NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau C 625 Broadway, 11th Floor, Albany, NY 12233-7014 P: (518) 402-9662 I F: (518) 402-9679 www.dec.ny.gov

September 3, 2020

Tanya Alexander National Fuel Gas Corporation 6363 Main Street Williamsville, NY 14221-5887

> Re: 100% Remedial Design Plan Hornell Former MGP Site, 851032

The New York State Department of Environmental Conservation (the Department) and the New York State Department of Health (NYSDOH) have reviewed the 100% Remedial Design Plan for the Hornell Former MGP site, dated August 20th, 2020. The 100% Remedial Design Plan is hereby approved contingent upon Department concurrence with findings from the ongoing effort to further delineate the extent of shallow soil excavation on the eastern side of the site.

If you have any questions about this letter or any other aspects of the project, please don't hesitate to contact me at 518-402-7383.

Sincerely,

Matthew A. King Geologist Trainee Remedial Bureau C

Matte a.K.

ec: Walker, B. Kopcow, D. Holden, J. Eaton, D. Kuehner, W.





August 20, 2020 Project 1801687

Consulting

Mr. Matt King

New York State Department of Environmental Conservation Engineers and

Remedial Bureau C Scientists

Division of Environmental Remediation

625 Broadway Albany, NY 12233

Re: National Fuel Gas Hornell Final Remedial Design

> **Former Hornell MGP Site** Hornell, New York Order No. A8-0634-02-10

Site No. 851032

Dear Mr. King:

On behalf of National Fuel Gas Distribution Corporation (NFG), GEI Consultants, Inc., P.C. (GEI) is providing the Final Remedial Design for the Former Hornell Manufactured Gas Plant (MGP) site (Site) located in Hornell, Steuben County, New York. The Final Remedial Design document presents a remedy consistent with the March 2018 Record of Decision (ROD), issued by the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation as well as the response to NYSDEC July 14, 2020 comments for the 95% Remedial Design.

The Final Remedial Design package includes the following components:

- 1. Technical Specifications
- 2. Final Remedial Design Drawings
- 3. Appendices, including
 - Community Air Monitoring Plan
 - Support of Engineering Design Calculations
 - NYSDEC approval of the revised target remediation limits
 - Color versions of cross-sections depicted in the Design Drawings
 - A summary of the supplemental shallow soil delineation sampling results to date
 - The Contractor's current project schedule
 - The Contractor's ISS test results

- h. A list of disposal facilities currently planned for disposal of materials removed from the site
- i. A copy of GEI's Health and Safety Plan for the project
- j. NYSDEC approval of the proposed approach for on-site reuse of minimally impacted soils
- k. A Confirmation sampling plan describing the approach for collecting postexcavation soil samples from shallow soil excavations, particularly the Gas Regulator parcel
- 1. A plan identifying the planned vibration monitoring program and provisions for noise monitoring

Below are the specific responses to NYSDEC comments for the 95% Remedial Design, which were provided via email on July 14, 2020. The NYSDEC comments are repeated in their entirety in italics and followed by GEI's response.

1) Drawing S-017, sheet 17 of 18, this 95% design drawing document indicates that on-site reuse material of a commercial standard is being considered for the 4-foot excavation area. Portions of this excavation area are located on residentially zoned properties. Any backfill on residential properties should be clean, approved, imported fill. Please modify this document to more clearly show the boundary between commercial and residential properties and to exclude the use of any commercial soils from being considered for reuse on any residential parcels.

Response: The intent is only to reuse soils within the commercially zoned areas. The illustration of soil reuse within the 4-foot excavation zone on Design Drawing 17 was only intended to apply to 4-foot excavations on the commercial property, not the residential parcels. This detail has been revised for clarity on Design Drawing 17 in the Final Design submittal. Also, the Design Drawings have been revised to indicate the source area for the proposed reuse soils, as well as the limits within which they may be re-placed for use as backfill. This is consistent with our revised soil reuse proposal (dated July 7, 2020), which was approved by the Department on July 8, 2020.

On a related topic, GEI noted via email on July 27, 2020 that the Gas Regulator parcel is zoned for residential use based on tax information available online for the City of Hornell. This seems inconsistent with the current use of this parcel as a location for gas service lines and gas regulators, as well as the ROD-specified cleanup goal for the parcel. Page 2 of the ROD states that the "upper one foot of soil exceeding 500 ppm total PAHs on the off-site Gas Regulator parcel will be excavated and transported off-site for disposal." Page 3 of the ROD further states that a "site cover will be required to allow for commercial use of the site and on the off-site Gas Regulator parcel in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs)." Based on these requirements and existing site characterization data, the remedial design includes removal of the uppermost foot of soil throughout most of the Gas Regulator parcel inside the perimeter fence and extends further to a depth of 4 feet adjacent to a Supplemental Pre-Design Investigation test pit sidewall sample that exceeded 500 ppm total PAHs.

Our July 27, 2020 email proposed that soil excavation would be performed on the Gas Regulator parcel to achieve the ROD-specified goals as specified in the design, and that post-excavation confirmation sampling would be performed within the Gas Regulator parcel. Specifically, after removing the soils to the target depths within this area (plus additional soils based on visual inspection following removal to target limits, if necessary), GEI would collect confirmation samples. To the extent that those concentrations exceed residential SCOs, the presence of remaining impacted soils would be documented in the Site Management Plan. In the unlikely future condition where the gas regulators may be removed and the parcel converted to residential use, any further remediation to meet residential use criteria could be more easily completed at that time when the gas lines and regulators are no longer present to complicate the work.

Our proposed approach for addressing the Gas Regulator parcel soils was approved via return email on August 4, 2020 and is thus reflected in the Final Design.

2) Drawing S-009, sheet 9 of 18, shows a symbol that is not listed in the legend nor labelled on the map. The symbol is a line with an "E" in it. Presumably this notes the location of an electrical wire which carries on from the overhead wire that is labelled O/H. Please add this symbol to the legend or make note of it on the figure.

Response: The "E" line indicates an underground electric line. The Design Drawings have been modified to include this item in the legend, including Sheets 003 (Existing Conditions) and 009 (Demolition and Protection).

3) Drawing S-018, sheet 18 of 18, contains a depiction of a sign to be posted at the site. The phone number on this sign in the depiction is the Bureau C fax number. The guidance has changed for signage at DEC sites. I have provided this new guidance as an attachment to this letter. The email address in the guidance should be used on any site sign. Use this email address anywhere else in the document that a number is listed for the general public to contact the Department. If anywhere in the design document lists a direct contact for on-site staff to use, such as in the CAMP, please provide my direct phone line 518-402-7383.

Response: Based on further clarification regarding this comment, we have modified the sign layout to specify alternative NYSDEC contact information.

4) Remedial Design Specifications, Section 01 31 00, 1.2 On-site Construction Personnel: There is no mention of a CAMP technician in this section. Please note any and all expectations for the onsite presence of a CAMP technician in this section.

Response: This specification has been revised to indicate the role of the CAMP technician.

5) Remedial Design Specifications, Section 02 55 00-6, 1.8, Performance Standards: The word average should be deleted in this section. Averages are not allowed as per Department guidance.

Response: The word "average" was struck from the ISS Performance Standards. Similarly, the flexibility for certain results to achieve less stringent standards was also removed. Consistent with the guidance, GEI and ENTACT will contact DEC to discuss handling of any results that do not meet the specified values.

6) Remedial Design Specifications, Section 02 55 00, 3.3, Soil Solidification, I: Final depths for the ISS mass must be made in consultation with the Department if ISS mass design depths are not met

Response: Noted. This is an excellent example of the issue discussed in the second bullet on Page 2 of our cover letter transmitting the 95% Design for NYSDEC review, which indicated:

"The 95% Remedial Design is partially comprised of the Technical Specifications that were used for Contractor procurement. Note that the Technical Specifications represent explicit instructions to the Contractor. In doing so, they reflect the scope of work and procedures that must be implemented for remedy construction. Because ENTACT is contracted to GEI, there are numerous instances where "approval by the Engineer" (or similar) is stated in these documents. As appropriate, GEI ("the Engineer") will solicit appropriate input from National Fuel, the NYSDEC, Design Drawings, relevant regulations/guidance, and/or other applicable sources before approving any of the Contractor's work."

The specification section referenced in this NYSDEC comment instructs the Contractor to notify the Engineer if the ISS depths cannot be met, and then the Engineer will provide further instruction. As indicated in the excerpt above, GEI would solicit input from all relevant parties when responding to any such occurrences. This same concept applies to the wording used in the Final Design.

- 7) Remedial Design Specifications, Section 02 60 00, 1.1, Summary, C, 1, b: Hardened tar is not in any instance a material acceptable for re-use onsite.
- Response: We concur that hardened tar is not suitable for re-use on site, which it why it was included as part of the definition of the "debris" subset of "Remediation Waste" in this specification. The phrase "not otherwise determined to be suitable for reuse on site" was intended to clarify that certain components of the debris (e.g., stone, wood or roots) may be deemed suitable for on-site reuse under certain conditions. The wording of this section has been revised in an effort to provide additional clarity.
- 8) Remedial Design Specifications, in general: In regard to spill reporting, the determination of whether a spill does or does not need to be reported is up to the Department. Any amount spilled should be shared with the Department project manager as soon as practicable.
- Response: Wording has been added to Specification Sections 01 14 00 and 02 60 00 to indicate that all spills are to be reported to the NYSDEC Project Manager as soon as practical.
- 9) Remedial Specifications, Section 1.5, Daily Report: Any CAMP exceedances and any corrective actions taken should be included in the daily report.
- Response: Section 1.5 of Specification 01 31 00 has been revised to specifically indicate that CAMP exceedances and corrective actions will be noted in the daily report.
- 10) Appendix 1 Community Air Monitoring Plan: There is no mention of odor monitoring in this plan. Please include a plan for odor monitoring along with response actions for odor detections by on-site personnel or the community in this plan.

Response: The CAMP document has been revised to odor monitoring and response actions. The updated CAMP document is provided as an attachment to the Final Design submittal.

11) Document Submittals: Please EC Wendy Kuehner, NYSDOH Engineer, on any future submittals of reports, work plans or any other documents requiring review by the Department and NYSDOH for this site. wendy.kuehner@health.ny.gov

Response: Noted.

Following NYSDEC approval of the Final Remedial Design, we will provide you notification of the remediation mobilization, currently scheduled for early September 2020.

If you have any questions regarding the information presented, please call me at (607) 216-8976 or email me at dkopcow@geiconsultants.com.

Jeffrey Holden, P.E.

Senior Engineer

Sincerely,

GEI CONSULTANTS, INC., P.C.

Daniel Kopcow, P.E., PMP

Project Manager and Vice President

DK:mlr

Enclosures

ec/c: Wendy S. Kuehner – NYSDOH

Tanya Alexander – National Fuel Gas Brad Walker – National Fuel Gas



SPECIFICATIONS FOR REMEDIAL ACTION FINAL REMEDIAL DESIGN

HORNELL FORMER MANUFACTURED GAS PLANT SITE



Prepared by GEI Consultants, Inc., P.C. 1301 Trumansburg Road, Suite N Ithaca, NY 14850

SECTION 00 01 10

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SECTION 01 11 00 SUMMARY OF WORK

PART 1 GENERAL

1.1. PROJECT DESCRIPTION

- A. The Remedial Action for the Former Hornell Manufactured Gas Plant (MGP) Site consists of the excavation, in-situ solidification (ISS), and off-site disposal of MGP-impacted material, plus areas of shallow excavation of surface soils within the former MGP parcel as well as on an adjacent natural gas regulator parcel and certain residential properties. The site is located along Franklin Street near the corner of Franklin and Canisteo Streets at the southwest side of the downtown area of Hornell, New York. The easternmost edge abuts Canisteo Street. The eastern third of the site is currently developed as part of a hotel property, and the central and western portion of the site is a grassy vacant lot. The site is generally flat and does not have any surface water features present.
- B. Unless otherwise specified, tasks, requirements, deliverables, etc. contained in the Final Design Package will be undertaken as a design-build project implemented by GEI Consultants, Inc., P.C. (Engineer) and ENTACT, LLC (Contractor) on behalf of National Fuel Gas Corporation. Project Work to be performed by the Contractor includes, but is not limited to, the following:
 - 1. Prepare and implement a Contractor Health and Safety Plan.
 - 2. Install, operate, and maintain temporary facilities and controls, including:
 - a. Erosion controls.
 - b. Temporary vehicular traffic and pedestrian control measures.
 - c. Worker health and safety measures.
 - d. Equipment and personnel decontamination facilities.
 - e. Sanitary facilities.
 - f. Office trailer, including dedicated space for NYSDEC representative and a separate space for GEI Construction Manager and technician.
 - g. Dust, odor, and vapor control.
 - h. Site access control/fencing.
 - i. All other facilities and utilities required to complete the Project Work.
 - 3. Establish additional survey control points as necessary.
 - 4. Obtain local permits as required for completion of the Work.

- 5. Abide by the provisions of all permits and provide coordination and adequate notice as may be required of any construction activity which will require an inspection.
- 6. Provide contact information for all Subcontractors, including transporters and disposal facilities, to the Engineer for approval.
- 7. Perform the remediation.
 - a. Perform utility location tasks as defined in Section 01 18 00 Utility Protection.
 - b. Identify, temporarily relocate, or protect existing utilities and site features to remain after the Project is complete. (Note: New York State Electric and Gas [NYSEG] will temporarily remove overhead utility lines along Franklin Street adjacent to the project. The removal is expected to be completed before Contractor mobilization and the replacement of overhead utility lines to their original location, if needed, will be performed by NYSEG after the completion of the Work.)
 - c. Carry out all tasks required for site preparation.
 - d. Remove hazards and provide support/protection of structures to remain as shown in the Final Design Package.
 - e. Implement all necessary odor and vapor control provisions.
 - f. Excavate to pre- and post-ISS lines and grades shown in the Design Drawings.
 - g. Excavate to indicated lines and grades at the off-site Gas Regulator parcel and adjacent residential parcels as shown in the Design Drawings.
 - h. Manage on site all excavated soil, including covering stored soil while not being actively handled.
 - i. Transport soil and debris to an approved off-site commercial disposal facility.
 - j. Implement ISS to the design limits and specifications.
 - k. Conduct all required quality and performance tests of ISS material.
 - 1. Provide and install fill material meeting site use criteria to provide at least 4 feet of cover atop the stabilized ISS mass.
 - m. Provide survey documentation confirming limits and depths of excavation, ISS, fill thicknesses, and soil cover thicknesses.
 - n. Reinstall or replace all site features and appurtenances that are damaged or relocated during the performance of the Work.

- 8. Clean up and restore site to preconstruction conditions, as directed by the Engineer. Demobilize and promptly remove all contractor supplies, equipment, and tools from the site. Restore, repair, or replace utilities, and other features removed, damaged, destroyed, or disrupted during construction.
- 9. Provide and perform any other equipment, Work, or submittals required to facilitate items 1 through 8 above and the Work shown on the Design Drawings.

1.2. DEFINITIONS

- A. National Fuel refers to the National Fuel Gas Distribution Corporation based in Williamsville, New York, its representatives, or designees.
- B. Engineer refers to GEI Consultants, Inc., P.C.
- C. Contractor refers to the remediation contractor selected to implement this design-build project, which is ENTACT, LLC.
- D. Final Design or Final Design Package refers to these specifications, the Design Drawings, and associated attachments that describe the scope of work, responsibilities, and procedures for implementing the remedial action for the Hornell former MGP site. The Final Design is subject to review and approval by the NYSDEC prior to implementation.
- E. Approved Design refers to the final remedial design package following approval by the NYSDEC and signed by the Engineer as Approved for Construction, including any modifications thereto approved during the course of the remedial construction (e.g., as approved change orders or design modifications warranted by field conditions).
- F. The Work refers to the Contractor's implementation of the Approved Design.

1.3. PROJECT CONDITIONS

- A. The site is located at the boundary of commercial and residential areas. The eastern portion of the site is an active hotel property, and the western side of the site is bordered by a parcel owned by the City of Hornell, which is used as a gas regulator station by National Fuel. Residential properties are present to the west of the gas regulator area and to the south of the site. Remedial activities extend onto certain residential properties to the south, as shown on the Design Drawings. Access agreements have been negotiated by National Fuel with the requisite property owners and Work is required to be performed in accordance with the access agreements.
- B. Information regarding site conditions, including the NYSDEC-issued Record of Decision (ROD), was provided to the Contractor during the procurement process. Contractor shall satisfy himself regarding all local conditions affecting the Work

by personal investigation, and neither the information provided, nor derived from maps or drawings, nor from the Engineer, National Fuel, or their agents or employees, shall act to relieve Contractor of any responsibility for implementing the Work in accordance with the remedial design.

1.4. CONTRACTOR'S USE OF SITE

- A. The Contractor's use of the site shall be in accordance with the terms of the access agreement(s), and any additional areas negotiated for access by the Contractor.
- B. Only stage equipment and materials in designated areas shown on Design Drawings, or as approved by the Engineer.
- C. Consider local conditions including, but not limited to, proper use, community, and local traffic patterns when implementing the Work. Implementation of the Work should minimize impacts to the neighboring properties and surrounding areas to the maximum extent practical.

1.5. FINAL DESIGN PACKAGE

- A. The Final Design Package includes the Specifications, Design Drawings, figures, attachments, and conditions included or referenced therein.
- B. It is not the intent of the Final Design to show every pipe, wire, conduit, utility connection, detail, and appurtenance necessary to complete the Work for this Project. However, such connections and details that may be necessary to complete the Work in accordance with code requirements, and to the Engineer's satisfaction will be included in the Work.

1.6. CONTRACTOR REQUIREMENTS

- A. Perform the scope of Work contained in the final design package or as otherwise approved or directed by the Engineer with approval by National Fuel and the NYSDEC.
- B. The Work will be performed on a known contaminated site. The Contractor shall develop and comply with the requirements of a Contractor Health and Safety Plan. Take precautions as necessary to protect the public and work force personnel from potential hazards.
- C. Comply with the requirements of the Record of Decision (ROD), a copy of which was provided to the Contractor during the bid phase of the project.
- D. Comply with the odor and vapor control provisions of the Community Air Monitoring Plan (CAMP), taking precautions as necessary to protect the public and work force personnel from potential hazards. A copy of the CAMP is included as an appendix to the Final Design Package. CAMP-related monitoring will be performed by the Engineer, but the Contractor is responsible for using methods and undertaking contingency measures as needed to comply with CAMP provisions.

- E. Furnish, install, and remove soil erosion and stormwater control measures. Inspect and maintain temporary facilities and controls until the Work is complete. Installation, maintenance, inspection, and removal will comply with the final design requirements or as otherwise approved by the Engineer.
- F. For any Work performed in close proximity to residential or commercial properties, utilities, or any other third-party property, take appropriate precautions and use best practices to protect the property, utility lines, trees, walls, and other structures and/or related appurtenances from damage.
- G. Repair any damage caused directly or indirectly outside the Project limits as directed by the Engineer at no additional cost to the Engineer or National Fuel.
- H. Comply with all applicable OSHA safety regulations during the performance of the Work.
- I. Provide proof of and maintain the requisite insurance, including any project-specific insurance requirements for performing Work on and/or near utilities.

1.7. DESIGN DRAWINGS AND SPECIFICATIONS

- A. Maintain at the site, two copies of all Design Drawings, Specifications, addenda, approved shop drawings, Change Orders, schedules, and instructions, in good order. Mark one set to record all changes made during construction and keep one set clean of all markings. Make both sets readily available for review by the Engineer.
- B. The Design Drawings include notes. Refer to the Design Drawings in conjunction with the Specifications.

1.8. WORK BY OTHERS

- A. Perimeter air monitoring (CAMP), noise monitoring, and vibration monitoring will be performed by the Engineer. Leak detection monitoring related to the gas pipelines will be performed by National Fuel. Work zone air monitoring is the responsibility of the Contractor.
- B. Some permitting Work will be performed by Others, refer to Section 01 41 00 Regulatory Requirements.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

(Not Applicable)

END OF SECTION 01 11 00

SECTION 01 14 00 WORK RESTRICTIONS

PART 1 GENERAL

1.1. SUMMARY

A. This section contains general restrictions to be followed during the performance of the Work. Other sections of the specification may contain additional requirements/ restrictions for performance of their specific subject matter.

1.2. SCHEDULE

- A. Schedule restrictions have been placed on the performance of the Work based on criteria stipulated in access agreements with property owners.
- B. Do not perform any Work outside the time windows given in the access agreements.

1.3. WORK HOURS

A. Do not conduct Work outside of the permitted working hours, which are Monday through Friday 9:00 am to 6:00 pm. The Contractor may perform preparatory work (e.g., greasing machines, holding safety meetings, etc.) prior to 9:00 am but may not start or operate machinery until the beginning of the permitted work hours. Additionally, the Contractor may not perform Work with high noise levels (e.g., using chainsaws, pile drivers, chippers or jackhammers) prior to 10:00 am. The Contractor, pending concurrence by National Fuel and the Engineer, may be able to negotiate alternative work hours with the hotel prior to or during remedial construction.

1.4. COMMUNICATION WITH THIRD PARTIES

- A. Representatives of regulatory agencies from the New York State Department of Environmental Conservation (NYSDEC), City of Hornell, and other local civic organizations may be on site to observe and inspect the Work.
- B. Direct communications with regulatory agency personnel to the Engineer or their designee.
- C. Do not communicate with the media/press, project stakeholders, elected officials, public, etc. regarding the Work. Refer all external questions and comments to the Engineer or the Engineer's on-site representative.

1.5. VEHICLE ACCESS AND PARKING

- A. Limited parking is available on site for use by the Contractor. Reserve designated parking spots within the site boundary for the following personnel:
 - 1. National Fuel project manager.
 - 2. Engineer (2).
 - 3. Community Air Monitoring Plan (CAMP) technician.

- 4. Visiting agency representative.
- B. Public parking facilities may be used (fees apply) to maintain vehicles nearby, if desired.
- C. Additional parking/storage space may be negotiated between the Contractor and private parking facilities, if desired.

1.6. TRAFFIC CONTROL

- A. The Work is being performed at the site is adjacent to active ongoing commercial operations and active roadways.
- B. Provide at least two weeks advance notice to the City of Hornell highway department (in writing) and to the local community (via signs and/or other communications as appropriate) prior to implementing any traffic restrictions on local roadways.
- C. If traffic must be disrupted, divert slow-moving traffic using traffic cones and caution tape. Comply with the criteria for traffic management identified in the Traffic and Pedestrian Control plan to be prepared by the Contractor and subject to approval by the Engineer.
- D. Provide all the equipment necessary to make remedial activities adequately visible to site traffic while ensuring the safety of residents, workers, and others.
- E. Obtain road permits and/or police traffic controls as required when working in or near public roads.
- F. Secure all equipment at the end of each work day.

1.7. SANITARY FACILITIES

- A. No sanitary facilities are available at the site for use by the Contractor.
- B. Provide sanitary facilities for use by the Contractor personnel, Subcontractors, National Fuel, and Engineer during the performance of the Work.

1.8. NOISE CONTROL

- A. Comply with the City of Hornell codes regarding acceptable noise levels.
- B. Limit truck and equipment idling when not in use or actively warming up equipment engines for the start of Work.
- C. Equip vehicles and motorized equipment with appropriate noise control devices to maintain noise levels that conform to current OSHA standards and State and local regulations. Take immediate steps to correct any deficiencies noticed, or as directed by the Engineer.
- D. Properly maintain all mufflers and noise control devices and replace when necessary. Operate all construction equipment in the manner that it was intended. Excessive amount of noise and vibration due to improper use of equipment is prohibited.

E. All equipment that is required to operate beyond standard work hours will, to the maximum extent possible, be electrically driven.

1.9. EQUIPMENT INSPECTIONS

- A. Before any machinery or mechanized equipment is placed in use, it shall be inspected by the Contractor to ensure it is in safe operating condition in accordance with the manufacturer's requirements and applicable OSHA regulations.
- B. Inspections shall be made and documented at the beginning of each shift during which the equipment is to be used.
- C. Any equipment found to be unsafe or not in proper working order shall be repaired prior to use by the Contractor.

1.10. EQUIPMENT LEFT ON SITE

- A. Secure all equipment left on site outside of standard work hours. Equipment keys shall be removed from equipment and stored in a locked location during non-work hours.
- B. Ensure that all equipment, where feasible, is de-energized when left on site and not in use to prevent electrical/fire/explosive hazards. The Contractor is responsible for the security, operation, and maintenance of any systems that require such services outside standard work hours. If systems are operational outside the standard work hours, provide oversight at all times when equipment is in operation, or provide an electronic monitoring system with a remote communication feature to alert the appropriate personnel of a system failure. Repair system failures in a timely manner such that the project schedule is not affected.

1.11. PERSONAL PROTECTIVE EQUIPMENT

A. All Work will begin in Level D with the possibility of an upgrade to Level C. Provide personnel that have been fit tested and certified for Level C work. Copies of all health and safety certifications must be submitted to the Engineer for review and acceptance prior to arrival on site.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

3.1. ENVIRONMENTAL PROTECTION

A. For the purposes of this specification, environmental protection is defined as the retention of the environment in its natural state to the greatest extent possible during construction, and to enhance its natural appearance at the conclusion of the Work. Comply with all applicable or relevant and appropriate, Federal, State, and local laws and regulations to provide for the abatement and control of any environmental pollution arising from the performance of the Work. The Contractor shall report

- any and all spills, regardless of volume, to the Engineer as soon as practical. The Engineer will in turn report them to the NYSDEC Project Manager to evaluate the need for further response.
- B. The Engineer may notify the Contractor in writing of any non-compliance with Federal, State, and/or local laws or regulations. Observations of non-compliance may originate from the Engineer's on-site representative or regulatory agency personnel. After receipt of the notice, immediately inform the Engineer of the proposed corrective action, and take such actions once they are approved by the Engineer. Failure or refusal to promptly comply may result in the Engineer issuing an order suspending or halting all or parts of the Work until satisfactory corrective action has been taken. Claims for extensions of time or for excess costs or damages due to the stop Work order described above, will be denied. Written documentations of non-compliance, and resolutions thereof, will be provided to National Fuel.
- C. Do not pollute any stream, river, waterway, roadway, or soil with fuel, oil, grease, lubricant, hydraulic fluid, bitumen, calcium chloride, acid, base, or other harmful materials. Comply with the appropriate Federal, State, and local regulations and guidelines for the handling and disposal of all materials.
- D. Properly dispose of any debris resulting from the performance of the Work. Disposing of any debris, soil, water, effluent, by product, waste, trash, chemical, fuel, oil, grease, lubricant, bitumen, calcium chloride, acid, base, or other harmful material etc., in or adjacent to the Project area is not acceptable. Remove any unauthorized dumped materials and restore the area as directed by the Engineer. If necessary, areas contaminated as a result of unauthorized activity or dumping by the Contractor will be remediated at no additional cost. The Contractor shall report any and all spills, regardless of volume, to the Engineer as soon as practical. The Engineer will in turn report them to the NYSDEC Project Manager to evaluate the need for further response.
- E. Dispose of all contaminated materials (debris, soil, water, effluent, by-product, waste, trash, chemical, fuel, oil, grease, lubricant, bitumen, calcium chloride, acid, base, used erosion controls, or other harmful material, etc.) resulting from the Work in accordance with all applicable, or relevant and appropriate, Federal and State laws and regulations prior to completion of the Work.

3.2. COMPLETION OF THE WORK

- A. At the completion of the Work, remove all equipment, tools and surplus materials from the site.
- B. Clean the premises, remove and dispose of all rubbish and debris, and leave the site in a neat and orderly condition.

END OF SECTION 01 14 00

SECTION 01 18 00 UTILITY PROTECTION

PART 1 GENERAL

1.1. SUMMARY

A. This specification contains the requirements for the location and protection of utilities affected by the performance of the Work.

1.2. UTILITY COORDINATION

- A. Except as noted in Section 1.4.A below, the Contractor is solely responsible for any and all required notifications to utility companies prior to commencing the Work, and for response to any emergencies that may arise during the Work. Certain active and inactive utilities may currently be present at the site. The exact location and type of utility is to be determined by the Contractor without reliance on information provided in good faith by National Fuel and/or the Engineer. National Fuel and the Engineer will not be held liable for damage by the Contractor to utilities. Several utilities may currently serve the site or adjacent properties including, but not limited to, electric, natural gas, water, sanitary sewer, storm sewer, and telephone/other communications (e.g., fiber optic cable).
- B. If the Contractor identifies a utility that is not depicted on the Design Drawings, or is located inaccurately on the Design Drawings, the Contractor shall notify the Engineer such that the locations can be corrected in National Fuel's records.

1.3. PROTECTION OF EXISTING UTILITIES

- A. Comply with the requirements of all applicable utility protection laws or regulations, including employing a private utility locator service and consulting with the appropriate Underground Facilities Protection Organization prior to starting the work. Ensure utility locations are marked or staked in the field and ensure the Work is conducted in compliance with the minimum offset distances.
- B. Contact and cooperate with utility companies to locate all utilities (including pipelines, cables, power poles, guy wires, and other structures) on the site prior to beginning the Work.
- C. Maintain all utility markouts for the duration of the Project.
- D. Markout the safe off-set distance from utilities that will not be relocated, as determined by the utility provider, prior to beginning intrusive activities.
- E. Protect all utilities from damage during construction, unless otherwise indicated to be removed or abandoned. If damaged, repair the utilities as required by the utility's owner at the Contractor's expense.
- F. Maintain existing manholes, catch basins, and other utility structures in their prework condition and protected in accordance with the Erosion and Sediment Control

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- drawings as applicable. Any material or debris entering these structures due to Contractor's operation shall be promptly removed.
- G. Use careful excavation and probing techniques (e.g., hand dig) around known existing utilities and/or when the depth or the location of utilities is uncertain.
- H. If during excavation a utility becomes undermined, provide proper support (e.g., flowable fill) until such time the excavation is backfilled.
- I. Restore any damaged utilities as directed by the utility owner and the Engineer.
- J. If a utility is identified or encountered that is not shown on the Design Drawings, or otherwise not made known to the Contractor prior to beginning the Work, promptly take the necessary steps to assure that the utility is not damaged, stop work, and notify the Engineer immediately of the presence of the utility. Stop work until the Engineer determines that further work will not affect the utility. The Engineer will review the conditions and determine the extent, if any, to which a change is required in the design to reflect and document the consequences of the existence of the utility.
- K. Immediately notify the Engineer of any incident involving a utility.

1.4 WORKING RESTRICTIONS - OVERHEAD ELECTRICAL UTILITIES

- A. There are overhead transmission lines near portions of the site. New York State Electric & Gas to temporarily remove the overhead lines along Franklin Street adjacent to the work site prior to the Contractor's mobilization, and to replace them to their original location, as needed, after the Work is complete.
- B. The Contractor shall follow applicable OSHA regulations and industry best practices during the implementation of the Remedial Action so as not to damage or interfere with these utilities.
- C. Maintain the minimum required setbacks, as prescribed by the utility owner, for all booms and trucks operating in the vicinity of energized lines.
- D. Coordinate with the electrical utility provider to de-energize, sheath, or relocate any additional overhead electrical lines as required to complete the Remedial Action.
- E. Do not load or empty trucks under the overhead electrical utilities. Do not open truck covers under the overhead electrical utilities. Provide warning signs of overhead lines and clearances for truck drivers at the site entrance.
- F. Provide ground level warning signs every 50 feet under overhead power lines within the work area.
- G. If unavoidable interference with aboveground utilities (e.g., poles, wires, cables, etc.) is expected, notify the Engineer and consult with the affected owner regarding temporary removal and restoration of the interfering item. Arrange with the utility owner to complete this work.

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1.5 SUBMITTALS

- A. Submit a utility incident report to the Engineer within 4 hours of any incident causing direct or indirect damage to a utility. At a minimum, document the following items in a utility incident report:
 - 1. Description of the incident.
 - 2. Damage assessment.
 - 3. Corrective actions taken.
 - 4. Initial estimate on the need for permanent repairs.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

(Not Applicable)

END OF SECTION 01 18 00

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SECTION 01 31 00 PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1. SUMMARY

A. This Section describes Project administrative requirements, and the minimum level of coordination and meetings required to execute the Work.

1.2. ON-SITE CONSTRUCTION PERSONNEL

- A. The Engineer will maintain a dedicated and full-time on-site representative who is employed by the Engineer for the duration of the Work. The Engineer's representative will be responsible for observing and documenting the Contractor's compliance with the Work in accordance with the Approved Design. The Engineer's representative will also serve as National Fuel's representative and the Contractor's main point of contact. The Engineer's representative will also document work activities, maintain a submittal register, prepare agendas and run weekly construction meetings, review invoices, and review and approve change orders, as needed. The Engineer will not direct the contractor on the specific means and methods of construction, however, the Engineer will advise the Contractor of non-compliance with the Approved Design and identify required corrective action.
- B. The Engineer will maintain a dedicated and full-time on-site Community Air Monitoring Plan (CAMP) technician who is employed by or subcontracted to the Engineer for the duration of the Work. The CAMP technician will be responsible for implementing the CAMP and providing notifications when perimeter monitoring exceeds the alert and/or action levels, as specified in the CAMP.
- C. The Engineer will provide a representative to perform noise monitoring and vibration monitoring on an as-needed basis (e.g., during driving of sheet pile).
- D. The term Engineer is used interchangeably with National Fuel's Representative in the Specifications.
- E. The Contractor shall maintain a full-time on-site Superintendent, who will be responsible for quality assurance, Contractor health and safety, and supervision of competent person(s) for the duration of the Work. The Superintendent will be responsible for the supervision and/or coordination of all Contractor employees, Subcontractors, manufacturers, fabricators, suppliers, distributors, installers, and testing agencies whose services, materials or equipment are required to ensure the completion of the Work. The Superintendent will have sufficient qualifications, experience, and authority to act as a single point of contact for the on-site staff, and to make adjustments to the means and methods as needed and as requested by the Engineer.

