by carrier personnel or in the presence of carrier personnel of packaged or containerized hazardous material onto a transport vehicle, aircraft, or vessel for the purpose of transporting it, including the loading, blocking and bracing a hazardous materials package in a freight container or transport vehicle, and segregating a hazardous materials package in a freight container or transport vehicle from incompatible cargo. For a bulk packaging, ***loading incidental to movement*** means filling the packaging with a hazardous material for the purpose of transporting it. ***Loading incidental to movement*** includes transloading.

Magazine vessel means a vessel used for the receiving, storing, or dispensing of explosives.

Magnetic material. See § 173.21(d) of this subchapter.

Marine pollutant, means a material which is listed in appendix B to § 172.101 of this subchapter (also see § 171.4) and, when in a solution or mixture of one or more marine pollutants, is packaged in a concentration which equals or exceeds:

(1) Ten percent by weight of the solution or mixture for materials listed in the appendix; or

(2) One percent by weight of the solution or mixture for materials that are identified as severe marine pollutants in the appendix.

Marking means a descriptive name, identification number, instructions, cautions, weight, specification, or UN marks, or combinations thereof, required by this subchapter on outer packagings of hazardous materials.

Material of trade means a hazardous material, other than a hazardous waste, that is carried on a motor vehicle–

(1) For the purpose of protecting the health and safety of the motor vehicle operator or passengers;

(2) For the purpose of supporting the operation or maintenance of a motor vehicle (including its auxiliary equipment); or

(3) By a private motor carrier (including vehicles operated by a rail carrier) in direct support of a principal business that is other than transportation by motor vehicle.

Material poisonous by inhalation or ***Material toxic by inhalation*** means:
(1) A gas meeting the defining criteria in § 173.115(c) of this subchapter and assigned to Hazard Zone A, B, C, or D in accordance with § 173.116(a) of this subchapter;
(2) A liquid (other than as a mist) meeting the defining criteria in § 173.132(a)(1)(iii) of this subchapter and assigned to Hazard Zone A or B in accordance with § 173.133(a) of this subchapter; or
(3) Any material identified as an inhalation hazard by a special provision in column 7 of the § 172.101 table.

Maximum allowable working pressure or ***MAWP***: For DOT specification cargo tanks used to transport liquid hazardous materials, see § 178.320(a) of this subchapter.

Maximum capacity means the maximum inner volume of receptacles or packaging.

Maximum net mass means the allowable maximum net mass of contents in a single packaging, or as used in subpart M of part 178 of this subchapter, the maximum combined mass of inner packaging, and the contents thereof.

Mechanical displacement meter prover means a mechanical device used in the oilfield service industry consisting of a pipe assembly that is used to calibrate the accuracy and performance of meters that measure the quantities of a product being pumped or transferred at facilities such as drilling locations, refineries, tank farms, and loading racks.

Metal hydride storage system means a single complete hydrogen storage system that includes a receptacle, metal hydride, pressure relief device, shut-off valve, service equipment and internal components used for the transportation of hydrogen only.

Metered delivery service means a cargo tank unloading operation conducted at a metered flow rate of 378.5 L (100 gallons) per minute or less through an attached delivery hose with a nominal inside diameter of 3.175 cm (1-1/4 inches) or less.

Miscellaneous hazardous material. See § 173.140 of this subchapter.

Mixture means a material composed of more than one chemical compound or element.

Mode means any of the following transportation methods; rail, highway, air, or water.

Motor vehicle includes a vehicle, machine, tractor, trailer, or semitrailer, or any combination thereof, propelled or drawn by mechanical power and used upon the highways in the transportation of passengers or property. It does not include a vehicle, locomotive, or car operated exclusively on a rail or rails, or a trolley bus operated by electric power derived from a fixed overhead wire, furnishing local passenger transportation similar to street-railway service.
Movement means the physical transfer of a hazardous material from one geographic location to another by rail car, aircraft, motor vehicle, or vessel.

Multiple-element gas container or MEGC means assemblies of UN cylinders, tubes, or bundles of cylinders interconnected by a manifold and assembled within a framework. The term includes all service equipment and structural equipment necessary for the transport of gases.

Name of contents means the proper shipping name as specified in § 172.101 of this subchapter.

Navigable waters means, for the purposes of this subchapter, waters of the United States, including the territorial seas.

Non-bulk packaging means a packaging which has:
(1) A maximum capacity of 450 L (119 gallons) or less as a receptacle for a liquid;
(2) A maximum net mass of 400 kg (882 pounds) or less and a maximum capacity of 450 L (119 gallons) or less as a receptacle for a solid; or
(3) A water capacity of 454 kg (1000 pounds) or less as a receptacle for a gas as defined in § 173.115 of this subchapter.

Nonflammable gas. See § 173.115 of this subchapter.

N.O.S. means not otherwise specified.

N.O.S. description means a shipping description from the § 172.101 table which includes the abbreviation ***n.o.s.***

NPT means an American Standard taper pipe thread conforming to the requirements of NBS Handbook H–28 (IBR, see § 171.7).

NRC (non-reusable container) means a packaging (container) whose reuse is restricted in accordance with the provisions of § 173.28 of this subchapter.

Occupied caboose means a rail car being used to transport non-passenger personnel.

Officer in Charge, Marine Inspection means a person from the civilian or military branch of the Coast Guard designated as such by the Commandant and who under the supervision and direction of the Coast Guard District Commander is in charge of a designated inspection zone for the performance of duties with respect to the enforcement and administration of title 52, Revised Statutes, acts amendatory thereof or supplemental thereto, rules and regulations thereunder, and the inspection required thereby.

Offshore supply vessel means a cargo vessel of less than 500 gross tons that regularly transports goods, supplies or equipment in support of exploration or production of offshore mineral or energy resources.

Open cryogenic receptacle means a transportable thermally insulated receptacle for refrigerated liquefied gases maintained at atmospheric pressure by continuous venting of the refrigerated gas.

Operator means a person who controls the use of an aircraft, vessel, or vehicle.

Organic peroxide. See § 173.128 of this subchapter.

ORM means other regulated material. See § 173.144 of this subchapter.

Outage or ***ullage*** means the amount by which a packaging falls short of being liquid full, usually expressed in percent by volume.

Outer packaging means the outermost enclosure of a composite or combination packaging together with any absorbent materials, cushioning and any other components necessary to contain and protect inner receptacles or inner packaging.

Overpack, except as provided in subpart K of part 178 of this subchapter, means an enclosure that is used by a single consignor to provide protection or convenience in handling of a package or to consolidate two or more packages. ***Overpack*** does not include a transport vehicle, freight container, or aircraft unit load device. Examples

of overpacks are one or more packages:
(1) Placed or stacked onto a load board such as a pallet and secured by strapping, shrink wrapping, stretch wrapping, or other suitable means; or
(2) Placed in a protective outer packaging such as a box or crate.

Oxidizer. See § 173.127 of this subchapter.

Oxidizing gas means a gas that may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. Specifically, this means a pure gas or gas mixture with an oxidizing power greater than 23.5% as determined by a method specified in ISO 10156: or 10156-2: (IBR, ***see*** § 171.7 of this subchapter) (***see also*** § 173.115(k)).

Oxygen generator (chemical) means a device containing chemicals that upon activation release oxygen as a product of chemical reaction.

Package or ***Outside Package*** means a packaging plus its contents. For radioactive materials, see § 173.403 of this subchapter.

Packaging means a receptacle and any other components or materials necessary for the receptacle to perform its containment function in conformance with the minimum packing requirements of this subchapter. For radioactive materials packaging, see § 173.403 of this subchapter.

Packing group means a grouping according to the degree of danger presented by hazardous materials. Packing Group I indicates great danger; Packing Group II, medium danger; Packing Group III, minor danger. See § 172.101(f) of this subchapter.

Passenger (With respect to vessels and for the purposes of part 176 only) means a person being carried on a vessel other than:
(1) The owner or his representative;
(2) The operator;
(3) A bona fide member of the crew engaged in the business of the vessel who has contributed no consideration for his carriage and who is paid for his services; or
(4) A guest who has not contributed any consideration directly or indirectly for his carriage.

Passenger-carrying aircraft means an aircraft that carries any person other than a crewmember, company employee, an authorized representative of the United States, or a person accompanying the shipment.

Passenger vessel means–
(1) A vessel subject to any of the requirements of the International Convention for the Safety of Life at Sea, 1974, which carries more than 12 passengers;
(2) A cargo vessel documented under the laws of the United States and not subject to that Convention, which carries more than 16 passengers;
(3) A cargo vessel of any foreign nation that extends reciprocal privileges and is not subject to that Convention and which carries more than 16 passengers; and
(4) A vessel engaged in a ferry operation and which carries passengers.

Person means an individual, corporation, company, association, firm, partnership, society, joint stock company; or a government, Indian Tribe, or authority of a government or Tribe, that offers a hazardous material for transportation in commerce, transports a hazardous material to support a commercial enterprise, or designs, manufactures, fabricates, inspects, marks, maintains, reconditions, repairs, or tests a package, container, or packaging component that is represented, marked, certified, or sold as qualified for use in transporting hazardous

material in commerce. This term does not include the United States Postal Service or, for purposes of 49 U.S.C. 5123 and 5124, a Department, agency, or instrumentality of the government.

Person who offers or ***offeror*** means:
(1) Any person who does either or both of the following:
(i) Performs, or is responsible for performing, any pre-transportation function required under this subchapter for transportation of the hazardous material in commerce.
(ii) Tenders or makes the hazardous material available to a carrier for transportation in commerce.
(2) A carrier is not an offeror when it performs a function required by this subchapter as a condition of acceptance of a hazardous material for transportation in commerce (e.g., reviewing shipping papers, examining packages to ensure that they are in conformance with this subchapter, or preparing shipping documentation for its own use) or when it transfers a hazardous material to another carrier for continued transportation in commerce without performing a pre-transportation function.

PHMSA means the Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, Washington, DC 20590.

Placarded car means a rail car which is placarded in accordance with the requirements of part 172 of this subchapter.

Poisonous gas. See § 173.115 of this subchapter.

Poisonous materials. See § 173.132 of this subchapter.

Portable tank means a bulk packaging (except a cylinder having a water capacity of 1000 pounds or less) designed primarily to be loaded onto, or on, or temporarily attached to a transport vehicle or ship and equipped with skids, mountings, or accessories to facilitate handling of the tank by mechanical means. It does not include a cargo tank, tank car, multi-unit tank car tank, or trailer carrying 3AX, 3AAX, or 3T cylinders.

Preferred route or ***Preferred highway*** is a highway for shipment of ***highway route controlled quantities*** of radioactive materials so designated by a State routing agency, and any Interstate System highway for which an alternative highway has not been designated by such State agency as provided by § 397.103 of this title.

Pre-transportation function means a function specified in the HMR that is required to assure the safe transportation of a hazardous material in commerce, including—
(1) Determining the hazard class of a hazardous material.
(2) Selecting a hazardous materials packaging.
(3) Filling a hazardous materials packaging, including a bulk packaging.
(4) Securing a closure on a filled or partially filled hazardous materials package or container or on a package or container containing a residue of a hazardous material.
(5) Marking a package to indicate that it contains a hazardous material.
(6) Labeling a package to indicate that it contains a hazardous material.
(7) Preparing a shipping paper.
(8) Providing and maintaining emergency response information.
(9) Reviewing a shipping paper to verify compliance with the HMR or international equivalents.
(10) For each person importing a hazardous material into the United States, providing the shipper with timely and complete information as to the HMR requirements that will apply to the transportation of the material within the United States.
(11) Certifying that a hazardous material is in proper condition for transportation in conformance with the requirements of the HMR.
(12) Loading, blocking, and bracing a hazardous materials package in a freight container or transport vehicle.
(13) Segregating a hazardous materials package in a freight container or transport vehicle from incompatible

cargo.
(14) Selecting, providing, or affixing placards for a freight container or transport vehicle to indicate that it contains a hazardous material.

Primary hazard means the hazard class of a material as assigned in the § 172.101 table.

Private track or ***Private siding*** means:
(i) Track located outside of a carrier's right-of-way, yard, or terminals where the carrier does not own the rails, ties, roadbed, or right-of-way, or
(ii) Track leased by a railroad to a lessee, where the lease provides for, and actual practice entails, exclusive use of that trackage by the lessee and/or a general system railroad for purpose of moving only cars shipped to or by the lessee, and where the lessor otherwise exercises no control over or responsibility for the trackage or the cars on the trackage.

Proper shipping name means the name of the hazardous material shown in Roman print (not italics) in § 172.101 of this subchapter.

Psi means pounds per square inch.

Psia means pounds per square inch absolute.

Psig means pounds per square inch gauge.

Public vessel means a vessel owned by and being used in the public service of the United States. It does not include a vessel owned by the United States and engaged in a trade or commercial service or a vessel under contract or charter to the United States.

Pyrophoric liquid. See § 173.124(b) of this subchapter.

Radioactive materials. See § 173.403 of this subchapter for definitions relating to radioactive materials.

Rail car means a car designed to carry freight or non-passenger personnel by rail, and includes a box car, flat car, gondola car, hopper car, tank car, and occupied caboose.

Railroad means a person engaged in transportation by rail.

Receptacle means a containment vessel for receiving and holding materials, including any means of closing.

Reconditioned packaging. See § 173.28 of this subchapter.

Registered Inspector means a person registered with the Department in accordance with subpart F of part 107 of this chapter who has the knowledge and ability to determine whether a cargo tank conforms to the applicable DOT specification. A Registered Inspector meets the knowledge and ability requirements of this section by meeting any one of the following requirements:
(1) Has an engineering degree and one year of work experience relating to the testing and inspection of cargo tanks;
(2) Has an associate degree in engineering and two years of work experience relating to the testing and inspection of cargo tanks;
(3) Has a high school diploma (or General Equivalency Diploma) and three years of work experience relating to the testing and inspection of cargo tanks; or
(4) Has at least three years' experience performing the duties of a Registered Inspector prior to September 1, 1991.

Regulated medical waste. See § 173.134 of this subchapter.

Remanufactured packaging. See § 173.28 of this subchapter.

Reportable quantity (RQ) for the purposes of this subchapter means the quantity specified in column 2 of the appendix to § 172.101 for any material identified in column 1 of the appendix.

Research means investigation or experimentation aimed at the discovery of new theories or laws and the discovery and interpretation of facts or revision of accepted theories or laws in the light of new facts. Research does not include the application of existing technology to industrial endeavors.

Residue means the hazardous material remaining in a packaging, including a tank car, after its contents have been unloaded to the maximum extent practicable and before the packaging is either refilled or cleaned of hazardous material and purged to remove any hazardous vapors.

Reused packaging. See § 173.28 of this subchapter.

SADT means self-accelerated decomposition temperature. See § 173.21(f) of this subchapter.

Salvage packaging means a special packaging conforming to § 173.3 of this subchapter into which damaged, defective, leaking, or non-conforming hazardous materials packages, or hazardous materials that have spilled or leaked, are placed for purposes of transport for recovery or disposal.

SCF (standard cubic foot) means one cubic foot of gas measured at 60 ° F. and 14.7 psia.

Secretary means the Secretary of Transportation.

Self-defense spray means an aerosol or non-pressurized device that:
(1) Is intended to have an irritating or incapacitating effect on a person or animal; and
(2) Meets no hazard criteria other than for Class 9 (for example, a pepper spray; see § 173.140(a) of this subchapter) and, for an aerosol, Division 2.1 or 2.2 (see § 173.115 of this subchapter), except that it may contain not more than two percent by mass of a tear gas substance (e.g., chloroacetophenone (CN) or 0-chlorobenzylmalonitrile (CS); see § 173.132(a)(2) of this subchapter.)

Settled pressure means the pressure exerted by the contents of a UN pressure receptacle in thermal and diffusive equilibrium.

Sharps. See § 173.134 of this subchapter.

Shipping paper means a shipping order, bill of lading, manifest or other shipping document serving a similar purpose and prepared in accordance with subpart C of part 172 of this chapter.

Siftproof packaging means a packaging impermeable to dry contents, including fine solid material produced during transportation.

Single packaging means a non-bulk packaging other than a combination packaging.

Solid means a material which is not a gas or a liquid.

Solution means any homogeneous liquid mixture of two or more chemical compounds or elements that will not undergo any segregation under conditions normal to transportation.

Special permit means a document issued by the Associate Administrator, or other designated Department official, under the authority of 49 U.S.C. 5117 permitting a person to perform a function that is not otherwise permitted under subchapter A or C of this chapter, or other regulations issued under 49 U.S.C. 5101 ***et seq.*** (***e.g.,*** Federal Motor Carrier Safety routing requirements).

Specification packaging means a packaging conforming to one of the specifications or standards for packagings in part 178 or part 179 of this subchapter.

Spontaneously combustible material. See § 173.124(b) of this subchapter.

Stabilized means that the hazardous material is in a condition that precludes uncontrolled reaction. This may be achieved by methods such as adding an inhibiting chemical, degassing the hazardous material to remove dissolved oxygen and inerting the air space in the package, or maintaining the hazardous material under temperature control.

State means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, the Virgin Islands, American Samoa, Guam, or any other territory or possession of the United States designated by the Secretary.

State-designated route means a preferred route selected in accordance with U.S. DOT "Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantities of Radioactive Materials" or an equivalent routing analysis which adequately considers overall risk to the public.

Storage incidental to movement means storage of a transport vehicle, freight container, or package containing a hazardous material by any person between the time that a carrier takes physical possession of the hazardous material for the purpose of transporting it in commerce until the package containing the hazardous material is physically delivered to the destination indicated on a shipping document, package marking, or other medium, or, in the case of a private motor carrier, between the time that a motor vehicle driver takes physical possession of the hazardous material for the purpose of transporting it in commerce until the driver relinquishes possession of the package at its destination and is no longer responsible for performing functions subject to the HMR with respect to that particular package.

(1) ***Storage incidental to movement*** includes—

(i) Storage at the destination shown on a shipping document, including storage at a transloading facility, provided the shipping documentation identifies the shipment as a through-shipment and identifies the final destination or destinations of the hazardous material; and

(ii) Rail cars containing hazardous materials that are stored on track that does not meet the definition of "private track or siding" in § 171.8, even if those cars have been delivered to the destination shown on the shipping document.

(2) Storage incidental to movement does not include storage of a hazardous material at its final destination as shown on a shipping document.