- F. The Contractor shall maintain a dedicated full-time on-site Health and Safety officer for the duration of the Project. The Health and Safety officer may have no other on-site responsibilities or duties outside of health and safety.
- G. Any material changes to the processes, staffing, sequencing, equipment, or materials used in the Work will require review and approval by the Engineer.
- H. The New York State Department of Environmental Conservation (NYSDEC) may provide a full or part-time on-site representative to observe the work. To the extent possible, the Contractor shall accommodate any requests by the NYSDEC representative to observed site conditions or work activities. The Engineer will request that any issues noted by NYSDEC during the performance of the Work be brought to the attention of the Engineer so that it can be documented and addressed in accordance with Contract requirements. This excludes any notification of potential immediate danger or life-/property-threatening conditions. In such cases, the Contractor may be notified immediately and then the issue can be properly documented with the Engineer.

1.3. MEETINGS

- A. A pre-construction meeting will be held at the site prior to the start of the Work. At a minimum, the Contractor's Project Manager and Superintendent for the Project will attend the meeting. It is recommended that the Contractor assemble input from primary Subcontractors prior to this meeting.
 - 1. This meeting is intended to make certain that the Work is properly scheduled, responsibilities are coordinated among Subcontractors and suppliers, and that those responsibilities are reflected on the Contractor submittals. Questions concerning the administrative requirements outlined during the preconstruction conference or any other aspect of the Project may also be addressed.
- B. Beginning with the mobilization to the site, the Engineer will facilitate weekly construction meetings for the duration of the Work. The agenda for these meetings will be provided to the selected Contractor after award. Prior to mobilization, if necessary, bi-weekly meetings may be held via teleconference. After mobilization, weekly meetings will be held at the site. The Contractor shall present a progress update at weekly construction meetings that includes tasks completed from the prior week, currently active tasks, and tasks/activities planned for the next two weeks along with an updated project schedule. The format of the two-week look ahead must be approved by the Engineer.
- C. The standard day and time for the weekly construction meeting will be established based on mutual agreement between the Engineer and other participants. The Engineer will prepare an agenda prior to each weekly meeting.
- D. Special construction meetings will be held at the site or other designated location to discuss urgent construction issues. The Contractor or the Engineer may call

- special construction meetings. Coordination (agenda, meeting minutes, location, time, and attendance) of special construction meetings is the responsibility of the organization calling the meeting. Special construction meetings will be called judiciously.
- E. Minimum attendance at weekly construction meetings will include the Project Superintendent, Contractor's on-site Health and Safety officer, and other members of the Contractor staff as may be needed to discuss certain agenda items, and the Contractor Project Manager (who may participate via teleconference). Attendance is required by a representative of any Subcontractors performing Work at the site during the time of the weekly meeting. Site construction meetings may also be attended by an on-site NYSDEC representative.
- F. The Contractor shall make physical arrangements for all meetings to be held on the site.
- G. All expenses associated with attending the meetings, except those that are incurred by NYSDEC, National Fuel, the Engineer, their representatives, or consultants, are to be borne by the Contractor.
- H. All Contractor employees shall attend an initial site safety briefing, and daily safety briefings with the Engineer/Contractor Site Safety and Health Officer (SSHO).

1.4. REQUESTS FOR INFORMATION, CLARIFICATIONS, AND CHANGES

- A. All Contractor requests for Project information, clarifications, or changes in the requirements of the Approved Design Package must be made in writing to the Engineer.
- B. Written requests must be provided regardless of any preceding conversations and preliminary decisions regarding the subject matter(s).
- C. At the discretion of the Engineer, e-mail communications may qualify as "requests made in writing" for the purposes of this provision.
- D. The Engineer will provide written responses to each request after soliciting input from others (e.g., National Fuel, NYSDEC, etc.) as needed.
- E. At their discretion, the Engineer may provide verbal approvals of requests to expedite the Work. In such cases, the Contractor is still required to provide written documentation of the request and approval from the Engineer.
- F. The Engineer may also issue clarifications and/or amendments based on their own assessment of Project needs.
- G. The Engineer will issue the Contractor supplemental instructions authorizing minor changes in the Work that may or may not involve adjustments to the Contract Price or the schedule.

H. If latent or unforeseen conditions require deviations from the Approved Design, the Contractor may propose changes in the Work by submitting a detailed request to include labor rates, equipment rates, material costs, etc. for a change to the Engineer.

1.5. DAILY REPORT

- A. The Contractor shall prepare a daily report summarizing the staff and equipment used, Work performed, and anticipated Work for the next day. The daily report should also list all daily quantities applicable to Contractor pay items. The Contractor's internal documentation used for this purpose may fulfill this requirement, subject to approval by the Engineer. At a minimum, the daily report will include the following additional items:
 - 1. Summary of any safety related issues including a summary of the daily safety meeting.
 - 2. Data for any Community Air Monitoring Plan (CAMP) exceedances and description of corrective actions taken.
 - 3. Daily equipment inspection logs for all on-site equipment (when used).
 - 4. Sketch of the area excavated, demolished, or treated via in-situ solidification.
 - 5. Summary of the in-situ solidification Work performed. Refer to Section 02 55 10 In-Situ Solidification for reporting requirements.
 - 6. Description of any QC testing performed and the results.
 - 7. Excavation and backfill rate for each working day. Submit certified weight tickets for material exported for off-site disposal and for each load of imported backfill material.
 - 8. Estimate of the volume of on-site excavated material reused for backfill.
 - 9. Types, quantities, and locations of Contaminated Material temporarily stored at the Work site.
 - 10. Types and total quantities of Contaminated Material shipped off site to date.
 - 11. Daily Trucking Report
 - a. Number of trucks (or vehicles) departing the site with Contaminated Material.
 - b. Trucking company and license plate number for each truck.
 - c. Type and approximate quantity of material the truck is removing.
 - d. Facility that is receiving the material.
 - e. Confirmation that the truck was decontaminated prior to leaving the site.
 - f. The time the truck departed the Work site.

- g. Estimate of the excavation rate, number of trucks needed for transportation to the disposal facility, and the disposal facility production rate for the next day.
- 12. Quantity of wastewater generated and disposed.
- B. Submit the daily report to the Engineer by 9 AM of the next day worked.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

(Not Applicable)

END OF SECTION 01 31 00

SECTION 01 40 00 QUALITY REQUIREMENTS

PART 1 GENERAL

1.1. QUALITY CONTROL

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including directions on sequence.
- C. When manufacturers' instructions conflict with the Approved Design, request clarification from Engineer before proceeding.
- D. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work with persons qualified to produce required and specified quality.
- F. Verify field measurements are as indicated on Shop Drawings or as described by manufacturer.
- G. The Contractor's Superintendent is required to monitor site conditions, quality of products and installation, quality of workmanship, and to take actions when necessary to meet quality requirements.

1.2. INSTALLATION REQUIREMENTS

- A. Testing, inspections and source quality control may occur on or off the Work site. Perform off-site testing as required by the Engineer.
- B. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of the Approved Design.
- C. Product Testing Before Work:
 - 1. Prior to start of Work, submit testing laboratory name, address, and telephone number.
 - 2. Include all means and methods of installation, testing, equipment to be used, and personnel for the quality assurance.

D. Product Testing In Situ:

- 1. Report all findings of material suitability, conformance with standards, and test results to Engineer. These must be documented in the Daily Progress Reports.
- E. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by qualified personnel on instructions by the

- Engineer. Payment for re-testing or re-inspection is the responsibility of the Contractor.
- F. Submit copy of certifications and reports of laboratory facilities inspections and compliance with all applicable testing laws and regulations.
- G. The Engineer is responsible for quality assurance of actual measured and placed quantities for payment.

1.3. TOLERANCES

- A. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Approved Design requirements, request clarification from Engineer before proceeding.
- B. Adjust products to appropriate dimensions; position before securing products in place.

1.4. REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standard, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- B. When specified reference standards or regulations conflict with Approved Design requirements, request clarification from Engineer before proceeding.

PART 2 – PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 PERFORMANCE

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify all Work meets requirements of Specifications and Drawings, and complies with all permits, laws and regulations.
- C. Approvals given by the Engineer, his/her representatives, or by testing agencies shall not relieve the Contractor of the responsibility for performing the Work in accordance with the Approved Design.
- D. In the event that the Engineer judges any equipment or Work unsatisfactory, the Contractor shall be given verbal or written notice to remedy any such deficiency to the satisfaction of the Engineer within 1 hour.

END OF SECTION 01 40 00

SECTION 01 41 00 REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1. SUMMARY

A. This Section establishes responsibility for obtaining Project permits between the Engineer and the Contractor.

1.2. ENGINEER PERMITS

A. The Work will conform to the approved NYSDEC-issued Record of Decision (ROD).

1.3. CONTRACTOR PERMITS

- A. Obtain the following Project permits:
 - 1. Local construction and demolition permits.
 - 2. Permits required for any off-site parking that is negotiated between the Contractor and the City of Hornell, and/or private parking facilities.
 - 3. It is not expected for the remediation and construction support area to expand into Franklin Street. However, if the remediation or construction support area must expand into the street, a street opening permit will be obtained by the Contractor.
 - 4. Any other notifications required by the City of Hornell.
 - 5. Any other permits required to complete the Work.
- B. This Section does not describe all permits required for performance of the Work. Any permits not identified in this Section, or elsewhere in the Approved Design, are the responsibility of Contractor.
- C. Regardless of who is responsible for obtaining a permit, the Contractor is responsible for performing the work in accordance with the terms and conditions of all permits.
- D. Provide any technical- and equipment-related data required for the Engineer to obtain the necessary permits.

1.4. COORDINATION/ASSISTANCE

- A. The Engineer will coordinate delivery of Contractor submittals to regulatory agencies, as may be required.
- B. Provide all data requested by the Engineer to support permit applications. When necessary, the Engineer may provide data summaries or other Project information in support of Contractor permit submittals.

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C. Any coordination and/or assistance between the Contractor and the Engineer are provided in the interest of expediting the Project. Provision of coordination and/or assistance does not relieve the Contractor of any obligations in obtaining the required permits.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

(Not Applicable)

END OF SECTION 01 41 00

SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1. SUMMARY

A. The Work required under this section includes furnishing all labor, equipment, supplies, laboratory testing, materials, and performing all operations required for providing temporary facilities and controls during the performance of the Work.

1.2. WORK ZONES

- A. Establish a Secured Zone, Support Zone, Exclusion Zone, and Decontamination Zone, as defined herein.
 - 1. Lay out the Work Zones and establish boundaries, barriers, facilities, and controls to ensure that all personnel and equipment exiting the Exclusion Zone pass through the Contamination Reduction Zone before entering the Support Zone and before exiting the site.
 - 2. Furnish, install, and maintain in good condition, orange plastic mesh fencing secured to metal posts to delineate the boundaries between Work Zones, including the Exclusion Zone, Contamination Reduction Zone, and Support Zone. Install orange plastic mesh fencing at the entrance of the Exclusion Zone for a clear demarcation for site workers.
- B. Establish a general Secured Zone that excludes unauthorized personnel from entering the site.
 - 1. Control access to the secure zone by use of a steel chain-link fence as shown on the Design Drawings.
 - 2. The Engineer shall be allowed free access to the Secured Zone 24 hours per day, subject to appropriate safety precautions. Providing the Engineer with access to the Secured Zone does not in any way relieve that Contractor of the responsibility for maintaining site security during the performance of the Work.
 - 3. Maintain a log sheet on which all Contractor personnel and visitors must sign in and out upon entering or leaving the Secured Zone. All truck drivers, Subcontractors, visitors, and suppliers will be required to present photo identification at the office trailer in the support zone to gain access to the site when signing in.
 - 4. The Contractor is solely responsible for the security and safety of equipment, facilities, personnel, and materials within the Secured Zone.
- C. Establish a Support Zone for field offices, storage, sanitary facilities, hand-washing facilities, and non-construction vehicle parking.

- 1. The Support Zone shall be an area that is free of physical and chemical hazards.
- 2. Maintain the Support Zone in a safe, clean, orderly, and sanitary manner at all times.
- D. Establish the limits of the Exclusion Zone using the following criteria in addition to any other criteria that may be deemed necessary by the Engineer:
 - 1. Open excavation areas.
 - 2. All stockpile areas.
 - 3. All areas where Impacted Materials are present at the ground surface.
 - 4. OSHA Regulations and all other applicable Laws and Regulations.
- E. Establish a Contamination Reduction Zone between the Support Zone and the Exclusion Zone.
 - Provide suitable facilities for personnel decontamination in the Contamination Reduction Zone, including portable toilets, emergency eyewash and a water hand-washing station. Equip the Contamination Reduction Zone to provide seating and shelter from the elements.
 - Construct a vehicle and equipment decontamination pad that allows for the capture of solid residuals and evaporation/infiltration of liquid residuals generated during decontamination of construction vehicles and trucks bound for off-site disposal facilities.
 - The vehicle and equipment decontamination facility will be sufficiently sized to ensure the largest piece of equipment can be adequately decontaminated.
 - If requested by Engineer, provide splash protection around the vehicle decontamination facility. Design splash protection to minimize potential contamination from splatter and mist during the vehicle and equipment decontamination process. If directed, furnish splash protection that is stable and capable of being dismantled in the event of high winds.
 - Provide a method for the transport of wastewater generated during decontamination procedures to the appropriate container for disposal.

PART 2 PRODUCTS

2.1. MATERIALS AND FACILITIES

- A. All furnished materials must be suitable for their intended use and conform to all applicable codes and standards.
- B. Provide appropriate first aid supplies in accordance with all applicable and relevant Federal, State, and local regulations.

- C. Provide any and all required personal protective equipment for on-site workers.
- D. Provide hand carried, portable, UL rated, Class ABC, dry chemical extinguishers or a combination of extinguishers of NFPA recommended classes for the exposures. Provide fire extinguishers at all temporary facilities, workstations, trailers, office, and vessels. Keep detailed records of maintenance and expiration dates.
- E. Provide fully equipped hand-wash stations outside of toilets and in the personnel decontamination area.
- F. Provide separate, dedicated, temporary on-site office space and work stations for the Contractor, NYSDEC representative and for the Engineer and CAMP technician. At a minimum provide space that includes electricity, internet service, a telephone line, air conditioning, and heat. Equip each work station with a desk, chair, and telephone. At least one of the job trailers shall be large enough to accommodate the weekly construction meetings.
- G. Provide two-way radios with spare batteries for the exclusive use of the Engineer and CAMP technician. The radios provided to the Engineer and CAMP technician must be able to receive and send on all frequencies to be used by the Contractor during the performance of the Work.
- H. Provide and maintain a sufficient supply of materials/equipment required to implement decontamination procedures, including, but not limited to, the following items:
 - Plastic trash barrels.
 - Liners for trash barrels.
 - Wash basins.
 - Emergency eye wash stations.
 - AlconoxTM or approved equivalent detergent concentrate.
 - Hand pump sprayers.
 - Long handled soft bristle brushes.
 - Large sponges.
 - Cleaning wipes for respirators.
 - Bench or stool(s).
 - Stepladder(s).
 - Steam generator and pressure washer.
 - Liquid detergent and paper towels.
 - Plastic trash bags.

- Supplies and equipment to construct the decontamination pad.
- I. Furnish, install, and maintain erosion and sedimentation control on the site. Perform weekly inspections of all erosion and sedimentation control features, as well as inspections immediately after each precipitation event of more than 0.25-inches. Refer to the Design Drawings for the erosion control configuration as well as details for each.
- J. Furnish, install, and maintain excavation stockpile pads (including a separate, dedicated pad for excavated materials that may be reused on site). The stockpile pads must meet all New York State soil stockpile requirements. Refer to the Design Drawings for details on the features to be included in the stockpile pad design.
- K. Install a security fence around the perimeter of the site, as needed to create a secure perimeter.
 - Cover the perimeter fence with opaque privacy fabric around the entire work area for the duration of the Project. If needed, provide additional reinforcement to prevent damage to the fence during periods of high wind. Promptly repair any damage to the fence or privacy fabric.
 - Extent of fencing around the site is shown on the Design Drawings. Protect this
 security fencing from damage and repair and replace fencing damaged by
 Contractor's activities.
 - Furnish, install, and maintain all other proposed temporary fencing, gates, and barriers around impacted areas as required by the Approved Design, and as may be needed to complete the Work.
 - Furnish and post signs at every entrance and gate, and at not less than every 50 feet along the fence warning the general public that the site contains physical and chemical hazards, and that access is forbidden to unauthorized persons.
- L. Furnish and post a professionally lettered sign, of a minimum size of 4 feet by 4 feet, at each entrance, or gate to the site with the following text, or other similar text approved by the Engineer: "All Personnel and Visitors Beyond This Point Must Wear Hard Hat, Safety Glasses, High-Visibility Vest, and Steel Toe Boots." Additionally, furnish the DEC MGP remediation sign as detailed in the Design Drawings.
- M. Provide Rusmar AC 645 Long Duration foam or Engineer approved equivalent. Provide a foam application unit with a minimum capacity and flow rate equal to or in excess of the RUSMAR PFU 400/25. An odor/vapor suppressant foam generator must be on site and available for use during any and all excavation of potentially contaminated media and during ISS Work.

2.2. STORAGE FACILITIES

A. The storage and security of materials is the sole responsibility of the Contractor.

- B. Provide all storage facilities necessary for the execution of the Work.
- C. Receive and store materials only in areas that are acceptable to the Engineer.

PART 3 EXECUTION

3.1. GENERAL

- A. Operate and maintain all equipment and systems to ensure that that the temporary facilities, controls, utilities, and other services are provided without disruption.
- B. Design, furnish, install, and maintain all temporary site facilities and controls required for the performance of the Work.
- C. Provide and maintain all temporary environmental controls, as necessary for protection of the environment, throughout the performance of the Work.
- D. Provide and maintain proper barricades and warning signs at all closures, holes, hazards, and equipment areas.
- E. Ensure that all Subcontractors comply with the provisions of this Specification.

3.2. SANITARY FACILITIES

- A. Empty the sanitary facilities before the capacity is exceeded, or on a weekly basis, whichever occurs first. Clean sanitation facilities concurrently with emptying.
- B. Clean and restock hand-wash stations as needed.

3.3. TEMPORARY UTILITIES

- A. Provide suitable decontamination water for the duration of the Project.
- B. Supply potable drinking water for on-site personnel.
- C. There are no utilities available on site for use by the Contractor.
- D. Provide all temporary utility services, including electricity, internet service, a telephone line, air conditioning, and heat, in accordance with this Specification for the duration of the Project. This includes, but is not limited to, installation, operation, maintenance, and removal of all equipment and/or systems required to ensure uninterrupted service and paying all fees associated with installation, connection, service, and shut-off.

3.4. PERSONNEL DECONTAMINATION

- A. Comply with all requirements of the Contractor Health and Safety Plan.
- B. Provide the means for the Engineer, visiting regulatory agency representatives, and CAMP technician to comply with requirements of the Contractor Health and Safety Plan.
- C. Provide a decontamination station where personnel can drop equipment and remove personal protective equipment (PPE).

- Equip the decontamination station with basins for water and detergent, and trash bags or cans for containing disposable PPE and other discarded materials.
- Supply a sink as a secondary means of personal hygiene for personnel.

3.5. EQUIPMENT DECONTAMINATION

- A. Install decontamination equipment in accordance with the Design Drawings.
 - Locate and operate a decontamination pad at any point that equipment leaves the site.
 - Provide a decontamination pad of sufficient size to ensure that the largest piece of equipment can be adequately decontaminated.
- B. Remove heavy contamination using a broom and/or brushes within the excavation area prior to movement to the decontamination pad.
- C. Perform heavy equipment decontamination within the limits of the decontamination pad.
- D. Pressure wash heavy equipment before it departs the site, as needed.
- E. Decontaminate any equipment utilized to excavate impacted materials prior to backfilling.
- F. Collect and transfer wastewater from equipment decontamination into the appropriate container for disposal.
- G. Collect and remove soils from the decontamination pad and bulk with excavated materials for disposal.

3.6. SITE SECURITY

- A. Take reasonable and prudent security precautions to prevent any unauthorized access to the work area, and to control construction traffic to and from the site.
- B. Manned security services during overnight and non-working hours are not required, but the Contractor may provide such services at their discretion to protect the Work, equipment, and materials.
- C. If utilized, security personnel employed during non-working hours must, at a minimum, meet the following requirements:
 - Be literate in the English language.
 - Be briefed on site hazards.
 - At no time have access to or the capacity to use firearms, restraint tools, or any weaponry associated with criminal investigation.
 - Have access to a telephone.

- D. Personnel assigned to perform site security are not required to adhere to the training, certification, and medical monitoring program defined in the site-specific Health and Safety Plan; however, security personnel must be briefed on all hazards present and instructed not to enter any exclusion zones and to avoid any potential exposure to contaminated wastes.
- E. Planned site security procedures, at a minimum, shall include:
 - Roles and responsibilities of personnel involved with site security.
 - Description of proposed daily security operations.
 - Method and frequency for conducting security checks.
 - Sign in/sign out procedures.
 - Location of security station.
 - Description of how a breach of security will be handled. A breach of security includes, but is not limited to, unauthorized personnel within the site working area, unauthorized personnel attempting to gain access to the site working area, broken fences and unlocked gates, and unauthorized personnel in the hazardous work zones.
 - Communications.
 - List of personnel to be contacted in case of emergency.

3.7. DUST, ODOR, and VAPOR CONTROLS

- A. Apply odor-suppressing foam to the demolished material, excavated material, and solidified material when stockpiled, during loading operations, or at any other time and location as directed by the Engineer.
- B. Provide the labor, equipment, and materials required to apply odor and vapor suppressant foam to all exposed excavations, including stockpiles, within 5 minutes of the start of intrusive activities, or when directed by the Engineer. No separate payment will be made for the supplying and operation of vapor/odor control equipment. Payment for vapor/odor suppression materials will be as per the unit bid price. Failure to apply vapor/odor suppression materials within the specified time will result in all Work being suspended until such time as the Engineer feels the request for controls has been fully satisfied. No additional payment for such downtime shall be due to the Contractor.
- C. Maintain sufficient materials on hand to apply foam as directed during the entire period when intrusive work is being performed.
- D. Cover all exposed stockpiles with a secured polyethylene tarp if left untouched for longer than 2 hours.

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- E. Provide dust control at the approved offload point using water trucks, hoses, or engineered dust suppression materials, as needed.
- F. Notification will be provided when real time monitoring being performed at the site perimeter exceeds the alert and/or action levels noted in the CAMP.

Upon notification, immediately begin to implement dust and/or odor/vapor controls, as needed and as directed by the Engineer.

END OF SECTION 01 50 00

SECTION 01 77 00 CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1. SUMMARY

A. Closeout procedures covers the administrative and technical requirements for final cleaning, inspection, Project as-built documents, system demonstrations and adjustments, warranties, bonds, final payment, and other procedures for Project closeout in accordance with the Approved Design.

1.2. CLOSEOUT PROCEDURES AND REQUIRED SUBMITTALS

A. Substantial Completion:

- 1. When the Contractor considers the Work, or designated portion thereof, to be at Substantial Completion, provide written notice, with a list of items to be completed or corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
- 2. The Engineer will inspect the Work to determine the status of completion.
- 3. If the Engineer determines that the Work is not at Substantial Completion, the Contractor will be notified of the deficiencies in writing.
- 4. The Contractor will, within two (2) days of the written notice, provide a schedule for when all defects will be corrected and/or the Work completed for the Engineer to review.
- 5. Upon approval from the Engineer, correct any deficient and/or incomplete Work and notify the Engineer upon completion. The Engineer will then reinspect the Work for the purpose of Final Acceptance.

B. Project Closeout Report:

- 1. Submit a Project closeout report that includes the following information:
 - a. Description of activities, including total work quantities.
 - b. Variations from the Approved Design.
 - c. Discussion of major issues encountered during the performance of the Work and the resolution.
 - d. A complete list of all Contractor personnel who performed Work on site.
 - e. Record drawings. The specific requirements for record drawings that are to be submitted as part of this report are contained in subparagraph 1.2.C of this section.

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f. Supporting documentation. The specific requirements for the required supporting documentation that is to be submitted as part of this report are contained in subparagraph 1.2, D, E, and F of this section.

C. Record Drawings:

- 1. Submit record surveys in electronic format, and provide five (5) hard copies to the Engineer that have been signed and sealed by a surveyor licensed to practice in the State of New York as part of the Project closeout report. At a minimum, record drawings are to include:
 - a. Encountered structures left in place.
 - b. Encountered pipes that were removed, not removed, and the terminal ends of cut/capped pipes.
 - c. Utility locations, elevations, and inverts.
 - d. Bottom of remedial excavation.
 - e. Backfill grade.
 - f. Lateral extent and top and bottom contours of the in-situ stabilization Work. Include QC sampling locations and note any columns relocated during construction.
 - g. Benchmark coordinates and elevation.
- D. Provide copies of all Project records including, but not limited to, the following:
 - 1. Manifests and bills of lading.
 - 2. Weight tickets.
 - 3. Testing results.
 - 4. Health and Safety reports.
 - 5. Copies of permits.

E. Utility Relocation:

1. If applicable, submit written confirmation from the utility providers that all temporary relocated utilities have been restored to pre-remediation condition, and that all temporary utility connection points have been restored to a suitable condition.

F. Permit Closeout:

- 1. Submit written confirmation that all permits have been closed with their governing authority and that any and all remaining fees have been paid in full.
- G. Final Acceptance:

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- 1. Submit written certification that confirms the following: Approved Design requirements have been reviewed, Work has been inspected, Work is complete in accordance with the Approved Design (including satisfactory compliance with performance guarantees), any previously noted deficiencies have been corrected or remediated, equipment has been tested in the presence of the Engineer, and that the Work is complete and ready for final inspection.
- 2. The Engineer will inspect the Work to verify status of completion.
- 3. Should the Engineer find the Work to be satisfactory, the Contractor will be allowed to make application for final payment in accordance with the Agreement. Should the Engineer find deficiencies and incomplete Work, the Contractor will be notified in writing of deficient and/or incomplete Work and requests for final payment will not be approved until such time that the Contractor has satisfactorily completed the required Work.
- 4. Take immediate action to remedy incomplete/deficient Work and send written notice to the Engineer upon completion. The Engineer will then re-inspect Work to verify the status of completion.

PART 2 MATERIALS

(Not Applicable)

PART 3 EXECUTION

(Not Applicable)

END OF SECTION 01 77 00

Closeout Procedures 01 77 00-3

SECTION 02 21 00 SURVEYS

PART 1 GENERAL

1.1. SUMMARY

- A. The Work required under this section includes furnishing all labor, materials and equipment, and performing all operations required for performing surveying Work.
- B. This section details the surveying requirements for the performance of the Work.

1.2. QUALIFICATIONS

- A. Subcontract with a Professional Surveyor licensed in the State of New York to serve as the independent surveyor for the Project.
- B. The selected surveyor may not be replaced unless the Contractor submits a written request to the Engineer for approval that details the reason(s) for the requested change and includes any noted deficiencies.

1.3. REFERENCE POINTS

- A. Establish horizontal control points and benchmarks, as needed. Protect the reference points from disturbance during performance of the Work.
- B. When laying out and controlling the performance of the Work, use horizontal and vertical datums that are consistent with those used in the Design Drawings.

1.4. LOCATION AND ELEVATION SURVEY

- A. Provide survey control, as needed, to complete the following Work items:
 - 1. Pre-Work topography, structures, and land features for all parcels where Work will be conducted.
 - 2. Demarcate the location of the support of excavation boundaries.
 - 3. Document the horizontal and vertical extent of pre-ISS excavation.
 - 4. Document the upper surface of the ISS mass.
 - 5. Document the final extents of any shallow excavations (up to 4 feet deep) outside the support of excavation boundary.
 - 6. Document achievement of the target ISS elevations and depths.
 - 7. Any additional survey work required to control and document the Work.
 - 8. Document the final restored elevations in all areas backfilled, restored, or otherwise disturbed by the Work.
 - 9. Mark and maintain visible indicators of adjacent parcel boundaries and active subsurface utilities during the Work.

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B. At the conclusion of the Work, provide an ALTA level survey of the site that meets the requirements of DER-33 / Institutional Controls: A Guide to Drafting and Recording Institutional Controls.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

3.1. TOPOGRAPHIC SURVEY REQUIREMENTS

- A. Promptly report to the Engineer the loss or destruction of a reference point.
- B. Perform the terrestrial survey Work using a total station with the following measurement tolerances and specified datums:
 - 1. Horizontal: +/- 0.05 feet; North American Datum of 1983 (NAD83).
 - 2. Vertical: +/- 0.1 feet; North American Vertical Datum of 1988 (NAVD88).
- C. Keep a complete and accurate log of all survey and control work. Maintain a copy of the log on site at all times.
- D. Survey crews must comply with the requirements of the Contractor Health and Safety Plan.

END OF SECTION 02 21 00

Surveys 02 21 00-2

SECTION 02 41 19 SELECTIVE DEMOLITION

PART 1 GENERAL

1.1. SUMMARY

A. The Work required under this section includes furnishing all labor, materials and equipment and performing all operations required for the partial or complete removal, storage, and/or disposal of the approximate two-foot retaining wall at the southern perimeter of the remedial boundary, the subsurface concrete pad in the south eastern portion of the ISS area, and any subsurface structures encountered that may obstruct ISS during performance of the Work.

1.2. GENERAL

- A. The Work is to be staged and proceed in a logical manner so as to maintain site access as shown on the Design Drawings.
- B. The use of implosions to demolish structures or portions of structures as part of this Project is not permitted.
- C. The Contractor may propose to demolish the structures in any logical order (e.g., in sections) if the methodology and phasing submitted are acceptable to the Engineer.
- D. Develop a comprehensive Demolition Plan, with written procedures and a set of shop drawings describing the selective demolition which shall be subject to review by the Engineer.
 - 1. Items to be specifically addressed in the plan include but are not limited to:
 - a. Sequence of demolition of each item indicated in the Design Drawings.
 - b. Sequential relationship between selective demolition and reconstruction.
 - c. Security and safety measures.
 - d. Provisions for site access for reconstruction simultaneous with selective demolition.
 - e. Handling of debris prior to hauling from site.
 - 2. The Contractor shall be solely responsible for safety, execution, and effectiveness of selective demolition.
- E. Consult the drawings for the extent of all demolition Work required and remove all indicated materials, finishes, and other items indicated thereon to be removed.
- F. Provide the temporary protection, removal, and reinstallation of lights, electrical conduits, etc. as needed in order to perform the demolition Work.

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1.3 SUBMITTALS

- A. Submit a schedule as part of the Demolition Plan to the Engineer for approval indicating proposed methods and sequence of operations for selective removals and demolition Work, prior to commencement of operations. The sequence of operations shall be planned, in detail, to ensure safety of the workers during demolition.
- B. Submit details and procedures for dust and noise control.

PART 2 MATERIALS

(Not Applicable)

PART 3 EXECUTION

3.1. GENERAL

- A. Remove only the below grade structures indicated for demolition on the Design Drawings, or structures that may obstruct ISS as approved by the Engineer. Use precautions to protect existing structures to remain and their finishes during demolition.
- B. Remnant foundations to be demolished must be cut in neat lines at the excavation extents. The Contractor may not chase remnant foundation elements outside of the excavation extents.
- C. Remnant foundations encountered during the pre-ISS excavation must be sized and sent for off-site disposal in conformance with Specification 02 60 00 Contaminated Material Management.
- D. Do not pull on remnant foundation elements extending outside of the excavation extents, and do not use impact tools to break up remnant foundation elements until they have been sectioned off at the excavation extents.
- E. Abandoned pipes associated with historic MGP operations are present within the remediation area. Abandoned pipes encountered during site investigations are noted on the Design Drawings; the Contractor shall anticipate these and other abandoned pipes in the course of the Work. Piping removed from the remediation limits shall be removed, sized, and subject to off-site disposal as debris in conformance with Specification 02 60 00 Contaminated Material Management. Abandoned piping/utilities shall be cut and plugged at or just beyond the excavation boundary. Any flowable fluid found in abandoned pipes should be assumed to be impacted and must be containerized according to Specification 02 60 00 Contaminated Material Management. Fluid should not be allowed to spread to the ground surface. Cut pipes at the excavation boundary shall be capped with a watertight sealant, pipe cap or mechanical plug that is acceptable to the Engineer.

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- F. Do not comingle waste streams unless they are intended for disposal at the same facility, and the comingling is acceptable to the facility without altering the disposal cost of the constituent components.
- G. Do not use cutting torches until the work area is clear of flammable materials. Verify the condition and content of hidden spaces before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during any flame-cutting operations.
- H. Maintain adequate ventilation when using cutting torches.
- I. Demolition shall be performed using methods and sequences according to the Demolition Plan. Operation shall be so conducted as to cause a minimum of disturbance.

3.2. MATERIAL HANDLING

- A. Store demolished materials on a debris pad, or in a container designed for the purpose.
- B. Avoid contact between contaminated demolition debris and soil.
- C. Dispose of any debris in accordance with Section 02 60 00 Contaminated Material Management.
- D. The on-site burning of materials is not permitted.

3.3. CLEANUP

A. Remove all debris, residuals, and materials at the conclusion of demolition activities.

END OF SECTION 02 41 19

Selective Demolition 02 41 19-3

SECTION 02 55 00 IN-SITU SOLIDIFICATION

PART 1 GENERAL

1.1. SUMMARY

A. The Work required under this section includes furnishing all labor, equipment, supplies, testing, materials, and performing all operations required for completing the in-situ solidification (ISS) portion of the Work.

1.2. REFERENCES

- A. Hornell Former MGP Site ISS Treatability Study Results submitted to the NYSDEC with the 50% Design as a component of the Pre-Design Investigation Results Report.
- B. Results of ISS treatability testing performed by Contractor provided as an appendix to the 95% Remedial Design Package.
- C. By reference, the most recent version of the following publications are incorporated in this specification:
 - 1. American Petroleum Institute (API) API RP 13-B1 for Viscosity and Density.
 - 2. API 13-A Specification for Bentonite.
 - 3. ASTM C150 Standard Specification for Portland Cement.
 - 4. ASTM C989 Ground Granulated Blast Furnace Slag (GGBFS) as a Constituent in Concrete and Mortar.
 - 5. ASTM D1633 Standard Test Method for Compressive Strength of Molded Soil-Cement Cylinders.
 - 6. ASTM D4832 Preparations and Testing of Controlled Low Strength Materials Test Cylinders.
 - 7. ASTM D5084-16 Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.

1.3. DEFINITIONS

- A. The following definitions are used in this section:
 - 1. Solidifying Reagents Type I Portland Cement, ground granulated blast furnace slag (GGBFS), bentonite, and other cementitious or otherwise beneficial chemicals, minerals, or admixtures approved by the Engineer for solidifying impacted soils.
 - 2. Grout A homogeneous mixture of water and solidifying reagents that acts as the cutting fluid for auger mixing of soils.

- 3. Homogeneous Mixture The column of prepared reagent and impacted soils that have been thoroughly mixed together to create a solidified material that meets the performance requirements specified in this specification section.
- 4. ISS Working Platform The engineered surface of solidified soil and/or supporting structures on which the ISS mixing equipment is placed while operating.
- 5. Mixing Pass Operation of the mixing equipment from the top elevation for ISS treatment to the bottom elevation for ISS treatment and back to the top.
- 6. Obstruction Subsurface manmade or natural object that impedes auger advancement.
- 7. Overlap Ratio The ratio between the overlap distance between adjacent mixing passes and the width of the mixing pass.
- 8. Penetration Rate The rate, in feet per minute, at which the mixing auger is advanced into the ISS column.
- 9. Refusal A condition that occurs during mixing when the auger can no longer be advanced either due to an obstruction or soil geotechnical properties, defined as 6 inches or less of penetration over a 2-minute period. The Engineer must individually confirm each situation where the Contractor believes that refusal has been met.
- 10. Spoil The excess material resulting from addition of reagent to the in-situ soil, typically a mixture of soil and reagent.
- 11. Swell The increase in volume caused by addition of reagent to the target treatment soil volume. For example, if the target treatment soil depth is 15 feet, and the resulting homogeneous soil-cement mixture has a total thickness of 20 feet, then the swell is 5 feet, or 33 percent.

1.4. GENERAL

- A. Review all available subsurface data and select equipment of sufficient size, working depth, and power to complete the ISS scope of Work shown on the Design Drawings.
- B. Review the boring logs and test pit data provided with the bid documents for soil conditions and potential underground obstructions.
- C. Design and construct a working platform that can support the ISS equipment during the performance of the Work.
- D. Perform all required QC sampling and analysis required to control and to document the Work.
- E. Provide all plant and equipment, labor, and materials to implement the Work.

1.5. QUALIFICATIONS

A. The equipment operators, batch plant operator, ISS rig operator, supervisory engineering staff, and technical staff involved with the ISS system operation shall have a minimum of 2 years of experience with ISS projects of a similar or larger scope.

1.6. SUBMITTALS

- A. Submit an ISS Implementation Plan to the Engineer for review and approval. At a minimum, the ISS Implementation Plan will consist of the following:
 - 1. Description and specifications of ISS equipment including maximum depth capabilities, mixing cell or auger size, and dimensions of the mixing equipment with a minimum required offset from existing building structures.
 - 2. Site layout showing storage area, grout plant and haul routes.
 - 3. Design calculations for the working platform construction with a description of how the working platform will be sequenced during the performance of the Work.
 - 4. A plan for additional ISS treatability study Work, if desired. Cost for any additional treatability study Work will be included in the Contractor's payment for the ISS Work, and will be completed within the deadlines listed in the schedule of Project milestones.
 - 5. The ISS mix design with the sources of all imported materials including water, cement, slag, pre-blended cement, bentonite and any other additives. Provide certifications from the vendors attesting to the quality of the materials with supporting analytical data, as needed.
 - 6. A plan showing the proposed layout and pattern of ISS columns/cells with auger/column diameter or dimensions of mixing cells indicating that there are no bucket reach limitations, the overlap ratio between adjacent ISS columns or cells, verticality tolerance, and sequence of the ISS Work. The sequence shall accommodate the Reduced ISS Production Zone indicated on the Design Drawings.
 - 7. Real-time survey methods for locating and verifying the coordinates, elevations, and depths of the ISS columns or cells.
 - 8. Sample calculation providing the grout ratio [a volumetric ratio of grout to soils (e.g., 100 gallons grout/cubic yard soil)] for a theoretical column or cell.
 - 9. Methodology for controlling exhaust, dust, smoke, odors and noise generated from the ISS equipment and grout plant. Describe specific controls to eliminate fugitive dust generated while offloading or handling dry bulk reagents and odor control foam or sprays as directed by the Engineer.
 - 10. Methodology for measuring and mixing reagents to proper proportions, and mud balance requirements for verifying grout density.

- 11. Total estimated quantity of water and solidification reagents required for the Work.
- 12. The water supply source and required flow rate for ISS mixing operation.
- 13. Analytical data for ISS admixtures.
- 14. The power source and electrical requirements for the ISS equipment.
- 15. Solidification procedures and sequencing.
- 16. Storm water management procedures.
- 17. Estimated production rate and schedule for solidification Work.
- 18. Methods for handling spoils generated during the Work, and an estimated quantity thereof.
- 19. Methodology for re-mixing columns/cells that do not meet performance requirements for the site.
- 20. Any proposed deviations from the specifications or Design Drawings.
- 21. Description and frequency of the Contractor-performed QC testing, with a list of equipment and personnel that will be used to perform the QC testing.
- 22. Equipment decontamination procedures and waste management practices.
- 23. Resumes for ISS Supervisor, ISS equipment operators, reagent plant operators, supervisory engineering staff, and other technical staff involved with the ISS operation.
- 24. List of reserve or backup equipment to be maintained at the site.
- B. Submit a summary of the ISS Work performed as part of the Daily Report that includes, at a minimum, the following information:
 - 1. Daily totals and running totals for the volume of soil mixed and reagents used.
 - 2. A data sheet for each individual column completed that includes the following information:
 - a. Column or cell ID.
 - b. Date.
 - c. Survey coordinates of column center axis or cell vertices.
 - d. Design and actual top elevation of ISS treatment.
 - e. Design and actual bottom elevation of ISS treatment.
 - f. Column or mixing cell soil volume (cubic yards).
 - g. Weights of grout solids broken out by individual reagent types (Portland, bentonite, etc.) and water used (pounds).

- i. Grout calculations must be calculated and checked for each column and may be corrected for overlaps within the same column.
- h. Start and finish time.
- i. Number of mixing passes.
- j. Overlap ratio and configuration.
- k. Grout volume injected into the column (gallons).
- 1. Identification of the grout batch used to construct the column.
- m. Any unforeseen site conditions or equipment problems that affected the solidification efforts.
- n. Any modifications or deviations from the Approved Design or the ISS Implementation Plan.
- o. Obstructions encountered.
- p. A list of all the QA/QC samples collected for the column.
- 3. A data sheet for each batch of grout that includes the following information:
 - a. Batch ID.
 - b. Batch start time.
 - c. Measured unit weight (pounds/cubic foot).
 - d. Measured volume of water added (gallons).
 - e. Calculated and measured weight of each solidifying reagent added (pounds).
 - f. Perform and record the results of a mud balance on every 5th batch of grout mixed.
- C. Upon completion of ISS Work, submit a final ISS summary that includes the following information:
 - 1. Total quantities of solidifying reagents delivered to the site and used during the Work. Provide supporting documentation in the form of weight receipts, bills of lading, flow meter records, etc.
 - 2. Any unforeseen site conditions or equipment problems that affected solidification efforts.
 - 3. Contractor collected QC data.
 - 4. Any modifications or deviations from the Approved Design or the ISS Implementation Plan.

1.7. ISS MIX DESIGN

- A. The Engineer conducted a treatability study using soils collected from the site. The results of the treatability study were provided to the NYSDEC with the Pre-Design Investigation Report and to the Contractor during the procurement process.
- B. The Contractor performed their own ISS treatability study using retained additional unused samples from the Engineer's treatability study. The results of the Contractor's study are provided in an Appendix to the Final Design Package.
- C. Based on the results of the treatability study performed, the following ISS reagents and mix ratios are anticipated:

Parameter	Acceptable Range
Portland Cement	≥ 2%
Ground Granulated Blast Furnace Slag (GGBFS)	3 - 5%
Bentonite	0 - 0.25%
Water:cement ratio	≤1.3:1

- D. The Contractor is responsible for developing a final mix design that will achieve the ISS performance standards defined in Part 1.8 below. The Engineer will review this mix design, and when approved, the mix will be considered the Approved Mix Design.
- E. Approval of the mix design by the Engineer in no way relieves the Contractor from his responsibility to achieve the ISS performance standards.
- F. The Contractor is responsible for all costs associated with changes in the Approved Mix Design, or changes to construction means and methods that may be needed to achieve the ISS performance standards.
- G. Do not modify the Approved Mix Design without prior written approval from the Engineer.
- H. The Engineer may request additional performance testing to support any Contractor requested changes to the Approved Mix Design, the costs of which are to be borne by the Contractor.

1.8. PERFORMANCE STANDARDS

A. The performance standards for the ISS are (a 28-day cure time period applies to all testing):

- 1. Average Unconfined Compressive Strength (UCS) greater than 50 psi but less than 500 psi after 28 days, with no single sample less than 40 psi or greater than 600 psi.
- 2. Average permeability less than 1×10^{-6} cm/sec, with no single sample greater than 1×10^{-5} cm/sec.
- 3. The solidified material, when observed along the break point of the UCS testing specified in this section, shall have no non-aqueous phase liquids (NAPL) present.
- B. The following testing methodologies will be used to determine whether the performance standards for the ISS have been met:
 - 1. Permeability (to be determined via ASTM D 5084-16 Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter).
 - 2. Strength (to be determined via ASTM-D 1633-00 Standard Test Method for Compressive Strength of Molded Soil-Cement Cylinders).
 - 3. Visual inspection by the Engineer for the presence of free liquids.
- C. The estimated top elevation for ISS treatment, bottom elevation for ISS treatment, and horizontal limits of the Work, are shown on the Design Drawings. Do not extend beyond (deeper than) the target elevation for the bottom of the ISS zone by greater than 0.5 feet without written authorization by the Engineer.
- D. Create a Homogenous Mixture of the solidifying reagents and in-situ soils in each column. The Engineer will verify that a homogenous mixture has been created using the following criteria applied to samples collected from representative columns:
 - 1. No visible NAPL or sheen.
 - 2. Grout and soil appear evenly mixed.
 - 3. Consistency of color from samples collected at different depth intervals within the column.
 - 4. The pH of the mixture must be greater than 10.5 standard units.
 - 5. There are no unmixed soil clumps greater than 3 inches in any dimension.
- E. Minimize the amount of spoil produced by the solidification processes while meeting the performance standards.

1.9. POST-ISS CORING

A. Subcontract with a qualified driller to collect post-ISS cores as outlined in the NYSDEC In-Situ Solidification QA/QC document.

- B. Provide a minimum of 10 working days of notice to the Engineer to allow for adequate coordination with the NYSDEC on the implementation of the coring program.
- C. The Engineer will review the collected cores to determine if the visual inspection criteria has been met.
- D. The Contractor is to note that at least one core is to be collected when the ISS treatment area is no more than 25% complete. As such, multiple mobilizations of the subcontracted driller will be required.

PART 2 PRODUCTS

2.1. ISS EQUIPMENT

- A. Furnish ISS equipment of sufficient size and power to perform the scope of ISS Work shown on the Design Drawings.
- B. Provide an excavator capable of reaching the known, subsurface structures at the site to remove any obstructions encountered during the Work.
- C. Furnish a solidifying reagent mixing system that meets the following requirements:
 - 1. Uses a calibrated scale that is certified for use in the State of New York.
 - 2. Is capable of precisely proportioning the mix constituents and blending them into a homogeneous mixture of uniform consistency.
 - 3. Can continually batch and mix solidifying reagents in sufficient quantity without interruption.
- D. Calibrate automatic metering systems in the presence of the Engineer, if used, prior to the beginning of grout injection. Re-calibrate the machinery at any time if requested by the Engineer. Automatic metering systems must have a manual backup method for verifying quantities.
- E. Batch type mixers may be used, subject to the provisions of an accurate means of proportioning the individual solidifying reagents and must be able to allow for uninterrupted injection. Batch plants which require slowing or stopping of the injection procedure while mixing additional batches when one or more batches are deemed not acceptable.

2.2. SOLIDIFYING REAGENT

- A. Use Type I Portland cement, or Engineer approved equivalent, meeting the requirements of ASTM C150.
- B. Blast furnace slag, if proposed for use by the Contractor, must be produced to meet the requirements of ASTM C989 Ground Granulated Blast Furnace Slag (GGBFS) as a Constituent in Concrete and Mortar. Chemical concentration data for the GGBFS must be submitted to the Engineer for review.

- C. Bentonite, if proposed for use by the Contractor, must be powdered bentonite meeting the requirements of API 13-A.
- D. Maintain a readily available quantity of solidifying reagents to allow for uninterrupted performance of the Work.
- E. Protect reagent materials from precipitation, moisture, and other potential deleterious weather conditions.
- F. Label containers for materials storage per the supplier's requirements and maintain Safety Data Sheets for all reagents on the site.
- G. Do not use solidifying reagent additives (e.g., thinners, retarders, accelerators) without prior written approval from the Engineer.

PART 3 EXECUTION

3.1. COORDINATION OF WORK

- A. Coordinate the ISS Work with excavation, groundwater cutoff, trenching, shoring, sampling, and backfilling Work.
- B. Maintain all equipment offsets from existing buildings as shown in the Design Drawings.
- C. Do not backfill or cover any Work areas without prior approval from the Engineer.

3.2. GROUT PREPARATION

- A. Add the calculated quantities of solidifying reagents to each column or mixing cell, as determined by the Approved Mix Design.
- B. Thoroughly mix the water and solidifying reagents into a consistent and homogenous mixture.
- C. Pump or deliver the solidifying reagent mixture from the mixing plant to the ISS equipment at an adequate pressure and flow rate for the solidification process.
- D. Meter solidifying reagent with a calibrated turbine flow meter that has the ability to display the flow rate (gpm) and total (gal) injected into each column or mixing cell.
- E. Record the total volume of solidifying reagent delivered to each column or mixing cell.
- F. Discard solidifying reagent that reaches a temperature of more than 80°F or is held for greater than 1 hour.
- G. Mix the solidifying reagent to the satisfaction of the Engineer.

3.3. SOIL SOLIDIFICATION

A. Construct and maintain a stable ISS working platform.

- B. Conduct solidification to the extents, depths, and elevations shown in the Design Drawings.
- C. Lay out columns or mixing cells in a manner to solidify the entire area and provide an overlap between adjacent columns or cells so that no material is untreated. Note that the Design Drawings show a gap between the target ISS limits and the sheetpile support wall so that augers or mixing buckets will not need to contact the sheetpile to stabilize the targeted soils.
- D. Perform surveying as specified in Section 02 21 00 Surveys.
- E. Define the top elevation for ISS treatment by surveying the elevation of the ISS Working Platform. Measure the elevation every 10 feet on center, throughout the ISS area, within 72 hours of starting solidification.
- F. Survey and record the location of the center point of each ISS column or mixing cell immediately before advancing the column or mixing the cell.
- G. Determine the bottom elevation of each completed column or cell by comparing the total auger or bucket depth below a fixed reference elevation datum. Do not change the reference datum throughout the project without prior approval from the Engineer.
- H. Note any variance between the Design Drawings and the observed top elevation for ISS treatment before beginning solidification of each column or cell and adjust the quantity of solidifying reagent mix accordingly.
- In the event that the excavator or auger tool meets an obstruction that reduces the drilling rate to refusal (as previously defined) before achieving the bottom elevation for ISS treatment, notify the Engineer immediately, who will instruct that one of the following courses of action be taken:
 - 1. Excavate overlying material in an attempt to remove the obstruction.
 - 2. Determine that the obstruction is unmovable (refusal) and the bottom elevation for ISS treatment revised to that location.
 - 3. If the obstruction cannot be removed within 15 minutes of commencing removal efforts, the Engineer will either consider the ISS column or obstructed portion of the mixing cell complete, or the Engineer will direct the Contractor to continue to attempt to remove the obstruction.
 - 4. Determinations made by the Engineer, relative to the presence of obstructions, are final.
- J. All reagent addition to a column is to be at the prescribed proportions of the mix design as calculated for each column or cell. The minimum grout or water amount for each column or cell will be blended and additional grout may be added when necessary to achieve proper mixing, as determined in the field.

- K. Mix grout with in-situ soils until it is a homogeneous mixture of soil and solidifying reagent from the top elevation for ISS treatment to the bottom elevation for ISS treatment shown on the Design Drawings.
- L. Complete a minimum of three mixing passes for the entire column once the bottom elevation of ISS treatment is reached for each column. If excavator mixing is used, Engineer must approve the proposed mixing time and methodology used to confirm completeness of the mixing process.

3.4. SPOIL MANAGEMENT

- A. Remove or re-grade spoils over the mixed columns or cells as necessary to avoid exceedance of the top of ISS elevation shown in the Design Drawings and so that the spoils are stable and able to drain.
- B. Manage spoils such that they do not accumulate in the working area and impact the mixing of subsequent columns or mixing cells.
- C. Do not cut/fill or otherwise disturb solidified material with heavy equipment until the area has been approved for backfill by the Engineer.
- D. Dispose of excess spoils at the approved disposal facility listed in the Contractor SOP.
- E. Break apart cured spoils to meet the sizing requirements for disposal at the commercial disposal facility, at no additional cost to the Engineer.

3.5. QUALITY CONTROL/QUALITY ASSURANCE (QA/QC)

- A. The Engineer will oversee a QA program during the performance of the ISS Work.
 - 1. While the Engineer will oversee and administer the QA program, it is the responsibility of the Contractor to perform, and provide the necessary labor for the following items associated with the QA:
 - a. Sample collection.
 - b. Field screening.
 - c. Molding/curing.
 - d. Shipping.
 - e. Analysis.
- B. It is the responsibility of the Contractor to administer and provide all labor, materials, and pay for all costs associated with the QC program outlined in the Contractor ISS Implementation Plan.
- C. Each column or cell represented by a failed sample that does not achieve the performance goals must be re-mixed by the Contractor, the costs of which are to be borne by the Contractor.

- D. Maintain the sampling equipment needed to support the QA/QC program on site during the performance of the ISS Work.
- E. Initiate sampling activities within 20 minutes of a request made by the Engineer.
- F. Collect a sample of the solidifying reagent for density verification testing according to API Method RP 13-B1 at a frequency of every 3rd batch mixed or at the direction of the Engineer.
- G. Collect for the Engineer one in-situ bulk sample of newly solidified soil for every 10 columns or 500 CY of treated soil in cells with a minimum of 1 sample collected per day.
 - 1. Sampling of the treated soil will occur within 1 hour of mixing while it is still wet.
 - 2. Provide and collect samples with a sampling tool capable of taking samples of mixed material over a discrete depth interval. Sampler shall be hydraulically or similar powered sampler capable of being fully opened and closed from the ground level. The sampler furnished must be capable of retrieving a discrete sample from Bottom Elevation for ISS Treatment elevations.
 - 3. The Engineer may instruct the Contractor to collect samples using the on-site excavator periodically in lieu of using the discrete interval sampling tool. The collection methodology used will be at the sole discretion of the Engineer.
 - 4. The sample will be tested each as per the testing procedures and performance standards in Section 1.8 of this specification.
- H. The Engineer will determine whether the Contractor's ISS operations meet the specified performance standards and will collect and test QA samples at his discretion. The Engineer will analyze a minimum of one sample from every 500 cubic yards for the performance standards specified in Section 1.8. Quality Control testing results provided by the Contractor may be used for informational purposes only and will not be used as official confirmation of successfully meeting the performance standards.
- I. Provide any additional sampling the Engineer may require based on the QA/QC test results.

3.6. REPROCESSING

- A. Reprocess the column(s) at the direction of the Engineer if the QA samples do not meet the requirements of the performance standards for ISS Work.
- B. Reprocess columns identified as being inadequately mixed by the Engineer.
- C. Reprocess columns or mixing cells that do not meet minimum performance standards specified in this specification.

- D. A failed QA sample will require the reprocessing of all columns/cells associated with that failed sample.
- E. Perform reprocessing within one working day of receiving notice that reprocessing is required. All reprocessing Work, as identified by failed QA/QC samples, is to be performed by the Contractor, the costs of which are to be borne by the Contractor.

3.7. POST-ISS CORING

- A. Complete the post-ISS coring as part of the NYSDEC requirements specified in the NYSDEC In-Situ Solidification QA/QC document.
- B. The coring must be completed and accepted by the Engineer and the NYSDEC prior to ISS equipment being demobilized from the site.

END OF SECTION 02 55 00

SECTION 02 60 00 CONTAMINATED MATERIAL MANAGEMENT

PART 1 GENERAL

1.1. SUMMARY

- A. The Work required under this section includes furnishing all labor, materials and equipment, and performing all operations required for the proper management, onsite handling, on-site reuse, off-site transportation, and disposal of waste materials and waste liquids generated during performance of the Remedial Action.
- B. Excavated Material generated during the Work and remediation-related liquid wastes are classified in two categories:
 - 1. Material determined through analytical testing and approved by the Engineer to be suitable for reuse on site.
 - 2. Contaminated Material requiring off-site transportation and disposal.
- C. Contaminated Material generated during the Work is classified in two categories:
 - 1. Remediation Waste Media or materials containing site-related contaminants and are unsuitable for reuse on site, which includes but is not limited to, the following:
 - a. Excavated bulk material (soil not otherwise determined to be suitable for reuse on site).
 - b. Impacted debris including, but not limited to concrete, brick, stone, asphalt, piping, wood, roots and hardened tar. (Note that certain of these materials may be suitable for reuse on site under certain conditions. For example, unimpacted or minimally impacted stone, wood, or roots may be suitable for on-site reuse as fill if they are properly sized, in limited quantities, and only used greater than one foot below final grade on the commercial property. Refer to the DEC-approved on-site soil reuse proposal attached to the Final Design.)
 - c. Wastewater, including stormwater or groundwater removed from the excavation area and decontamination water.
 - 2. Construction-related Contaminated Waste Waste media or materials generated during the Work which do not contain site-related contaminants and are unsuitable for future use (e.g., cement batch plant wastes, unused water treatment or decontamination reagents, or spent lubricants or solvents). This category excludes structural demolition material (e.g., two-foot retaining wall at the southern perimeter of the site) and construction-related wastes suitable for disposal as routine municipal solid waste.

1.2. GENERAL

- A. This section includes requirements for on-site management of Excavated Material and off-site transportation of Contaminated Material to specified disposal or recycling facilities. The Contractor is responsible for the cost of all material transportation. Only use routes outlined in the Approved Design. It is the responsibility of the Contractor to use equipment and personnel capable of navigating the local traffic patterns while maintaining minimum daily production, as required, to meet the Project milestones. The Contractor is responsible for all delays caused as a result of trucks not following approved traffic routes, inadequate scheduling of trucks, causing traffic delays, or from using equipment that cannot safely navigate the local roadways.
- B. Wastewater from dewatering activities and equipment decontamination must be collected and pumped into a temporary storage container meeting all applicable regulations until the Wastewater is properly disposed of off site.
- C. Excavated soil will be transported off site for disposal at a landfill or other approved facility if analytical testing or physical characteristics demonstrates the soil to be unsuitable for reuse as backfill on site as defined in Section 31 23 00, or is otherwise unable to be reused on site, as determined by the Engineer.
- D. The Contractor is solely responsible for proper vehicle loading. Ensure the vehicle contents are properly contained and secured in the vehicle, including the proper lining and covering of loads. All vehicles leaving the site must abide by all load and weight limits. All fines, taxes, penalties, or judgments resulting from overweight or improperly loaded vehicles are the responsibility of the Contractor.
- E. Refer to the materials management flow chart in the Design Drawings for details on the disposition of the anticipated waste streams to be generated during the performance of the Work.
- F. For the duration of the Work, maintain copies on site of all documents related to the off-site shipment of Contaminated Material.
- G. Develop a driver orientation plan that includes, but is not limited to:
 - 1. An orientation detailing, at a minimum:
 - a. An overview of the Project.
 - b. Requirements of the traffic plan.
 - c. City of Hornell traffic rules and regulations.
 - d. Driver conduct.
 - e. Approved haul routes.
 - f. Approved staging areas.

- g. A prohibition to stage or park trucks near the neighboring commercial and residential areas prior to working hours, and to only park or queue in pre-designated areas.
- h. A hand-out detailing the haul routes, speed limits, warnings, designated staging areas, etc.
- i. Incident reporting requirements.
- j. Abatement waste materials.
- 2. All truck drivers are required to sign the orientation plan stating that they have read and understood the information.
- 3. Provide all truck drivers with hard copies of the orientation package including the transportation plan and the traffic plan.
- 4. All trucks will carry a copy of their Part 364 Waste Transporter Permit.

1.3. CONTRACTOR RESPONSIBILITIES

- A. Segregate and manage Contaminated Material at the Work site in accordance with all applicable laws and regulations, including but not limited to those listed in the References section of this specification.
- B. Perform all additional analytical testing required to characterize Excavated Material for on-site reuse, off-site disposal or recycling.
- C. Propose off-site disposal or recycling facilities for Contaminated Material requiring transport off site, including off-spec ISS material and decontamination residuals.
- D. Ensure transportation of impacted materials shall be performed by personnel with proper training and in compliance with applicable Regulations including, but not limited to, New York State, RCRA, US DOT, local, and other applicable Regulations.
- E. Prepare all documentation and permits required for off-site treatment, disposal or recycling of Contaminated Material.
- F. Submit to the Engineer copies of all waste manifests, bills of lading, and certified weight slips for all materials removed from the site for disposal.
- G. The Contractor is responsible for the acceptance of Contaminated Material at the facilities. In the event that the identified and approved facilities stop accepting the Contaminated Material (e.g., due to capacity restrictions), the Contractor shall identify alternate facilities and make arrangements with such facilities to accept material from the Work. Alternate facilities are subject to review and approval by National Fuel and the Engineer.
- H. In the event that an alternate facility is needed to accept Contaminated Material, the Contractor will supply a written submission to the Engineer on the material type, amount, location, and reason the approved facility stopped accepting the material.

I. Provide, maintain, and utilize an anti-tracking pad for trucks exiting the site, and promptly (minimum daily) collect any soil tracked onto public roadways for appropriate off-site disposal with impacted soils.

1.4. ENGINEER RESPONSIBILITIES

- A. Provide existing waste characterization data to the Contractor.
- B. Review proposed receiving facilities, analytical test results, and documentation and recommend appropriate facilities to National Fuel.

1.5. OWNER RESPONSIBILITIES

- A. Approve off-site disposal/recycling facilities as appropriate for the Work.
- B. Act as generator for all waste streams transported off site. National Fuel (or authorized designee) will sign all manifests/bills of lading as required for Project-generated waste transported off site.

1.6. APPROVED DISPOSAL FACILITIES

A. A list of disposal facilities currently approved by National Fuel is provided in the table below. All waste streams generated from the site must be sent to a National Fuel-approved facility. The Contractor may propose alternative facilities subject to review and approval by National Fuel.

Table 1. National Fuel-Approved Disposal Facilities

Facility Name	Location	
Non-Hazardous Solid Waste		
Casella Landfill	Angelica, NY	
Steuben County Landfill	Bath, NY	
Non-Hazardous Liquid Waste		
American Recyclers	Tonawanda, NY	
Covanta	Niagara Falls, NY; Oriskany, NY	
Hazardous Wastes		
The Environmental Quality Company	Belleville, MI	

1.7. SUBMITTALS

A. Submit a Contaminated Material Management Plan providing, at a minimum, the following information:

- 1. Credentials of the Waste Management Coordinator responsible for regulatory compliance of Contaminated Material management.
- 2. Procedures for on-site segregation, management, and temporary storage of the different waste streams comprising Remediation Waste and Construction-related Contaminated Waste (include provisions for a separate stockpile for storage of material suitable for potential reuse).
- 3. Procedures for minimizing the volume of decontamination residuals, if any.
- B. Within two days of transporting materials off site, submit copies of completed manifests/bills of lading signed by the transporter and receiving location. Include copies of receiving facility's weight slips.
- C. Submit copies of all permits, insurance and licenses for all waste transporters.
- D. Provide truck driver orientation signature sheets for all truck drivers.

1.8. DEMOLITION MATERIALS

- A. Segregate the materials generated during the demolition of the existing structures. Refer to Section 02 41 19 Selective Demolition.
- B. If Asbestos-Containing Materials are encountered, develop an Asbestos Abatement Plan for the handling and disposal of asbestos-containing materials.
- C. If flowable fluid is encountered within abandoned pipes, it must be containerized. Water from pipes may be combined with other Wastewater generated for treatment or off-site disposal by the Contractor. Other fluids must be containerized and staged by the Contractor for subsequent characterization and disposal by others.
- D. Dispose of non-environmentally impacted construction and demolition debris at a recycling or C&D facility.
- E. Dispose of environmentally impacted structural materials at a Subtitle C or D landfill, as needed.

PART 2 PRODUCTS

2.1. IMPACTED MATERIAL STORAGE AND TRANSPORT

- A. Transport impacted demolished materials and/or soil materials in sealed, gasketed, tailgate dump trucks or trailers. The vehicles and storage containers used for the storage and/or transport of impacted materials must be structurally sound and tight to prevent leakage or spillage of materials.
- B. Use containment materials that will not degrade and are compatible with the contaminants in the waste.
- C. Provide vehicles and containers used for the storage and/or transport of materials with SOLID sealable covers to minimize the release of odors from the containers

- during transport. The use of mesh or fabric covers is not permitted except for demolition waste if permitted under applicable laws and standards.
- D. Comply with requirements provided in Section 01 50 00 Temporary Facilities and Controls when stockpiling impacted materials, including use of a separate, dedicated stockpile for materials that may be reused on site as backfill.
- E. Furnish appropriate on-site storage (e.g., a frac tank or equivalent) meeting all applicable regulations for the temporary storage of any Wastewater generated during the performance of the Work. It is the responsibility of the Contractor to select an appropriately sized storage unit based on their selected means and methods, the anticipated amount of Wastewater to be encountered, and planned treatment/disposal method. The selected storage method must include appropriate support, containment, and/or other controls as required by applicable regulations.
- F. Furnish, utilize, and maintain a gravel anti-tracking pad(s) at the exit(s) of the work area as indicated on the Design Drawings.

2.2. TRUCK BED LINERS

- A. Except for demolition waste, provide polyethylene impermeable liners for the interior of the excavated impacted material storage containers and vehicles to prevent the leakage of entrained liquid. The liner material must be strong enough to withstand the placement of excavated material into the container without tearing, chemically resistant to the contaminants within the material, and be of sufficient length and width to cover the interior bed of the haul truck with no seams while completely covering over the load with overlap.
- B. Provide staging so that workers can safely place liners into the truck bed. Drivers may not place liners or cover loads.

2.3. ODOR SUPPRESSANT

A. Provide odor and dust suppressing foam to supplement covers, as directed by the Engineer.

PART 3 EXECUTION

3.1. ON-SITE EXCAVATED MATERIAL HANDLING

- A. When not direct-loaded (see Paragraph 3.3 below), segregate Excavated Material into separate stockpiles for grossly contaminated bulk solid waste, debris, construction-related contaminated waste, and material designated by the Engineer for potential reuse in separate lined and covered stockpile pads. Materials not designated for potential reuse should be sampled, loaded, and disposed as described in paragraphs 3.2 through 3.6 below.
- B. If any materials are encountered during the Work that appear to exhibit hazardous characteristics, notify the Engineer immediately and segregate these materials.

- C. Amend Contaminated Material destined for off-site disposal as necessary to meet the moisture requirements of the specified disposal facility, at the direction of the Engineer. Refer to Specification Section 31 23 00 Excavation and Fill.
- D. Size debris destined for off-site disposal to meet disposal facility requirements.
- E. Perform all sampling and analysis required to demonstrate that the stockpiled material designated for potential on-site reuse meets the environmental analytical requirements for on-site reuse detailed in Section 31 23 00 Excavation and Fill.
- F. If the material is found to be acceptable for reuse, only place the material in areas designated by the Engineer as acceptable, which broadly includes areas within the footprint of the former MGP commercial lot at a depth of at least 1 foot below finished ground surface (i.e., reused material must be covered by at least 1 foot of imported clean fill and segregated with a demarcation layer consisting of non-woven needle punched geotextile fabric such as Mirafi 140NL or Engineer accepted equivalent).
- G. Complete a Modified Proctor density test via ASTM D1557-latest edition, and grain size analysis via ASTM D6913-latest edition for each stockpile of reuse material collected if it is found to satisfy the environmental analysis requirements.
- H. Use the results of the Modified Proctor density tests to determine compaction requirements when reusing the material as backfill. Refer to the table governing target compaction percentage in Section 31 23 00 Excavation and Fill.