Stowage means the act of placing hazardous materials on board a vessel.

Strong outer packaging means the outermost enclosure that provides protection against the unintentional release of its contents. It is a packaging that is sturdy, durable, and constructed so that it will retain its contents under normal conditions of transportation. In addition, a strong outer packaging must meet the general packaging requirements of subpart B of part 173 of this subchapter but need not comply with the specification packaging requirements in part 178 of the subchapter. For transport by aircraft, a strong outer packaging is subject to § 173.27 of this subchapter. The terms "strong outside container" and "strong outside packaging" are synonymous with "strong outer packaging."

Subsidiary hazard means a hazard of a material other than the primary hazard. (See ***primary hazard***).

Table in § 172.101 or ***§ 172.101 table*** means the Hazardous Materials Table in § 172.101 of this subchapter.

Technical name means a recognized chemical name or microbiological name currently used in scientific and technical handbooks, journals, and texts. Generic descriptions are authorized for use as technical names provided they readily identify the general chemical group, or microbiological group. Examples of acceptable generic chemical descriptions are organic phosphate compounds, petroleum aliphatic hydrocarbons and tertiary amines. For proficiency testing only, generic microbiological descriptions such as bacteria, mycobacteria, fungus, and viral samples may be used. Except for names which appear in subpart B of part 172 of this subchapter, trade names may not be used as technical names.

TOFC means trailer-on-flat-car.

Top shell means the tank car tank surface, excluding the head ends and bottom shell of the tank car tank.

Toxin. See § 173.134 of this subchapter.

Trailership means a vessel, other than a carfloat, specifically equipped to carry motor transport vehicles and fitted with installed securing devices to tie down each vehicle. The term ***trailership*** includes ***Roll-on/Roll-off (RO/RO)*** vessels.

Train means one or more engines coupled with one or more rail cars, except during switching operations or where the operation is that of classifying and assembling rail cars within a railroad yard for the purpose of making or breaking up trains.

Train consist means a written record of the contents and location of each rail car in a train.

Trainship means a vessel other than a rail car ferry or carfloat, specifically equipped to transport railroad vehicles, and fitted with installed securing devices to tie down each vehicle.

Transloading means the transfer of a hazardous material by any person from one bulk packaging to another bulk packaging, from a bulk packaging to a non-bulk packaging, or from a non-bulk packaging to a bulk packaging for the purpose of continuing the movement of the hazardous material in commerce.

Transportation or ***transport*** means the movement of property and loading, unloading, or storage incidental to that movement.

Transport vehicle means a cargo-carrying vehicle such as an automobile, van, tractor, truck, semitrailer, tank car or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (trailer, rail car, etc.) is a separate transport vehicle.

UFC means Uniform Freight Classification.

UN means United Nations.

UN cylinder means a transportable pressure receptacle with a water capacity not exceeding 150 L that has been marked and certified as conforming to the applicable requirements in part 178 of this subchapter.

UN portable tank means an intermodal tank having a capacity of more than 450 liters (118.9 gallons). It includes a shell fitted with service equipment and structural equipment, including stabilizing members external to the shell and skids, mountings or accessories to facilitate mechanical handling. A UN portable tank must be capable of being

filled and discharged without the removal of its structural equipment and must be capable of being lifted when full. Cargo tanks, rail tank car tanks, non-metallic tanks, non-specification tanks, bulk bins, and IBCs and packagings made to cylinder specifications are not UN portable tanks.

UN pressure receptacle means a UN cylinder or tube.

UN Recommendations means the U.N. Recommendations on the Transport of Dangerous Goods, Model Regulations (IBR, ***see*** § 171.7 of this subchapter).

UN standard packaging means a packaging conforming to standards in the UN Recommendations (IBR, see § 171.7).

UN tube means a seamless transportable pressure receptacle with a water capacity exceeding 150 L but not more than 3,000 L that has been marked and certified as conforming to the requirements in part 178 of this subchapter.

Undeclared hazardous material means a hazardous material that is: (1) Subject to any of the hazard communication requirements in subparts C (Shipping Papers), D (Marking), E (Labeling), and F (Placarding) of Part 172 of this subchapter, or an alternative marking requirement in Part 173 of this subchapter (such as §§ 173.4(a)(10) and 173.6(c)); and (2) offered for transportation in commerce without any visible indication to the person accepting the hazardous material for transportation that a hazardous material is present, on either an accompanying shipping document, or the outside of a transport vehicle, freight container, or package.

Unintentional release means the escape of a hazardous material from a package on an occasion not anticipated or planned. This includes releases resulting from collision, package failures, human error, criminal activity, negligence, improper packing, or unusual conditions such as the operation of pressure relief devices as a result of over-pressurization, overfill or fire exposure. It does not include releases, such as venting of packages, where allowed, and the operational discharge of contents from packages.

Unit load device means any type of freight container, aircraft container, aircraft pallet with a net, or aircraft pallet with a net over an igloo.

United States means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, the Virgin Islands, American Samoa, Guam, or any other territory or possession of the United States designated by the Secretary.

Unloading incidental to movement means removing a packaged or containerized hazardous material from a transport vehicle, aircraft, or vessel, or for a bulk packaging, emptying a hazardous material from the bulk packaging after the hazardous material has been delivered to the consignee when performed by carrier personnel or in the presence of carrier personnel or, in the case of a private motor carrier, while the driver of the motor vehicle from which the hazardous material is being unloaded immediately after movement is completed is present during the unloading operation. (Emptying a hazardous material from a bulk packaging while the packaging is on board a vessel is subject to separate regulations as delegated by Department of Homeland Security Delegation No. 0170.1 at 2(103).)

Unloading incidental to movement includes transloading.

Vessel includes every description of watercraft, used or capable of being used as a means of transportation on the water.

Viscous liquid means a liquid material which has a measured viscosity in excess of 2500 centistokes at 25 ° C. (77 ° F.) when determined in accordance with the procedures specified in ASTM Method D 445-72 “Kinematic Viscosity

of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)" or ASTM Method D 1200-70 "Viscosity of Paints, Varnishes, and Lacquers by Ford Viscosity Cup."

Volatility refers to the relative rate of evaporation of materials to assume the vapor state.

Water reactive material. See § 173.124(c) of this subchapter.

Water resistant means having a degree of resistance to permeability by and damage caused by water in liquid form.

Wooden barrel means a packaging made of natural wood, of round cross-section, having convex walls, consisting of staves and heads and fitted with hoops.

Working pressure for purposes of UN pressure receptacles, means the settled pressure of a compressed gas at a reference temperature of 15 °C (59 °F).

W.T. means watertight.

ATTACHMENT D

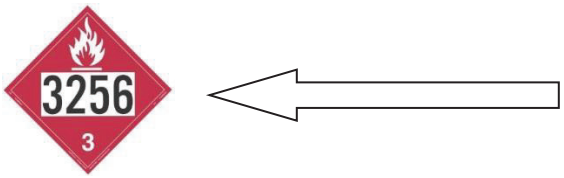
UN Classification Numbers

UN CLASSIFICATION SYSTEM

UN numbers or **UN IDs** are four-digit numbers that identify hazardous substances and products (such as explosives and poisonous materials) of commercial importance. This numbering scheme is widely used in international commerce, for instance to label the contents of shipping containers.

NA numbers (**N**orth **A**merica), also known as **DOT numbers** are issued by the United States Department of Transportation and are identical to UN numbers, except that some substances without a UN number may have an NA number. These additional NA numbers use the range NA8000 - NA9999.

Associated with each UN number is a **hazard identifier**, which encodes the general hazard class and subdivision (and, in the case of explosives, their compatibility group). For instance, the hazard identifier of acrylamide is 6.1 and the one of cigarette lighters is 2.1. If a substances poses several dangers, then subsidiary risk identifiers may be specified. It is not possible to deduce the hazard class(es) of a substance from its UN number: they have to be looked up in a table.



HAZARD CLASSES AND THEIR DIVISIONS

Class 1: Explosives

- Division 1.1:
  - Substances and articles which have a mass explosion hazard
- Division 1.2:
  - Substances and articles which have a projection hazard but not a mass explosion hazard
- Division 1.3:

        - Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard
    - Division 1.4:
        - Substances and articles which present no significant hazard
    - Division 1.5:
        - Very insensitive substances which have a mass explosion hazard
    - Division 1.6:
        - Extremely insensitive articles which do not have a mass explosion hazard

Class 2: Gases

- Division 2.1:
    - Flammable gases
- Division 2.2:
    - Non-flammable, non-toxic gases
- Division 2.3:
    - Toxic gases

Class 3: Flammable liquids

- Division 3.1:
    - Flashpoint below -18°C (0°F)
- Division 3.2:
    - Flashpoint -18°C (0°F) and above but less than 23°C (73°F)
- Division 2.3:
    - Flashpoint of 23°C (73°F) and up to 61°C (141°F)

Class 4: Flammable Solids; *substances liable to spontaneous combustion; substances which, on contact with water, emit flammable gases*

- Division 4.1:
    - Flammable solids, self-reactive substances and solid desensitized explosives
- Division 4.2:
    - Substances liable to spontaneous combustion
- Division 4.3:
    - Substances which in contact with water emit flammable gases

Class 5: Oxidizing Substances and Organic Peroxides

- Division 5.1:
  - Oxidizing substances
- Division 5.2:
  - Organic peroxides

Class 6: Toxic and Infectious Substances

- Division 6.1: Toxic substances
- Division 6.2: Infectious substances

Class 7: Radioactive Material

Class 8: Corrosive Substances

Class 9: Miscellaneous Dangerous Substances and Articles

J.H. MAXYMILLIAN, INC.

OVER 50 YEARS STRONG

ATTACHMENT E

OSHA Hazard Communication
Safety Data Sheets

OSHA® QUICK CARD™

Hazard Communication Safety Data Sheets

The Hazard Communication Standard (HCS) requires chemical manufacturers, distributors, or importers to provide Safety Data Sheets (SDSs) (formerly known as Material Safety Data Sheets or MSDSs) to communicate the hazards of hazardous chemical products. The HCS requires new SDSs to be in a uniform format, and include the section numbers, the headings, and associated information under the headings below:

Section 1, Identification includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.

Section 2, Hazard(s) identification includes all hazards regarding the chemical; required label elements.

Section 3, Composition/information on ingredients includes information on chemical ingredients; trade secret claims.

Section 4, First-aid measures includes important symptoms/effects, acute, delayed; required treatment.

Section 5, Fire-fighting measures lists suitable extinguishing techniques, equipment; chemical hazards from fire.

Section 6, Accidental release measures lists emergency procedures; protective equipment; proper methods of containment and cleanup.

Section 7, Handling and storage lists precautions for safe handling and storage, including incompatibilities.

(Continued on other side)

For more information:

U.S. Department of Labor

OSHA® Occupational Safety and Health Administration

www.osha.gov (800) 321-OSHA (6742)

OSHA 3493-01R 2016

OSHA® QUICK CARD™

Hazard Communication Safety Data Sheets

Section 8, Exposure controls/personal protection lists OSHA's Permissible Exposure Limits (PELs); ACGIH Threshold Limit Values (TLVs); and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the SDS where available as well as appropriate engineering controls; personal protective equipment (PPE).

Section 9, Physical and chemical properties lists the chemical's characteristics.

Section 10, Stability and reactivity lists chemical stability and possibility of hazardous reactions.

Section 11, Toxicological information includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.

Section 12, Ecological information*
Section 13, Disposal considerations*
Section 14, Transport information*
Section 15, Regulatory information*

Section 16, Other information, includes the date of preparation or last revision.

*Note: Since other Agencies regulate this information, OSHA will not be enforcing Sections 12 through 15 (29 CFR 1910.1200(g)(2)).

Employers must ensure that SDSs are readily accessible to employees.
See Appendix D of 29 CFR 1910.1200 for a detailed description of SDS contents.

For more information:

U.S. Department of Labor

OSHA® Occupational Safety and Health Administration

www.osha.gov (800) 321-OSHA (6742)

J.H. MAXYMILLIAN, INC.

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ATTACHMENT F

Hazard Communication Signature Sheet

J.H. MAXYMILLIAN, INC.

OVER 50 YEARS STRONG

HAZARD COMMUNICATION PROGRAM

I received a copy of the company Hazard Communication Program. I understand that from time to time, I will receive copies of updated information. Upon receipt of this material, I will place the information in the book as instructed.

_____ _____

Employee Name Signature

_____

Date

Please sign and return to the main office.

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ATTACHMENT G

Hazard Communication Training Program Certification

J.H. MAXYMILLIAN, INC.

OVER 50 YEARS STRONG

OSHA and Hazard Communication Training Program Certification

Employee Name: _____ Date: _____

Project Name: _____ Project Number: _____

I participated in an OSHA and Hazard Communication training program.

Date of Training: _____ Conducted by: _____

Training Location (job-site name): _____

Training included, but was not limited to:

1. A detailed explanation of my employee rights under Hazard Communication and OSHA.

2. An introduction to SDSs: how to read and understand them.

3. An overview of the Hazard Communication Standard that includes both the written training program and copies of all SDSs, and Communication Standard (upon request of the job-site foreman, or in the Dispatch Office).

4. An explanation of the protective clothing and equipment to be used when handling or using toxic or hazardous substances in the workplace.

I understand that re-training will be provided to me if conditions regarding hazardous materials or SDSs change. I understand, too, that a copy of this signed certification will be maintained in my employee file.

_____ _____

Company Name Employee Signature

APPENDIX F

Control of Hazardous Energy (Lockout/Tagout) Program

CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT) POLICY

J.H. MAXYMILLIAN, INC.

OVER 50 YEARS STRONG

Revision Number: 6

Revised: 2024
CIH Reviewed: April 2012

Control of Hazardous Energy - Lockout/Tagout Policy
TABLE OF CONTENTS

ATTACHMENTS

1.0 Purpose

This program establishes policies and provides guidelines to ensure standardized implementation of the OSHA Lockout/Tagout Standard 29 CFR 1910.147.

The objective of this procedure is to establish a means of positive control to prevent the accidental starting or activating of machinery or systems while they are being repaired, cleaned and/or serviced. This program serves to:

1. Establish a safe and positive means of shutting down machinery, equipment and systems.

2. Prohibit unauthorized personnel or remote control systems from starting machinery or equipment while it is being serviced.

3. Provide a secondary control system (tagout) when it is impossible to positively lockout the machinery or equipment.

4. Establish responsibility for implementing and controlling lockout/tagout procedures.

5. Ensure that only approved locks, standardized tags and fastening devices provided by the company will be utilized in the lockout/tagout procedures.

6. Electrical equipment that has been de-energized but not locked and tagged out shall be treated as live parts.

7. Provide requirements for working on or near live or energized parts. *(See Appendix 3 – Electrical Safety Program)*

2.0 Scope

This policy applies to all employees who perform work that involves the unexpected start-up of equipment, as defined in 29 CFR 1910.147 and 29 CFR 1926.20. Training will familiarize the employees with this policy so they may work safely and confidently while performing their assigned tasks. This program does not apply to routine service or maintenance, when guards and safety devices are in place. Training as outlined herein will be provided prior to any associated work. This program will be reviewed by on an annual and as needed basis.

3.0 Definitions

Affected employee - An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized employee - A person who locks or implements a lockout/tagout system procedure on machines or equipment to perform the servicing or maintenance on that machine or equipment. An authorized employee and an affected employee may be the same person when the affected employee's duties also include performing maintenance or service on machines or equipment that must be locked or tagged out.

Blanking of lines - When possible, each end of a feed line into a confined space will be blocked and the line drained. Any drains that may be present in the confined space will be locked open so that any spill will drain from the area.

Capable of being locked out - An energy isolating device will be considered capable of being locked out if it is designed with a hasp or other attachment or internal part to which, or through which, a lock can be affixed, or if it has a locking mechanism built into it. Other energy isolating devices will also be considered capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

Energized - Connected to an energy source or containing residual or stored energy.

Energy isolating device - A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following:

- a disconnect switch
- a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently:
    - a slide gate
    - a manually operated electrical circuit breaker
    - a slip blind
    - a line valve
    - a block
    - a similar device used to block or isolate energy.

The term does not include:

- a push button
- a selector switch or other control circuit type devices

Energy source - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Hot tap - A procedure used in the repair, maintenance and service activities that involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. It is commonly used to replace or add sections of pipelines without the interruption of service for air, gas, water, steam and petrochemical distribution systems.

Lockout - The placement of a lockout device on an energy isolating device, in occurrence with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout device - A device that utilizes a positive mean such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment.

Normal production operations - The utilization of a machine or equipment to perform its intended production function.

Servicing and/or maintenance - Workplace activities such as construction, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or un-jamming of machines or equipment and making adjustment or release of hazardous energy.

Setting up - Any work done to prep a machine / equipment in order for it to perform its normal production operations.

Tagout - The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout device - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

4.0 Responsibility

Project Supervisors will be responsible for implementing the lockout/tagout program on jobsites.

Project Managers are responsible for enforcing the program and insuring compliance with the procedures in their departments.

Corporate Health and Safety Officer will be responsible for monitoring the compliance of this procedure and will conduct the annual inspection and certification of the authorized employees.

Authorized employees *(list will be site specific)* are responsible for following established lockout/tagout procedures. Only properly training and authorized persons may work on electric circuit parts or equipment that has not been de-energized. Such persons shall be made familiar with the use of special precautionary techniques, PPE, insulating & shielding materials and insulated tools.

Affected employees (all other employees involved in or affected by the lockout/tag out procedures) will be responsible for insuring they do not attempt to restart or re-energize machines or equipment which are locked out or tagged out.

5.0 Employees and Training

Employees involved in or affected by lockout will be trained in the following areas before being allowed to work in the area:

1. The recognition of hazardous energy sources.
2. The type and magnitude of the energy located in the workplace.
3. The procedures for energy isolation and control including specific procedures developed for equipment and systems.
4. The purpose and use of the energy control (lockout/tagout) procedure.
5. The prohibition and penalties for attempts to restart or re-energize equipment which has been locked out or to work on equipment without following the lockout/tagout procedures.

Affected employees are those personnel working around equipment or systems that are subject to lockout/tagout but are not directly involved with them. These personnel are not required to be familiar with specific procedures for equipment and systems.

Each authorized employee shall receive site or equipment specific training in the recognition or applicable hazardous energy sources, clearance distances, the type and magnitude of the energy and the methods and means necessary for energy isolation and control.

The following employee training refers to ***Site or Equipment Specific Training***:

- Each authorized employee will be furnished with his/her own specifically marked key and lock (examples: color, marking, size, etc.).

- Each affected employee shall be instructed in the purpose and use of the energy control procedure.

- All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

- Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program; they are essentially warning devices fixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock – locks are to be used whenever possible.

- When a tag is attached to an energy isolating means, ***it is not to be removed without authorization of the person responsible for it***, and it is never to be bypassed, ignored or otherwise removed.

- Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective;

- Employees must be aware that tags are used as "warning devices" and do not provide any physical restraint. Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use;

- Tags will be attached to the lock to identify the company locking out; tags will conform to OSHA Standard 1910.147; in regard to water and corrosion resistance all tags will be attached with nylon ties.

Records of training containing the identity of the employee and the date of training will be maintained and kept on file either; on the job site or at the home office in Pittsfield, MA.

5.1 Retraining of Employees

Retraining of authorized and affected employees shall be performed annually or whenever the following changes occur;

1. Whenever there is a change in job assignment.
2. Whenever there is a change in machines, equipment or processes that present a new hazard or when there is a change in the energy control procedures.
3. Whenever periodic inspections show inadequacies in the employee's knowledge or use of the energy control procedures.
4. Whenever the Lockout/tagout program has been changed.

5.2 Enforcement

Project Managers and Supervisors who manage authorized lockout/tagout employees shall periodically audit their employees on the job to verify that training is understood and followed; and to ensure compliance with lockout/tagout procedures.

Employees who fail to adhere to lockout/tagout procedures are subject to disciplinary action.

6.0 Lockout/Tagout Equipment

Equipment used in a lockout/tagout procedure shall consist of the following:

- **Padlocks -** sufficient quantities of padlocks with each lock to have an individual key and one master key controlled by Project Manager or Site Supervisor.
- **Multiple lock tongues -** to be used in case more than one department is involved in a job.
- **Danger/Warning tags -** to be used whenever it is necessary to warn employees and operators of a repair.

All equipment shall be distributed and controlled by each site supervisor.

All Lockout/Tagout devices shall be:

- **Durable -** devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.
- **Standardized -** devices shall be standardized within JHM in at least one of the following criteria: color; shape; or size; and additionally, in the case of tagout devices, print and format shall be standardized.

- **Substantial** –
    - Lockout devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools.
    - Tagout devices shall be substantial enough to prevent accidental removal. Attachment means shall be non-reusable, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds.
- **Identifiable -** Devices shall indicate the identity of the employee applying the device(s).

6.1 Lockout/ Tagout Program Procedures

- Devices shall be affixed to each energy isolating device by the authorized employee; a Company Supervisor shall verify.
- Devices shall indicate the identity of the employee applying the device.
- No employee may affix a personal lockout/tagout device for another employee.
- Locks shall be affixed in a manner that will hold the energy isolating device in a safe (off) position.
- Tag-out device is used on an energy-isolating device, which is capable of being locked out, the tag-out device shall be attached at the same location that the lockout device would have been attached, and this employer shall demonstrate that the tag-out program will provide a level of safety equivalent to that obtained by using a lockout program.
- Stored energy: all potential stored or residual energy must be released, relieved or disconnected; if there is a potential of reclamation, verification of isolation shall continue throughout the project.
- Conductors and parts of equipment that have been de-energized but have not been locked or tagged out shall be treated as live or energized parts.

7.0 Isolation Procedures & Techniques

Procedures will be developed and documented when employees are engaged in activities that potentially could be hazardous, due to exposure from an energy source. Therefore isolation procedures will be initiated by the authorized person or persons. In preparation for lockout, an initial survey must be made to locate and identify all energy isolating

devices to be certain which switch, valve, or other energy isolating devices apply to the machine / equipment to be locked out. More than one energy source (electrical, hydraulic, pneumatic, chemical, thermal, or others) may be involved.

All affected employees on the job site shall be notified of the equipment isolation and will be notified of the specific type and magnitude of energy involved. If the machine or equipment is operating, shut it down by normal stopping procedure.

Machine or Equipment Isolation - Physically locate and operate the switch, valve, or other energy isolating devices so that the equipment is isolated from its energy sources and apply adequate hardware.

Lockout Device Application - Authorized employees shall lockout the energy isolating devices with assigned individual locks. Each employee involved with the operation will place his/her lock on each energy-isolating source. The locks must be applied with a warning tag describing why the equipment is locked out, marked with the name of the individual that placed the lock on the equipment, and the date. Lockout devices shall be applied so that they will hold the energy isolating devices in a "Neutral" or "Off" position.

Stored Energy - All stored or residual energy in rams, flywheels, springs, pneumatic, or hydraulic systems, etc. shall be blocked or dissipated. If there is a possibility of re-accumulation of stored energy, verification of isolation must be continued until servicing or maintenance is completed.

8.0 Verification of Isolation Procedures

In order to assure ***Verification of Isolation***, prior to starting work on machines or equipment that have been locked and after ensuring that no personnel are exposed, the authorized employee shall operate the push button or normal operating controls to verify that the appropriate equipment or machine has been de-energized and make certain it will not operate. A Site Supervisor will complete Certification of Lockout/Tagout Inspection Form ***[see Attachment A].***

9.0 Release from Lockout/Tagout

The following tasks will be performed before any lockout/tagout devices are removed and energy is restored to the machine or equipment, they are as follows:

A. ***Inspections*** - Make certain the work is completed; tools and equipment used are removed.

B. ***Replace guards***- Sometimes a particular guard may have to be left off until the start sequence is over due to possible adjustments; however, all other guards must be put back into place.

C. ***Check controls -*** All controls shall be in a neutral or safe position.

D. ***Ensure employees safety-*** The work area shall be checked to ensure employees are clear of the affected area. Before removal of lockout/tagout devices all affected employees will be notified.

E. ***Remove locks/tags –***The removal of lockout/tagout devices shall only be performed by the authorized employee. A Project Manager/Supervisor will then verify the removal of the devices.

Exception: When the employee is not available, then the Supervisor shall remove the lockout/tagout devices provided that he:

1. Verifies that the employee is not at the facility.

2. He makes all reasonable efforts to contact the employee and notify that he will remove the devices.

3. Before re-energizing, all employees in the machine or equipment area shall be notified that the lockout/tagout devices have been removed.

10.0 Group Lockout/Tagout

10.1 Procedures Involving More Than One Person

When more than one person is involved in the performing maintenance or service of equipment/machinery, an authorized employee should establish primary responsibly for a set number of individual group members working under the protection of a group lockout/ tagout device. Each employee shall attach a personal lockout/tag out device while he or she is working, and remove it when job is complete. Each authorized employee performing servicing or maintenance where the release of hazardous energy is possible shall be protected by his/her personal lockout/tagout device and by the company procedure.

10.2 Procedures for Outside Personnel/Contractors

Outside personnel/contractors must be advised of the JHM Lockout/ Tagout Procedure Plan. The outside personnel/contractor must be informed of the use of locks and tags, and that it is prohibited to restart or re-energize machines or equipment that are locked out or tagged out.

JHM's Site Project Manager or Supervisor must obtain a copy of the outside personnel/contractor lockout/tagout procedures, and will advise affected employees of this

information. The outside personnel/contractor will be required to sign a certification form unless a previously signed certification is on file.

11.0 Shift Personnel Changes

Changes between shifts shall be made in an orderly fashion. The initial authorization person shall remain in control until all of his crew has removed their locks and tags. He will then transfer them to the next shifts authorized person, who will then start the entire lockout/tagout procedure for his/her crew. If an employee must leave a site and be replaced, he/she must remove his/her lock and turn them into his/her supervisor who shall orient the new employee. The new employee will then place his/her lock and tag on the equipment.

AS IT APPLIES TO CONFINED SPACE (Tank Entry)

- Electrical boxes, valves and mechanical devices will be tagged and locked out with chains and padlocks when these items pose a potential threat to an employee. Each person working in the work zone will have a unique padlock that he or she will open upon leaving the work zone. Those items that are locked out will remain so until the last person removes his or her padlock.

- Blanking of lines: when possible, each end of a feed line into a confined space will be blocked and the line drained. Any drains that may be present in the confined space will be locked open so that any spill will drain from the area.

- Misalignment of Lines: feed lines may be misaligned in the event blanking is not possible. Again, any drains in the confined space must be locked in the open position.

- Employees may not enter spaces containing exposed energized parts unless illumination is provided that enables the employees to work safely.

- Protective shields, protective barriers or insulating materials as necessary shall be provided.

12.0 Periodic Inspection by the Employer

An authorized employee other than those utilizing the energy control procedure being inspected is required to inspect and verify the effectiveness of the company's energy control procedures at least annually. These inspections shall at least provide for a demonstration of the procedures and may be implemented through random audits and planned visual observations. These inspections are intended to ensure that the energy control procedures are being properly implemented and to provide an essential check on the continued utilization of the procedures. The inspections are described below.

- When **Lockout** is used, inspection shall include a review of the responsibilities of each authorized employee implementing the procedure with that employee. Group meetings between the authorized employee who is performing the inspection and all authorized employees who implement the procedure would constitute compliance with this requirement.

- When **Tagout** is used, the employer shall conduct this review with each affected and authorized employee.

- Energy control procedures used less frequently than once a year need be inspected only when used.

- The periodic inspection must provide for and ensure effective correction of identified deficiencies.

JHM is required to certify that the prescribed periodic inspections have been performed. (***See Attachment A, Certification of Lockout/Tagout Inspection)***

Attachment A

Certification of Lockout/Tagout Inspection Form

J.H. MAXYMILLIAN, INC.

OVER 50 YEARS STRONG

Certification of Lockout/Tagout Inspection Form

Date: _____

Inspection/Training Performed by: _____

Supervisor: _____

Crew:

Type of work, include name of equipment: _____

Type of controls used: _____

If none, why? _____

Were procedures followed? ☐ Yes ☐ No

Were procedures reviewed with employees? ☐ Yes ☐ No

Comments: _____

Supervisor's signature: _____

APPENDIX G

Respirable Crystalline Silica Exposure Program

RESPIRABLE CRYSTALLINE SILICA EXPOSURE PROGRAM

J.H. MAXYMILLIAN, INC.

OVER 50 YEARS STRONG

Revision Number: 1

Revised: 2024
CIH Reviewed: March 2017

Respirable Crystalline Silica Exposure Program
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1.0 Purpose

The purpose of this program is to provide an understanding of crystalline silica and its properties. This program, in compliance with the requirements of OSHA Standard 1926.1153, has been implemented to protect J.H. Maxymillian employees from the possibility of exposure to the dangers of crystalline silica. This program will be evaluated at least annually or more frequently as necessary.

A copy of this program will be kept on all job sites as well as the main office and will be available to all employees.

2.0 Material Characteristics

JHM employees should be familiar with the characteristics of crystalline silica. Crystalline silica is a basic component of soil, sand, granite, and many other minerals. Quartz is the most common form of crystalline silica. Cristobalite and tridymite are two other forms of crystalline silica. All three forms may become respirable size particles when workers chip, cut, drill, or grind objects that contain crystalline silica.

3.0 Health Effects

The health hazards of crystalline silica come from inhaling the dust. If crystalline silica becomes airborne through industrial activities, exposures to respirable crystalline silica dust can lead to a disabling, sometimes fatal disease called silicosis. Respirable silica dust is very small and is not visible to the human eye. These fine silica particles are deposited in the lungs, causing scarring and thickening of the lung tissue. The scar tissue restricts the lungs' ability to extract oxygen from the air. This damage is permanent, but the symptoms of the disease may not appear for many years. Silica has also been shown to cause other possible health effects including lung cancer, pulmonary tuberculosis and other airway diseases.

4.0 Exposure

Crystalline Silica is commonly found in sand, concrete, brick, concrete blocks, stone and mortar. Many of the activities performed on JHM projects could result in the creation or release of silica dust, thus potentially exposing our employees. These activities include, but are not necessarily limited to:

- abrasive blasting,
- bushhammering,
- cleanup operations,
- cutting,
- demolishing,
- drilling,
- grinding,
- jackhammering,
- milling,
- mixing,
- polishing,
- scabbling,
- scarifying.

5.0 Regulatory Limits

OSHA's Respirable Crystalline Silica Standard establishes two exposure limits, both over the course of an 8-hour workday. The permissible exposure limits (PEL) for respirable crystalline silica is 50 micrograms per cubic meter of air (50 µg/m³).

The action level (AL) for respirable crystalline silica is 25 micrograms per cubic meter of air (25 µg/m³). This is a concentration to which nearly all workers could be exposed for eight hours a day, five days a week, without adverse health effects. However, as a suspected carcinogen, crystalline silica is also an ALARA (As Low As Reasonably Achievable) substance, and exposures must be reduced to levels as low as reasonably achievable below the PEL.

6.0 Exposure Prevention and Control

JHM is committed to providing a safe and healthy workplace to our employees, recognizing the right of workers to work in a safe and healthy work environment. JHM will ensure that every reasonable precaution is taken to protect our employees and others, from the adverse health effects associated with exposure to silica.

6.1 Responsibilities

6.1.1 Competent Person

The competent person is one who is capable of identifying existing and predictable crystalline silica hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them.

The competent person is responsible to follow this program and implement an exposure control plan for all work covered under this program.

6.1.2 Project Supervisors

The project supervisor is responsible for ensuring that the components of this plan are being met regardless of assignment of competent person.

The Project Supervisor will ensure that the exposure control plan has been effectively implemented and communicated to employees, as appropriate. The Project Supervisor will also make certain that employees have received any training related to this policy and that of the exposure control plan.

In conjunction with the JHM Health and Safety Officer, the Project Supervisor will review this policy on an annual basis and update as necessary.

6.1.3 Employees

Employees will understand and know the hazards of silica dust exposure. Employees will use the appropriate engineering controls and the assigned personal protective equipment in a safe and effective manner. Employees will immediately report any potential hazards to their supervisor.

7.0 Exposure Assessment

JHM will use a variety of methods to assist with the assessment of (possible or actual) silica exposures. These methods will include, but may not necessarily be limited to:

- Reviewing OSHA's Table 1: Specified Exposure Control Methods When Working with Material Containing Crystalline Silica.
- Reviewing data/reports available in the public domain.
- Make the determination if the employee exposure to respirable crystalline silica is above the action level of 25 $\mu g/m^3$ averaged over an 8-hour day. The designated Competent Person will make this decision assuming that the employee is not wearing a respirator. They will make this determination by monitoring the employee's exposure or by using objective data, which can demonstrate conclusively that no employee will be exposed to respirable crystalline silica in excess of the action level.
- Implement a suitable respirable silica exposure monitoring program. This program will ensure that JHM has quantifiable silica exposure data available that is representative of all regularly occurring, as well as reasonably foreseeable work activities. Exposure monitoring will generally be conducted in-house, although assistance may be obtained through outside consultants/hygienists.

7.1 Control Methods

When determining measures to reduce, maintain or eliminate worker exposure to the lowest feasible level, to silica dust, JHM will generally select a combination of controls, including:

- Engineering,
- Administrative,
- Personal Protective Equipment (PPE).

See Table 7-1 for Guidance.

7.1.1 Engineering Controls

Engineering controls are those, which aim to control or otherwise minimize the release of crystalline silica. Two common engineering control options are Local Exhaust Ventilation (LEV) or Wet Dust Suppression (WDS) systems.

7.1.1.1 Local Exhaust Ventilation (LEV)

An LEV system may be available on some tools/appliances. Such LEV systems are generally comprised of a shroud assembly, a hose attachment, and a vacuum system. Dust-laden air is collected within the shroud, drawn into the hose attachment, and conveyed to the vacuum where it is filtered and discharged. Silica particles are collected for proper disposal. Large LEV systems, such Vacuum Truck and Mobile Sweeper, may also be used.

When LEV systems are used, JHM will employ the following systems and safe work practices:

- Vacuum attachment systems that capture and control dust at its source whenever possible.
- Maintain dust control systems in optimal working conditions.
- Use HEPA or good quality, multi-stage vacuum units, approved for use with silica dust, in accordance with the manufacturer's instructions.
- Whenever possible, perform concrete grinding when the concrete is wet, thus significantly reducing the release of dust.

7.1.1.2 Wet Dust Suppression (WDS)

Some tools at JHM can be equipped with a WDS system. When WDS as a standard or retrofitted part of the tool/equipment are not available, similar effects can also be achieved by manually wetting the surface.

When WDS systems are used, JHM will employ the following system and safe work practices:

- If water is not readily available on the specific JHM project, the PM/SS will arrange to have a water tank delivered to the site for use.
- Pneumatic or fuel powered equipment will generally be used instead of electrically powered equipment, if water is the method of dust control, and unless the electrical equipment is specifically designed to be used in such circumstances.
- Pressure and flow rate will be controlled in accordance with the tool manufacturer's specifications.
- When sawing concrete, tools that provide water directly to the blade will be used if possible.

7.1.2 Administrative Controls

Administrative controls are those that aim to control or otherwise minimize the release of silica by using work procedures and work methods, rather than by affecting the actual physical work. Common examples of administrative controls include, but are not limited to:

- Posting warning signs.

- Relocating unprotected workers away from dusty areas.

When administrative controls are used, JHM will employ the following systems and safe work practices:

- Exposure control strategies will be discussed and determined. As necessary, supplemental project and task specific Exposure Control Plans will be developed.
- Suitable housekeeping, restricted work area, hygiene practices, training and supervision procedures will be determined and implemented on JHM projects.
- As appropriate, barriers will be erected around known silica dust generating activities and/or warning signs will be posted.
- When possible, work activities will be scheduled to minimize the silica related effect on, and from, others.

7.1.3 Personal Protective Equipment Controls

When used in conjunction with the engineering and administrative controls, personal protective equipment and clothing can help further reduce employee exposure to silica dust.

An air purifying, disposable respirator/dust mask, with an APF 10, is the most common piece of PPE likely to be used by JHM to minimize exposure to silica dust. Depending on the effectiveness of the engineering and administrative controls implemented, one of the following respirators (based on the required Assigned Protection Factor (APF)), will be used:

- Air purifying respirator, half mask/dust mask (N95) with an APF=10.
- Air purifying respirator, half mask with cartridges (P100) with an APF=10.
- Air purifying respirator, full face with cartridges (P100) with and APF=50.