3.2 SAMPLING AND CHEMICAL ANALYSIS FOR OFF-SITE TREATMENT OR DISPOSAL

- A. Sampling conducted by the Contractor for waste disposal characterization will be witnessed by the Engineer.
- B. Sampling and laboratory analyses conducted for off-site disposal of Construction-related Contaminated Waste will be paid by the Contractor.
- C. All laboratory analyses arranged by the Contractor will be conducted by a laboratory approved by the Engineer.

3.3 LOADING AND OFF-SITE TRANSPORTATION OF CONTAMINATED MATERIAL

- A. Use pre-characterization sample results provided by the Engineer to allow for the direct loading, transport, and disposal of all MGP-related impacted material, whenever possible.
- B. If excavated material set aside for potential reuse on site cannot be reused as backfill material, transport and dispose of material at a regulated, licensed, and National Fuel-approved disposal facility as directed by the NFG Representative and Engineer.

- C. Transport the impacted material directly to the appropriate disposal facility, as directed by the Engineer.
- D. Ensure that any mud or dirt tracked off site onto public roadways is promptly (minimum daily) recovered and containerized for appropriate off-site disposal with impacted soils.
- E. All trucks entering the site must be free of contamination and/or visible dirt. The Engineer reserves the right to reject trucks that arrive to the site in a dirty condition.
- F. Provide a dedicated flagger for traffic control at the site entry to ensure a smooth flow of traffic and to minimize congestion at the site entrance during all trucking activities.
- G. Appropriately cover trucks filled with excavated material prior to exiting the site to prevent vapor and fugitive dust emissions during transport. Supplement with odor suppressant foam, as needed. Ensure gross vehicle weight conforms to the most current local, city, state, federal DOT and bridge and tunnel requirements from the point of origin to the final disposal facility.
- H. Perform all Work in and around trucks in appropriate personal protective equipment. Address these specific activities in the site-specific Contractor HASP.
- I. Drivers are not permitted to exit their vehicles within the exclusion zone without proper personal protective equipment and the requisite health and safety training.
- J. Staging must be provided to access truck beds. Drivers and site workers are not permitted to climb on vehicles.
- K. Visually inspect transport vehicles for evidence of contamination (inside of wheels and undercarriage) prior to leaving the site. All trucks prior to leaving the site will proceed to a decontamination station for cleaning before exiting onto public roads.
 - 1. Brush off equipment using a broom and/or brushes within the excavation area prior to movement to the decontamination pads to decrease the amount of respirable particulates leaving the remediation area.
 - 2. If necessary, at the decontamination pad, pressure wash heavy equipment before allowing it to leave the site.
- L. Proceed directly to the designated treatment, storage, and disposal facility when departing the site. No off-site overnight storage of loaded trucks is permitted.
- M. The Contractor is responsible for any and all actions necessary to remedy situations involving material spilled or leaked in transit, or mud or dirt tracked off site. This includes trucks carrying imported fill or other materials to the site (i.e., dust generated from trucks entering the site on adjacent roads). Perform cleanup in accordance with all applicable Federal, State, and local regulations at no additional cost to the Engineer. The Contractor shall report any and all spills, regardless of

- volume, to the Engineer as soon as practical. The Engineer will in turn report them to the NYSDEC Project Manager to evaluate the need for further response.
- N. All transporters used will be properly licensed, permitted, and certified for the service provided.
- O. Do not combine material from the site with any other material, without approval from the Engineer.
- P. A representative or agent of National Fuel will sign transport bills of lading or manifests, and provide a hazardous waste generator number, if required. Maintain on-site copies of all documents involving transportation of materials from the site. Submit copies of these records to the Engineer at a frequency agreed to between the Contractor and the Engineer. Turn over all remaining records in a timely manner to the Engineer at the completion of the Remedial Action.
- Q. Ensure that transport vehicles are properly secured, labeled, and placarded prior to exiting the site.

3.4 DISPOSAL OF CONTAMINATED MATERIALS

- A. Dispose of Contaminated Materials at the approved disposal facilities.
- B. In the event that material cannot be sent to an approved facility, notify the Engineer in writing of the characteristics of the material that are preventing it from being disposed of at the approved disposal facility.
- C. If any materials are encountered during the Work that appear to exhibit hazardous characteristics, these materials should be segregated for further evaluation and instruction from the Engineer.
- D. Dispose of wastewater at a National Fuel-approved off-site liquid waste treatment facility.
- E. Bulk solid material collected in any wastewater storage container (e.g., frac tank) as a result of settling in the tank, shall be disposed off site with excavated impacted material for disposal.
- F. Perform any sampling of liquid waste as needed for disposal at the approved liquid waste disposal facility.

3.5 DISPOSAL OF NON-CONTAMINATED STRUCTURAL DEMOLITION MATERIALS

- A. The transport of non-environmentally impacted structural demolition materials, as approved by the Engineer, may be performed using standard roll top mesh covers in place of solid sealable covers.
- B. Handle, transport, and dispose of all waste streams generated as part of the structural demolition Work as required by all applicable codes and standards.

- C. Do not comingle waste streams from the structural demolition Work without prior approval from the Engineer.
- D. Dispose of materials at the approved disposal facilities.
- E. Notify the Engineer immediately if, during the course of the demolition Work, an unanticipated waste stream is discovered.
- 3.6 DISPOSAL OF NON-CONTAMINATED CONSTRUCTION-RELATED WASTE MATERIALS
 - A. The Contractor is solely responsible for disposal of construction-related wastes suitable for disposal as routine municipal solid waste; no additional compensation will be provided for disposal of these materials.

END OF SECTION 02 60 00

SECTION 31 09 00 GEOTECHNICAL INSTRUMENTATION

PART 1 GENERAL

1.1. SUMMARY

- A. With the exception of sections 1.1, 1.2, and 1.3, and where noted throughout, this specification covers work to be performed by the Engineer. The Contractor may propose additional instrumentation to ensure the safety of personnel, the Work, and to suit the Contractor's means and methods. Except where otherwise noted, installation and monitoring of all instrumentation will be performed by the Engineer. This work will also be covered by this specification.
- B. Protect instrumentation installed and monitored by the Engineer, as shown on the Design Drawings, from damage.
- C. Replace any instrumentation installed by the Engineer that is damaged either directly or indirectly by the Contractor, his personnel, or Subcontractors.
- D. Assist the Engineer with development of Plans of Action in the event of abovethreshold readings. As directed by the Engineer, implement Plans of Action as required when threshold values are reached and stop Work if alarm values are reached.
- E. Provide equipment, controls, and processes needed to comply with protection of infrastructure based on monitoring and surveys performed by the Engineer and/or National Fuel.

1.2 MOVEMENT CRITERIA

- A. The Engineer will monitor the performance of the excavation support system.
- B. Stop Work and immediately notify the Engineer if excessive deflections are noticed during the performance of the Work.
- C. The Engineer-supplied excavation support design has predicted maximum deflections of 1.0 inch. Stop Work if deflections beyond this predicted maximum are noted in the field.

1.3 VIBRATION CRITERIA

- A. Gas utility infrastructure adjacent to the Site will be monitored via seismograph by the Engineer during the performance of the Work.
- B. The following peak particle velocity (PPV) threshold values, as measured by the Engineer at the adjacent gas utility infrastructure, are not to be exceeded during the Work:
 - 1. 2 inches per second on transverse or longitudinal channels (i.e., gas lines).

- 2. 4 inches per second on vertical channels (i.e., gas lines).
- C. The following peak particle velocity (PPV) threshold values, as measured by the Engineer at or near the adjacent properties, are not to be exceeded during the Work:
 - 1. 0.5 inches per second in any direction.
- D. The maximum PPV value for any singular measurement will be considered to be the summation of vectors that yields the highest PPV value as measured in the x, y, and z coordinate planes for that event.
- E. The Engineer may direct the Contractor to alter construction methods or take other preventative measures if exceedances of the threshold PPV values are recorded during the performance of the Work.

1.4. DEFINITIONS

- A. Response Values Predefined "trigger" levels of geotechnical instruments at which time appropriate Plans of Action shall be implemented.
 - 1. Threshold Value The trigger level at which the following actions shall be implemented: analyze data, report on possible causes of high readings, and implement contingency measures.
 - 2. Alarm Value The trigger level at which the following actions shall be implemented: stop work and implement emergency measures. Suspension of activities in the affected area with the exception of those actions necessary to diminish the deformations and ground responses. Re-evaluate designs and methods of construction.
- B. Formal Initial Reading Instrument readings taken by the Engineer soon after instrument installation and prior to any construction activity and agreed to by Engineer as being the one with which all subsequent readings will be compared to determine levels of change.
- C. Acceptance Tests Tests performed on installation, prior to installation, and soon after installation to ensure the instrument is properly working.
- D. Baseline Readings A series of readings taken over a period of time before an instrument reading is affected by construction to determine how ambient conditions may be affecting the instrument.
- E. Reflective Prism Survey Point (RP) A reflective survey prism installed on a structure to monitor horizontal and vertical movement during construction.
- F. Settlement Monitoring Point (SMP) A survey nail, or Engineer accept equivalent placed in a fixed location.
- G. Seismograph Measures vibrations during construction.
- H. Contractor's Additional Instrumentation Instrumentation proposed by the Contractor and installed by the Engineer, in addition to the instruments shown on

the Design Drawings, to ensure the safety of personnel and the Work and to suit the Contractor's means and methods.

1.5. REFERENCES

A. Geotechnical Instrumentation for Monitoring Field Performance, John Dunnicliff, John Wiley & Sons, Inc., 1993.

1.6. QUALITY ASSURANCE

A. FACTORY CALIBRATION

1. A factory calibration shall be conducted on all instruments at the place of manufacture prior to shipment. Each factory calibration shall include a calibration curve with data points clearly indicated, and a tabulation of the data. Each instrument shall be marked with a unique identification number. Quality assurance procedures during factory calibration shall be as specified. Factory calibrations shall be traceable to the National Institute of Standards and Technology (NIST).

B. Use qualified instrumentation personnel including:

1. Land Surveyor – A Registered Land Surveyor in the State of New York, who has a minimum of 5 years of experience in deformation measurements of the types and accuracies specified herein. The field survey party chief delegated by the Land Surveyor shall have a minimum of 1 year of experience in deformation survey measurements of the types and accuracies specified herein. If an automated survey system is used, a Registered Professional Engineer in the State of New York with a minimum of 5 years of experience in deformation measurements and monitoring may be utilized to oversee the deformation monitoring.

1.7. SCHEDULE OF INSTALLATION WORK

A. The Engineer shall install and baseline instruments and provide formal initial readings at least one week prior to any intrusive activity on the site.

PART 2 PRODUCTS

2.1. MATERIALS

- A. Engineer shall furnish instrumentation, tools, materials, readout devices, dataloggers, data storage units, and miscellaneous instrumentation components. All units should be calibrated within six months of the installation date, if required.
- B. All graduations shall be in U.S. Customary Units (e.g., feet, inches, pounds).

2.2. SEISMOGRAPHS

A. Engineer shall furnish and place Instanel Micromate or equivalent for vibration monitoring at the locations shown in the Design Drawings.

2.3. REFLECTIVE (OPTICAL) PRISMS

A. Engineer shall furnish high quality precision reflective (optical) survey prisms for installation at the locations shown in the Design Drawings.

2.4. SETTLEMENT MONITORING POINTS

A. Engineer shall furnish and place settlement monitoring points consisting of RPs and survey nails as indicated in the Design Drawings.

2.5. CRACK GAUGES

A. Non-automated crack gauges shall be grid crack monitors as manufactured by Avongard Products (USA) Ltd, or approved equivalent. Anchors, bolts, screws, and quick-setting epoxy shall be as recommended by the manufacturer as acceptable for use on the mounting surface.

2.6. LEAK DETECTION MONITORS

A. National Fuel will furnish portable hydrogen flame ionization detector, optical methane detector, or approved equivalent.

PART 3 EXECUTION

3.1. PREPARATION

- A. Develop means and methods of construction of the work in this Contract that complies with the response values of the instruments. Develop and implement Plans of Action if the response values are reached. Obtain required permits from the responsible jurisdiction prior to installation of any new additional instruments.
- B. The Contractor shall protect from damage and maintain all instruments installed, and repair or replace damaged or inoperative instruments at no cost to the Engineer.
- C. Monitor, collect, and interpret data from additional instrumentation.
- D. The Contractor shall provide to the Engineer safe access to any part of the Work for data collection.
- E. Visually inspect utilities, structures, and adjacent buildings before and after construction operations that might affect their integrity, when required to protect existing adjacent facilities from construction-related damage, and to ensure the safety of personnel and the Work. Provide photo or video documentation of inspections to verify conditions before and after construction.

3.2. PRE-INSTALLATION ACCEPTANCE TESTS

A. When instruments are received at the installation site, the instrumentation personnel shall perform pre-installation acceptance tests to ensure that the instruments and readout units are functioning correctly prior to installation. Pre-installation acceptance tests should be documented on a pre-installation acceptance test record form and shall include relevant items from the following list:

- 1. Examine factory calibration.
- 2. Verify that all components fit together in the correct configuration.
- 3. Check all components for signs of damage in transit.
- 4. Check that quantities received correspond to quantities ordered.
- B. An instrument that fails the specified pre-installation acceptance test shall be repaired such that it passes a subsequent pre-installation acceptance test, or shall be replaced by an identical instrument.

3.3. INSTALLATION

- A. All instruments shall be installed and tested by the Engineer or National Fuel (leak testing only) in accordance with the manufacturer's recommendations. Testing shall be undertaken as necessary to ensure satisfactory functioning of the equipment.
- B. Notify the Contractor at least 24 hours prior to installing instruments.
- C. If the Contractor elects to install additional RPs, submit proposed locations in elevation and horizontal position to the Engineer for review at least 7 work days prior to installing such points. The additional RPs shall not conflict with the Engineer's RPs.
- D. For all other instrumentation, notify the Engineer at least 24 hours prior to installing any such additional instrumentation. Data will be accepted by the Engineer only if the data are obtained from instrumentation furnished, calibrated, tested, installed, and maintained as specified herein, if the data are collected and plotted as specified herein, and if submitted to the Engineer within 1 week of data collection.
- E. Measures shall be taken to ensure that additional electrical instrumentation is not adversely affected by other temporary or permanent electrical services and equipment, and does not affect any other services, activities or equipment within or adjacent to the Works.
- F. Cabling for additional instrumentation shall be neatly and securely fixed to appropriate cable trays which in turn shall be securely fixed to the structure. All cabling shall be tagged with an appropriate reference, identifying the instrument to which it is attached.
- G. Readout boxes shall collect the cabling from the various remotely read additional instruments and from local terminal boxes, so that monitoring can be conveniently carried out from a single position close to an instrumented section.
- H. Readout boxes shall be positioned for ease of access and shall be protected from damage during construction.

3.4. FIELD CALIBRATION AND MAINTENANCE

- A. All additional instrumentation shall be calibrated as required. Periodic checks shall be carried out at appropriate intervals to confirm the validity of the calibration of the equipment in accordance with the manufacturer's instructions, and any adjustments that are found necessary shall be made. Records shall be kept of checks, errors recorded and whether any adjustments were undertaken.
- B. Instrumentation personnel shall conduct regular maintenance of field terminals and accessible instrument components. Maintenance shall include both instruments installed by the Contractor and instruments installed by the Engineer. Instruments shall be maintained by the Contractor in good working order throughout the construction period. All instruments shall be protected. The Contractor shall carry out his construction using methods that accommodate the presence of instrumentation and shall make every effort to protect them for damage and allow the instruments to be monitored according to the schedule.
- C. Copies of all certification shall be held on site and made available to the Engineer if required.
- D. If the Contractor discovers that an additional instrument is damaged or inoperative, the Contractor shall notify the Engineer verbally within 24 hours and submit a damage report within five days. If the instruments are damaged, or inoperative, or inaccessible due to Contractor's works, the instruments shall be repaired or replaced by the party initially responsible for installation at the Contractor's expense.

3.5 DATA COLLECTION

A. If not being collected from an automated system, the following data will be collected at the frequencies specified, based on the type of work being done:

Instrumentation	Baseline	Intrusive Activity ¹	Non-intrusive Activity
Seismographs	Automated data collection over 2 days prior to start of work	Automated over entire period	Automated over entire period
Optical Prism	3 measurements at each location upon installation	Once daily	Once weekly, or as required by Engineer
Crack Gauges	1 initial measurement of each crack in each adjacent building	Once weekly, or as required by Engineer	Once monthly, or as required by Engineer
Leak Detection Monitors	1 initial measurement by National Fuel prior to start of work	As required by National Fuel	As required by National Fuel

1. Intrusive activities include installation of excavation support, ISS, and excavation.

- B. Monitor both horizontal and vertical movement, as applicable, of the Settlement Monitoring Points and Reflective Prisms.
- C. Tolerances:
 - 1. Determine the initial location of each monitoring point with respect to established benchmarks.
 - 2. Determine the location of monitoring points to an accuracy of plus/minus 0.01 feet in the horizontal and vertical direction.
- D. Data for all instruments shall be recorded on field data records, which shall include at least the following:
 - 1. Project name.
 - 2. Contract name and number.
 - 3. Instrument Type.
 - 4. Date and time.
 - 5. Observer.
 - 6. Readout unit number.
 - 7. Instrument number.
 - 8. Readings.
 - 9. Remarks.
 - 10. Visual Observation.
 - 11. Other related data including weather, temperature, and construction activities.
- E. Data for all instruments shall be recorded in U.S. Customary Units, such as feet, inches, pounds, etc.
- F. Data from Contractor-installed instrumentation will be accepted by the Engineer only if the data are collected and plotted, if readout unit materials and calibrations are as specified herein, and if submitted to the Engineer within 1 week of data collection.
- G. Provide and facilitate safe access to the Work at all times for the Engineer and/or National Fuel to collect data from specified instruments and any additional instruments. Safe access shall include, but not be limited to, cessation of work activities, temporary relocation of obstructing materials and equipment, provision of ladders, working platforms and hoisting services, and any other needs that, in the opinion of the Engineer, are necessary to ensure safe access. Furnish two sets of safety equipment for use by the Engineer and/or National Fuel when collecting data, which shall include, but not be limited to respirators and harnesses.

H. Formal initial readings shall be collected as previously specified.

3.6 DATA REDUCTION, PROCESSING, AND REPORTING

- A. The Engineer will establish a Central Data Management (CDM) system capable of reducing and recording instrumentation data. The CDM will issue warnings when a Response Value is reached. This system shall be assessable to the Contractor via the Internet by any web browser.
- B. The CDM system used shall provide the Contractor access to both the electronic raw data and processed data at any time. The processed data shall include all tables, plots and graphs specified in this section.
- C. The CDM system shall be able to display current readings in engineering units for any sensor or monitoring point and display the entire history of readings for the sensor or monitoring point via a web browser.
- D. The Engineer shall provide data and reports to the Contractor and Owner in printable Portable Digital File (.pdf) format in accordance with the following schedules:
 - 1. Weekly Data Report. The data report shall be provided no later than 3 days later than the last day on which data are collected. When the periods specified are interrupted by weekends or holidays, the periods will be increased by up to 24 hours for each weekend day or each holiday day.

The weekly report shall include the following:

- a. A covering table summarizing all instruments that have reached the response values, with the actual readings, the response values and date when the response values are reached.
- b. A summary of corrected readings for instruments that had erroneous readings in the previous week's daily data report.
- c. A summary table of instruments which have been installed during that week.
- d. An updated instrumentation location plan.
- e. A description of the work performed.
- E. When the Engineer concludes from the data that a change has occurred, and the change, in the judgment of the Engineer, is likely to require remedial or precautionary measures, the Engineer will notify the Contractor within a time period less than the periods specified above so that Contractor can verify the change and take appropriate action.

3.7. DAMAGE TO INSTRUMENTATION

A. If an instrument, including an existing instrument installed by the Engineer, is damaged or inoperative, the Engineer shall repair or replace the damaged or

- inoperative instrument. When damage or improper function is due to Contractor's actions, the cost of repair or replacement shall be the Contractor's responsibility.
- B. When data is collected from an instrument that has been installed to replace a damaged instrument, the formal initial reading for the damaged instrument shall be used as an initial reading for the replacement instrument so that data are plotted continuously, without an offset at the time of damage. The time of damage and replacement shall be noted on the plot of data.

3.8. DISCLOSURE OF DATA

A. Do not disclose any instrumentation data to third parties and do not publish data without prior written consent of the Engineer.

3.9. INTERPRETATION OF DATA AND IMPLEMENTATION OF PLANS OF ACTION

- A. The Threshold and Alarm Values for each instrument shall be defined collectively as Response Values. The actions associated with these Response Values are defined below. Actions to be implemented are referred to herein as response actions.
- B. Engineer shall interpret the data collected. Interpretation shall include making correlations between instrumentation data and specific construction activities. Instrumentation data shall be evaluated to determine whether the response to construction activities is reasonable.
- C. The following actions shall be taken after obtaining data indicating that a Threshold Value has been reached:
 - 1. Engineer and Contractor shall meet to discuss possible causes of high readings and the need for response action(s).
 - 2. A Plan of Action shall be developed, as needed, and shall include a schedule and detailed description of the methods to be implemented to limit further building movements.
 - 3. Install additional instruments, and increase the frequency of monitoring if needed
- D. Take necessary steps so that the Limiting Value is not reached. Suspend activities in the affected area with the exception of those actions necessary to avoid reaching the Limiting Value. Emergency response actions may include suspension of activities in the affected area with the exception of those actions necessary to diminish the deformations and ground responses; structural stabilization works; revision of construction procedures and schedules; and ground improvement work.

3.10. DISPOSITION OF INSTRUMENTS

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A. All instrumentation installed by the Engineer shall be removed by the Engineer at Substantial Completion of the Contract or when they are no longer required, as determined by the Engineer.

END OF SECTION 31 09 00

SECTION 31 10 00 SITE CLEARING

PART 1 GENERAL

1.1. SUMMARY

A. The Work required under this section includes furnishing all labor, materials, and equipment and performing all operations required for site clearing prior to other Work.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTIONS

3.1. GENERAL SITE PREPARATION ACTIVITIES

- A. Locate and clearly flag trees and vegetation to remain, and other materials to remain in the site clearing limits. Minimize the extent of clearing to the extent possible based on target work limits.
- B. Provide flagging to delineate limits of areas to be cleared or grubbed. Review at site with Engineer before commencing removal of trees, vegetation, and other materials to be removed.
- C. Replace flagging that is lost, removed, or destroyed until clearing and grubbing Work is complete and Engineer allows for removal of flagging.
- D. Clear all debris, rubble, and vegetation from the Work areas and construction support areas that are not flagged to remain as approved by the Engineer.
- E. Clear all debris, rubble, and vegetation from the air monitoring station locations as directed by the Engineer.
- F. Provide protection for existing monuments, structures, and appurtenances during the Work.
- G. Provide temporary relocation of appurtenances that have the potential to become damaged during the performance of the Work.

3.2. DEBRIS REMOVAL

- A. Remove and dispose all trees, shrubs, stumps, roots, brush, logs, rubbish and debris within the limits of Work area.
 - 1. 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 the Engineer.
- B. Remove and dispose (if it cannot be replaced and reused) the sections of chain-link fence indicated in the Design Drawings.

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- C. Remove additional debris generated during the performance of the Work within the limits of the Work area. Conduct all handling, segregating, and screening activities that are necessary to facilitate off-site disposal.
- D. Segregate contaminated materials from non-contaminated materials and prepare, as necessary, for disposal. Dispose of debris at the approved disposal or recycling facility identified for use for each type of waste.
 - 1. The Contractor may temporarily stockpile above-ground portions of tree trunks greater than 6" in diameter at designated location(s) approved by the Engineer. Tree sections must be handled in a manner that prevents accumulation of potentially impacted soils on the exterior. Tree sections shall be disposed or discarded off site by any legal means prior to the completion of the Work.
 - 2. Chip branches, stems, and trunks that are less than 6" in diameter on site and stockpile at location(s) designated by the Engineer.
 - 3. Root balls or other materials cleared at or below grade will be disposed of off site at a commercial facility in accordance with applicable regulations.
 - 4. Dispose of fence fragments, and other rubbish at appropriate off-site location in accordance with applicable laws and regulations unless otherwise noted in the Approved Design.

3.3. SNOW REMOVAL

- A. Perform all snow removal activities on the site during the duration of the Work.
- B. Arrange for snow removal to be performed as soon as practicable after a snow event, and minimize the amount of time lost due to inclement weather.
- C. Remove/relocate snow to maintain emergency vehicle access and egress points on the site at all times while the Work is being performed.

END OF SECTION 31 10 00

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SECTION 31 23 00 EXCAVATION AND FILL

PART 1 GENERAL

1.1. SUMMARY

- A. The Work required under this section includes furnishing all labor, materials, equipment, and performing all operations required for the excavation, handling, backfilling and stabilization of material during the performance of the Work.
- B. All excavation and backfill Work performed must be done in a manner that complies with the Community Air Monitoring Plan (CAMP) that has been prepared for the site.

1.2. SUBMITTALS

- A. Excavation and Backfilling Plan: Submit an excavation and backfilling plan to the Engineer showing the sequencing, staging, and phasing of the excavation and backfill activities.
 - 1. Incorporate coordination with the in-situ solidification component of the Work into the excavation and backfilling plan.
- B. Borrow Source Evaluation: Submit the results of the borrow source evaluation for each source to be used as backfill to the Engineer, indicating that the material complies with the geotechnical and environmental criteria. Perform borrow source evaluations prior to the import of fill from the borrow source and/or reuse of unimpacted soil from site excavations stockpiled at the direction of the Engineer. Include the following information as part of the submittal:
 - 1. Name, address, telephone number, and website address of off-site borrow source, if used.
 - 2. Certificate from the off-site borrow location, if used, stating that the soil is native in origin and free of contamination.
 - 3. Analytical results from the off-site borrow source, if used, specific to the actual fill being imported to the site, as confirmation that the material is free of contamination and in compliance with the Imported Clean Fill environmental criteria. If stockpiled site material is reused as backfill, provide analytical results from the stockpile confirming that the material complies with environmental criteria.
 - 4. Geotechnical test results from the off-site borrow source, if used, specific to the actual fill being imported to the site, as confirmation that the material complies with the Imported Clean Fill geotechnical criteria. If stockpiled site material is reused as backfill, provide geotechnical results from the stockpile confirming that the material complies with geotechnical criteria.

PART 2 PRODUCTS

2.1. STABILIZATION AGENT

A. Provide a stabilization agent, such as cement kiln dust (CKD), or equivalent to amend soils too wet to transport in trucks. The stabilization agent used must be acceptable to the disposal facility and in conformance with all applicable NYSDEC requirements for amendments.

2.2. BACKFILL

A. Imported Clean Fill:

1. Furnish Imported Clean Fill that meets the environmental criteria identified in Section C below and is free of organic or deleterious materials and meets the following gradation requirements, or equivalent, as approved by the Engineer. The same requirements apply to site material stockpiled for reuse within the footprint of the former MGP commercial lot, if used. Collect one sample per borrow source.

U.S. Standard Sieve	Percent Finer by Dry Weight	
1 inch	100	
No. 4	70 to 100	
No. 200	0 to 10	

2. Complete a Modified Proctor maximum density test via ASTM D1557 (latest edition), and grain size analysis via ASTM D6913 (latest edition) for each sample of Imported Clean Fill or material stockpiled for reuse. Collect one sample per borrow source.

B. Topsoil

1. Furnish Topsoil that conforms to material designation Topsoil-Type A in section §713-01 of the New York State Department of Transportation Standard Specification, January 7, 2010 letting, which includes the following gradation requirements:

U.S. Standard Sieve	Percent Finer by Dry Weight	
2 inch	100	
1 inch	85 to 100	
0.25 inch	65 to 100	
No. 200	20 to 65	
2 micron particle	0 to 20	

2. Complete an analysis for pH, organic content, and grain size via ASTM D6913 (latest edition), for each sample of topsoil collected. Collect one sample per borrow source.

C. Environmental Analysis Requirements:

- 1. In addition to any laboratory analysis required specific to the imported fill type, analyze each imported fill sample for RCRA 8 Metals, PCBs by EPA Method 8082, VOCs by EPA Method 8260, SVOCs by EPA Method 8270C, 1,4-dioxane by EPA Method 8270, and the list of 21 NYSDEC-specified perand polyfluoroalkyl substances (PFAS) compounds by EPA Method 537.1 (modified) at a laboratory that is appropriately licensed to perform the analysis in the State of New York. Collect one sample per borrow source. Forward analytical results to the Engineer at least two weeks prior to the material being imported to the site.
- 2. For stockpiled site material proposed for replacement as backfill, analyze for SVOCs by EPA Method 8270C at a laboratory that is appropriately licensed to perform the analysis in the State of New York. Collect and analyzed at a rate of one sample per 500 cubic yards. Forward analytical results to the Engineer upon receipt and prior to the material being reused on site.
- 3. Imported off-site fill must meet the Commercial Soil Cleanup Objectives for backfill within the commercial remediation areas, and the Residential Soil Cleanup Objectives for backfill placed within residential remediation areas, as listed in Appendix 5 of the *DER-10/Technical Guidance for site Investigation and Remediation* published by the NYSDEC, to meet the environmental analysis requirements for the Project.
- 4. The imported fill must meet criteria identified in the Special Testing Requirements for Import or Reuse of Soil, as provided in NYSDEC's Sampling for 1,4-Dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under DEC's Part 375 Remedial Programs document (dated June 2019) and NYSDEC's updated Guidelines for Sampling and Analysis of PFAS (dated January 2020).
- 5. Stockpiled material reused as backfill must be free of gross contamination, and total polycyclic aromatic hydrocarbons must be less than 500 milligrams per kilogram (mg/kg) (as measured using SVOC analytical data by EPA Method 8270C).

2.3. REUSE OF STOCKPILED SOIL

- A. If material excavated from the site is stockpiled, tested, and reused as backfill on site, it must be:
 - 1. Reused only within the former MGP commercial lot boundary.

- 2. Placed back into the excavation first, (i.e., prior to backfilling with Imported Clean Fill and/or Topsoil).
- 3. Covered with at least one foot of Imported Clean Fill and/or Topsoil (or any combination thereof).

2.4. DEMARCATION BARRIER

- A. Provide a demarcation barrier to separate clean fill materials from underlying reuse soils or native soils.
 - 1. The demarcation layer shall be non-woven needle punched geotextile fabric with an ultraviolet inhibitor, such as Mirafi 140 NL or Engineer accepted equivalent when segregating clean fill from underlying native soils or backfilled reuse soils.
 - 2. The demarcation layer shall be the top of the solidified ISS soils when clean imported soils are placed directly atop the ISS mass.

PART 3 EXECUTION

3.1. CAMP REQUIREMENTS

- A. Implement airborne dust and vapor suppression measures required to comply with the CAMP and as directed by the Engineer. These actions may include, but are not limited to, any of the following measures:
 - 1. Applying water on exposed soil surfaces and/or roadways to suppress dust.
 - 2. Covering working areas of exposed soils or stockpiles with tarpaulins, vapor suppressing foam, or other vapor controls.
 - 3. Modifying the means and methods of the Work (i.e., using different or additional equipment, etc.).
 - 4. Modifying the production rate (i.e., excavation rate, etc.).
 - 5. Changing the sequence of activities.

3.2. HOLDER BACKFILL

A. The required depth of excavation in former Gas Holder A is deeper than the surrounding areas, but the depth of ISS is consistent. Volumetric swell materials from adjacent areas can be re-graded into the former gas holder area and compacted in lifts as detailed within this section.

3.3. EXCAVATION

- A. Perform excavations in accordance with OSHA regulations.
- B. Perform the Work to the lines and grades shown on the Design Drawings, and remove any debris encountered.

- C. Load the material into trucks for disposal at the approved facility(ies). To the extent possible, perform the excavation as a direct load operation for the soils that are subject to off-site disposal and do not require amendment or gravity dewatering to reduce the moisture content.
 - 1. Excavation will occur primarily above the water table but may partially extend below the water table depending upon the specific area and seasonal conditions at the time the work is performed. As needed, perform the excavation below the water table using techniques to minimize the water content of the excavated soil and allow for gravity dewatering within the excavation area or on a stockpile pad. Soil should be gravity dewatered such that the water is allowed to drain back into the excavation or be collected and containerized for proper disposal as described in Section 02 60 00 Contaminated Material Management.
 - 2. Use stabilization only for soils that are inherently too wet and cannot be dried sufficiently using gravity techniques. Stabilization agents may only be used with the approval of the Engineer and at the minimum effective application rates.
 - 3. Perform localized dewatering on an as needed basis, with Engineer concurrence, and containerize the collected wastewater for proper disposal or send to the on-site wastewater treatment system for treatment.
- D. If direct loading for off-site transportation is not possible, excavated soil shall be placed in designated stockpiles constructed and managed as specified in accordance with Section 02 60 00 Contaminated Material Management.
- E. Segregate bulk solid waste and construction debris encountered during the excavation in accordance with Section 02 60 00 Contaminated Material Management.
- F. Remove all historical subsurface structures within the excavation limits. If structures not shown on the Design Drawings are encountered, notify the Engineer immediately. No additional payment will be made for removal of unidentified structures without proper notification and approval from the Engineer.
- G. Manage excavated materials in accordance with the Section 02 60 00 Contaminated Material Management.
- H. Perform all excavations using proper shoring and bracing and/or excavation sloping/benching consistent with OSHA requirements to ensure slope stability.
- I. Handle materials in a manner that will protect site personnel, the public, and the environment in accordance with all applicable Federal, State, and local laws and regulations, and to prevent cross contamination.