Air purifying respirators including dust mask, half mask and full face with cartridges, require a proper facial seal. Users must be “fit tested” and clean shaven where the respirators seal to the face. *Refer to our Respiratory Program, Attachment H for more information.*

Protective clothing (i.e. disposable coveralls and gloves) may be used and/or required to help prevent the contamination of the worker’s personal clothing. **Never use compressed air to clean clothing of dust.**

Eye protection is mandatory and must be worn to prevent dust from entering the eyes.

Table 7-1*
Specified Exposure Control Methods
(based on OSHA Standard 1926.1153 TABLE 1)

		Required respiratory protection and minimum assigned protection factor (APF)	
Equipment/task	**Engineering and work practice control methods**	**≤ 4 hours/shift**	**>4 hours/shift**
Stationary masonry saws -Cutting masonry blocks	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None
	-When WDS not available/feasible	APF 10	APF 10
Handheld power saws (any blade diameter) -Cutting concrete or asphalt	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	-When used outdoors	None	APF 10
	-When used indoors or in an enclosed area	APF 10	APF 10
	-When WDS not available/feasible	None	APF 10
Walk-behind saws -Cutting concrete or asphalt	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	-When used outdoors	None	None
	-When used indoors or in an enclosed area	APF 10	APF 10
	-When WDS not available/feasible	APF 10	APF 10
Rig-mounted core saws or drills -Drilling/cutting concrete or asphalt	Use tool equipped with integrated water delivery system that supplies water to cutting surface Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None
Handheld and stand-mounted drills (including impact and rotary hammer drills) -Drilling into concrete or rock	Use drill equipped with commercially available shroud or cowling with dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism Use a HEPA-filtered vacuum when cleaning holes	None	None
	-When WDS not available/feasible	APF 10	APF 10

Vehicle-mounted drilling rigs for rock and concrete -Drilling into concrete, rock or asphalt	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector	None	None
	OR		
	Operate from within an enclosed cab and use water for dust suppression on drill bit	None	None
Jackhammers and handheld powered chipping tools -Jackhammering/ chipping of concrete, rock or asphalt	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact:		
	-When used outdoors	None	APF 10
	-When used indoors or in an enclosed area	APF 10	APF 10
	OR		
	Use tool equipped with commercially available shroud and dust collection system		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism:		
	-When used outdoors	None	APF 10
	-When used indoors or in an enclosed area	APF 10	APF 10
	When WDS or LEV not available or feasible	APF 10	APF 10
Handheld grinders for mortar removal (*i.e.*, tuckpointing) -Grinding concrete or mortar	Use grinder equipped with commercially available shroud and dust collection system	APF 10	APF 25
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism		
	When LEV not available or feasible	APF 25	APF 25
Handheld grinders for uses other than mortar removal	For tasks performed outdoors only: Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface	None	None
	OR		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Use grinder equipped with commercially available shroud and dust collection system		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism:		

	-When used outdoors	None	None
	-When used indoors or in an enclosed area	None	APF 10
	When WDS or LEV not available or feasible	APF 10	APF 10
Walk-behind milling machines and floor grinders -Grinding or milling of asphalt or concrete	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	OR		
	Use machine equipped with dust collection system recommended by the manufacturer	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism		
	When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes		
	When WDS or LEV not available or feasible	APF 10	APF 10
Small drivable milling machines (less than half-lane) including milling head attachment for Bobcat -Milling of asphalt or concrete	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant	None	None
	Operate and maintain machine to minimize dust emissions		
	When WDS not available (Bobcat attachment)	APF 10	APF 10
Large drivable milling machines (half-lane and larger) -Milling of asphalt or concrete	For cuts of any depth on asphalt only: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust	None	None
	Operate and maintain machine to minimize dust emissions		
	For cuts of four inches in depth or less on any substrate:		
	Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust	None	None
	Operate and maintain machine to minimize dust emissions		
	OR		
	Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant	None	None
	Operate and maintain machine to minimize dust emissions		
Crushing machines	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points)	None	None

-Crushing of asphalt, stone and concrete	Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions		
	Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote-control station		
Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (*e.g.*, hoe-ramming, rock ripping) -Demolition activities involving silica-containing materials	Operate equipment from within an enclosed cab	None	None
Heavy equipment and utility vehicles -Grading and excavating but not including: Demolishing, abrading, or fracturing silica-containing materials	When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab	None	None
Housekeeping -Sweeping of concrete dust or sand. Removing dust from oneself.	Apply water and/or dust suppressants as necessary to minimize dust emissions (wet sweeping)	None	None
	Use a HEPA-filtered vacuum to clean up dust from surface areas and oneself	None	None

In the event that a specific equipment/task is not listed an exposure/hazard assessment must be conducted to determine appropriate control measures.

8.0 Housekeeping

When feasible, utilize wet sweeping, HEPA-filter vacuuming or other methods that minimize the likelihood of exposure with airborne dust.

9.0 Medical Surveillance

Per OSHA regulations 29 CFR 1926.1153, all employees exposed to silica at or above the PEL and using a respirator full-time for 30 or more days per year, shall participate in a medical surveillance program. The objectives of this program are to ensure that employees are medically fit to perform their job and to provide adequate medical monitoring. This will permit detection of any site-related health problems.

As required, all employees exposed to silica shall receive the following medical examinations as outlined in the OSHA standards for silica.

In accordance with OSHA 29 CFR 1926.1153, employees who are performing construction work and are occupationally exposed on any day to silica at or above the action limit requiring the use of respirators for more than 30 days in any consecutive 12 months will be offered the following medical surveillance:

1. Initial examination –an initial (baseline) examination will be made available within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of this program within the past 3 years. The examination shall consist of:
    a. Medical and work history – focusing on past, present, future exposure to silica, and any history of respiratory system dysfunction or disease, tuberculosis and smoking.
2. Physical examination – a physical exam with special emphasis on the respiratory system including:
    a. Chest x-ray and read by a certified B Reader,
    b. Pulmonary function test,
    c. Test for latent tuberculosis infection,
    d. Any other test deemed appropriate by the physician.
3. Periodic examination – periodic exams including the procedures listed above will be made available at least every three years, or more frequently if recommended by the physician.

10.0 Employee Training

Prior to performing activities or working on project sites where personnel could be exposed to silica dust, JHM will ensure that personnel receive suitable training and demonstrate competency. Refresher training will be conducted periodically or as needed. Training may include, but is not limited to the following:

- Hazards and risks associated with exposure to silica dust.
- Signs and symptoms of silica related diseases.
- General and specific silica exposure reduction methods/strategies as detailed in the Specified Exposure Control Methods Table 7-1.
- The proper use of specific pieces of equipment and control systems.
- The use and care of respiratory and other personal protective equipment.
- What to do in the event of an emergency or need of first aid.
- How to report any issues or items of concern.

Training will be delivered to JHM employees through a variety of methods, including by not necessarily limited to:

- New employee orientation.
- Project/site orientation.
- Equipment/task specific training.
- Site safety meetings (i.e. “tool-box talks”, “tailgate meetings”, etc.).
- Notifications or bulletins (developed in house or acquired from other reputable sources).

11.0 Recordkeeping

All records of air monitoring data, objective data and medical surveillance will be maintained as required by OSHA regulations 29 CFR 1910.1053 and 29 CFR 1926.1153.

Appendix B

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

1.1 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).

1.2 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.

1.3 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

3.1 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.

3.2 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.

F. 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.

3.3 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.

3.4 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.

3.5 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.

3.6 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

1.1 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.

1.2 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.

1.3 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.

1.4 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.

1.5 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

2.1 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.

2.2 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.

2.3 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.

2.4 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.

2.5 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.

2.6 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

3.1 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.

3.2 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.

3.3 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.

3.4 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.

3.5 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.

3.6 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.

3.7 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.

3.8 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 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.

3.9 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 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.

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

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. 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.

3.02 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.

3.03 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.

3.04 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.

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

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.

2. 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.

3. 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.

4. 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.

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.

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.

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.

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 1×10^{-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 x 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 x 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).

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 with the criteria described in Section 3.1 of the Soil Cover/Backfill Characterization Plan. 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.

   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.

2) 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.

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.

3) 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), 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).

f. Geotechnical analysis in accordance with relevant specifications in Article 2.02 of Section 31 05 13 – Soils for Earthwork.

2. 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 Construction Manager (CM).

3. Sampling and testing of each aggregate material from each borrow pit shall be conducted as part of the off-site material source evaluation (to be completed in advance of construction earthwork activities with acceptable results identified no

less than 15 days before material delivery to the Site). Sampled materials shall be tested in accordance with Part 2.02 A.1. of this specification.

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

3.01 Refer to material Sections referenced in Part 1.01 (B) of this Section for material installation specifications.

- END OF SECTION -

SECTION 31 05 19.13 – GEOTEXTILES FOR EARTHWORK

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Providing all labor, materials, tools, equipment, and services as shown, specified, and required to furnish and install geotextiles.

B. Related Sections:

1. Section 31 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.

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
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 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, 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 within15 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, 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

C. 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).

1.01 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.

1 Lift thickness for structure 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.

3.05 EXISTING FACILITIES

A. General:

1. Existing subsurface facilities may be encountered during construction of the work or located in close proximity to the work.

2. These facilities may include, but are not necessarily limited to, sewers, drains, water mains, gas mains, electrical conduits, and their appurtenances. These facilities may or may not be shown on the Design Drawings. However, the sizes, locations, heights, and depths, if indicated, are only approximate and the Contractor shall conduct its operations with caution and satisfy itself as to the accuracy of the information given. The Contractor shall not claim, nor shall it be entitled to receive compensation for damages sustained by reason of the inaccuracy of the information given or by reason of its failure to properly maintain and support such structures.

3. There may be other subsurface facilities, the existence and/or location of which are not known, such as individual water and gas services, electrical conduits, sanitary and storm sewer drains, etc. The Contractor shall consult with the CM of such facilities and, if possible, shall determine, prior to construction, the location and depth of any such facilities that may exist in the area to be excavated.

4. If underground facilities are known to exist in an area but their location is uncertain, the Contractor shall exercise reasonable care in its excavation technique to avoid damage to them.

5. The Contractor shall notify Massachusetts Dig Safe at least 72 hours prior to any site work.

B. Notification and Protection Procedures:

1. Except where superseded by state or local regulations, or in the absence of any applicable regulations, the Contractor shall, at a minimum, include the following procedures in its operations:

a. Prior to Excavating:

1) Determine correct field location of all nearby underground facilities or arrange for Representatives of the utilities to locate them.

2) Notify owners of nearby underground facilities when excavation is to take place, allowing them reasonable time to institute precautionary procedures or preventive measures which they deem necessary for protection of their facilities.

3) In cooperation with owners of nearby facilities, provide temporary support and protection of those underground facilities that may be especially vulnerable to damage by virtue of their physical condition or location, or those that could create hazardous conditions if damaged.

b. Immediately notify any utility owner of any damage to its underground facilities resulting from the Contractor's operations and arrange for repairs to be made as soon as possible.

c. In case of any emergency the Contractor shall follow the approved Contingency and Emergency Procedures Plan.

3.06 OTHER REQUIREMENTS

A. Unfinished Work:

1. When, for any reason, the work is to be left unfinished, all trenches and excavations shall be filled, and all roadways and watercourses left unobstructed with their surfaces in a safe and satisfactory condition.

B. Hauling Material on Street:

1. When hauling material over the streets or pavement, the Contractor shall provide suitably tight-sealing vehicles so as to prevent deposits on the streets or pavements. In all cases where any materials are dropped from the vehicles, the Contractor shall clean up the same as often as required to keep the crosswalks, streets, and pavements clean and free from dirt, mud, stone, and other hauled material.

C. Field Quality Control:

1. In-Place Density Testing of Fill Materials:

a. Perform field density tests in accordance with Section 3.03 C.

b. Submit test results, certified by testing laboratory, to CM within 24 hours after completion of test.

c. If testing laboratory reports or inspections indicate subgrade, bedding, or fill compaction below specified density, Contractor shall remove unacceptable materials as necessary and replace with specified materials, and provide additional compaction until subgrades, bedding, and fills are acceptable. Contractor shall retest subgrade, bedding, or fills that did not originally comply with specified density.

3.07 CRITERIA AND TOLERANCES

A. Fill materials shall be constructed to the lines and grades shown on the contract drawings unless otherwise requested by the CM. Acceptance of final grades will be based on site observations by the CM and review of a final as-built survey information by the CM. Any settlements that occur prior to final acceptance of the work shall be restored to design and/or intended grades by the contractor.

- END OF SECTION -

SECTION 31 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.

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.

3) Across upstream or discharge ends of storm water piping or culverts.

3. Installation:

a. Securely fasten filter fabric to each support post in no less than four locations. Spacing between support posts shall not exceed 10 feet (center to center).

b. When two sections of filter fabric abut each other, fold over edges and overlap by minimum of six inches and securely fasten to wire mesh.

c. Embed posts in the ground to the depth necessary for proper controls, but not less than 16 inches below ground surface.

d. Extend filter fabric a minimum of six inches below ground and a minimum of 16 inches above ground.

e. Bury filter fabric at bottom of silt fence in a trench, in a “J” configuration, to a depth of six inches below grade.

f. Remove sediment accumulated at silt fencing as required. Repair and reinstall silt fencing as required.

4. Maintenance:

a. Conduct routine inspection at least once every seven days until final restoration.

b. Remove accumulated sediment when depth reaches one-half the effective height of the sediment control.

c. Repair and reinstall silt fencing as required.

d. Do not allow formation of concentrated storm water flows on slopes above silt fencing unless so shown or indicated in the Contract Documents. If unauthorized concentrated storm water flows occur, stabilize the slope via earthmoving and other stabilization measures as required to prevent flow of concentrated storm water flows toward silt fencing.

C. Protection of Storm Water Drainage Inlets:

1. Protect each drainage inlets that has the potential to receive storm water run-off from exposed soils.

2. Install inlet filter bags inside of drainage inlet or catch basin in accordance with manufacturer’s instructions. Secure inlet filter bag with the structure’s grate or by other acceptable means.

3. Inlet filter bags shall not pose any obstruction above the elevation of the drainage inlet or catch basin grate requiring barricades or flashers.

4. When removing silt and sediment from inlet filter bag, do not dump filter bag's contents into the drainage inlet or catch basin.

5. Remove silt and sediment from inlet filter bag, or replace inlet filter bag, when inlet filter bag is not more than half full.

3.02 SURFACE WATER CONTROL

A. General:

1. Provide methods to control surface water to prevent damage to the Work, the Site, and adjoining properties.

2. Control fill, grading, and ditching to direct surface water away from disturbed areas, excavations, pits, tunnels, and other construction areas, and to direct drainage to proper run-off courses to prevent erosion, damage, or nuisance.

B. Equipment and Facilities for Surface Water Control:

1. Provide, operate, and maintain equipment and facilities of adequate size to control surface water.

C. Discharge:

1. Discharge surface water in a manner to prevent flooding, erosion, and other damage to any and all parts of the Site and adjoining areas, and that complies with Laws and Regulations.

3.03 REMOVAL OF EROSION AND SEDIMENT CONTROLS

A. Remove erosion and sediment controls only when directed by the CM.

- END OF SECTION -

SECTION 31 37 00 – RIPRAP

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:

1. Providing all labor, materials, tools, equipment, and incidentals as shown, specified, and required to install riprap.

2. Extent of riprap is shown or indicated on the Design Drawings.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with or before riprap.

C. Related Sections:

1. Section 31 05 16.10 – Materials for Earthwork.

2. Section 31 05 19.13 – Geotextiles for Earthwork.

3. Section 31 11 00 – Clearing and Grubbing.

4. Section 31 23 00 – Excavation and Fill.

1.02 SUBMITTALS

A. Informational Submittals:

1. Delivery Tickets: Submit copy of delivery ticket for each load of material delivered to the Site. Each delivery ticket shall indicate Supplier name and source address, project name, contract number, date, material type, MassDOT item number when applicable, and quantity delivered.

1.03 DELIVERY

A. 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 33 05 05 – BURIED WATER PIPE

PART 1 – GENERAL

1.1 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.

   f. Field quality control, including testing.

   g. Cleaning and disinfecting.

   h. 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.

1.2 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.

1.3 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.

   c. Berkshire County.

2. Obtain required permits for Work in roads, rights-of-way, and other areas of the Work.

1.4 SUBMITTALS

A. Action Submittals – Submit the following:

1. Shop Drawings:

a. Laying schedules for concrete pipe and piping with restrained joints.

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.

1.5 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

2.1 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.

2.2 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

3.1 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.

   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.

3.2 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.

3.3 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.

3.4 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.

3.5 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.

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.

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.

3.6 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 40 05 53 – HYDRANTS

PART 1 – GENERAL

1.1 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.

1.2 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.

1.3 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.

1.4 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.

1.5 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

2.1 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.

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.

2.3 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.

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:

2.20 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.

    c. Safety Coupling: Stainless steel.

3. Nozzles:

    a. Pumper and Hose Nozzles: Bronze.

    b. Nozzle Caps: Cast-iron.

    c. Cap Chains: Steel.

4. Main Valve Assembly:

    a. Main Valve: Rubber.

    b. Upper Valve Plate: Bronze.

    c. Lower Valve Plate and Nut: Cast-iron.

5. Drain Valves:

    a. Drain Ring Housing: Cast-iron.

    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.

2.24 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.

2.26 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.

2.27 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.

2.28 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

3.1 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.

3.2 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.

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 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.