3.4. SOFT EXCAVATION

- A. Provide National Fuel with a minimum of 72 hours of notice prior to starting soft excavation within the gas regulator parcel and/or removal of the regulator station fencing.
- B. Perform the excavation work within the gas regulator parcel using soft excavation techniques (i.e., vacuum excavation or equivalent subject to approval by National Fuel and Engineer).
- C. The soft excavation equipment must be properly grounded for the duration of the soft excavation portion of the work.
- D. Any hand tools used must be made of non-sparking materials and are subject to inspection by the Engineer or National Fuel representative at any time.

3.5. VIBRATION / LEAK DETECTION MONITORING

- A. National Fuel's Operations personnel will perform leakage tests utilizing portable field equipment prior to, and following intrusive construction activities on or near the gas lines on the regulator parcel. The Contractor shall keep National Fuel apprised of schedule and provide at least two weeks prior notice for any intrusive work within 20 feet of the gas regulators or associated gas lines. The Contractor shall also modify work practices or otherwise accommodate direction from National Fuel based on leak detection testing.
- B. Gas utility infrastructure adjacent to the site will be monitored via seismograph by the Engineer during the performance of the Work.
- C. The following peak particle velocity (PPV) threshold values, as measured by the Engineer at the adjacent gas utility infrastructure, are not to be exceeded during the Work:
 - 1. 2" per second on transverse or longitudinal channels (i.e., gas lines).
 - 2. 4" per second on vertical channels (i.e., gas lines).
- D. The maximum PPV value for any singular measurement will be considered to be the summation of vectors that yields the highest PPV value as measured in the x, y, and z coordinate planes for that event.
- E. The Engineer may direct the Contractor to alter construction methods or take other preventative measures if exceedances of the threshold PPV values are recorded during the Work.

3.6. POST-EXCAVATION COMPLIANCE SAMPLING

A. For the residential properties south of the former MGP, the horizontal and vertical extents of soil removal were pre-delineated and confirmation sampling is not anticipated. For shallow excavations (up to 4 feet deep) outside the sheetpile wall and within the limits of the former MGP site, it is possible that confirmation

- sampling may be required by the NYSDEC and/or the Engineer based on visual observations or other factors.
- B. When the need for confirmation sampling is determined, the Contractor shall assist the Engineer in collecting compliance samples from the bottom and/or sidewalls.
- C. The Contractor's surveyor shall survey the location and elevation of sample locations.
- D. Within seven (7) business days, based on the results of sample laboratory analysis, the Engineer will either provide the Contractor with authorization to backfill or direct them to excavate additional material.
- E. If additional excavation is required, the Engineer will collect additional confirmatory samples with the Contractors assistance, and the Contractor's surveyor shall survey the new limits of excavation and sample locations. The same requirements for Engineer's authorization will apply as for the initial excavation.

3.7. EXCAVATION SCHEDULE

A. The excavation may not be backfilled until the Contractor is directed to do so by the Engineer, after the ISS portion of the Work has been completed (in areas where ISS is required).

3.8. BORROW SOURCE EVALUATION

A. Perform borrow source evaluations for geotechnical and environmental criteria given in subsection 2.2 above to ensure that the imported material meets the Project requirements. Submit the results of the borrow source evaluation to the Engineer.

3.9. ISS AND SHALLOW EXCAVATION BACKFILL

- A. Backfill the excavation areas to the lines and grades shown on the restoration plan in the Design Drawings.
- B. Do not place backfill without the approval of the Engineer. Placement of backfill prior to Engineer approval is at the Contractor's risk and may require removal at the Contractor's cost. Commence backfill placement and compaction upon confirmation of the horizontal and vertical limits of the excavation, as directed by the Engineer.
 - 1. Install the visual demarcation barrier at the vertical limits of the excavation in accordance with Section 2.4 above.
 - 2. Place backfill using a method that does not cross-contaminate backfill, or disturb/damage adjacent structures and property.
 - 3. If stockpiled site soil is used as backfill, it may only be placed within the former MGP commercial lot and covered with at least one foot of Clean Imported Fill (made up of common fill and/or topsoil).
 - 4. Place and compact backfill in maximum 12-inch-thick loose lifts.

- 5. Maintain moisture content within +2 to -3 percent of the optimum moisture content.
- 6. Perform laboratory and field geotechnical testing.
- 7. Compact the backfill to the percent of the maximum dry density (as determined by Modified Proctor during the borrow source evaluation) indicated in the table. Perform compaction testing to assess the degree of compaction. Do not place overlying lifts of backfill until in place compaction tests indicate that the current layer has been compacted in accordance with this criterion.

Project Area	Percent Compaction (%)	Test Frequency (per lift of material)
Less than 2 feet below finished grade	95	50 ft by 50 ft
Greater than 2 feet below finished grade	92	50 ft by 50 ft
Topsoil	Place and compact with tracked equipment or bucket	N/A

8. Use an appropriately licensed testing Subcontractor that is certified to test soil by ASTM D6938 (latest edition), Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods-Shallow Depth.

C. Field Control Quality

- 1. If compaction testing indicates that the Work does not meet the specified requirements, provide additional compaction, or remove the soil and replace with acceptable backfill.
- 2. The Engineer reserves the right to reject backfill that differs visually from the identified source material and to randomly test backfill materials for conformance with the specifications. Remove backfill that fails to meet the specifications.
- 3. Divert or otherwise prevent surface water from entering excavations to the greatest extent practicable without causing damage or flooding to adjacent properties.

END OF SECTION 31 23 00

SECTION 31 23 19 DEWATERING

PART 1 GENERAL

1.1. SUMMARY

- A. The Work required under this section includes furnishing all labor, materials, equipment, and performing all operations required for the dewatering of the excavation area during performance of the Remedial Action.
- B. Dewatering effluent must be containerized and handled in conformance with Section 02 60 00 Contaminated Material Management.

1.1. SEQUENCING AND SCHEDULING

- A. Continuously dewater the excavation to minimize the water content of the excavated material and facilitate backfilling as per the requirements detailed in Specification 31 23 00 Excavation and Fill.
- B. Coordinate and schedule the dewatering Work in a manner that minimizes the quantity of water pumped while not affecting the excavation and backfill schedule.

PART 2 PRODUCTS

2.1. DEWATERING EQUIPMENT

- A. Furnish, install, and operate pumping equipment of sufficient capacities to meet the requirements for the removal of groundwater, stormwater, and surface runoff water from the excavation area as necessary to complete the excavation, ISS, and backfilling Work.
- B. Provide adequate on-site storage (e.g., frac tank or equivalent) for all wastewater collected during the performance of the Work. The Contractor is to select the size/quantity of the wastewater storage unit(s) based on their selected means and methods, the anticipated amount of wastewater to be encountered, and planned treatment/disposal method. The selected storage method must include appropriate support, containment, and/or other controls as required by applicable regulations.
- C. Keep on site or have immediate access to, additional pumps of sufficient capacity to maintain dewatering activities during any pump breakdown, maintenance, or in case of flooding.
- D. The excavation dewatering network should have redundant features such as adequate standby pumping capacity, valves, and piping so that damage to, or failure of, a principle component of the network will not result in the failure of the entire network.
- E. Provide sufficient suction and discharge hose or piping for transferring pumped liquids without causing erosion, sedimentation, or other adverse consequences.

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- F. Provide freeze protection for all dewatering hoses, piping, and pumping equipment necessary to execute the Work throughout the winter months, including but not limited to: insulation, heat wraps, heaters, and/or enclosures. Freeze protection chemicals or solutions shall not be used on site without prior approval by the Engineer.
- G. Equipment for dewatering may be new or used, but shall be suitable for the Work and maintained in good condition.
- H. All dewatering equipment shall remain the property of the Contractor or Subcontractor.
- I. Decontaminate dewatering equipment in accordance with Specification 01 50 00 Temporary Facilities and Controls, and remove the equipment from the site at the completion of the Work.

PART 3 EXECUTION

3.1. DEWATERING - GENERAL

- A. Design, furnish, install, operate, and remove a dewatering network to allow excavation to the depths shown on the Design Drawings. The network should be designed to filter the existing soils to prevent the migration of soil particles and keep groundwater levels at least 2 feet below active excavation activities while minimizing the amount of water discharged.
- B. The water from the active excavation area or water in contact with exposed impacted soils may contain MGP residuals. Containerize and transport this water off site for disposal.
- C. Do not operate dewatering equipment unattended.
- D. Review the available sub-surface and geotechnical information to determine the pumping rates and storage requirements that will be required to complete the Work.
- E. Furnish, at a minimum, all labor, materials, and equipment required to perform all operations required to design, install, test, pump, measure, and maintain the excavation dewatering equipment and water storage systems, including the storage tank, pumps, sumps, electric power supply, and distribution equipment as required to dewater the excavations so that the Work can be conducted under controlled conditions.
- F. Grade the site and the excavation area to direct surface water runoff away from the excavation areas.
- G. Prevent any impacted water from contacting soils or water outside of the active excavation area. If environmental contamination results from the Contractor's failure to control impacted water, contamination will be removed to the satisfaction of the Engineer, at the expense of the Contractor. The Contractor shall report any and all spills, regardless of volume, to the Engineer as soon as practical. The

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- Engineer will in turn report them to the NYSDEC Project Manager to evaluate the need for further response.
- H. In areas where ISS of underlying soils is not subsequently required, backfilling may proceed once the excavation is completed and inspected/sampled by the Engineer so long as water levels are maintained at least 2 feet below the backfill level until final grades are achieved.
- I. Install, operate, and remove the dewatering systems in accordance with applicable Federal, State, and local Laws and Regulations, permits, and generally accepted industry practices.

3.2. INSPECTION AND MAINTENANCE

A. Repair or replace damaged pumps, piping, hoses, tanks, and all other dewatering equipment and materials within four working hours, if damaged. Damage includes any pump and power failures, leaks, breaks, clogs, or other conditions that adversely affect the dewatering system or releases contaminated water.

3.3. SAMPLING AND ANALYSES

A. Water sampling and analysis will be performed by the Contractor in accordance with the requirements of the approved liquid waste disposal facility(ies).

3.4. SYSTEM REMOVAL

A. Decontaminate dewatering equipment in accordance with Section 01 50 00 – Temporary Facilities and Controls, and remove the equipment from the site at the completion of decanting and dewatering operations.

3.5. FIELD QUALITY CONTROL

A. Perform initial tests of dewatering equipment to ensure proper operation of the system components and that all effluent is contained properly.

END OF SECTION 31 23 19

Dewatering 31 23 19-3

SECTION 31 41 00 SHORING

PART 1 GENERAL

1.1. SUMMARY

- A. Provide all labor, equipment, supplies, and materials to install, operate, maintain, and remove a temporary excavation support system in the locations indicated on the Design Drawings.
- B. Refer to Section 31 09 00 Geotechnical Instrumentation for information and details on instrumentation requirements.

1.2. EXCAVATION SUPPORT SYSTEM

- A. The Contractor is responsible for selecting the materials, means, and methods for the excavation support system, subject to the criteria provided in the Final Design Package. This shall include providing means and methods for equipment and personnel access into the excavation area to perform the Work.
- B. Coordinate the installation of the excavation support system with the dewatering plan. Incorporate staging of the excavation support and dewatering equipment into the narrative of the Contractor means and methods.
- C. Documentation of the design of the excavation support system is provided as an attachment to the Final Design Package.

1.3. SUBMITTALS

- A. Submit a Shop Drawing to the Engineer for review and acceptance that depicts the pile installation locations relative to the limits of excavation, installation sequence, and estimated production rate.
- B. After installation of the excavation support system submit a detailed as-built plan. Include structural member identification number, size, location, length, top elevation, tip elevation, excavation level/stage, and any other pertinent data.
- C. Submit an action plan for arresting any unforeseen movements which could damage nearby structures, utilities, roadways and other features. Include methods and time for implementation.

PART 2 PRODUCTS

2.1. EXCAVATION SUPPORT SYSTEM MATERIALS

- A. Use structural steel that conforms to AISC standards.
- B. Use welding technique and welding electrodes that are in accordance with AWS D1.1, Structural Welding Code, latest edition, if needed.
- C. Use steel shims or wedges, wooden shims or wedges are not permitted.

2.2. INSTALLATION EQUIPMENT

- A. Size installation equipment to provide sufficient energy to install the excavation support system to the required depths.
- B. Contractor shall take note of the required tip elevations and site stratification information included with the Design Drawings.
- C. The use of impact hammers on the Project is not permitted.

PART 3 EXECUTION

3.1. GENERAL

- A. Install the temporary excavation support system in order to excavate, perform ISS, and backfill the excavation area shown in the Design Drawings.
- B. Install and maintain the excavation support system in a manner that prevents the following:
 - 1. Excessive movement and settlement.
 - 2. Removal of soil fines from the adjacent ground.
 - 3. Damage to, or excessive movement of, nearby structures, utilities, roadways, and other features.
 - 4. Cross and/or re-contamination from impacted materials.

3.2. EXCAVATION SUPPORT SYSTEM INSTALLATION

- A. Install steel sheet piles in a plumb position at the locations shown in the Engineer accepted Shop Drawing.
- B. If the excavation support system is unable to be installed as designed due to unforeseen field conditions, cease installation and notify the Engineer.
- C. Phase the installation of the excavation support system as follows:
 - 1. Install the sheet piles to the depths shown on the Design Drawings or otherwise depicted on the Engineer-approved shop drawings.
 - 2. Excavate to target pre-ISS excavation depths/elevations.
 - 3. Perform ISS.
 - 4. Backfill the excavation to final grade.
 - 5. Remove or cutoff sheet piles to at least 4 feet below final grade.
 - 6. Decontaminate removed sheeting per the requirements of Specification Section 01 50 00 prior to removal from the site.
- D. Maintain accurate records of the excavation support system installation. Include type of steel member, detailed installation record, final elevation, deviations from

design location and alignment, lateral deflection and settlement measurements, and all other data pertaining to the installation and performance.

3.3. SETBACKS

- A. Do not allow construction machinery within 4 feet of the vertical face of wall for the excavation support system. The excavation support design is based on an allowable contact pressure of 250 psf with a 4 foot setback. If the Contractor intends to perform the work using equipment and/or methods that will exceed this design surcharge then they must submit an alternative excavation support design to the Engineer for review and acceptance.
- B. Do not stockpile soil within 20 feet outside of the vertical face of the excavation support system.

3.4. MOVEMENT CRITERIA

- A. The Engineer will monitor the performance of the excavation support system.
- B. Stop Work and immediately notify the Engineer if excessive deflections are noticed during the performance of the Work.
- C. The Engineer supplied excavation support design has predicted maximum deflections of 1.0 inch. Stop Work if deflections beyond this predicted maximum are noted in the field.

3.5. VIBRATION CRITERIA

- A. Gas utility infrastructure adjacent to the Site will be monitored via seismograph by the Engineer during the performance of the Work.
- B. The following peak particle velocity (PPV) threshold values, as measured by the Engineer at the adjacent gas utility infrastructure, are not to be exceeded during the Work:
 - 1. 2" per second on transverse or longitudinal channels (i.e., gas lines).
 - 2. 4" per second on vertical channels (i.e., gas lines).
- C. The maximum PPV value for any singular measurement will be considered to be the summation of vectors that yields the highest PPV value as measured in the x, y, and z coordinate planes for that event.
- D. The Engineer may direct the Contractor to alter construction methods or take other preventative measures if exceedances of the threshold PPV values are recorded during the Work.

3.6. REMOVAL

A. The Contractor has the option of removing sheet piles or cutting down the top 4-feet of pile below final grade and abandoning the remainder in place.

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- B. If the Contractor elects to remove the sheet piles, the work must be done in a manner that does not cause excessive soil movement. The Engineer reserves the right to direct the Contractor to take precautionary measures to limit soil loss, if it is noted during the removal process.
- C. Removed sections of sheets are subject to decontamination prior to removal from the site, as indicated above.

END OF SECTION 31 41 00

SECTION 32 31 13 CHAIN LINK FENCE

PART 1 GENERAL

1.1 SUMMARY

A. This Specification includes performing all Work required to furnish and install permanent replacement chain link fences and gates in the locations shown in the Design Drawings.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. A 116 Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric
 - 2. A 702 Standard Specification for Steel Fence Posts and Assemblies, Hot Wrought
 - 3. F 626 Standard Specification for Fence Fittings
 - 4. A 90/A 90 M Standard Test Method for Weight (MASS) of Coatings on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
 - 5. F 1083 Standard Specification for Pipe, Steel, Hot-Dipping Zinc-Coated (Galvanized) Welded, for Fence Structures
 - 6. A 153/A 153 M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - 7. F 1043 Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework
 - 8. C 94/C 94 M Standard Specification for Ready-Mixed Concrete

1.3 SUBMITTALS

- A. Submit to the Engineer shop drawings for the erection and installation of the chain link fence, including fence assembly.
- B. Submit manufacturer's catalog data to the Engineer for the following items:
 - 1. Fence assembly, and
 - 2. Fence hardware and accessories.

1.4 DELIVERY STORAGE AND HANDLING

A. Deliver materials to the site in an undamaged condition. Store materials off the ground to provide protection against oxidation caused by ground contact.

1.5 QUALITY ASSURANCE

- A. Submit reports from the manufacturer indicating the weight in ounces for the zinc coating.
- B. The manufacturers catalog data may satisfy the requirements of the quality assurance submittal if, as determined by the Engineer, the information provided therein is sufficient to establish if the material meets the requirements of the Specification.
- C. Manufacturer's Qualifications:
 - 1. The manufacturer of the fencing of the type specified or similar product shall have at least five years' experience in the manufacture of such materials.
- D. Installer's Qualifications:
 - 1. The fencing installer shall be the manufacturer, approved manufacturer's installer, or a Subcontractor approved by the Engineer.

PART 2 MATERIALS

2.1. GENERAL

A. Provide fencing materials that conform to the requirements of ASTM A 116, ASTM A 702, ASTM F 626, and as specified.

2.2. ZINC COATING

- A. Provide hot-dip galvanized (after fabrication) ferrous-metal components and accessories, except as otherwise specified.
- B. Provide zinc coating of weight as detailed in this Specification, as determined from the average result of two specimens when testing in accordance with ASTM A90/A90M.
- C. Provide zinc coating that conforms to the requirements of the following:
 - 1. Pipe: ASTM F1083.
 - 2. Hardware and accessories: ASTM A 153/A 153M, Table 1
 - 3. Surface: ASTM F 1043
- D. Provide galvanized repair material that is cold-applied zinc-rich coating conforming to ASTM A 780/A 780M.

2.3. FABRIC

- A. Provide fabric consisting of No. 6 gage wires woven into a 2-inch diamond mesh, with a Class 2 weight of zinc coating. The weight of zinc coating shall not be less than 2.0 ounces per square foot of uncoated wire surface.
- B. Provide one-piece fabric widths for the fence height shown in the Design Drawings.

2.4. TOP AND BOTTOM SELVAGES

A. Provide twisted or knuckled top selvage and knuckled bottom selvage.

2.5. LINE POSTS

A. Provide Type 1 round posts with a nominal outside diameter of 2.375 inches, a weight of 3.65 pounds per linear foot, and a minimum average zinc coating of 1.8 ounces per square foot.

2.6. END AND CORNER POSTS

A. Provide Type 1 round posts with a nominal outside diameter of 2.875 inches, a weight of 5.79 pounds per linear foot, and a minimum average zinc coating of 1.8 ounces per square foot.

2.7. TOP RAIL

- A. Provide a round top rail with a nominal outside diameter of 1.66 inches, a weight of 2.27 pounds per square foot, and a minimum average zinc coating of 1.8 ounces per square foot.
- B. Fit top rails with couplings for connecting the lengths into a continuous run. The couple may not be less than 6 inches long with 0.070 inches minimum wall thickness, and shall allow for expansion and contraction of the rail.
- C. Provide suitable wire ties in sufficient number for attaching the fabric securely to the rail at intervals not exceeding 24 inches.
- D. Provide the means to attach the top rail to each corner, and line post.

2.8. SLEEVES

- A. Provide sleeves for setting into concrete which consist of the same material as the post sections, sized 1 inch greater than the diameter of the post.
- B. Weld flat plates to each sleeve base to provide anchorage and prevent intrusion of concrete.

2.9. WIRE TIES

A. Provide 16-gage galvanized steel wire for tying fabric to line posts at intervals not exceeding 12 inches. For tying fabric to rails and braces, space wire ties 24 inches on center.

2.10. POST TOPS

- A. Provide galvanized steel combination tops fit over the outside of the posts and exclude moisture from the entering the inside of the posts.
- B. Provide caps with an opening to permit through passage of the top rail.

2.11. CONCRETE

A. Provide concrete conforming to ASTM C 94/C 94M, and obtaining a minimum 28 day compressive strength of 3,000 psi.

2.12. GROUT

A. Provide grout of proportions one part Portland cement to three parts clean, well graded sand and a minimum amount of water to produce a workable mix.

PART 3 EXECUTION

3.1. GENERAL

- A. Verify the absence of defects or errors in the subgrade or other applicable site features which would cause defective erection, installation, or application of products, or cause latent defects in workmanship and function.
- B. Comply with manufacturer's written instructions, specifications, and recommendations for the erection and installation of the chain link fences and gates.

3.2. EXCAVATION

- Provide excavation for post footings which shall be drilled holes in virgin or compacted soil.
- B. Space footings for line posts at a maximum interval of 10 feet on center, and at closer intervals where required.
- C. Set the bottom of each post not less than 36 inches below finished grade with the bottom of the hole at least 3 inches below the bottom of the posts. The diameter of borehole shall be a minimum of 4 times the largest cross section of the post that is being set. Set posts deeper, as required, in soft and problem soils or to support heavy lateral loads.
- D. When solid rock is encountered near the surface, drill into the rock at least 12 inches for line posts and at least 18 inches for end and corner posts. Drill holes at least 1 inch greater in diameter than the largest dimension of the placed post.

3.3. SETTING POSTS

- A. Remove loose and foreign materials from the boreholes and moisten the soil prior to placing concrete.
- B. Set sleeves in a vertical position, plumb and align while concrete is backfilled.
- C. Provide tops of footings that are trowel finished and sloped or domed to shed water away from posts.
- D. Keep exposed concrete moist for at least 7 calendar days after placement, or cured with a membrane curing material.

E. Set poles into sleeves in a vertical position, plumb and align while backfilled with grout.

3.4. CONCRETE STRENGTH

A. Allow concrete to attain at least 75% of its minimum 28-day compressive strength, but in no case sooner than 7 calendar days after placement, before rails, wire, or fabric are installed.

3.5. TOP RAILS

A. Install top rails to run continuously through post caps, bending to radius for curved runs. Provide expansion couplings as recommended by the fencing manufacturer.

3.6. FABRIC INSTALLATION

- A. Install fabric in single lengths between posts with bottom barbs placed approximately 1.0 to 1.5 inches above the ground.
- B. Install fabric on the security side of the fence.
- C. Pull fabric taut and tie to posts and rails with wire ties.
- D. Ensure fabric remains under tension after the pulling force is released.

3.7. WIRE TIE INSTALLATION

A. Install tie wires that are "U" shaped to the pipe diameters to which they are attached. Twist ends of tie wires not less than two full turns and bend so as not to present a hazard.

3.8. ZINC COATING REPAIR

A. Clean and repair galvanized surfaces damaged by welding, abrasion, peening, and cut ends of fabric, or other cut sections with specified galvanized repair material applied in strict conformance with the manufacturer's printed instructions.

3.9. TOLERANCES

- A. Provide posts that are straight and plumb within a vertical tolerance of 0.25 inch after the fabric has been stretched. Provide fencing and gates that are true to line with no more than 0.5 inch deviation from the established centerline between line posts.
- B. Repair defects as directed by the Engineer.

3.10. CLEANUP

- A. Remove waste fencing materials from the site.
- B. Dispose of soil cuttings from drilling as detailed in Specification 02 60 00 Contaminated Material Management.

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END OF SECTION 32 31 13

SECTION 32 90 00 RESTORATION

PART 1 GENERAL

1.1. SUMMARY

- A. The Work required under this section includes furnishing all labor, equipment, supplies, materials, and performing all operations required for establishing satisfactory vegetative coverage, replacing the chain link fence, and rebuilding the retaining wall, as shown on the Design Drawings.
- B. Provide project maintenance including supplemental irrigation, weed removal, and replacement of damaged or dead plant materials throughout the duration of the contract at no additional cost to the Owner.

1.2. QUALITY CONTROL

- A. Perform seeding in accordance with standard local practice and all applicable regulations for the City of Hornell.
- B. Seed shall result in grasses of a quality and composition that match existing grasses.

1.3. DELIVERY, STORAGE, AND HANDLING

- A. Deliver packaged materials in containers showing weight, analysis (% pure seed, % germination, date tested, etc.) and name of manufacturer.
- B. Deliver plants immediately prior to planting on site. Plants to be kept cool and moist throughout shipment and handling process. Plants with damaged tops will be rejected. Store all plant materials, not installed immediately after delivery, out of direct exposure to sun and wind. Maintain moistness of root balls by covering with wet straw or cloth and periodic watering until time of planting.
- C. Handle all plant materials in a manner so as to avoid damages to plants and containers.
- D. Seed temporarily stored on site shall be held off the ground in a cool (<60° F) dry location and protected from inclement weather. Do not use seed that is wet, moldy, or otherwise damaged.

1.4. SUBMITTALS

- A. Submit a nursery invoice stating botanical and common name of plants, origin of plant materials, and quantity and size upon delivery to the site.
- B. Samples of erosion control materials bearing original labels and manufacturer's installation instructions.
- C. Certification of seed from seed vendor stating the botanical and common name, percentage by weight of each species and variety, place of origin, strain, percentage

- of purity, germination and amount of Pure Live Seed (PLS) per bag. Include the year of production and date of packaging.
- D. Copies of invoices for fertilizer, lime, and mulch used showing the grade furnished, along with certification of quality and warranty.
- E. Submit the application methodology and seed, fertilizer, and lime application rates that will be used during the Work.
- F. Submit a schedule of planned shipments of plants and seed to the site phased to ensure that material is not kept in storage beyond the time periods specified in this section.

1.5. PROJECT CONDITIONS

- A. All erosion and sediment controls are to be installed as depicted on the Design Drawings, prior to commencement of any intrusive activities.
- B. The retaining wall will be replaced with Redi-Rock or Engineer-approved equivalent prior to commencing landscaping work.
- C. Specified portions of the chain-link fence will be replaced prior to commencing landscaping work.
- D. The restoration area shall be graded as shown on the plans and details, unless otherwise pre-approved by the Engineer.
- E. Do not plant in frozen backfill, or when soil is in an unsatisfactory working condition as determined by the Engineer.
- F. Coordinate the plant installation schedule with the Engineer.
- G. Proceed with planting only when existing and forecasted weather conditions permit.
- H. Apply specified seed mixtures and plant trees and shrubs during the following time periods:
 - 1. In spring, between April 16 and June 16.
 - 2. In fall, between September 1 and October 20.

PART 2 PRODUCTS

2.1. TREES AND PLANTS

- A. Remedial activities will require the removal of vegetation along an existing fence line bordering the western and southern perimeter of the site. Trees, shrubs, and landscape items damaged or destroyed as a result of the construction operations shall be replaced as specified on the Design Drawings and the requirements of this section.
- B. Provide container-grown trees and plants as shown on the Design Drawings.

- 1. Shade trees shall be single-stem with straight trunk, well-balanced crown, and intact leader, with a minimum of 2" caliper diameter measured at 6" above ground level, complying with ANSI Z60.1 for Type 2 trees. Shrubs shall be multi-stemmed with a minimum of 4 canes and between 18 and 24 inches in height, complying with ANSI Z60.1 for Type 3 shrubs.
- 2. Dig pits and beds at least 6 inches larger than the plant root system to be installed in that location.
- 3. Trees to be replanted at an approximate spacing of 15' on center using a staggered row ("W" or zig-zag) planting pattern within the approximate area indicated on the Drawings. Shrubs shall be planted at an approximate spacing of 15' on center between the trees. Trees and shrubs shall be planted inside the final perimeter fence line except as needed to replace removed trees/shrubs in excavations outside the fence line.
- 4. Remove non-biodegradable containers prior to planting.
- 5. Support planted trees using one wooden stake and one tie.
- 6. Provide and install wood chip mulch by hand to form a continuous blanket over the soil surrounding the plant, approximately 2 inches in uniform thickness at loose measurement.
- 7. An initial watering of planted trees and shrubs will occur immediately after planting and subsequent watering will be performed throughout the first two growing season, as needed, until accepted by the Owner.
- 8. Small Upright or Spreading Trees shall be branched or pruned naturally according to species and type, with relationship of caliper, height, and branching according to ANSI Z60.1
- 9. Provide antidessicant: water-soluble emulsion, permeable moisture retarder, film forming. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.
- 10. Provide trees with trunk-wrap tape: Two layers of crinkled paper cemented together with bituminous material, 4-inch wide minimum with stretch factor of 33 percent.
- 11. Do not install plant life when the temperature may drop below 35 °F or rise above 90 °F.
- 12. Install trees and shrubs during the planting windows specified above.
- 13. Do not install plant life when the wind velocity exceeds 30 miles per hour.

2.2. FERTILIZER

A. Utilize a fertilizer at manufacturer-recommended application rates that is appropriate for the local soil type and climate.

2.3. LIME

A. Utilize a lime at manufacturer-recommended application rates that is appropriate for the local soil type and climate.

2.4. SEED

- A. Furnish seed in sealed standard containers labeled with producer's name and seed analysis in accordance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act.
- B. Seed that has become wet, moldy, or otherwise damaged will not be acceptable.
- C. Seed shall be of a quality and composition that matches surrounding grasses and recommended for the region.

2.5. WATER

A. Furnish water that is clean, potable, and will not inhibit the growth of vegetation.

2.6. MULCH

A. Furnish mulch that is clean long-fibered hay or straw, consisting of stalks of oats, wheat, barley, rye, or excelsior wood fibers, reasonably free of noxious weed seeds, with water content less than 15%. Apply at a rate that conforms to the local requirements.

2.7. RETAINING WALL

- A. Furnish a modular block retaining wall system to reconstruct the height and character of the existing retaining walls along the abutting properties consisting of a Redi-Rock or Engineer accepted equivalent system.
- B. The modular block wall system is to be sufficiently sized such that it can be placed in a single course along the length of the reconstructed retaining wall.
- C. Provide the following information to the Engineer for review and acceptance prior to ordering materials or beginning installation:
 - 1. Manufacturer cut sheets.
 - 2. Shop Drawings showing a typical cross section of the retaining wall and a plan view layout showing the location of the retaining wall relative to the property lines and fence location.
 - 3. Manufacturer's recommended surface preparation and block installation methods.
- D. The replacement retaining wall is subject to review and approval by the abutting property owners. If requested by the Engineer, deliver a single typical piece of the retaining wall system to the site at a location that will allow for it to be reviewed by the Engineer and adjoining property owners.

E. Do not order materials or begin installation until receiving confirmation that the retaining wall system proposed for use has been accepted by the Engineer and abutting property owners.

2.8. CHAIN LINK FENCE

- A. Remove existing chain link fence between the MGP site and adjacent residential properties as needed to perform the Work.
- B. If the chain-link fencing and posts removed during site preparation are suitable for reuse, stage them for re-installation during site restoration.
- C. If (portions of) the pre-existing chain link fence cannot be reused, replace with equivalent material per Specification 32 31 13 Chain Link Fence.

PART 3 EXECUTION

3.1. SITE PREPARATION

- A. Install the modular block retaining wall per the manufacturer's instructions and the Engineer accepted Shop Drawings.
 - 1. Prior to placement of the retaining wall, proof roll the retaining wall subgrade and remove and replace any materials that exhibit rutting or pumping.
 - 2. The retaining wall subgrade must be reviewed and accepted by the Engineer prior to beginning installation.
- B. Replace the chain link fence as shown in the Design Drawings.

3.2. GROUND PREPARATION

- A. Remove all boulders, stumps, roots, or other objects with any dimension larger than 2 inches.
- B. Cultivate the topsoil to a loose depth of approximately 4 inches. Perform plowing, harrowing, cultivating, and all other operations with proper equipment and in such a manner as to break up clods.

3.3. APPLICATION OF TEMPORARY GRASS SEED

- A. If completion of construction occurs outside of specified seeding dates, a temporary cover crop of 20 LBS/acre of winter wheat (*Triticum aestivum*) & 1 LBS/acre redtop (Agrostis gigantea) will be applied until the next consecutive growing season, when the cover crop will be cut to the ground and the area re-seeded to the specified seed mixture.
- B. Apply temporary seeding to areas lacking vegetation if no construction activities will be performed in the area for more than 30 days.

3.4. APPLICATION OF SEED

- A. Apply specified seed mixtures in the planting windows indicated above. If completion of construction occurs outside of specified seeding dates, apply a temporary cover crop.
- B. Water seeded area at least once per week to encourage germination and establishment through the first growing season.
- C. For permanent upland seeding, apply seed and mulch as follows:
 - 1. Uniformly apply lime at the rate recommended by the manufacturer.
 - 2. Uniformly apply fertilizer at the rates recommended by the manufacturer. Apply fertilizer so that it does not run-off into the local storm sewer system.
 - 3. Place fertilizer, seed, and mulch using mechanical methods that will not damage the completed Work. The placement of grass seed via the use of hydro seeding, is not permitted.
 - 4. Uniformly spread mulch over the seeded area immediately after the grass seed has been placed.