3.3 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 -

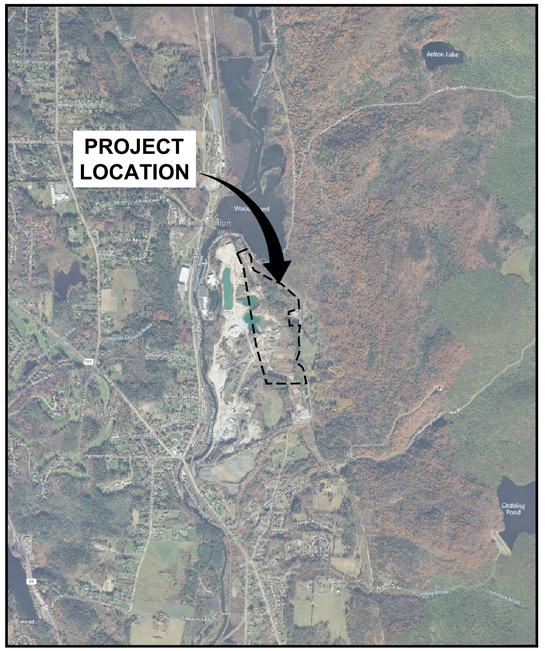
Appendix C

Design Drawings

DESIGN DRAWINGS

GE-PITTSFIELD/HOUSATONIC RIVER SITE
UPLAND DISPOSAL FACILITY
CONTRACT 10 - UDF SITE PREPARATION

UDF PREPARATION (UP)



LOCATION MAP
0 2000' 4000'
GRAPHIC SCALE

AREA LOCATION
MASSACHUSETTS

INDEX TO DRAWINGS

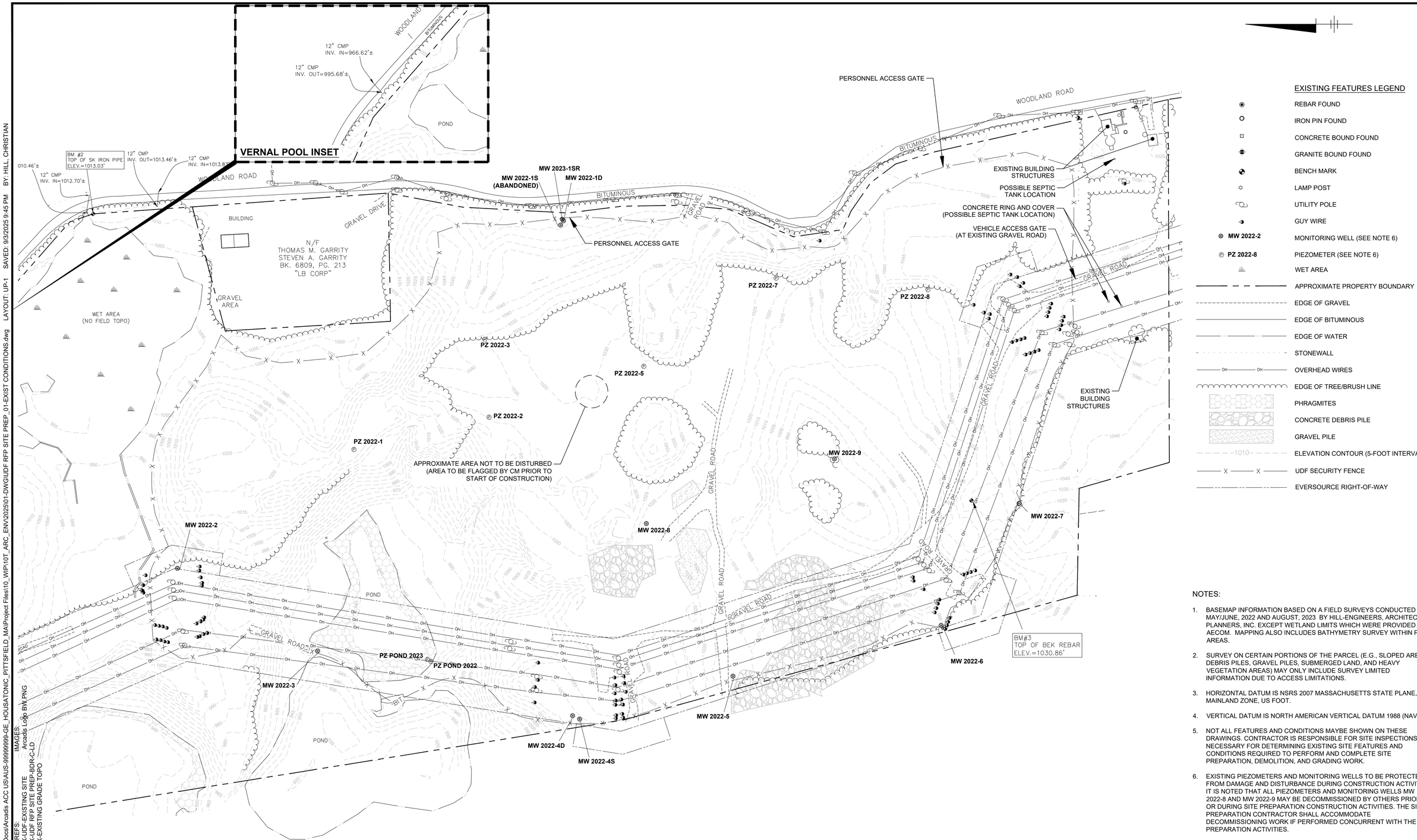
DATE ISSUED / DATE REVISED
SEPTEMBER 2025

LEE, MASSACHUSETTS
BERKSHIRE COUNTY

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS

ARCADIS

ARCADIS U.S., INC.



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 6)
- PZ 2022-8 — PIEZOMETER (SEE NOTE 6)
- 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
- 1010 — ELEVATION CONTOUR (5-FOOT INTERVAL)
- UDF SECURITY FENCE
- EVERSOURCE RIGHT-OF-WAY

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 ONLY INCLUDE SURVEY LIMITED 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. NOT ALL FEATURES AND CONDITIONS MAYBE SHOWN ON THESE DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR SITE INSPECTIONS NECESSARY FOR DETERMINING EXISTING SITE FEATURES AND CONDITIONS REQUIRED TO PERFORM AND COMPLETE SITE PREPARATION, DEMOLITION, AND GRADING WORK.
6. 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 MAY BE DECOMMISSIONED BY OTHERS PRIOR TO OR DURING SITE PREPARATION CONSTRUCTION ACTIVITIES. THE SITE PREPARATION CONTRACTOR SHALL ACCOMMODATE DECOMMISSIONING WORK IF PERFORMED CONCURRENT WITH THE SITE PREPARATION ACTIVITIES.

C:\Users\CSHill\IDCACDocs\Arcadis ACC US\AUS-99999999-GE_HOUSATONIC_PITTSFIELD_MA\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\UDF RFP SITE PREP_01-EXIST CONDITIONS.dwg LAYOUT: UP-1 SAVED: 9/3/2025 9:45 PM BY: HILL, CHRISTIAN

XREFS:
X-UDF-EXISTING SITE
X-UDF RFP SITE PREP-BDR-C-LD
X-EXISTING GRADE TOPO
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

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

ARCADIS

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

EXISTING CONDITIONS PLAN

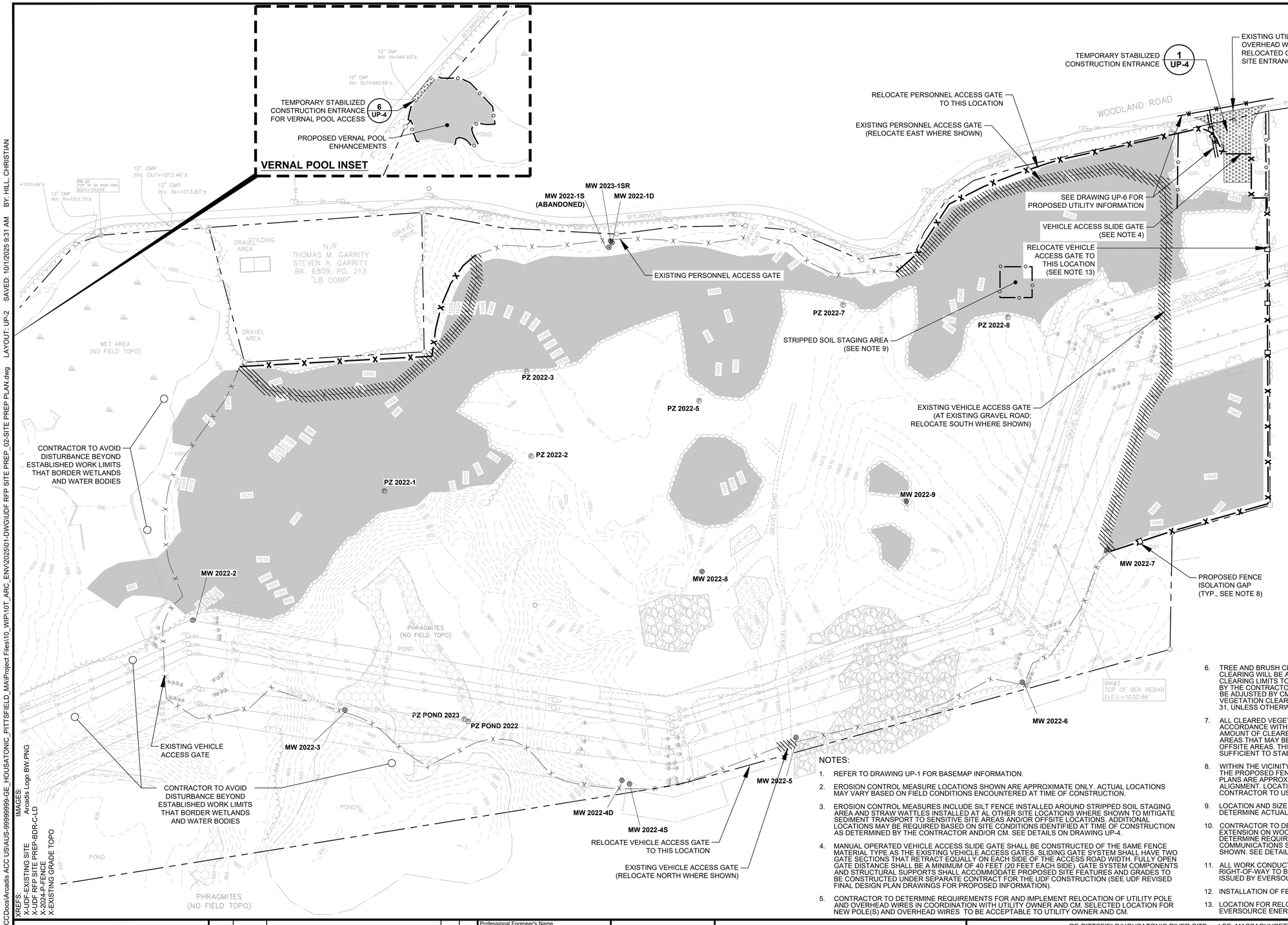
CONTRACT 10 - UDF SITE PREPARATION

ARCADIS Project No.
30223149.3000

Date
SEPTEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UP-1



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
- EVERSOURCE RIGHT-OF-WAY
- EDGE OF TREE/BRUSH LINE
- PHRAGMITES
- CONCRETE DEBRIS PILE
- GRAVEL PILE
- X — X — UDF SECURITY FENCE

DESIGN FEATURES LEGEND

- EROSION CONTROL MEASURE (SEE NOTES 2 AND 3)
- UDF SECURITY FENCE ADDITION (SEE NOTE 12 AND DETAILS ON DRAWING UP-5)
- UDF SECURITY FENCE REMOVAL
- APPROXIMATE TREE AND BRUSH CLEARING AREA (SEE NOTE 6)
- FENCE ISOLATION GAP ADDITION (SEE NOTE 8)
- E/C — UNDERGROUND ELECTRIC AND COMMUNICATIONS CONDUITS (SEE NOTE 10)
- W — WATERLINE (SEE NOTE 10)

NOTES:

1. REFER TO DRAWING UP-1 FOR BASEMAP INFORMATION.
2. EROSION CONTROL MEASURE LOCATIONS SHOWN ARE APPROXIMATE ONLY. ACTUAL LOCATIONS MAY VARY BASED ON FIELD CONDITIONS ENCOUNTERED AT TIME OF CONSTRUCTION.
3. EROSION CONTROL MEASURES INCLUDE SILT FENCE INSTALLED AROUND STRIPPED SOIL STAGING AREA AND STRAW WATTLES INSTALLED AT AL OTHER SITE LOCATIONS WHERE SHOWN TO MITIGATE SEDIMENT TRANSPORT TO SENSITIVE SITE AREAS AND/OR OFFSITE LOCATIONS. ADDITIONAL LOCATIONS MAY BE REQUIRED BASED ON SITE CONDITIONS IDENTIFIED AT TIME OF CONSTRUCTION AS DETERMINED BY THE CONTRACTOR AND/OR CM. SEE DETAILS ON DRAWING UP-4.
4. MANUAL OPERATED VEHICLE ACCESS SLIDE GATE SHALL BE CONSTRUCTED OF THE SAME FENCE MATERIAL TYPE AS THE EXISTING VEHICLE ACCESS GATES. SLIDING GATE SYSTEM SHALL HAVE TWO GATE SECTIONS THAT RETRACT EQUALLY ON EACH SIDE OF THE ACCESS ROAD WIDTH. FULLY OPEN GATE DISTANCE SHALL BE A MINIMUM OF 40 FEET (20 FEET EACH SIDE). GATE SYSTEM COMPONENTS AND STRUCTURAL SUPPORTS SHALL ACCOMMODATE PROPOSED SITE FEATURES AND GRADES TO BE CONSTRUCTED UNDER SEPARATE CONTRACT FOR THE UDF CONSTRUCTION (SEE UDF REVISED FINAL DESIGN PLAN DRAWINGS FOR PROPOSED INFORMATION).
5. CONTRACTOR TO DETERMINE REQUIREMENTS FOR AND IMPLEMENT RELOCATION OF UTILITY POLE AND OVERHEAD WIRES IN COORDINATION WITH UTILITY OWNER AND CM. SELECTED LOCATION FOR NEW POLE(S) AND OVERHEAD WIRES TO BE ACCEPTABLE TO UTILITY OWNER AND CM.
6. 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.
7. ALL CLEARED VEGETATION TO BE REMOVED FROM THE SITE FOR OFFSITE DISPOSITION IN ACCORDANCE WITH PROJECT DOCUMENTS. WHERE NECESSARY TO CONTROL EROSION, A LIMITED AMOUNT OF CLEARED VEGETATION SHALL BE CHIPPED AND USED TO COVER DISTURBED GROUND AREAS THAT MAY BE SUBJECT TO EROSION AND SEDIMENT TRANSPORT TO SENSITIVE AND/OR OFFSITE AREAS. THICKNESS AND PLACEMENT OF CHIPPED VEGETATION COVER MATERIAL SHALL BE SUFFICIENT TO STABILIZE THE DISTURBED GROUND AREAS.
8. WITHIN THE VICINITY OF THE UTILITY RIGHT-OF-WAY, FENCE ISOLATION GAPS ARE REQUIRED ALONG THE PROPOSED FENCE ALIGNMENT EVERY 100 FT OR LESS. GAP LOCATIONS SHOWN ON THE SITE PLANS ARE APPROXIMATE ONLY. ACTUAL GAP LOCATIONS MAY VARY BASED ON INSTALLED FENCE ALIGNMENT. LOCATION OF FENCE ISOLATION GAPS TO BE DETERMINED IN COORDINATION WITH CM. CONTRACTOR TO USE REMOVED ISOLATION GAP FENCING.
9. LOCATION AND SIZE OF STRIPPED SOIL STAGING AREA ARE APPROXIMATE. CONTRACTOR TO DETERMINE ACTUAL SIZE REQUIRED BASED ON AMOUNT OF SOIL STRIPPED.
10. CONTRACTOR TO DETERMINE REQUIREMENTS FOR AND INSTALLATION OF MUNICIPAL WATERMAIN EXTENSION ON WOODLAND ROAD AND TO LIMIT IN PROJECT SITE AS SHOWN. CONTRACTOR TO DETERMINE REQUIREMENTS FOR AND INSTALLATION OF UNDERGROUND ELECTRIC AND COMMUNICATIONS SERVICE CONDUITS AT WOODLAND ROAD AND TO LIMIT IN PROJECT SITE AS SHOWN. SEE DETAIL 4 ON DRAWING UP-4.
11. ALL WORK CONDUCTED WITHIN AND ADJACENT TO THE EVERSOURCE ENERGY POWERLINE UTILITY RIGHT-OF-WAY TO BE CONDUCTED IN ACCORDANCE WITH PERMITTED USE LICENSE AGREEMENTS ISSUED BY EVERSOURCE ENERGY ON APRIL, 10, 2024 AND DECEMBER 11, 2024.
12. INSTALLATION OF FENCE ADDITION TO BE NO LESS THAN 2 FEET INSIDE PROPERTY LINE.
13. LOCATION FOR RELOCATED VEHICLE ACCESS GATE TO BE COORDINATED WITH GE AND EVERSOURCE ENERGY.