3.5. ESTABLISHMENT OF GRASS AND OTHER PLANTINGS

- A. The Engineer will review completed planting for acceptance of installation. Approval of planting denotes initial acceptance and beginning of maintenance period.
- B. Any landscaping Subcontractor used to perform maintenance of the plantings after demobilization by the Contractor must be identified and approved by the Engineer in advance.
- C. Replace all new plants supplied, which are impaired, dead, or dying within the 2-year guarantee period. Complete replacement plantings no later than the next planting season.
- D. Grass shall be at least 80% established by the end of the growing season (or by the end of the following growing season, if seeded in fall). If 80% coverage is not achieved, the thin areas shall be re-prepared and overseeded or reseeded with the same seed mix as that which was originally used, or an alternate seed mix approved by the Engineer.
- E. Water at least once per week for the first two growing seasons (between May 15 and October 1) following seeding and plant installation, unless otherwise directed by the Engineer.
- F. The Engineer will periodically inspect the site to verify that a satisfactory stand of grass is obtained in all areas seeded. A satisfactory stand of grass is defined as a cover of living plants, after true leaves are formed, of the seed species applied, in which gaps larger than one square foot do not occur, and the total bare area is less

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than one percent of the total seeded area. Re-seed bare and eroded areas as directed by the Engineer.

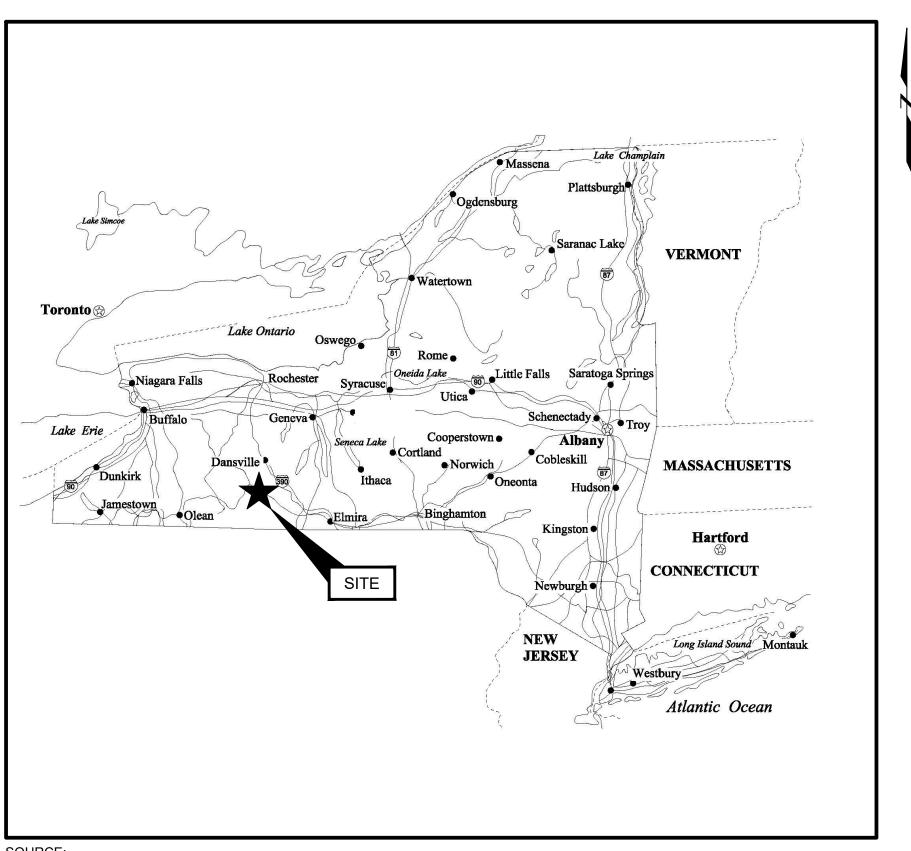
G. Mow the property twice once a satisfactory stand of grass has been established.

END OF SECTION 32 90 00

Restoration 32 90 00-7

REMEDIAL ACTION

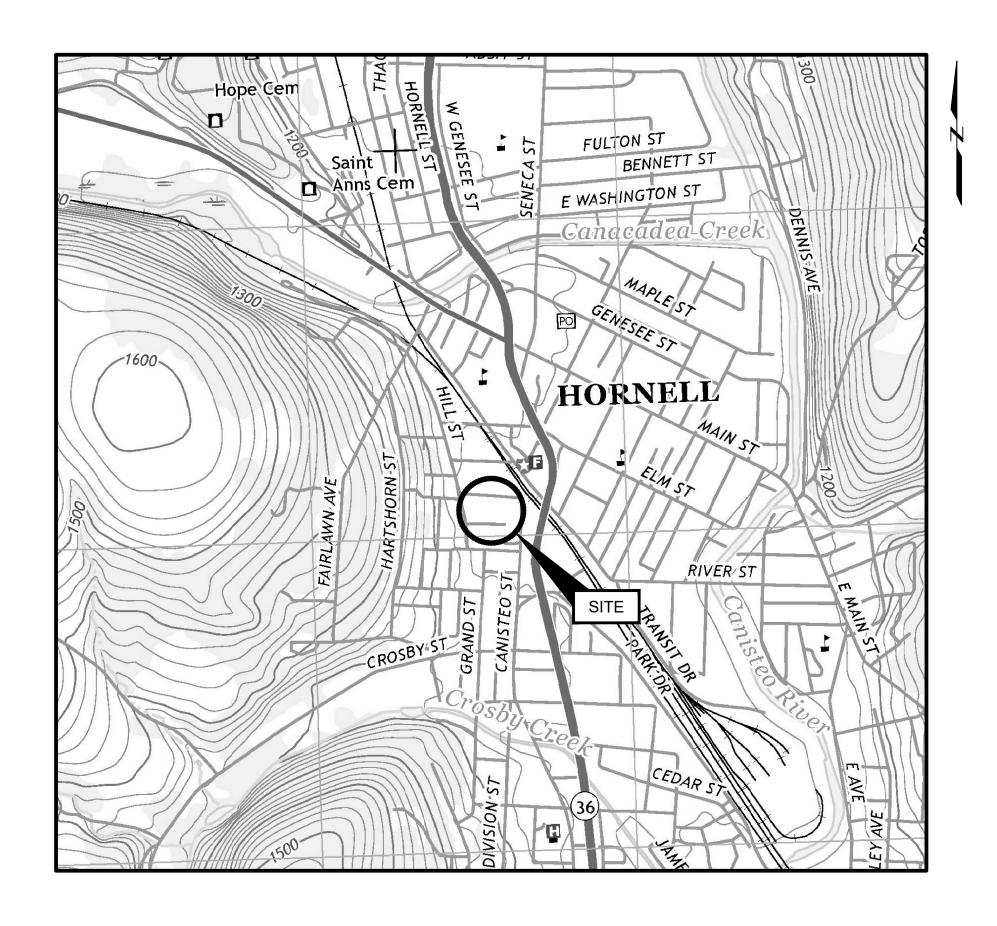
HORNELL FORMER MGP SITE NYSDEC SITE #851032 CITY OF HORNELL, STEUBEN COUNTY, NEW YORK



<u>SOURCE:</u> MAP IMAGE PREPARED BY MAGELLAN GEOGRAPHICX, SANTA BARBARA, CA 1994.

STATE MAP

APPROXIMATE SCALE: 1" = 100 MILES



SITE LOCATION MAP

SCALE: 1"=1000'

SHEET INDEX

SHEET NO.	DRAWING NO.	<u>TITLE</u>
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4	S-004	HISTORICAL CONDITIONS
5	S-005	REMEDIATION OVERVIEW
6	S-006	REMEDIATION PHASING PLAN
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PREPARED FOR:

PREPARED BY:

NATIONAL FUEL GAS DISTRIBUTION CO.

GEI CONSULTANTS, INC., P.C. 1301 TRUMANSBURG ROAD SUITE N ITHACA, NY 14850 (607)216-8955



national Fuel

FINAL DESIGN

	-				ГШИ	AL DESIGN
WARNING: IT IS A VIOLATION OF SECTION 7209.2 OF THE NEW YORK STAT EDUCATION LAW FOR ANY	4	8/20/2020	FINAL DESIGN	CRP		DWG. NO.
PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER. TO ALTER IN ANY WAY PLANS.	3	5/26/2020	95% DESIGN	CRP		S-001
SPECIFICATIONS, PLATS OR REPOTS TO WHICH THE SEAL OF A PROFESSIONAL ENGINEER HAS BEEN APPLIED. IF AN ITEM	2	1/6/2020	75% DESIGN	CRP		0 001
BEARING THE SEAL OF A PROFESSIONAL ENGIEER IS ALTERED, THE ALTERING ENGINEER SHALL AFFIX TO THE ITEM HIS SEAL	1	1/29/2018	50% DESIGN	CRP		SHEET NO.
AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS SIGNATURE, THE DATE, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.	0	12/7/2018	PROGRESS 50%	CRP		1 OF 18
	NO	DATE	ISSUF/REVISION	APP		1 01 10

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A. GENERAL CONSTRUCTION NOTES

- 1. DURING CONSTRUCTION, TEMPORARY FENCING SHALL BE INSTALLED AND THE SITE AREA SHALL BE SECURELY MAINTAINED. UPON COMPLETION OF CONSTRUCTION, THE TEMPORARY FENCING SHALL BE REMOVED.
- 2. THE CONTRACTOR IS NOT REQUIRED TO PROVIDE A SECURITY GUARD, BUT MAY CHOOSE TO DO SO AT THEIR OWN DISCRETION FOR THE CARE AND PROTECTION OF THE WORK, EQUIPMENT AND MATERIAL.
- 3. LOCAL FIRE DEPARTMENTS AND EMERGENCY MANAGEMENT TEAMS SHALL BE MADE AWARE OF SITE ACTIVITIES PRIOR TO INITIATION OF REMEDIAL ACTIVITIES.
- 4. ALL CONSTRUCTION ACTIVITIES, INCLUDING OPERATION OF MACHINERY, EXCAVATION, FILLING, GRADING, CLEARING OF VEGETATION, DISPOSAL OF WASTE, AND STOCKPILING OF MATERIAL SHALL TAKE PLACE WITHIN THE APPROVED WORK AREA AS DEPICTED ON THE CONSTRUCTION DRAWINGS AND/OR AS SPECIFIED IN THE CONTRACT DOCUMENTS. CONTRACTOR SHALL MANAGE ALL TRAFFIC WITHIN THE CONSTRUCTION AREA.
- 5. THE CONTRACTOR SHALL LIMIT MOVEMENT OF CREWS, VEHICLES, AND EQUIPMENT ON APPROVED ACCESS ROADS TO MINIMIZE DAMAGE TO PROPERTIES AND DISRUPTION OF NORMAL LAND USE ACTIVITY.
- 6. THE CONTRACTOR SHALL PARK PERSONNEL AND CONSTRUCTION VEHICLES IN AREAS DESIGNATED IN SUCH A WAY THAT THEY SHALL NOT INTERFERE WITH NORMAL TRAFFIC, CAUSE A SAFETY HAZARD, OR INTERFERE WITH EXISTING LAND USE OUTSIDE OF THE SITE AS WELL AS WITH OTHER ACTIVITIES WITHIN THE SITE.
- 7. WASTE WATERS FROM CONSTRUCTION OPERATIONS SHALL NOT ENTER STREAMS, WATER COURSES OR OTHER SURFACE WATERS WITHOUT THE USE OF APPROPRIATE AND APPROVED TURBIDITY CONTROL METHODS AND COMPLYING WITH THE PERTINENT FEDERAL, STATE, AND/OR LOCAL REGULATIONS. WATER GENERATED DURING EXCAVATION ACTIVITIES INCLUDING, BUT NOT LIMITED TO, THE DEWATERING OF EXCAVATIONS AND DECONTAMINATION FLUIDS, SHALL BE COLLECTED AND TREATED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- 8. ALL VEHICLES EXITING THE SITE MUST PASS THROUGH A TIRE WASH/DECONTAMINATION ZONE, WHERE VISIBLE DIRT WILL BE REMOVED FROM THE TIRES AND OTHER PARTS OF THE VEHICLES. PERFORM VEHICLE WASHDOWNS AS DIRECTED BY THE ENGINEER.
- 9. NOISE IMPACTS SHALL BE MINIMIZED AND MITIGATED. CONTRACTOR SHALL COMPLY WITH STATE AND LOCAL NOISE ORDINANCES, INCLUDING POTENTIAL RESTRICTION OF WORK HOURS AS SET FORTH IN THOSE REGULATIONS. CONTRACTOR SHALL MAINTAIN ALL EQUIPMENT IN GOOD OPERATING CONDITIONS AND ALL MOTORS AND ENGINES SHALL BE MUFFLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. ANY FAULTY NOISE SUPPRESSOR SHALL BE REPAIRED OR REPLACED.
- 10. WELLS, OR PORTIONS THEREOF, THAT ARE TO BE ABANDONED AND ARE WITHIN THE AREA OF SOILS SUBJECT TO EXCAVATION AND ISS MAY BE DESTROYED BY THE CONTRACTOR DURING EXCAVATION AND ISS. WELLS TO BE ABANDONED AND ARE OUTSIDE OR DEEPER THAN THE EXCAVATION/ISS ZONE WILL BE ABANDONED IN ACCORDANCE WITH NYSDEC CP-43 GROUNDWATER MONITORING WELL DECOMMISSIONING POLICY PRIOR TO CONTRACTOR MOBILIZATION.
- 11. THE CONTRACTOR SHALL PROVIDE SAFE PEDESTRIAN AND VEHICULAR ACCESS AND PROTECTION ADJACENT TO WORK AREA THROUGHOUT THE DURATION OF THE PROJECT.

B. GENERAL NOTES FOR SURVEY

- 1. COORDINATE AND HORIZONTAL REFERENCE BASED ON NEW YORK CENTRAL ZONE (3101) NORTH AMERICAN DATUM OF 1983 (NAD 83). VERTICAL DATUM IS BASED UPON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
- 2. ALL CONSTRUCTION STAKEOUT SHALL BE PERFORMED UNDER THE SUPERVISION OF A NEW YORK STATE LICENSED SURVEYOR.

C. GENERAL NOTES FOR UTILITIES

- 1. VERIFY ALL UTILITY LOCATIONS AND DEPTHS PRIOR TO BEGINNING WORK BY POSITIVE IDENTIFICATION USING AIR KNIFE TO A MINIMUM DEPTH OF 5 FEET. AT LEAST 48 HOURS PRIOR TO DIGGING, THE CONTRACTOR SHALL CALL "DIG SAFELY, NEW YORK", TELEPHONE NUMBER 1-800-962-7962 AND OTHERS, AS NECESSARY, FOR UTILITY MARKOUTS.
- 2. THE CONTRACTOR SHALL USE SOFT-DIG TECHNIQUES WHEN EXCAVATING NEAR EXISTING UTILITIES. EXTREME CAUTION SHALL BE EXERCISED WHILE EXCAVATING, INSTALLING, BACKFILLING, OR COMPACTING AROUND THE UTILITIES.
- 3. VERIFICATION OF THE PRESENCE AND LOCATION OF ALL UTILITIES PRIOR TO INITIATING WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL COORDINATE ALL UTILITY RELOCATION WITH THE
- 4. OVERHEAD UTILITY LINES ALONG FRANKLIN STREET TO BE REMOVED BY OTHERS PRIOR TO THE START OF INTRUSIVE WORK.

D. GENERAL NOTES FOR SITE AIR AND STORMWATER CONTROL

- 1. CONTRACTOR SHALL COMPLY WITH THE COMMUNITY AIR MONITORING PLAN WHICH HAS BEEN PREPARED BY GEI.
- 2. THE CONTRACTOR SHALL COMPLY WITH THE EROSION AND SEDIMENT CONTROL PLAN AS SHOWN ON DRAWING S-010.

E. GENERAL NOTES FOR WORK AND SITE INSPECTION

- 1. REPRESENTATIVE FROM THE NYSDEC SHALL BE PERMITTED TO INSPECT THE SITE (INCLUDING RELEVANT RECORDS) AT ANY TIME DEEMED NECESSARY TO ENSURE THAT ALL ACTIVITIES ARE IN ACCORDANCE WITH CONTRACT REQUIREMENTS, NYSDEC APPROVED SITE PLANS AND THE TERMS AND CONDITIONS SPECIFIED IN THE ISSUED PERMITS.
- 2. NOTIFY THE CONSTRUCTION MANAGER A MINIMUM OF 72 HOURS BEFORE COMMENCING ANY EXCAVATION, CONSTRUCTION, INSTALLATION, TESTING, OR BACKFILLING ACTIVITIES.

F. CONSTRUCTION SEQUENCE

- PERFORM EXTERIOR EXISTING CONDITIONS SURVEY OF ABUTTING PROPERTIES AND MARK OUT UTILITIES.
- 2. VERIFY ALL UTILITY LOCATIONS AND DEPTHS WITHIN THE LIMIT OF WORK USING SOFT DIG METHODS.
- 3. PERFORM UTILITY RELOCATION, IF NEEDED, AND TEST TEMPORARY UTILITIES.
- 4. INSTALL TEMPORARY FENCING, LIGHTING, SIGNAGE, EROSION AND SEDIMENTATION CONTROLS, AND OTHER TEMPORARY FACILITIES AND CONTROLS.
- 5. PROTECT EXISTING FEATURES TO REMAIN, AND CONDUCT SELECTIVE DEMOLITION.
- 6. EXCAVATE AND RESTORE RESIDENTIAL PROPERTIES BEFORE INSTALLING EXCAVATION SUPPORT TO PREVENT ACCESS RESTRICTIONS TO RESIDENCES.
- 7. INSTALL THE TEMPORARY EXCAVATION SUPPORT SYSTEM.
- 8. PERFORM THE PRE-ISS EXCAVATION.
- 9. PERFORM THE ISS.
- 10. BACKFILL THE SITE AND REMOVE OR CUT DOWN AND ABANDON THE SOE SYSTEM IN-PLACE. STEEL SHEETS MUST BE REMOVED FROM THE SEGMENT THAT TRAVERSES RESIDENTIAL PROPERTY.
- 11. EXCAVATE AND BACKFILL/RESTORE ANY SHALLOW SOIL REMEDIATION AREAS NOT PREVIOUSLY ADDRESSED
- 12. PERFORM GENERAL SITE RESTORATION AND FINAL GRADING.
- 13. INSTALL PLANTINGS AND SEEDING.
- 14. REMOVE TEMPORARY FACILITIES AND CONTROLS.

G. GENERAL NOTES FOR EXCAVATION SUPPORT

- 1. ALL STEEL SHEET PILES TO CONFORM TO ASTM A572 GR. 50.
- 2. PRE-TRENCH THE ALIGNMENT TO A DEPTH OF 5-FEET TO REMOVE OBSTRUCTIONS. REMOVE OVERSIZED MATERIALS AND RETURN THE BALANCE TO THE TRENCH.
- 3. DRIVE SHEETS TO THE TIP ELEVATIONS SHOWN ON THE CONTRACT DRAWINGS.
- 4. WITH THE EXCEPTION OF BENDS IN THE SHEET PILE ALIGNMENT, DRIVE ALL SHEETS PLUMB WITH INTERLOCKS FULLY ENGAGED TO EACH ADJACENT PILE. BENDS IN THE SHEET PILE ALIGNMENT MAY BE CONSTRUCTED VIA OVERLAPPING PILES, AS DETAILED HEREIN.
- 5. SUBMIT A SHOP DRAWING FOR THE SHEET PILE LAYOUT AND DRIVING SEQUENCE TO THE ENGINEER FOR REVIEW AND ACCEPTANCE PRIOR TO BEGINNING INSTALLATION.

J. ABBREVIATIONS

CAMP COMMUNITY AIR MONITORING PLAN

ISS IN-SITU SOLIDIFICATION

KIP KILO-POUND

NYSDEC NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

NYSDOH NEW YORK STATE DEPARTMENT OF HEALTH

PSI POUNDS PER SQUARE INCH

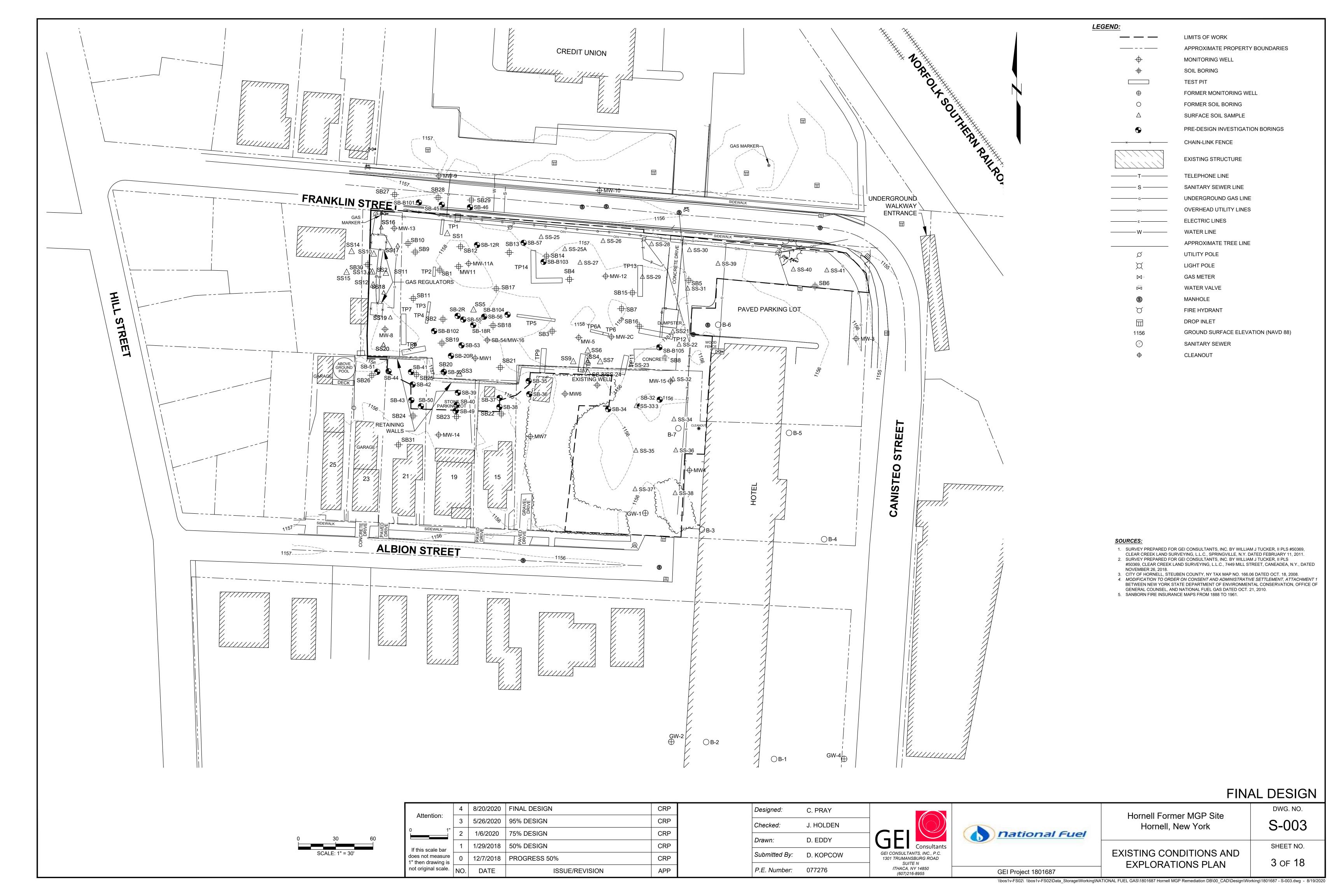
SOE SUPPORT OF EXCAVATION

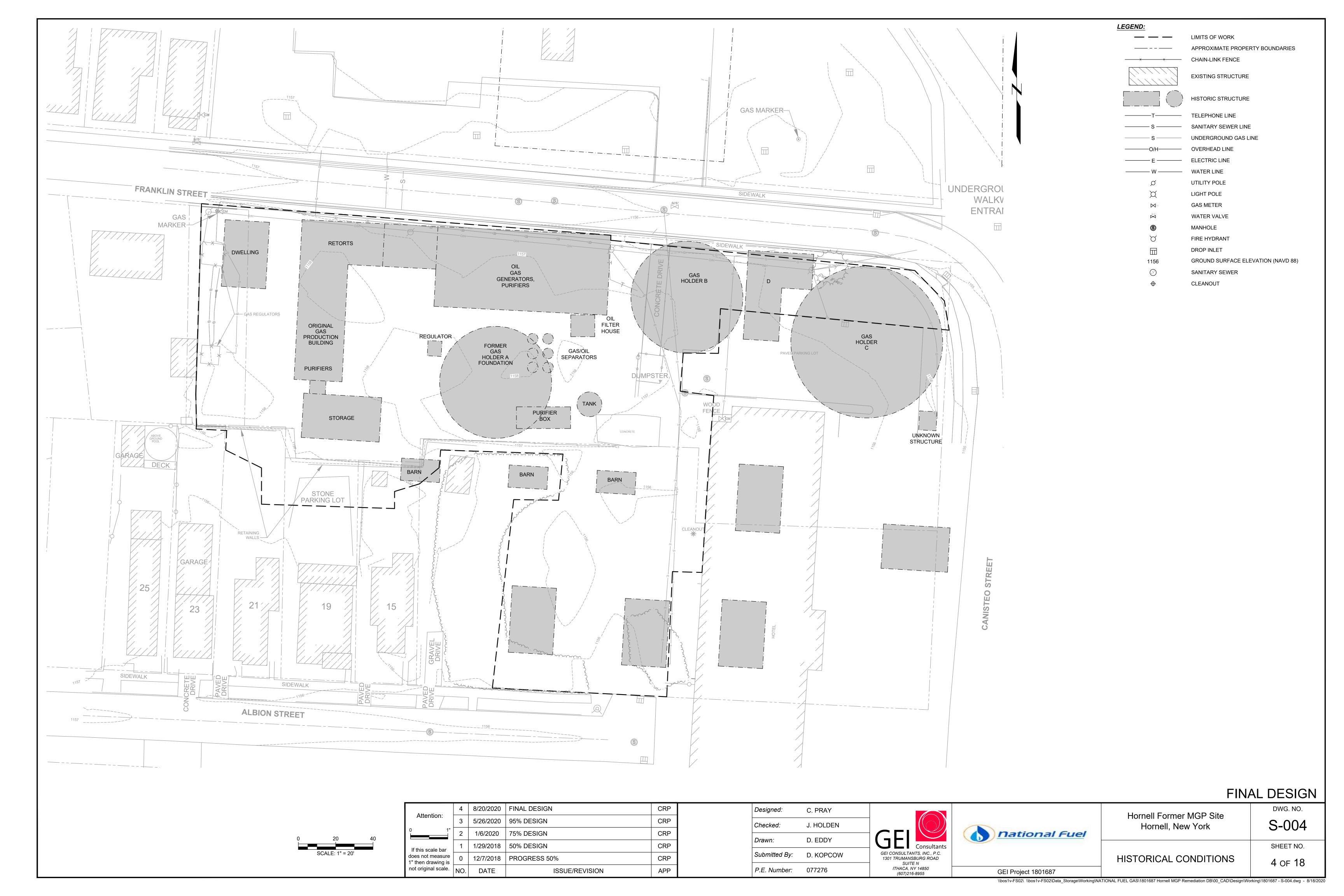
FINAL DESIGN

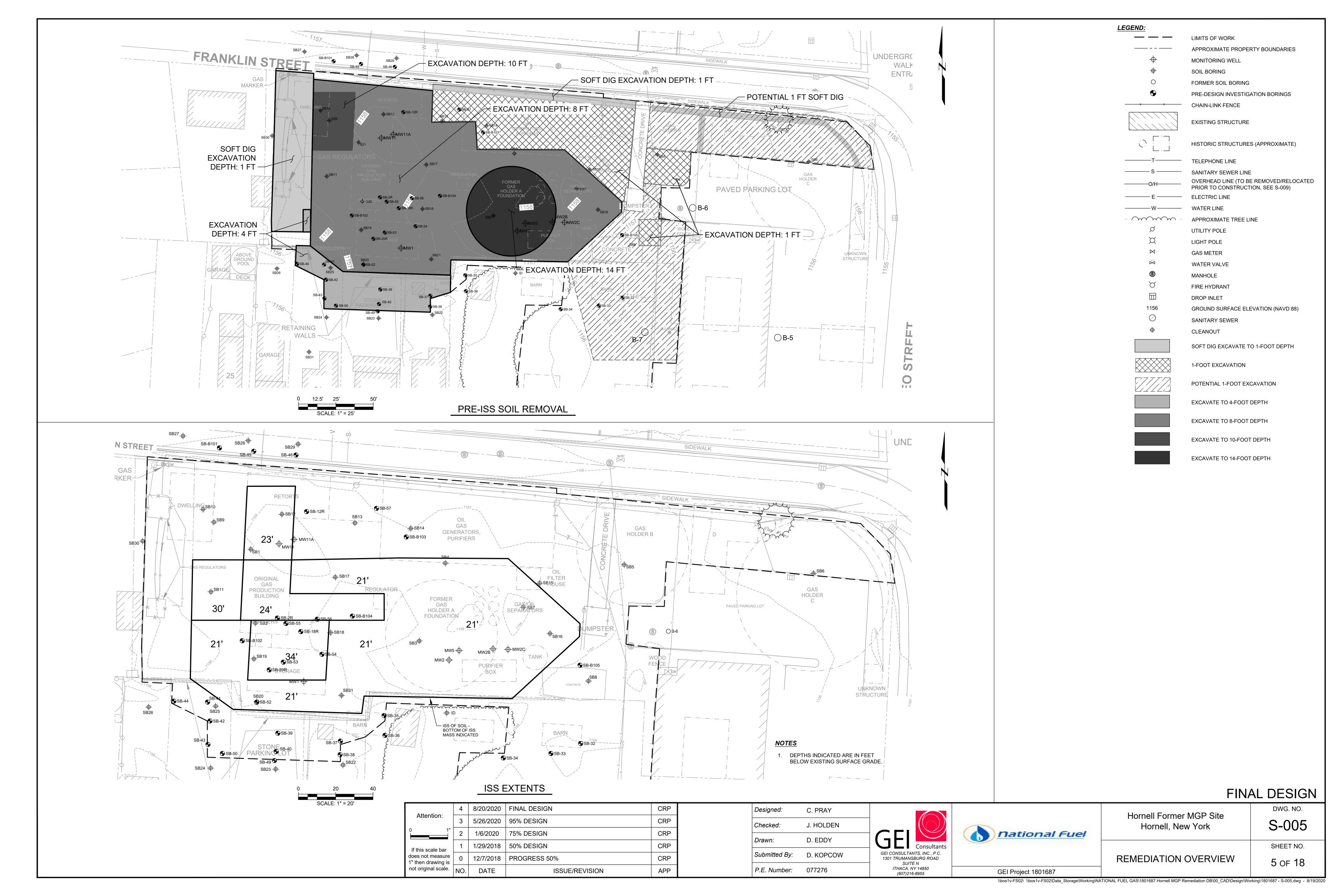
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Attention:	3	5/26/2020	95% DESIGN	CRP
0 1"	2	1/6/2020	75% DESIGN	CRP
If this scale bar	1	1/29/2018	50% DESIGN	CRP
does not measure 1" then drawing is	0	12/7/2018	PROGRESS 50%	CRP
not original scale.	NO.	DATE	ISSUE/REVISION	APP