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XREFS:
X-UDF-EXISTING SITE
X-UDF RFP SITE PREP-BDR-C-LD
X-2024-P-FENCE
X-EXISTING GRADE TOPO
IMAGES:
Arcadis Logo BW.PNG

1"=100' (100' 0 100' 200')

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

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

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

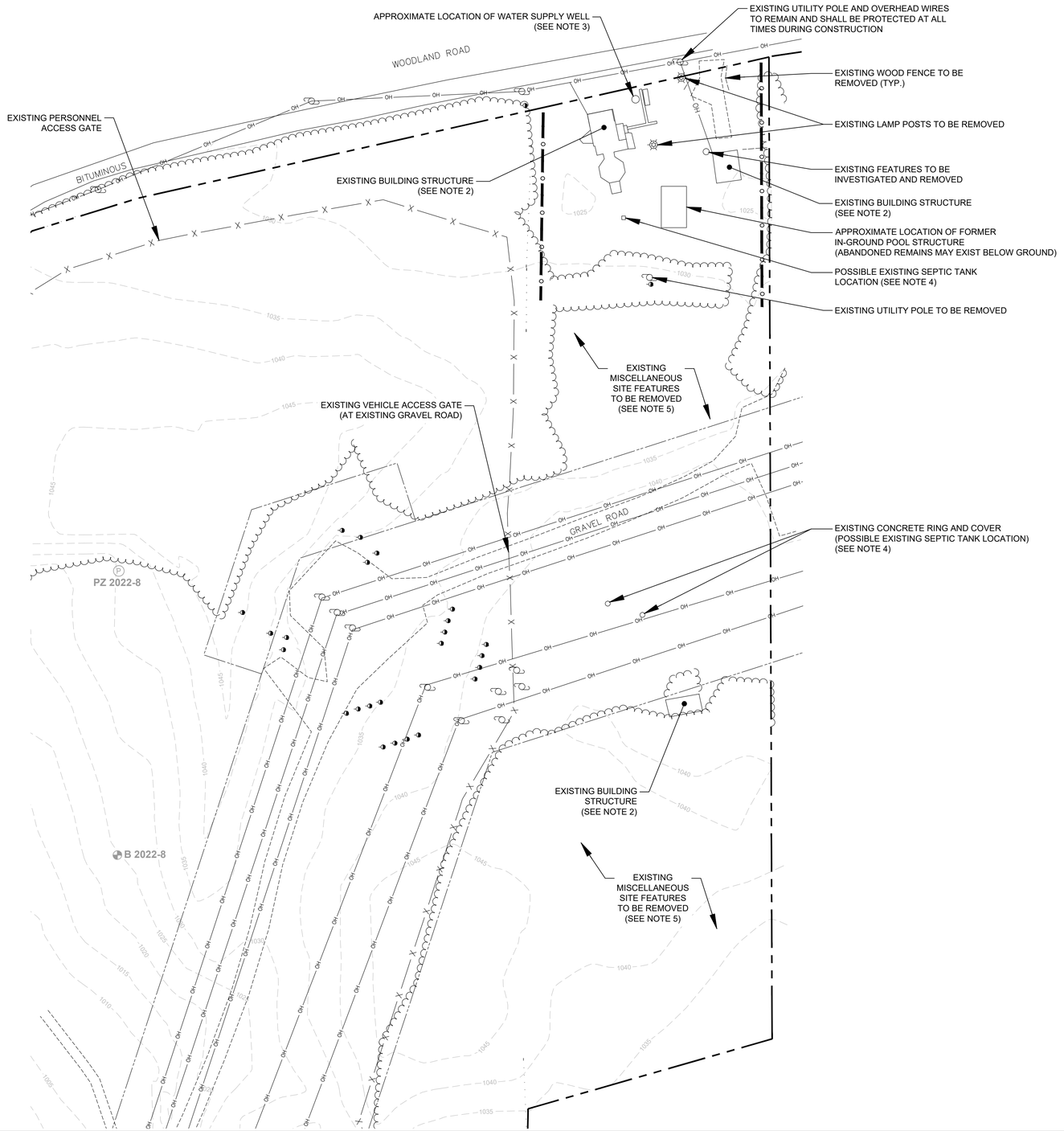
SITE PREPARATION PLAN

CONTRACT 10 - UDF SITE PREPARATION

ARCADIS Project No. 30223149.3000
Date SEPTEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UP-2



EXISTING FEATURES LEGEND

- IRON PIN FOUND
- BENCH MARK
- LAMP POST
- UTILITY POLE
- GUY WIRE
- PZ 2022-8 — PIEZOMETER
- B 2022-8 — SOIL BORING
- APPROXIMATE PROPERTY BOUNDARY
- EDGE OF GRAVEL
- EDGE OF BITUMINOUS
- STONEWALL
- OVERHEAD WIRES
- EDGE OF TREE/BRUSH LINE
- ELEVATION CONTOUR (5-FOOT INTERVAL)
- UDF SECURITY FENCE
- EVERSOURCE RIGHT-OF-WAY
- EROSION CONTROL MEASURE (SEE DRAWING UP-2)

NOTES:

1. REFER TO DRAWING UP-2 FOR SITE PREPARATION INFORMATION.
2. EXISTING ON-SITE FEATURES ASSOCIATED WITH THE FORMER RESIDENTIAL PROPERTY TO BE DEMOLISHED FOR OFFSITE DISPOSAL INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   - ABOVE AND BELOW GROUND BUILDING STRUCTURES AND CONTENTS.
   - ANCILLARY STRUCTURES.
   - ABOVE GROUND UTILITIES.
   - BELOW GROUND UTILITIES AND RELATED FEATURES ENCOUNTERED DURING EARTHWORK ACTIVITIES.
   - NON-SECURITY FENCES.
   - POSTS/POLES.
   - PAVEMENTS (EXCLUDES PUBLIC ROAD).
   - MISCELLANEOUS EQUIPMENT, CONCRETE STRUCTURES, WOOD DEBRIS, METAL, ETC.
3. EXISTING PRIVATE WATER SUPPLY WELL TO BE DECOMMISSIONED IN ACCORDANCE WITH THE PROJECT DOCUMENTS AND APPLICABLE LAWS AND REGULATIONS, INCLUDING WITH THE TOWN OF LEE BOARD OF HEALTH DEPARTMENT. WELL DEPTH IS APPROXIMATELY 92 FEET DEEP AND IS 6-INCH DIAMETER.
4. SANITARY SEPTIC TANK(S) TO BE DECOMMISSIONED IN ACCORDANCE WITH THE PROJECT DOCUMENTS AND APPLICABLE LAWS AND REGULATIONS, INCLUDING WITH THE TOWN OF LEE BOARD OF HEALTH DEPARTMENT.
5. MISCELLANEOUS SITE FEATURES MAY INCLUDE ANY SURFACE POLYETHYLENE WATER SUPPLY PIPING, UNDERGROUND ELECTRIC SERVICES, AND ANY OTHER FACILITIES ASSOCIATED WITH THE FORMER CAMPGROUND.
6. FOLLOWING DEMOLITION AND REMOVAL OF FOUNDATION MATERIALS, CONTRACTOR TO BACKFILL REMAINING FOUNDATION HOLE WITH SURPLUS SOIL MATERIAL RESULTING FROM PREPARATION OF CONSTRUCTION ENTRANCE AND UTILITY INSTALLATION WORK. TO EXTENT POSSIBLE, INITIAL FOUNDATION BACKFILLING SHALL INCLUDE USE OF NON-TOPSOIL TYPE MATERIAL PLACED AND COMPACTED IN 12-INCH-THICK LIFTS WITH TRACKED EARTHWORK EQUIPMENT. ANY REMAINING FOUNDATION HOLE CAN BE COMPLETED WITH STRIPPED TOPSOIL-TYPE MATERIAL.
7. COVER ALL DISTURBED GROUND AREAS, INCLUDING BASEMENT FOUNDATION AREAS, WITH ON-SITE CHIPPED VEGETATION MATERIAL. THICKNESS AND PLACEMENT OF CHIPPED VEGETATION COVER MATERIAL SHALL BE SUFFICIENT TO STABILIZE THE DISTURBED GROUND AREAS.

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XREFS:
IMAGES:
Arcadis Logo BW.PNG
X-UDF-EXISTING SITE
X-UDF RFP SITE PREP-BDR-C-LD
X-EXISTING GRADE TOPO
X-2024-P-FENCE

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

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

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

SITE DEMOLITION PLAN

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110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
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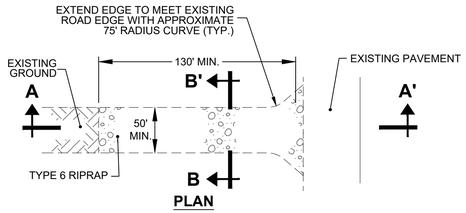
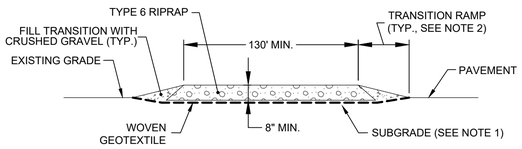
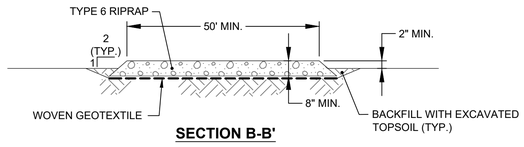
UP-3



PLAN



SECTION A-A'



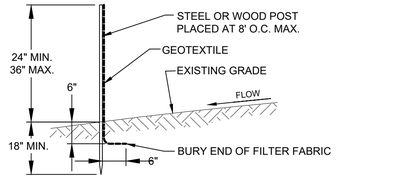
SECTION B-B'

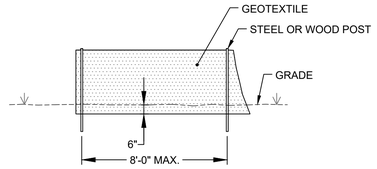
NOTES:

1. REMOVE (STRIP) TOPSOIL AND UNDERLYING ROOTING SUBSOIL THROUGHOUT EXTENT OF TYPE 6 RIPRAP PLACEMENT. STRIPPED SOIL TO BE STAGED WHERE SHOWN ON DRAWING 2.
2. TAPER SOIL REMOVAL AT BOTH TRANSITION RAMPS TO ALLOW FOR PLACEMENT OF CRUSHED STONE AT A SLOPE NO GREATER THAN 10% FROM TOP OF RIPRAP TO EXISTING GRADE.

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE 1

NOT TO SCALE



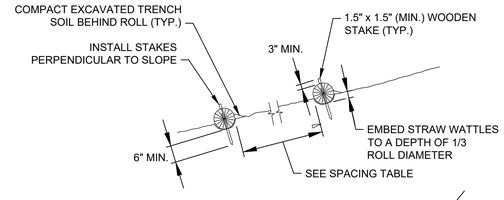


NOTES:

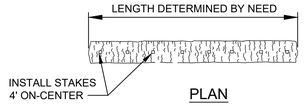
1. DEPOSITS SHALL BE REMOVED WHEN THEY REACH APPROXIMATELY 6 INCHES ABOVE GRADE ELEVATION.
2. THE SILT FENCE WILL REMAIN IN PLACE UNTIL A VEGETATIVE STAND IS ESTABLISHED.
3. THE SILT FENCE WILL BE USED FOR TEMPORARY EROSION AND SEDIMENTATION CONTROL ONLY.

SILT FENCE 2

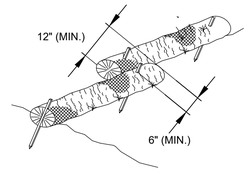
NOT TO SCALE



SIDE VIEW



PLAN



OVERLAPPING DETAIL

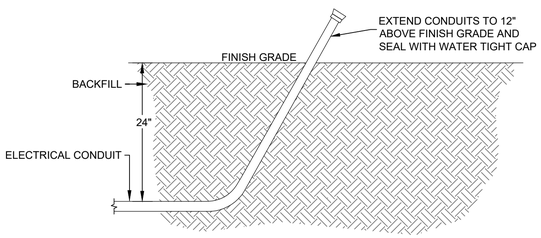
NOTES:

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.

STRAW WATTLE MAX. SPACING TABLE			
SLOPE	WATTLE SIZE		
	9"	12"	20"
1:1	10 FT	15 FT	20 FT
2:1	20 FT	30 FT	40 FT
3:1	30 FT	45 FT	60 FT
4:1 OR FLATTER	40 FT	60 FT	80 FT

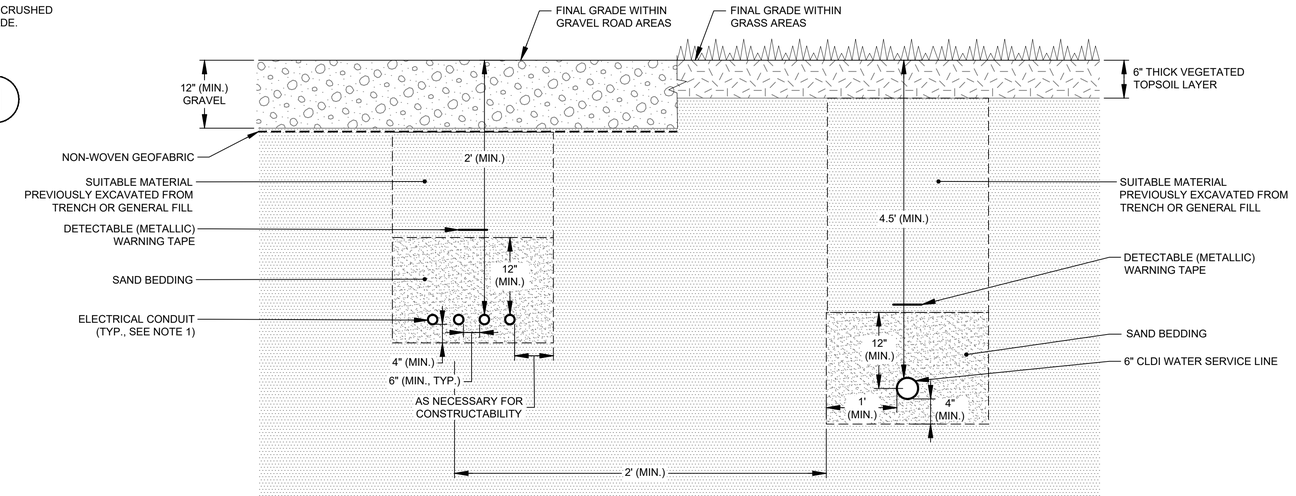
STRAW WATTLE 3

NOT TO SCALE



ELECTRICAL CONDUIT TERMINATION 4

NOT TO SCALE

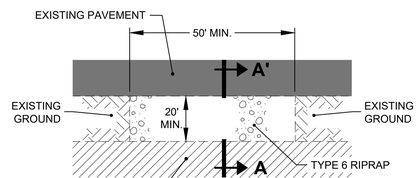


NOTES:

1. ELECTRICAL CONDUIT SHALL BE RIGID 4-INCH DIAMETER (IPS) PVC CLASS 2 SOLID WALL CONDUIT.
2. FINAL GRADE SURFACE MAY BE EITHER GRAVEL OF VEGETATED TOPSOIL ABOVE UTILITIES.

TYPICAL UTILITY TRENCHING WITH WATER SERVICE LINE 5

NOT TO SCALE



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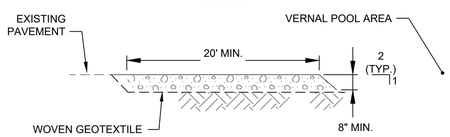

SECTION A-A'

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE FOR VERNAL POOL ACCESS 6

NOT TO SCALE

SCALE AS INDICATED (ANSI D)

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING:

USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

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

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE • LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

DETAILS - 1

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ARCADIS Project No.
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Date
SEPTEMBER 2025

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ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
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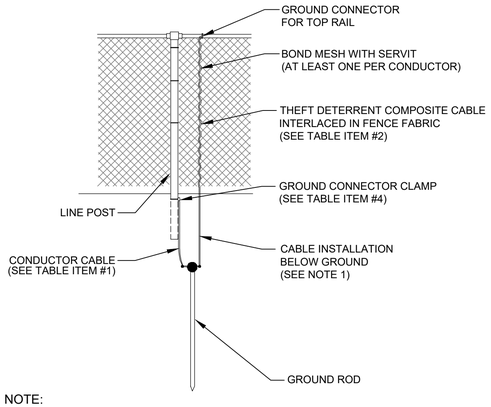
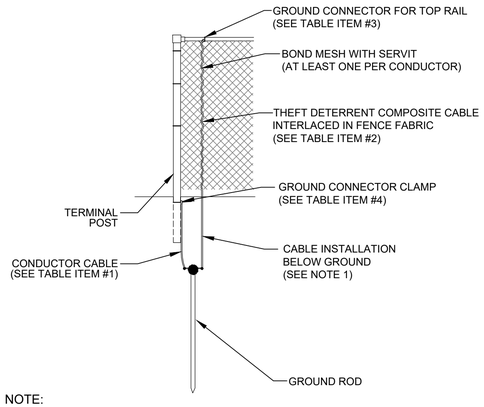
UP-4



NOTE:

1. THEFT DETERRENT COMPOSITE CABLE CAN BE RUN IN SAME TRENCH USED FOR THE CONDUCTOR WIRE. CABLE CAN BE SECURED TO BOTTOM OF FENCE POST USING ZIP-TIES OR SIMILAR PRODUCT THEN INTERLACED IN FENCE FABRIC UP TO FENCE TOP RAIL.

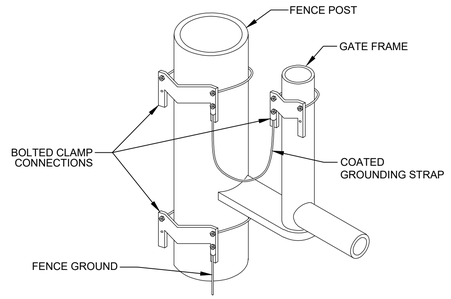
TYPICAL LINE POST AND FENCE FABRIC GROUNDING 1



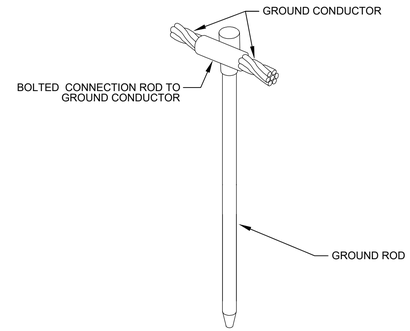
NOTE:

1. THEFT DETERRENT COMPOSITE CABLE CAN BE RUN IN SAME TRENCH USED FOR THE CONDUCTOR WIRE. CABLE CAN BE SECURED TO BOTTOM OF FENCE POST USING ZIP-TIES OR SIMILAR PRODUCT THEN INTERLACED IN FENCE FABRIC UP TO FENCE TOP RAIL.