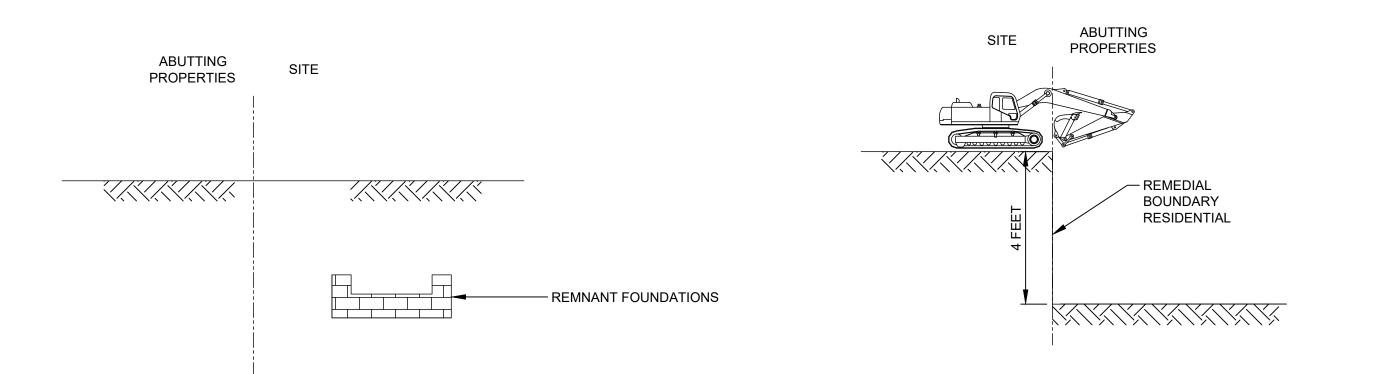


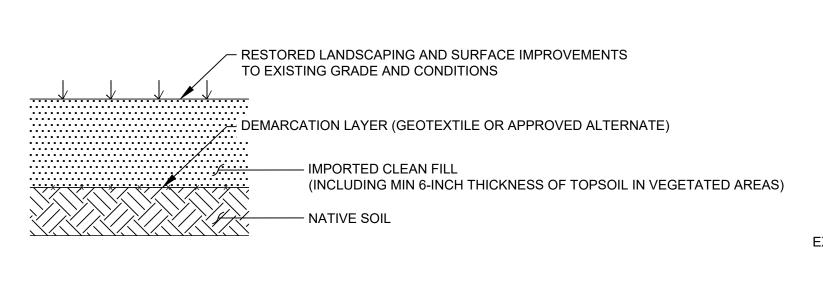
national Fuel

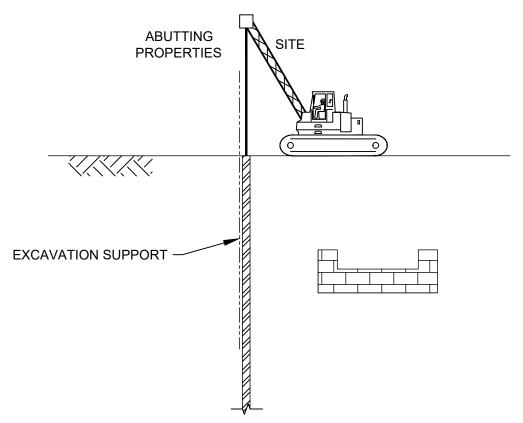










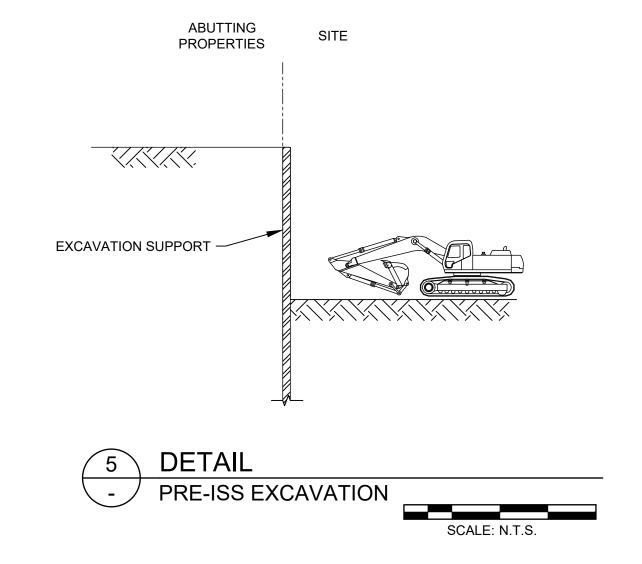


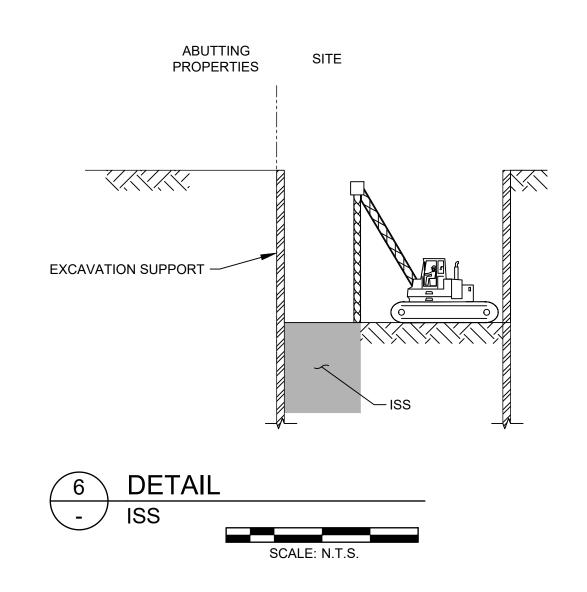


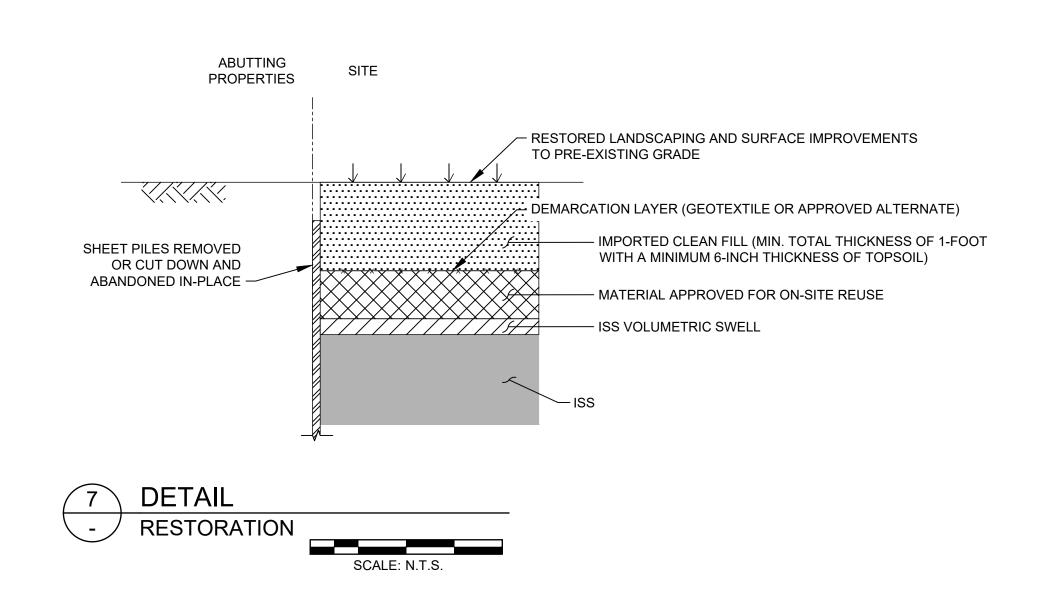












FINAL DESIGN

<u>NOTES</u>

- 1. THE PHASING SHOWN IS CONCEPTUAL, THE CONTRACTOR IS RESPONSIBLE FOR THE SEQUENCE AND MEANS AND METHODS OF CONSTRUCTION.
- 1-FOOT EXCAVATIONS TO BE COMPLETED AT CONTRACTOR CONVENIENCE AFTER THE COMPLETION OF RESIDENTIAL AREA RESTORATION.

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Attention:	3	5/26/2020	95% DESIGN	CRP
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does not measure 1" then drawing is	0	12/7/2018	PROGRESS 50%	CRP
not original scale.	NO.	DATE	ISSUE/REVISION	APP

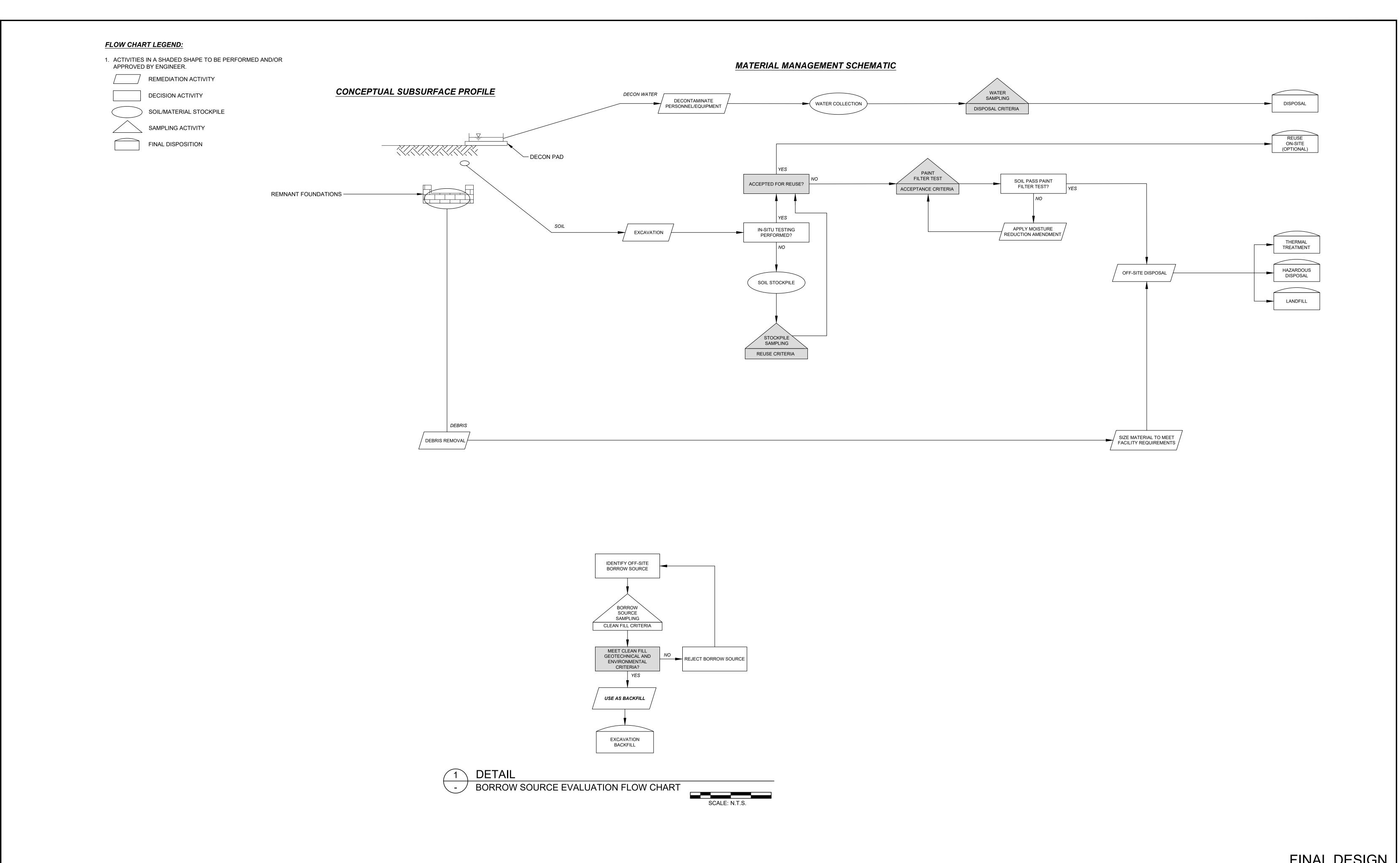
Designed:	C. PRAY	
Checked:	J. HOLDEN	
Drawn:	D. EDDY	GEI Consultan
Submitted By:	D. KOPCOW	GEI CONSULTANTS, INC., P.C. 1301 TRUMANSBURG ROAD
P.E. Number:	077276	SUITE N ITHACA, NY 14850 (607)216-8955

national Fuel	

GEI Project 1801687

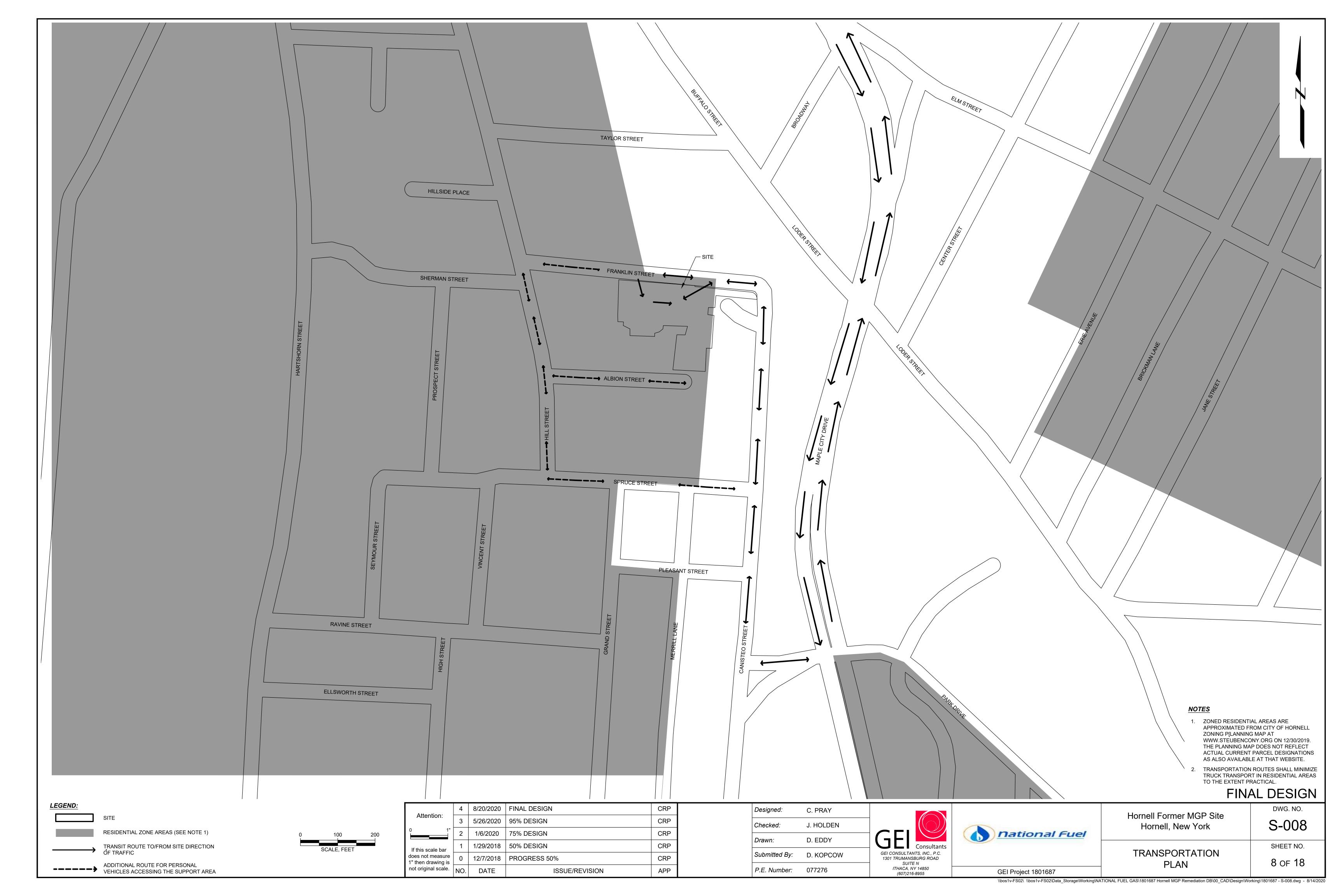
ional Fuel	Hornell Former MGP Site Hornell, New York	DWG. NO. S-006
	DEMEDIATION	SHEET NO.
	REMEDIATION PHASING PLAN	6 of 18

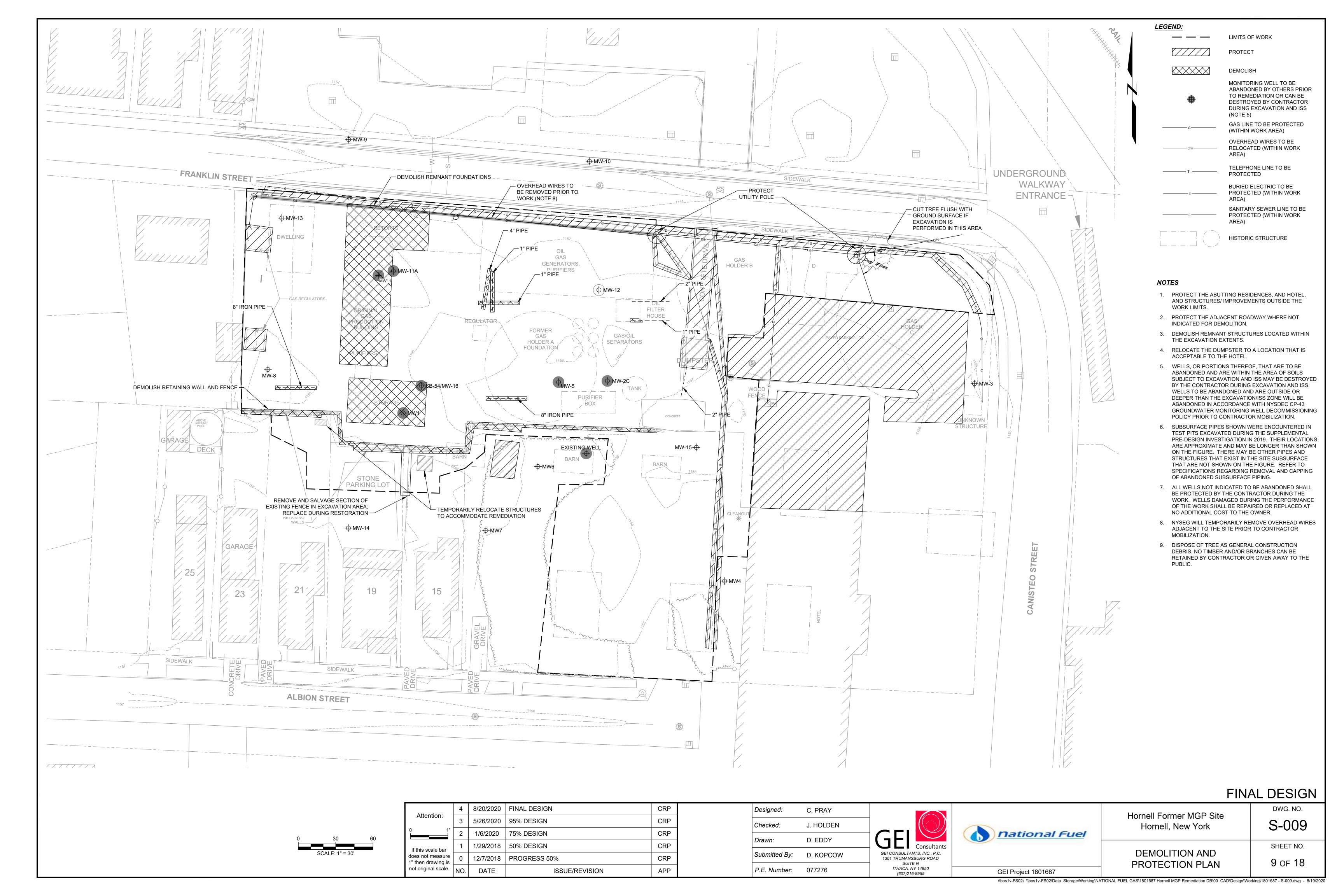
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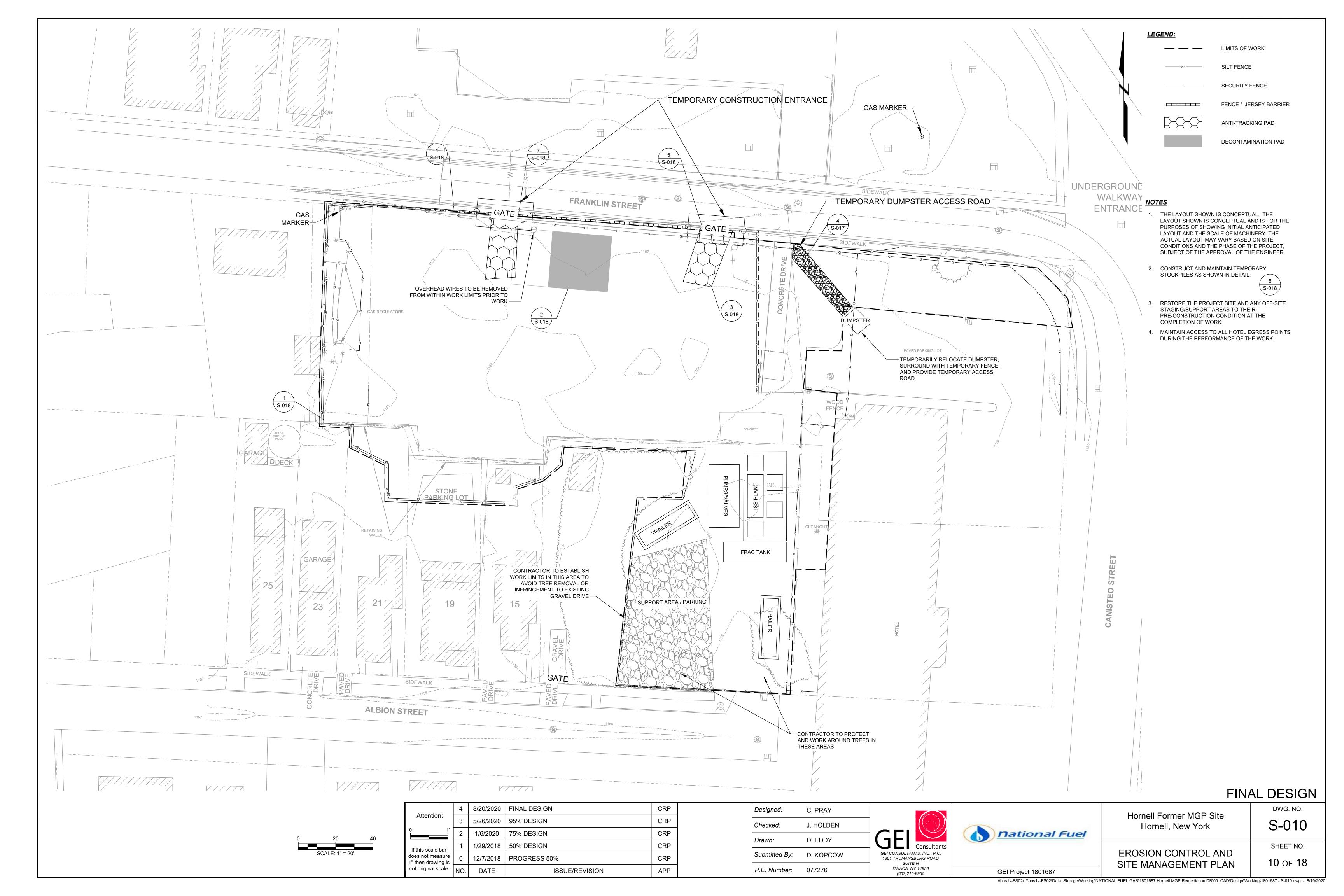


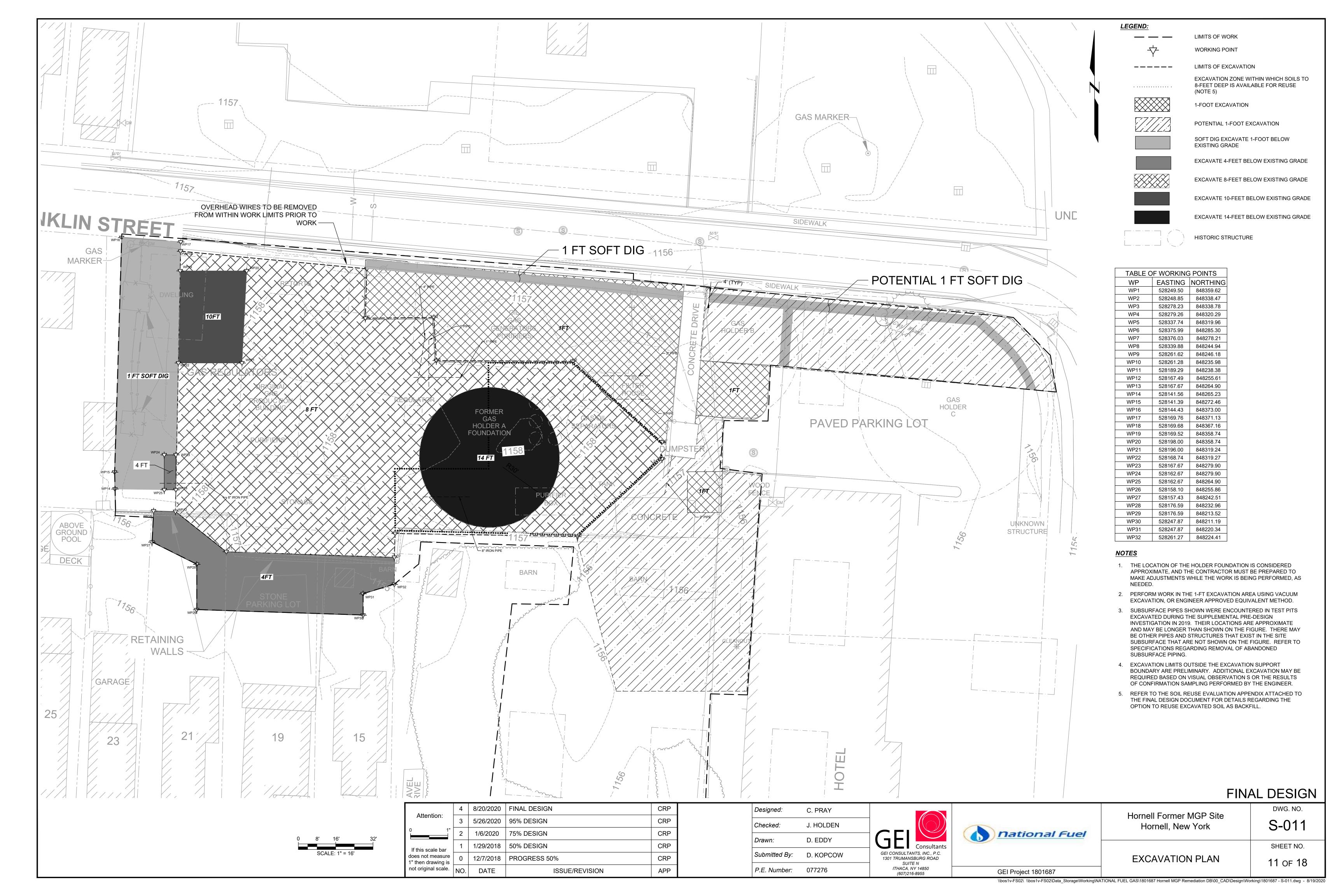
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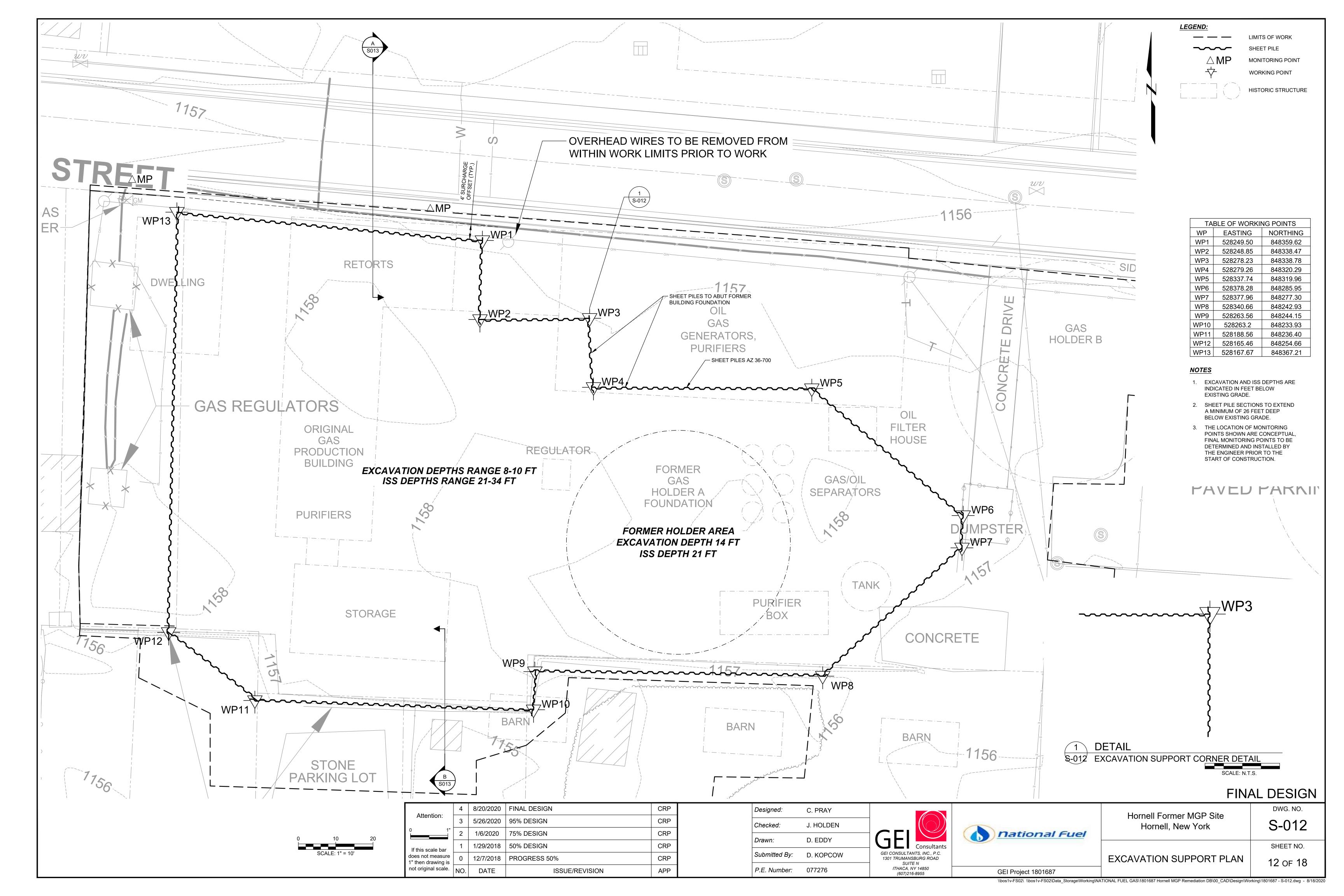
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2	1/6/2020	75% DESIGN	CRP			CEI			0 001
1	1/29/2018	50% DESIGN	CRP		D. EDDY			MATERIALS MANAGEMENT PLAN	SHEET NO.
0	12/7/2018	PROGRESS 50%	CRP	Submitted By:	D. KOPCOW	GEI CONSULTANTS, INC., P.C. 1301 TRUMANSBURG ROAD SUITE N ITHACA, NY 14850 (607)216-8955			7 of 18
1 O.	DATE	ISSUE/REVISION	APP	P.E. Number:	077276		GEI Project 1801687		7 01 10
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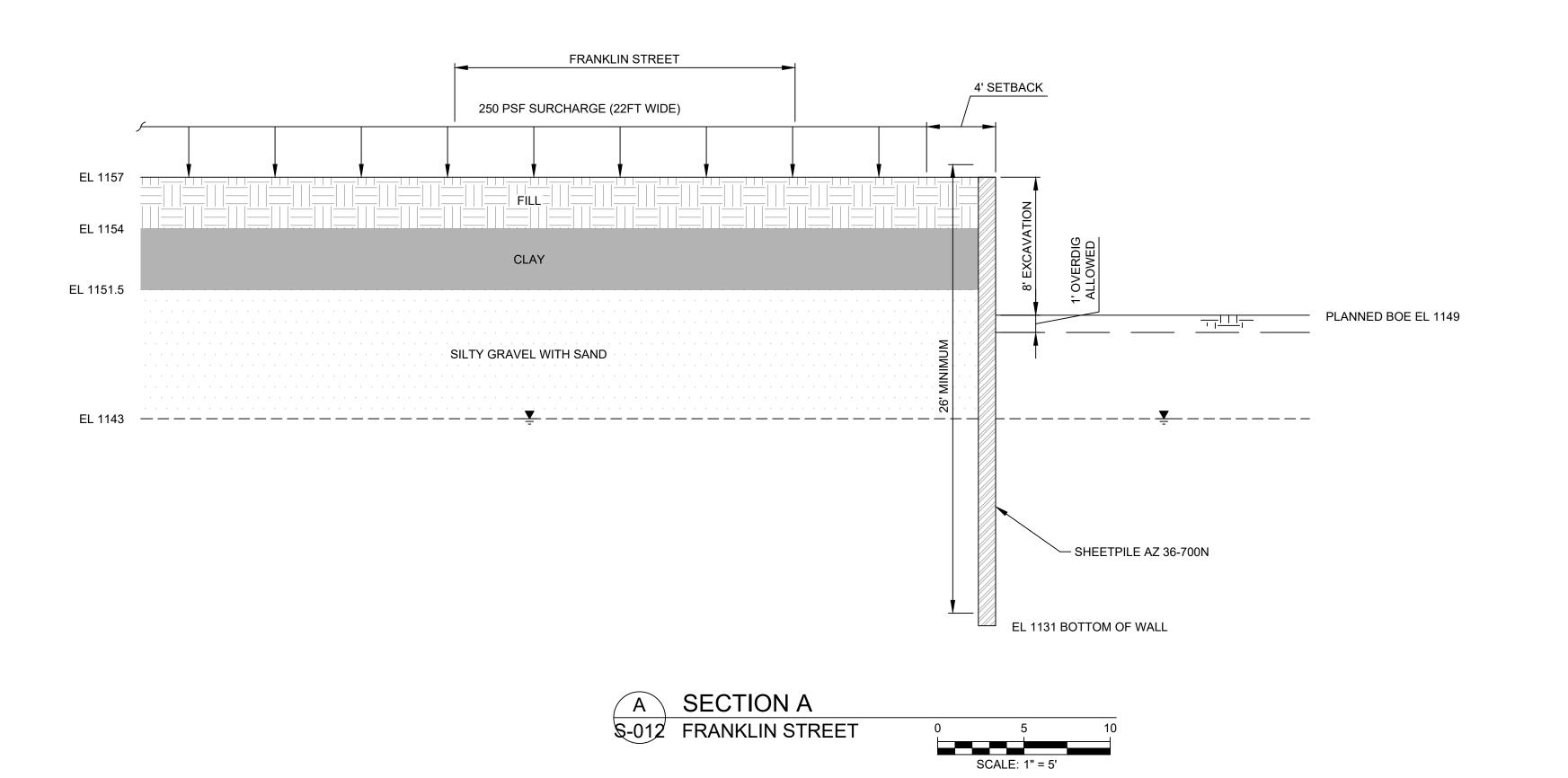