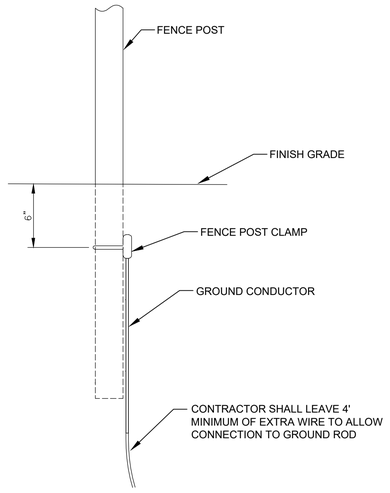
TYPICAL TERMINAL POST AND FENCE FABRIC GROUNDING 2



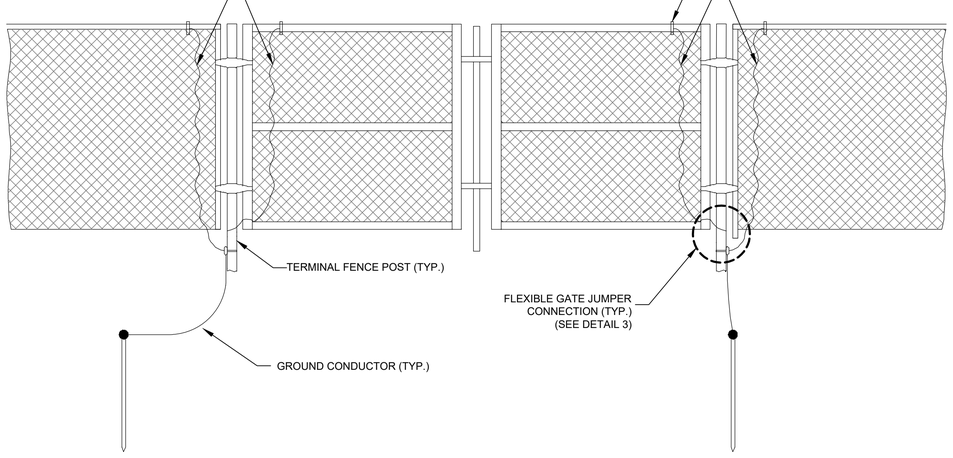
FLEXIBLE GATE JUMPER CONNECTION 3



GROUND ROD CONNECTION 4



TYPICAL FENCE POST 5



TYPICAL FENCE AND GATE GROUND LOOP 6

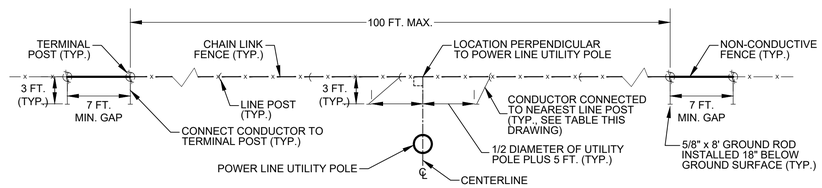
GENERAL NOTES:

1. LINE AND TERMINAL POSTS SHOULD BE SECURELY CONNECTED TO GROUND ROD AT LEAST EVERY 100 LINEAR FEET.
2. TOP OF GROUND ROD SHALL BE INSTALLED AT MINIMUM DEPTH OF 1.5 FEET BELOW GRADE.
3. GROUND CONDUCTOR SHALL BE INSTALLED AT MINIMUM DEPTH OF 1.5 FEET BELOW GRADE.

ITEM	MATERIAL DESCRIPTION	MANUF.	CAT. NO.
1	CONDUCTOR, GROUND, #4/0 AWG, 19 STRAND, BARE, SOFT DRAWN COPPER	--	--
2	CONDUCTOR, GROUND, THEFT DETERRENT COMPOSITE CABLE	ERICO	CC5A04
3	GROUND CONNECTOR, 1-1/4" IPS TOP RAIL TO #2 COPPER	SEFCOR	1-OC-2548
4	CLAMP, BRONZE TINNED FENCE POST	ERICO	FC078
5	SERVIT CLAMP CONNECTION FOR MESH (CONDUCTOR WIRE TO FENCE FABRIC)	HARGER	FGC2-4/0
6	FLEXIBLE GATE JUMPER CONNECTION (TERMINAL POST TO FENCE FRAME)	HARGER	AS REQ'D

NOTE:

1. MANUFACTURER PRODUCTS SHOWN MAY BE SUBSTITUTED WITH EQUIVALENT PRODUCTS.



NOTE:

1. WHEN THE FENCE IS PARALLEL TO AN OVERHEAD POWER LINE, ADDITIONAL GROUND RODS ARE TO BE INSTALLED AS SHOWN. REFER TO SITE PLAN FOR NUMBER OF GROUNDS REQUIRED AT EACH APPLICABLE STRUCTURE LOCATION.

FENCE GROUND ROD SPACING 7

NOT TO SCALE

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No.	Date	Revisions	By	Ckd

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MA		DK
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UP-5

WATERMAIN UTILITY NOTES:

1. EXISTING MUNICIPAL WATERMAIN AND FIRE HYDRANT LOCATIONS SHOWN ARE APPROXIMATE ONLY. CONTRACTOR TO DETERMINE ACTUAL LOCATIONS IN COORDINATION WITH TOWN OF LENOX WATER DEPARTMENT.
2. LOCATION AND INSTALLATION REQUIREMENTS FOR ALL COMPONENTS OF PROPOSED MUNICIPAL WATERMAIN (E.G., CONNECTION TO EXISTING AND PROPOSED WATERMAINS, HYDRANTS, TERMINATIONS, ETC.) IN WOODLAND ROAD TO BE DETERMINED BY CONTRACTOR IN COORDINATION WITH TOWN OF LEE AND TOWN OF LENOX PUBLIC WORKS DEPARTMENTS.
3. LOCATION FOR CONNECTION OF PROPOSED UDF WATERMAIN TO PROPOSED MUNICIPAL WATERMAIN TO BE DETERMINED BY CONTRACTOR IN COORDINATION WITH TOWN OF LENOX PUBLIC WORKS DEPARTMENT AND CM.
4. LOCATION AND INSTALLATION REQUIREMENTS FOR ALL COMPONENTS OF PROPOSED UDF WATERMAIN TO BE DETERMINED BY CONTRACTOR IN COORDINATION WITH TOWN OF LENOX PUBLIC WORKS DEPARTMENT AND CM.
5. PROPOSED MUNICIPAL WATERMAIN WILL NOT BE CONENCTED DIRECTLY TO EXISTING 16-INCH WATERMAIN BUT INSTEAD WILL BE CONNECTED TO EXISTING FIRE HYDRANT WATERLINE OR OTHER POTENTIAL EXISTING WATERLINE THAT CONNECTS TO THE 16-INCH WATERMAIN IN THE GENERAL VICINITY OF THE CONNECTION POINT CURRENTLY SHOWN.
6. PROPOSED WATERMAIN AND ASSOCIATED FEATURES SHOWN ARE PRELIMINARY ONLY.

ELECTRICAL UTILITY NOTES:

1. LOCATION OF PROPOSED ELECTRICAL UTILITY CONDUIT IS APPROXIMATE ONLY. ACTUAL LOCATIONS TO BE DETERMINED IN COORDINATION WITH CM, CONTRACTOR, AND UTILITY OWNER.
2. PROPOSED ELECTRICAL COMPONENTS SHOWN ARE PRELIMINARY ONLY.

GENERAL NOTE:

1. REFER TO DRAWING UP-1 FOR BASEMAP INFORMATION.

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XREFS:
X-UDF-EXISTING SITE
X-UDF RFP SITE PREP-BDR-C-400
X-2024-P-FENCE
X-EXISTING GRADE TOPO
IMAGES:
GEN-X-IMAGE1.jpg
Arcadis Logo BW.PNG

1"=40' (40' 0 40' 80')

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

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

ARCADIS U.S., INC.

GE-PITTSFIELD/HOUSATONIC RIVER SITE ● LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

UTILITY LOCATION PLAN

CONTRACT 10 - UDF SITE PREPARATION

ARCADIS Project No. 30223149.3000
Date SEPTEMBER 2025

ARCADIS
ONE LINCOLN CENTER
110 WEST FAYETTE STREET
SYRACUSE, NEW YORK 13202
TEL. 315.446.9120

UP-6

Appendix D

Piezometer and Monitoring Well Decommissioning Logs

WELL DECOMMISSIONING RECORD

Well I.D.: PZ-2022-1

Project: GE UDF		Start Date:	9/8/2025
Location: Lee MA		Finish Date:	9/10/2025
Client: General Electric		Driller:	J. Eaves
Drilling Company: Parratt Wolff		Inspector:	Dan Meandro

Original Well Construction

Outer Casing

Material:	Steel
Diameter (in):	4
Length (ft):	5
Depth to Bottom (ft):	~1

Well Casing

Material:	PVC
Diameter (in):	1
Length (ft):	67.45
Interval (elev. or depth bgs):	2.86' ags - 64.59'

Screen

Material:	PVC
Diameter (in):	1
Length (ft):	10
Interval (elev. or depth bgs):	64.59'- 74.59'

Decommissioning Data

Casing Removal

Method Employed:	Overdrill
Casing Retrieved (ft):	NA

Overdrilling

Drilling Method:	Spun Casing
Borehole Diameter (in):	4.5
Length (ft):	75.6
Interval Drilled (elev. or depth bgs):	0.0' - 75.6' bgs

Grouting

Cement Type:	Portland
Cement Quantity (lbs.):	1316
Bentonite Quantity (lbs.):	87.5
Water Quantity (gal):	125
Grout Volume (gal):	175
Calculated Borehole Volume (gal):	62.5

Surface Seal

Diameter or Dimensions (ft):	NA
Thickness (ft):	NA

Decommissioned Well Schematic (not to scale)

Depth (ft)	Elevation (AMSL)
0	1,021.90
2.00	
3.00	
75.6	946.30

Abbreviations

NA - Not Applicable, bgs -below grade surface, ags - above grade surface, HSA - Hollow Stem Auger

Comments

1. Well overdrilled with 4.5 inch diameter spun casing.
2. Well casing filled with grout before overdrilling. Grout quantity above is for borehole.

WELL DECOMMISSIONING RECORD

Well I.D.: PZ-2022-2

Project: GE UDF		Start Date:	8/28/2025
Location: Lee MA		Finish Date:	9/2/2025
Client: General Electric		Driller:	J. Eaves
Drilling Company: Parratt Wolff		Inspector:	Rick McDermitt

Original Well Construction

Outer Casing

Material:	Steel
Diameter (in):	4
Length (ft):	5
Depth to Bottom (ft):	~1

Well Casing

Material:	PVC
Diameter (in):	1
Length (ft):	78.66
Interval (elev. or depth bgs):	2.66' ags - 76'

Screen

Material:	PVC
Diameter (in):	1
Length (ft):	10
Interval (elev. or depth bgs):	76'- 86'

Decommissioning Data

Casing Removal

Method Employed:	Overdrill
Casing Retrieved (ft):	NA

Overdrilling

Drilling Method:	Spun Casing and HSA
Borehole Diameter (in):	8.125
Length (ft):	88
Interval Drilled (elev. or depth bgs):	0.0' - 88' bgs

Grouting

Cement Type:	Portland
Cement Quantity (lbs.):	2350
Bentonite Quantity (lbs.):	156.25
Water Quantity (gal):	225
Grout Volume (gal):	315
Calculated Borehole Volume (gal):	237.0

Surface Seal

Diameter or Dimensions (ft):	NA
Thickness (ft):	NA

Decommissioned Well Schematic (not to scale)

Depth (ft)	Elevation (AMSL)
0	1,030.20
2.00	
3.00	
88	942.20

Abbreviations

NA - Not Applicable, bgs -below grade surface, ags - above grade surface, HSA - Hollow Stem Auger

Comments

1. Well overdrilled with 3 inch diameter spun casing followed by 4.25 inch inner diameter heavy duty HSA.
2. Well casing filled with grout before overdrilling. Grout quantity above is for borehole.

WELL DECOMMISSIONING RECORD

Well I.D.: PZ-2022-3

Project: GE UDF		Start Date:	8/25/2025
Location: Lee MA		Finish Date:	8/28/2025
Client: General Electric		Driller:	J. Eaves
Drilling Company: Parratt Wolff		Inspector:	Rick McDermitt

Original Well Construction

Outer Casing

Material:	Steel
Diameter (in):	4
Length (ft):	5
Depth to Bottom (ft):	~1

Well Casing

Material:	PVC
Diameter (in):	1
Length (ft):	82.69
Interval (elev. or depth bgs):	2.69' ags - 80.00'

Screen

Material:	PVC
Diameter (in):	1
Length (ft):	10
Interval (elev. or depth bgs):	80.00'- 90.00'

Decommissioning Data

Casing Removal

Method Employed:	Overdrill
Casing Retrieved (ft):	NA

Overdrilling

Drilling Method:	Spun Casing and HSA
Borehole Diameter (in):	8.125
Length (ft):	92
Interval Drilled (elev. or depth bgs):	0.0' - 92' bgs

Grouting

Cement Type:	Portland
Cement Quantity (lbs.):	2256
Bentonite Quantity (lbs.):	150
Water Quantity (gal):	200
Grout Volume (gal):	280
Calculated Borehole Volume (gal):	243.0

Surface Seal

Diameter or Dimensions (ft):	NA
Thickness (ft):	NA

Decommissioned Well Schematic (not to scale)

Depth (ft)	Elevation (AMSL)
0	1,034.00
2.00	
3.00	
92	942.00

Abbreviations

NA - Not Applicable, bgs -below grade surface, ags - above grade surface, HSA - Hollow Stem Auger

Comments

1. Well overdrilled with 3 inch diameter spun casing followed by 4.25 inch inner diameter heavy duty HSA.
2. Well casing filled with grout before overdrilling. Grout quantity above is for borehole.

WELL DECOMMISSIONING RECORD

Well I.D.: PZ-2022-5

Project: GE UDF		Start Date:	8/20/2025
Location: Lee MA		Finish Date:	8/21/2025
Client: General Electric		Driller:	J. Eaves
Drilling Company: Parratt Wolff		Inspector:	Rick McDermitt

Original Well Construction

Outer Casing

Material:	Steel
Diameter (in):	4
Length (ft):	5
Depth to Bottom (ft):	~1

Well Casing

Material:	PVC
Diameter (in):	1
Length (ft):	74.19
Interval (elev. or depth bgs):	2.69' ags - 71.50'

Screen

Material:	PVC
Diameter (in):	1
Length (ft):	10
Interval (elev. or depth bgs):	71.5'- 81.50'

Decommissioning Data

Casing Removal

Method Employed:	Overdrill
Casing Retrieved (ft):	NA

Overdrilling

Drilling Method:	Spun Casing and HSA
Borehole Diameter (in):	8.125
Length (ft):	84
Interval Drilled (elev. or depth bgs):	0.0' - 84' bgs

Grouting

Cement Type:	Portland
Cement Quantity (lbs.):	2209
Bentonite Quantity (lbs.):	100
Water Quantity (gal):	235
Grout Volume (gal):	325
Calculated Borehole Volume (gal):	227.0

Surface Seal

Diameter or Dimensions (ft):	NA
Thickness (ft):	NA

Decommissioned Well Schematic (not to scale)

Depth (ft)	Elevation (AMSL)
0	1,031.90
2.00	
3.00	
84	947.90

Abbreviations

NA - Not Applicable, bgs -below grade surface, ags - above grade surface, HSA - Hollow Stem Auger

Comments

1. Well overdrilled with 3 inch diameter spun casing followed by 4.25 inch inner diameter heavy duty HSA.
2. Well casing filled with grout before overdrilling. Grout quantity above is for borehole.

WELL DECOMMISSIONING RECORD

Well I.D.: PZ-2022-7

Project: GE UDF		Start Date:	8/19/2025
Location: Lee MA		Finish Date:	9/3/2025
Client: General Electric		Driller:	G. Lansing
Drilling Company: Parratt Wolff		Inspector:	Rick McDermitt

Original Well Construction

Outer Casing

Material:	Steel
Diameter (in):	4
Length (ft):	5
Depth to Bottom (ft):	~1

Well Casing

Material:	PVC
Diameter (in):	1
Length (ft):	67.04
Interval (elev. or depth bgs):	3.59' ags - 63.5'

Screen

Material:	PVC
Diameter (in):	1
Length (ft):	10
Interval (elev. or depth bgs):	63.5'- 73.5'

Decommissioning Data

Casing Removal

Method Employed:	Overdrill
Casing Retrieved (ft):	NA

Overdrilling

Drilling Method:	Spun Casing and HSA
Borehole Diameter (in):	8.125
Length (ft):	75.5
Interval Drilled (elev. or depth bgs):	0.0' - 75.5' bgs

Grouting

Cement Type:	Portland
Cement Quantity (lbs.):	2256
Bentonite Quantity (lbs.):	150
Water Quantity (gal):	215
Grout Volume (gal):	300
Calculated Borehole Volume (gal):	204.0

Surface Seal

Diameter or Dimensions (ft):	NA
Thickness (ft):	NA

Decommissioned Well Schematic (not to scale)

Depth (ft)	Elevation (AMSL)
0	1,024.70
2.00	
3.00	
75.5	949.20

Abbreviations

NA - Not Applicable, bgs -below grade surface, ags - above grade surface, HSA - Hollow Stem Auger

Comments

1. Well overdrilled with 3 inch diameter spun casing followed by 4.25 inch inner diameter heavy duty HSA.
2. Well casing filled with grout before overdrilling. Grout quantity above is for borehole.

WELL DECOMMISSIONING RECORD

Well I.D.: PZ-2022-8

Project: GE UDF		Start Date:	9/4/2025
Location: Lee MA		Finish Date:	9/8/2025
Client: General Electric		Driller:	J. Eaves
Drilling Company: Parratt Wolff		Inspector:	Kyle Barber

Original Well Construction

Outer Casing

Material:	Steel
Diameter (in):	4
Length (ft):	5
Depth to Bottom (ft):	~1

Well Casing

Material:	PVC
Diameter (in):	2
Length (ft):	78.86
Interval (elev. or depth bgs):	3.66' ags - 75.20'

Screen

Material:	PVC
Diameter (in):	2
Length (ft):	10
Interval (elev. or depth bgs):	75.2'- 85.2'

Decommissioning Data

Casing Removal

Method Employed:	Overdrill
Casing Retrieved (ft):	NA

Overdrilling

Drilling Method:	HSA
Borehole Diameter (in):	8.125
Length (ft):	87.1
Interval Drilled (elev. or depth bgs):	0.0' - 87.1' bgs

Grouting

Cement Type:	Portland
Cement Quantity (lbs.):	3008
Bentonite Quantity (lbs.):	200
Water Quantity (gal):	215
Grout Volume (gal):	400
Calculated Borehole Volume (gal):	235.0

Surface Seal

Diameter or Dimensions (ft):	NA
Thickness (ft):	NA

Decommissioned Well Schematic (not to scale)

Depth (ft)	Elevation (AMSL)
0	1,035.40
2.00	
3.00	
87.1	948.30

Abbreviations

NA - Not Applicable, bgs -below grade surface, ags - above grade surface, HSA - Hollow Stem Auger

Comments

1. Drill rod placed in well casing and well overdrilled with 4.25 inch inner diameter heavy duty HSA.

WELL DECOMMISSIONING RECORD

ARCADIS

Well I.D.: Initial MW-2022-8 (Abandoned)

Project: GE UDF		Start Date:	8/14/2025
Location: Lee MA		Finish Date:	8/19/2025
Client: General Electric		Driller:	G. Lansing
Drilling Company: Parratt Wolff		Inspector:	Kyle Barber

Original Well Construction

Outer Casing

Material:	Steel
Diameter (in):	4
Length (ft):	5
Depth to Bottom (ft):	~1

Well Casing

Material:	PVC
Diameter (in):	2
Length (ft):	64.74
Interval (elev. or depth bgs):	1.55' ags - 63.19'

Screen

Material:	PVC
Diameter (in):	2
Length (ft):	10
Interval (elev. or depth bgs):	63.19'- 73.19'

Decommissioning Data

Casing Removal

Method Employed:	Overdrill
Casing Retrieved (ft):	NA

Overdrilling

Drilling Method:	HSA
Borehole Diameter (in):	8.125
Length (ft):	85
Interval Drilled (elev. or depth bgs):	0.0' - 85' bgs

Grouting

Cement Type:	Portland
Cement Quantity (lbs.):	2021
Bentonite Quantity (lbs.):	60
Water Quantity (gal):	215
Grout Volume (gal):	300
Calculated Borehole Volume (gal):	224.0

Surface Seal

Diameter or Dimensions (ft):	NA
Thickness (ft):	NA

Decommissioned Well Schematic (not to scale)

Depth (ft)	Elevation (AMSL)
0	1,019.00
2.00	1,017.00
3.00	1,016.00
85	934.00

Abbreviations

NA - Not Applicable, bgs -below grade surface, ags - above grade surface, HSA - Hollow Stem Auger

Comments

1. Drill rod placed in well casing and well overdrilled with 4.25 inch inner diameter heavy duty HSA.

WELL DECOMMISSIONING RECORD

Well I.D.: MW-2022-8 (Formerly PZ-2022-4)

Project: GE UDF		Start Date:	8/13/2025
Location: Lee MA		Finish Date:	8/14/2025
Client: General Electric		Driller:	G. Lansing
Drilling Company: Parratt Wolff		Inspector:	Rick McDermitt

Original Well Construction

Outer Casing

Material:	Steel
Diameter (in):	4
Length (ft):	5
Depth to Bottom (ft):	~1

Well Casing

Material:	PVC
Diameter (in):	2
Length (ft):	66.24
Interval (elev. or depth bgs):	3.29' ags - 62.95'

Screen

Material:	PVC
Diameter (in):	2
Length (ft):	10
Interval (elev. or depth bgs):	62.95'- 72.95'

Decommissioning Data

Casing Removal

Method Employed:	Overdrill
Casing Retrieved (ft):	NA

Overdrilling

Drilling Method:	HSA
Borehole Diameter (in):	8.125
Length (ft):	75.5
Interval Drilled (elev. or depth bgs):	0.0' - 75.5' bgs

Grouting

Cement Type:	Portland
Cement Quantity (lbs.):	1880
Bentonite Quantity (lbs.):	125
Water Quantity (gal):	180
Grout Volume (gal):	250
Calculated Borehole Volume (gal):	203.0

Surface Seal

Diameter or Dimensions (ft):	NA
Thickness (ft):	NA

Decommissioned Well Schematic (not to scale)

Depth (ft)	Elevation (AMSL)
0	1,018.50
2.00	
3.00	
75.5	943.00

Abbreviations

NA - Not Applicable, bgs -below grade surface, ags - above grade surface, HSA - Hollow Stem Auger

Comments

1. Drill rod placed in well casing and well overdrilled with 4.25 inch inner diameter heavy duty HSA.

WELL DECOMMISSIONING RECORD

Well I.D.: MW-2022-9

Project: GE UDF		Start Date:	8/11/2025
Location: Lee MA		Finish Date:	8/12/2025
Client: General Electric		Driller:	G. Lansing
Drilling Company: Parratt Wolff		Inspector:	Rick McDermitt

Original Well Construction

Outer Casing

Material:	Steel
Diameter (in):	4
Length (ft):	5
Depth to Bottom (ft):	~1

Well Casing

Material:	PVC
Diameter (in):	2
Length (ft):	34.65
Interval (elev. or depth bgs):	3.23' ags - 31.42'

Screen

Material:	PVC
Diameter (in):	2
Length (ft):	10
Interval (elev. or depth bgs):	31.42' - 41.42'

Decommissioning Data

Casing Removal

Method Employed:	Overdrill
Casing Retrieved (ft):	NA

Overdrilling

Drilling Method:	HSA
Borehole Diameter (in):	8.125
Length (ft):	47
Interval Drilled (elev. or depth bgs):	0.0' - 47' bgs

Grouting

Cement Type:	Portland
Cement Quantity (lbs.):	1128
Bentonite Quantity (lbs.):	75
Water Quantity (gal):	90
Grout Volume (gal):	150
Calculated Borehole Volume (gal):	120.0

Surface Seal

Diameter or Dimensions (ft):	NA
Thickness (ft):	NA

Decommissioned Well Schematic (not to scale)

Depth (ft)	Elevation (AMSL)
0	987.80
2.00	
3.00	
47	940.80

Abbreviations

NA - Not Applicable, bgs -below grade surface, ags - above grade surface, HSA - Hollow Stem Auger

Comments

1. Drill rod placed in well casing and well overdrilled with 4.25 inch inner diameter heavy duty HSA.

Appendix E

Stockpiled Debris Sampling Work Plan

ARCADIS

General Electric Company

Stockpiled Debris Sampling Work Plan

GE Upland Disposal Facility

October 2025

Stockpiled Debris Sampling Work Plan

GE Upland Disposal Facility

October 2025

Prepared By:
Arcadis U.S., Inc.
One Lincoln Center, 110 West Fayette Street, Suite 300
Syracuse
New York 13202
Phone: 315 446 9120
Fax: 315 449 0017

Prepared For:
Mr. Matthew Calacone
Senior Project Manager
GE Aerospace
1 Plastics Avenue
Pittsfield, Massachusetts 01201

Our Ref:
30223149

Contents

Figures

Acronyms and Abbreviations

Eversource	Eversource Energy
FSP/QAPP	The GE Pittsfield/Housatonic River Site Field Sampling Plan / Quality Assurance Project Plan
GE	General Electric Company
HASP	Health and Safety Plan
JSA	Job Safety Analysis
Lane	The Lane Construction Corporation
MS/MSD	Matrix Spike and Matrix Spike Duplicate
PCB	polychlorinated biphenyl
Project	The sampling activities described in the Work Plan
QA/QC	Quality Assurance/Quality Control
Site	The GE Upland Disposal Facility located at 339 Woodland Road in Lee, Massachusetts
SOP	standard operating procedures
SVOC	semi-volatile organic compound
TCLP	Toxicity Characteristic Leaching Procedure
UDF	Upland Disposal Facility
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
Work Plan	Stockpiled Debris Sampling Work Plan

1 Introduction and Objectives

This Stockpiled Debris Sampling Work Plan (Work Plan) has been prepared on behalf of the General Electric Company (GE) to present the proposed sampling activities for debris stockpiles existing within the Upland Disposal Facility (UDF) area on the GE property.

The GE property is located at 339 Woodland Road, Lee, MA (the Site). The UDF will be constructed on a portion of the 75-acre GE property that was formerly part of an active sand and gravel quarry that GE acquired from the Lane Construction Corporation (Lane) in April 2021. A Site Location Map showing the GE property and UDF area is presented as Figure 1.

1.1 Site Description and History

The UDF Site area generally consists of previously disturbed and barren ground areas void of vegetation, open grassed and wooded areas, and man-made ponds which are associated with the prior quarry operations. The bordering Site features are Valley Street to the north, Woodland Road to the east, the Lee Municipal Landfill to the south, and the remaining former Lane property (now known as Northeast Paving, a Division of Eurovia Atlantic Coast, LLC) to the west, which is located on Willow Hill Road. The soils on Site largely consist of sand and gravel. There is a general east-to-west gradient in the groundwater table across the Site. Additionally, there is an existing Eversource Energy (Eversource) utility easement containing overhead electric lines on the western side of the GE property. There are no known underground utilities within the GE property.

1.2 Objectives

This Work Plan describes the proposed sampling investigations necessary to support evaluation of possible options for reuse of the debris stockpile material or its off-Site disposition. The debris stockpiles (e.g., concrete, brick) present at the Site are the result of past operations conducted by the previous property owner. At this time, GE is considering possible options for reuse of stockpile materials on-site as part of UDF construction, pending laboratory analytical results. The major elements of the sampling activities described in this Work Plan are referred to herein as the “Project.”

1.3 Work Plan Organization

The remainder of this Work Plan is organized into the following sections:

- Section 2 provides a summary of the Work Plan sampling elements.
- Section 3 addresses decontamination procedures associated with the sampling work.
- Section 4 provides an overview of project documentation.
- Section 5 presents the proposed project schedule.

2 Work Plan Sampling Elements

This section provides a summary of the Work Plan sampling activities.

2.1 Site Preparation

Prior to mobilization of equipment, materials, and qualified personnel to the Site, several initial tasks will be completed to safeguard workers and facilitate execution of the Project, including, but not limited to:

- Implementation of the health and safety program to ensure safety is the top priority for Site personnel. The health and safety program includes updating the Site-specific Health and Safety Plan (HASP) to address potential hazards.
- Establishment of temporary Project support areas as appropriate, including a staging area for equipment and materials, an area for processing sample materials; an equipment decontamination area; etc.
- Identification and demarcation (if necessary) of utilities within the work areas (i.e., overhead utility lines and related equipment).

2.2 Sample Collection

Debris stockpile sampling will be conducted to assess the potential for reuse of the debris materials on Site. Six discrete debris piles are present on Site, as shown on Figure 2. These debris piles contain materials including concrete, red clay brick, slate, concrete block, milled asphalt, aggregate, and other construction-related materials. The following procedure will be implemented for sampling of the stockpiled debris materials:

- GE will collect and submit for analysis samples from each debris stockpile at the following frequencies:
  - Approximately one sample per type of material, per condition (i.e., samples will be collected to assess representative conditions by material type [e.g., clean concrete, stained concrete, painted concrete, miscellaneous coated concrete]). The minimum number of samples collected for each of the defined debris stockpile areas shown on Figure 1 are indicated in Table 1 below.
  - Additional samples of material that appear impacted (e.g., other staining/conditions, odor, etc.)
- All samples will be submitted for analysis TCLP and the full list of analytes for soil presented in Table 2 of GE's 2023 Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP, Arcadis 2023).
- Samples will be submitted under proper chain-of-custody protocols to a GE-approved laboratory, for analysis on a standard (10-day) turnaround time.
- Appropriate Quality Assurance/Quality Control (QA/QC) samples will be collected at the approximate frequences provided herein, primarily consisting of field blind duplicate samples and Matrix Spike and Matrix Spike Duplicate (MS/MSD) samples (one per 20 samples), equipment blanks (one per 20 samples), and trip blanks (one per cooler containing samples for VOC analysis).

An initial visual assessment of debris material quantities and condition will be made in the field and sampled materials and sample quantities will be adjusted accordingly based on the presence and quantity of materials identified. All sampling work will be conducted in accordance with relevant GE standard operating procedures SOPs) and health and safety Job Safety Analysis (JSA) procedures.

Table 1

Debris Pile Area*	Minimum Number of Samples
1	7
2	2
3	2
4	2
5	3
6	2

*See Figure 2 for debris pile area locations.

2.3 Laboratory Analysis Procedures

The procedures to be followed in conducting the sampling and analysis and related activities described in Section 2.2 will consist of those provided in the FSP/QAPP, as applicable. Applicable SOPs for field-based activities are found in Volumes II and III of that FSP/QAPP Appendices and are listed below:

- Appendix A Standard Operating Procedures for Field Measurement Data Collection
- Appendix Z Standard Operating Procedures for Building Material Sampling Procedures
- Appendix DD Standard Operating Procedures for Sample Handling, Packing, and Shipping
- Appendix EE Standard Operating Procedures for Equipment Cleaning

2.4 Project Restoration

Following sampling and handling of materials, Project equipment and materials will be decontaminated (as required) and removed from the Site and temporary work areas will be returned to their pre-mobilization conditions.

3 Project Documentation

Upon completion of the Project activities, a summary report will be prepared and submitted to United States Environmental Protection Agency (USEPA). This summary report is anticipated to include the following information:

- Description of the work completed.
- Figures depicting the sampling areas.
- Analytical data tables and associated laboratory analytical reports for samples collected during the Project.
- Photographs documenting the work conducted.
- Deviations from the Work Plan approach, if any.

4 Project Schedule

GE intends to commence the work discussed in this Work Plan in fall 2025, contingent upon USEPA review/approval. Activities are anticipated to be completed over a week, with an estimated completion by mid to late November 2025. GE will notify USEPA prior to the start of the sampling field work.

Figures

LEGEND:

- GE PARCEL BOUNDARY
- UPLAND DISPOSAL FACILITY LIMITS OF CONSOLIDATED MATERIAL
- UPLAND DISPOSAL FACILITY OPERATIONAL AREA
- EXISTING OVERHEAD TRANSMISSION EASEMENT

0 600' 1200'

GRAPHIC SCALE

NOTES:

1. SITE FEATURES OBTAINED FROM DRAWING ENTITLED "PLAN OF LAND SURVEYED FOR THE LANE CONSTRUCTION CORPORATION" PREPARED BY SK DESIGN GROUP, INC., DATED JUNE 4, 2010.
2. AERIAL IMAGERY: © MICROSOFT CORPORATION © 2022 MAXAR ©CNES (2022) DISTRIBUTION AIRBUS DS.
3. UPLAND DISPOSAL FACILITY LIMITS OF CONSOLIDATED MATERIAL, OPERATIONAL AREA, AND SUPPORT AREAS SHOWN ARE CONCEPTUAL ONLY.

GE-PITTSFIELD/HOUSATONIC RIVER SITE
LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

SITE LOCATION MAP

ARCADIS

FIGURE
1

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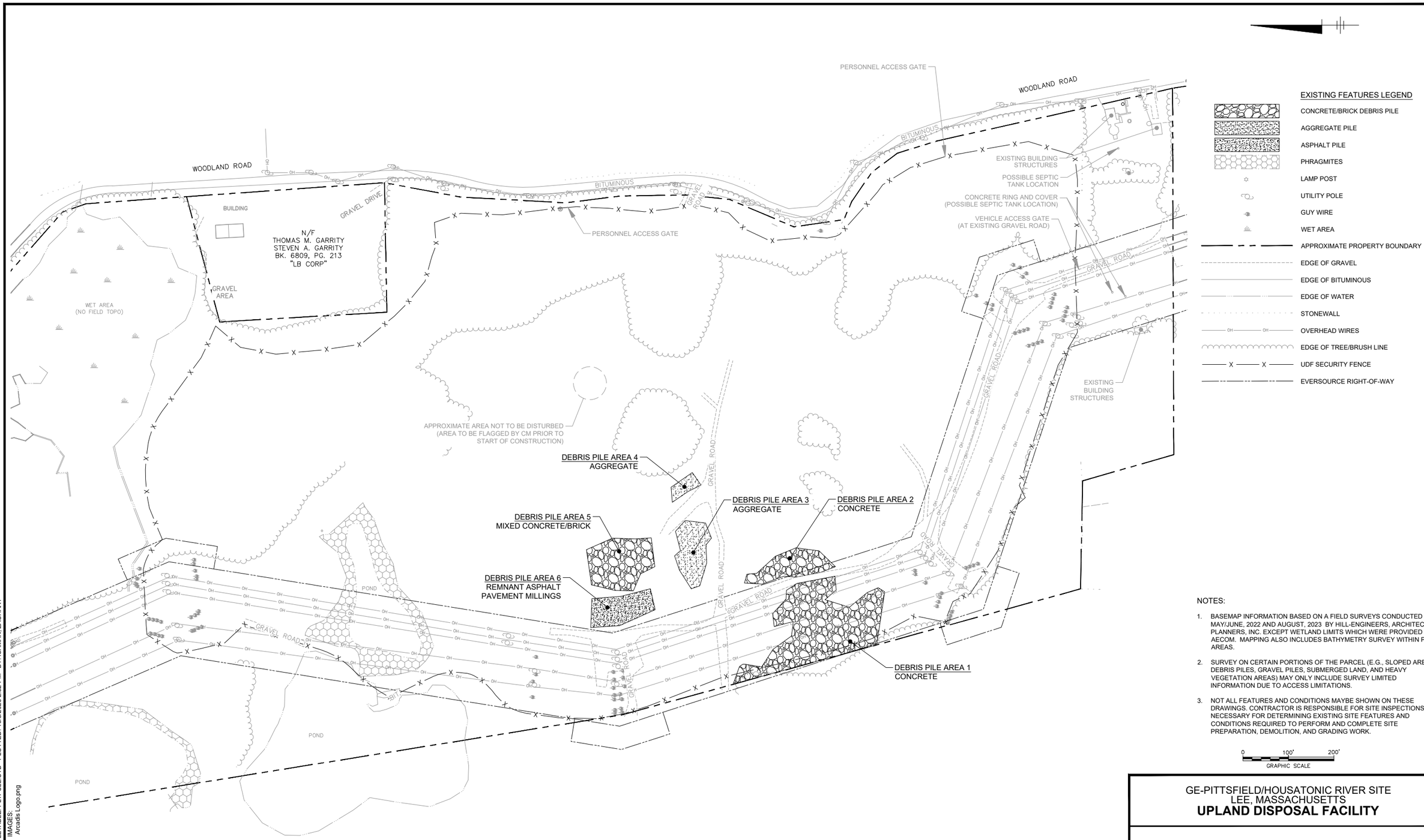

NOTES:

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 ONLY INCLUDE SURVEY LIMITED INFORMATION DUE TO ACCESS LIMITATIONS.
3. NOT ALL FEATURES AND CONDITIONS MAYBE SHOWN ON THESE DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR SITE INSPECTIONS NECESSARY FOR DETERMINING EXISTING SITE FEATURES AND CONDITIONS REQUIRED TO PERFORM AND COMPLETE SITE PREPARATION, DEMOLITION, AND GRADING WORK.

0 100' 200'
GRAPHIC SCALE

GE-PITTSFIELD/HOUSATONIC RIVER SITE
LEE, MASSACHUSETTS
UPLAND DISPOSAL FACILITY

DEBRIS STOCKPILE LOCATIONS AND SITE FEATURES PLAN

ARCADIS

FIGURE
2

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Arcadis U.S., Inc.
One Lincoln Center, 110 West Fayette Street, Suite 300
Syracuse
New York 13202
Phone: 315 446 9120
Fax: 315 449 0017
www.arcadis.com