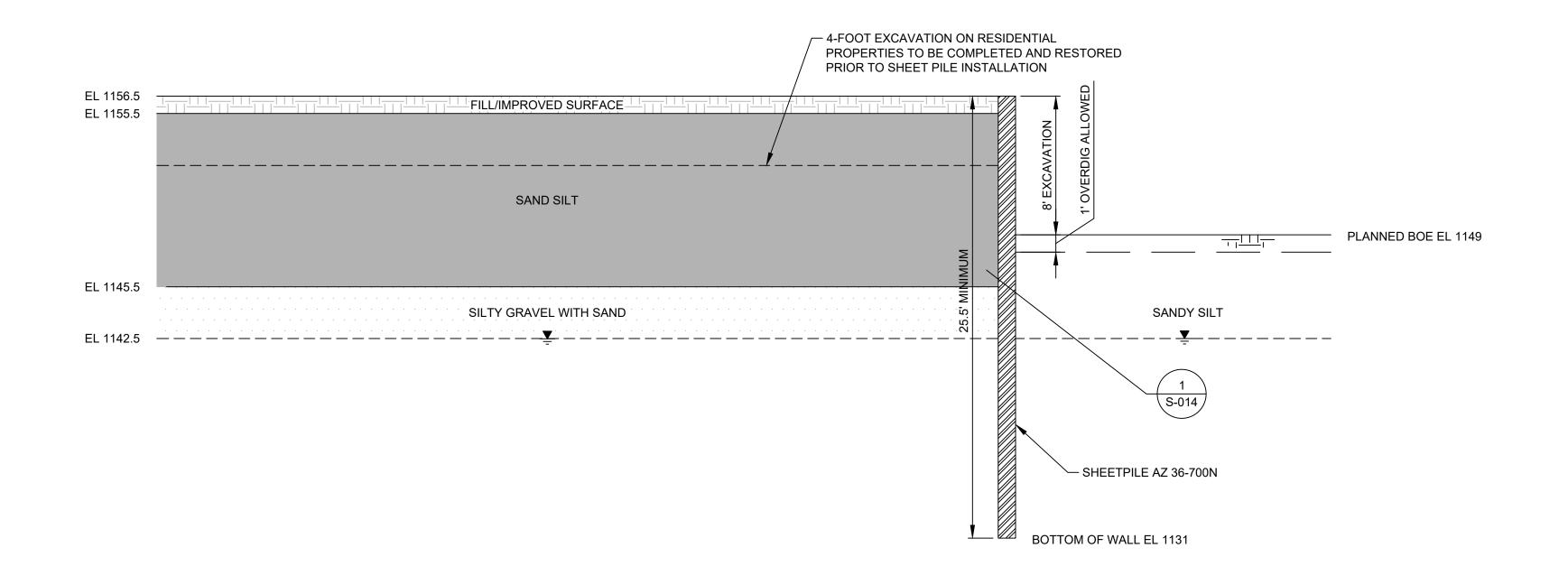








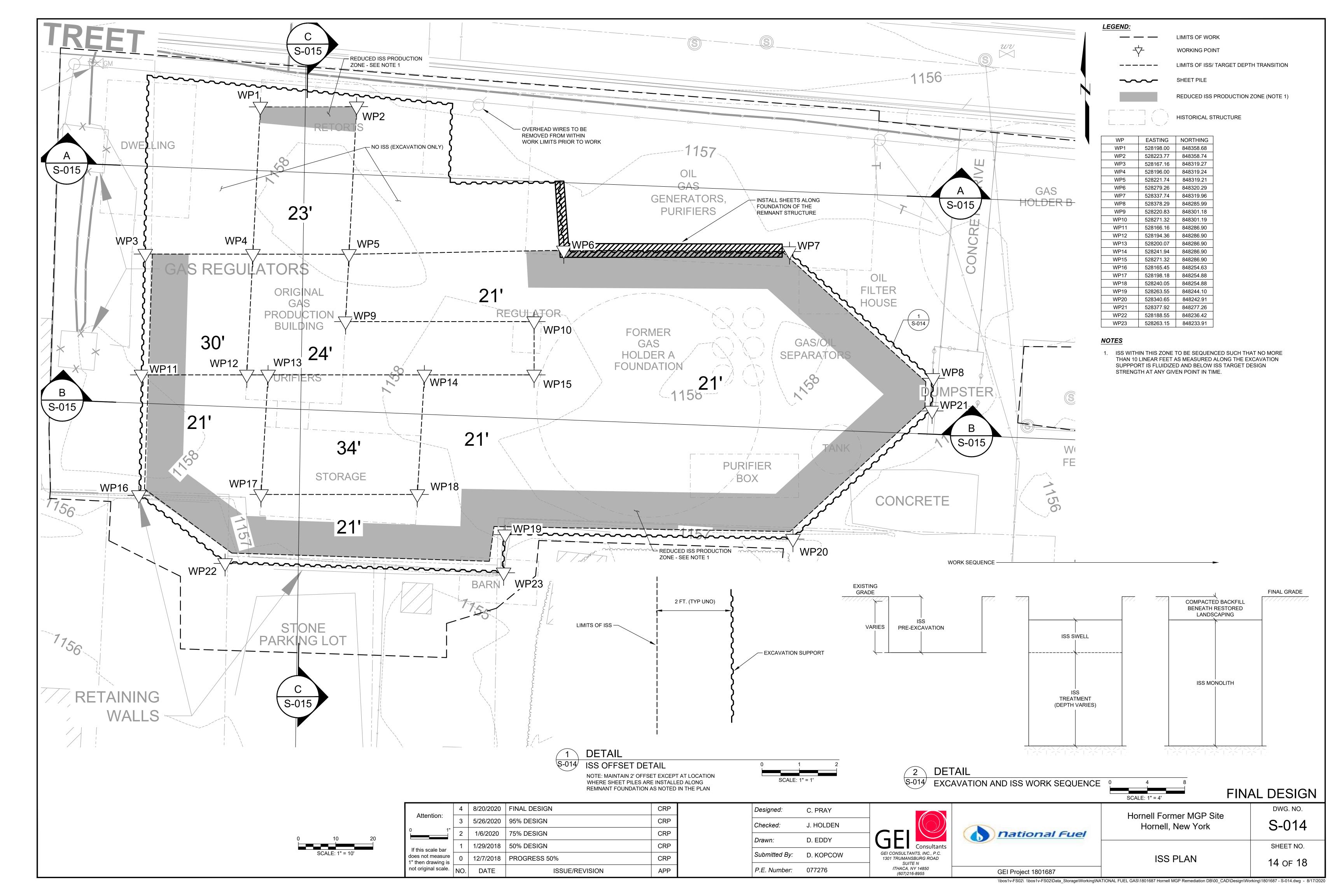


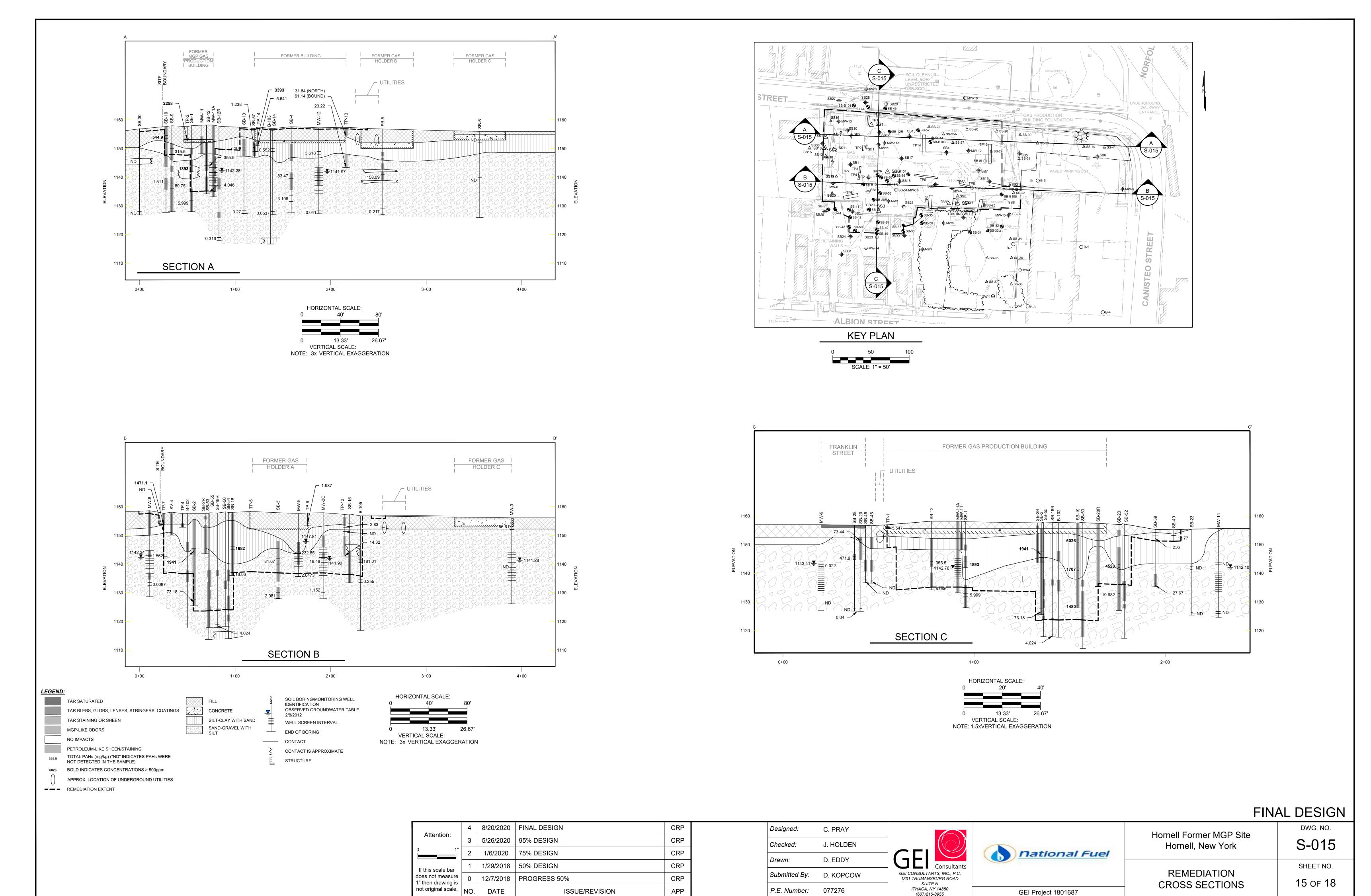




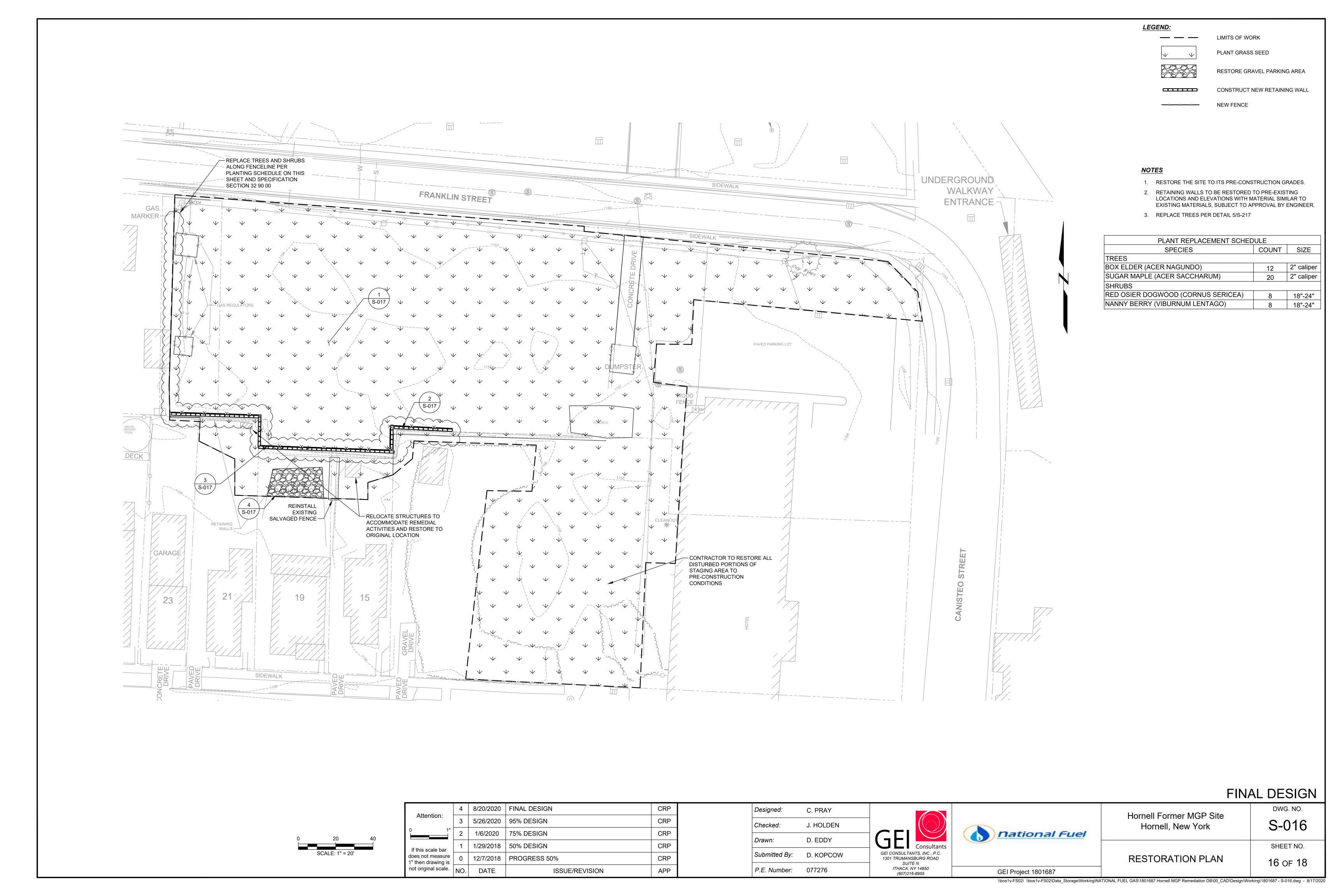
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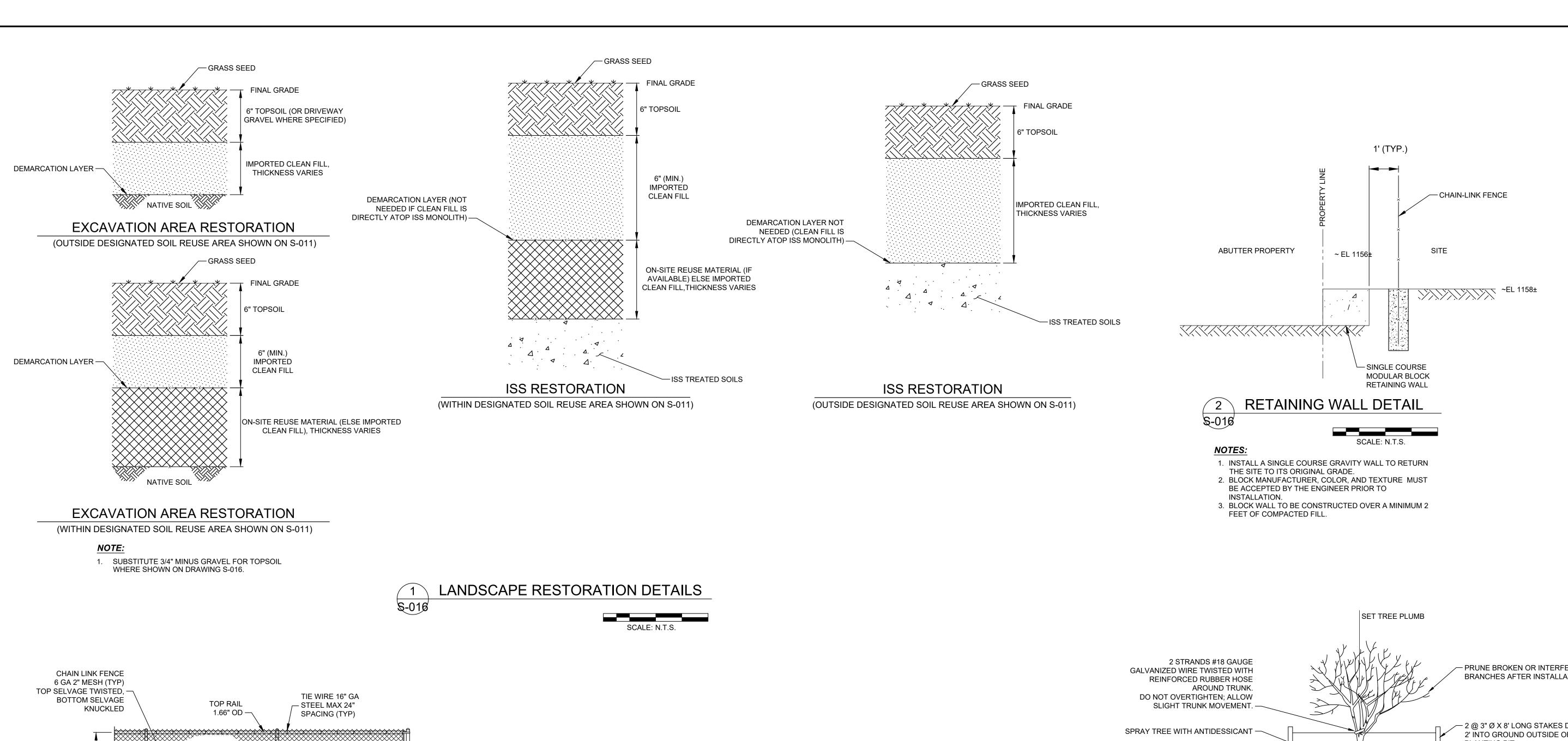
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If this scale bar	1	1/29/2018	50% DESIGN	CRP	Drawn:	D. EDDY			EXCAVATION SUPPORT DETAILS	SHEET NO.	
does not measure 1" then drawing is		12/7/2018	PROGRESS 50%	CRP	Submitted By:	D. KOPCOW	GEI CONSULTANTS, INC., P.C. 1301 TRUMANSBURG ROAD SUITE N			13 of 18	
		DATE	ISSUE/REVISION	APP	P.E. Number:	077276	ITHACA, NY 14850 (607)216-8955	GEI Project 1801687		100110	
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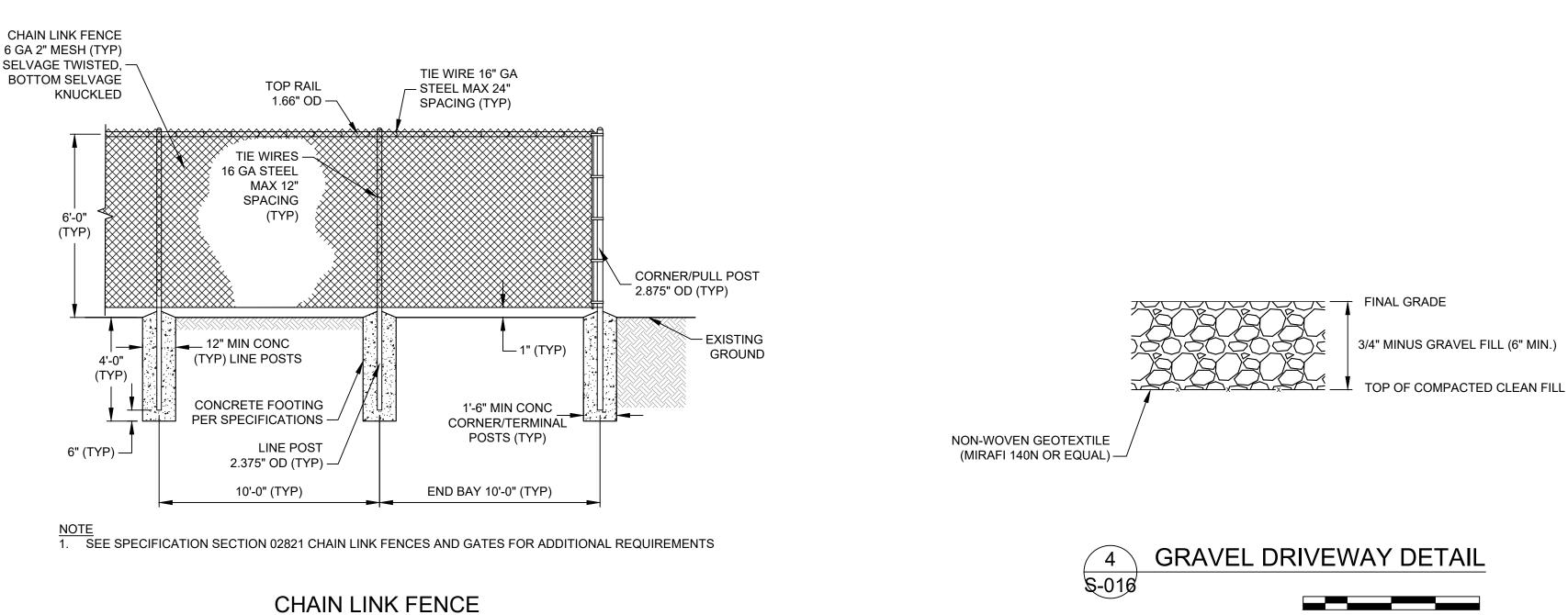




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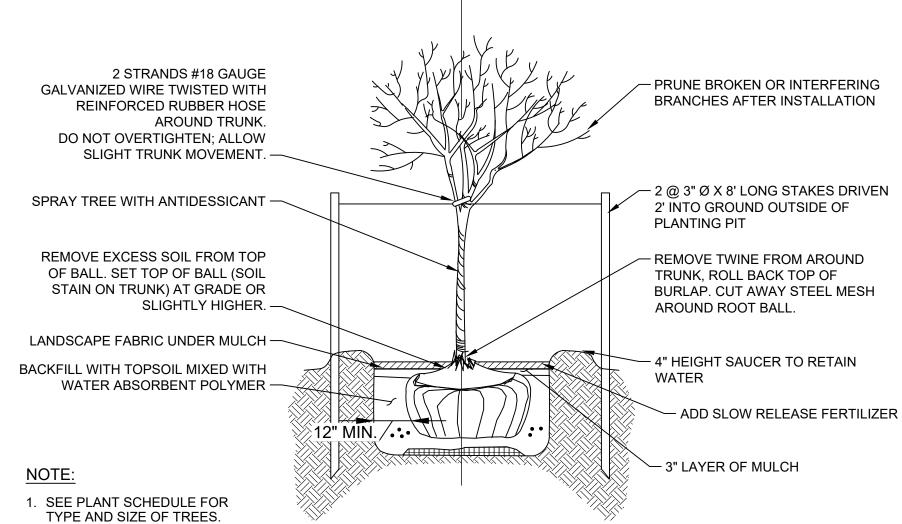




SCALE: NTS

S-016

S-016 SCALE: N.T.S. 1. MATCH PRE-EXISTING GRAVEL THICKNESS, HOWEVER, 6" IS THE MINIMUM THICKNESS TO BE PROVIDED.

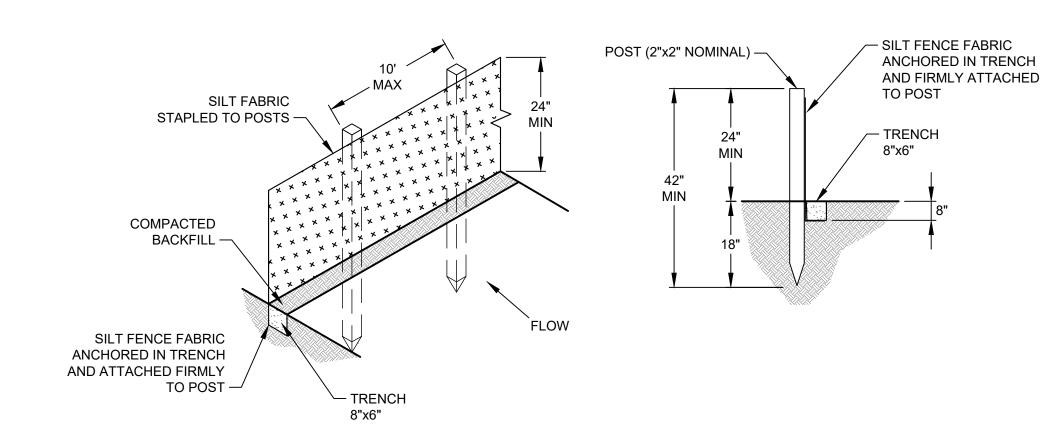




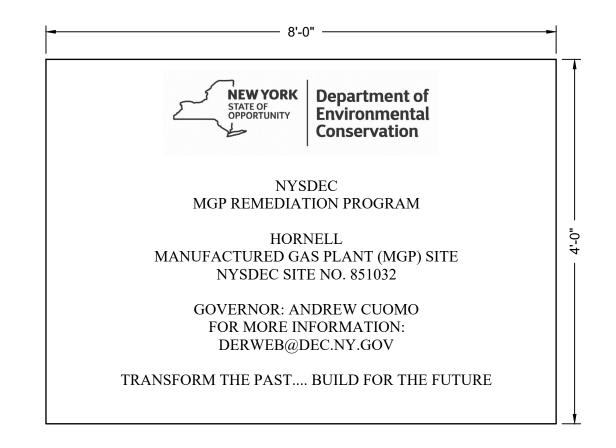
FENCE DETAIL SCALE: N.T.S.

Attention	4 8/20/2020 FINAL DESIGN	CRP	Designed: C. PRAY			Harnell Farmer MCD Cite	DWG. NO.
Attention:	3 5/26/2020 95% DESIGN	CRP	Checked: J. HOLDEN	GEI Consultants	national Fuel	Hornell Former MGP Site Hornell, New York	S-017
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does not measu 1" then drawing	ire 0 12/7/2018 PROGRESS 50%	CRP	Submitted By: D. KOPCOW	GEI CONSULTANTS, INC., P.C. 1301 TRUMANSBURG ROAD SUITE N		RESTORATION	17 of 18
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FINAL DESIGN





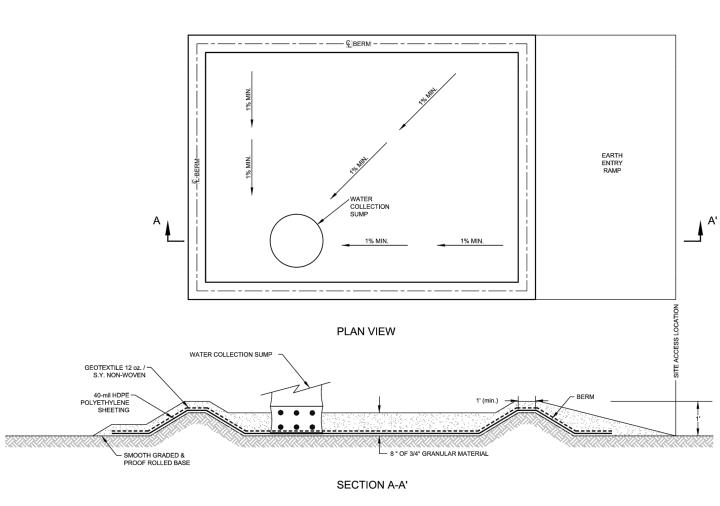


5 DETAIL - TYPICAL SIGN S-010 SCALE: N.T.S.

SIGN NOTES:

- 1. SIZE: HORIZONTAL FORMAT 96" BY 48" HIGH
- 2. NYSDEC LOGO TO BE SHOWN IN ACCORDANCE WITH NYSDEC SPECIFICATIONS.
- 3. TEXT: CASLON 540
 MGP REMEDIATION PROGRAM
 SITE NAME, SITE NUMBER, PARTY PERFORMING
 NAME OF GOVERNOR
 PMS 301
- TRANSFORM THE PAST.... BUILD FOR THE FUTURE PMS 355

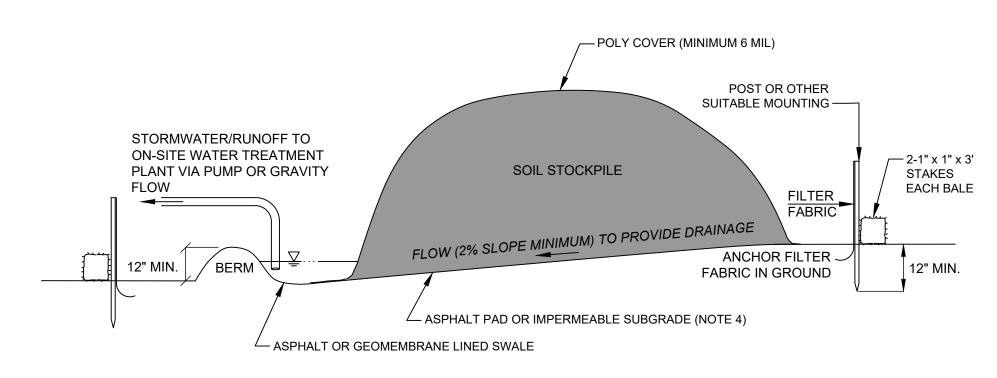
 4. CENTER EACH LINE OF COPY WITH SMALL CAPS AND INITIAL CAPS
- 5. 96" WIDE BY 48" HIGH ALUMINUM BLANKS WILL BE COVERED WITH VINYL SHEETING TO ACHIEVE BACKGROUND COLOR. COPY LOGO WILL BE SILK SCREENED ON THIS SURFACE.



2 DETAIL - EQUIPMENT DECONTAMINATION PAD Scale: N.T.S.

DECONTAMINATION NOTES:

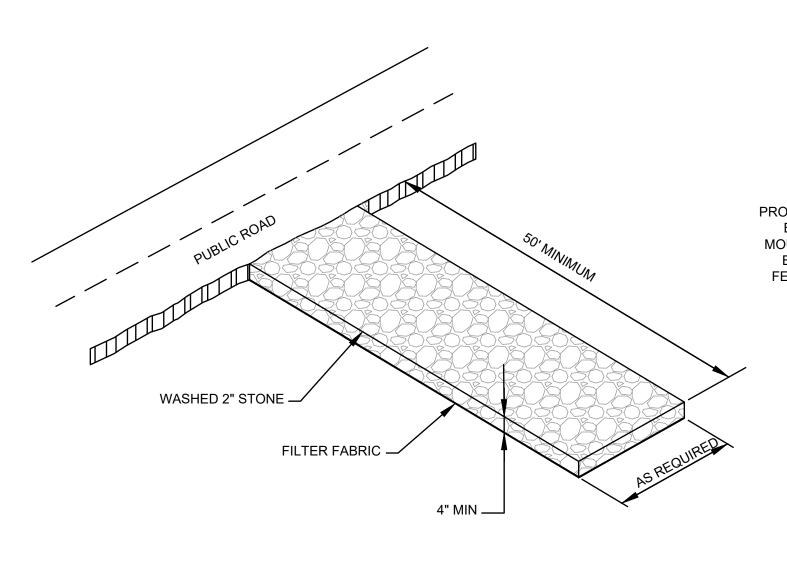
- 1. ALL VEHICLES EXITING EXCLUSION ZONE MUST PASS THROUGH THE CONTAMINANT REDUCTION ZONE. USE EQUIPMENT DECONTAMINATION PAD AS REQUIRED BY ENGINEER AND NYSDEC. CONTROL OVER SPRAY.
- 2. TEMPORARY DECONTAMINATION PAD TO BE CONSTRUCTED IN SUITABLE LOCATION CLOSE TO WORK AREAS, AS REQUIRED.
- 3. TEMPORARY DECONTAMINATION PAD GRANULAR MATERIAL AND SEDIMENTS COLLECTED FROM DECONTAMINATING EXCAVATION EQUIPMENT TO BE CHARACTERIZED FOR OFF-SITE DISPOSAL.
- 4. DECONTAMINATION PAD MAY BE RAISED ABOVE EXISTING GRADE OR EXCAVATED AND EMBEDDED (CONTRACTOR OPTION).
- 5. DIMENSIONS AND CONFIGURATION OF THE DECONTAMINATION PAD TO BE DETERMINED BY CONTRACTOR BASED ON EQUIPMENT SIZE.

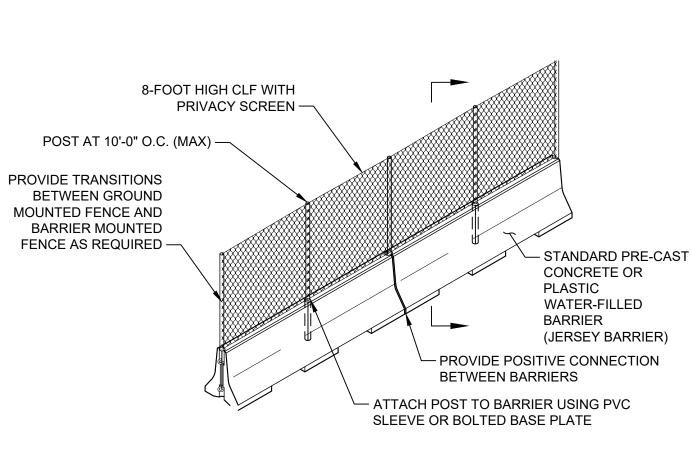


6 DETAIL - SOIL/DEBRIS STOCKPILE PAD SCALE: N.T.S.

PAD NOTES:

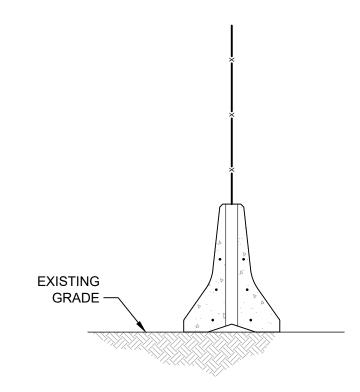
- SOIL/DEBRIS STOCKPILE PAD DESIGN IS CONCEPTUAL. FINAL DESIGN WILL MEET THE INTENT OF THE CONCEPT AND BE APPROVED BY ENGINEER.
- 2. COLLECT ALL STORMWATER/RUNOFF WATER FROM THE SOIL/DEBRIS PADS AND DIRECT TO WATER TREATMENT SYSTEM.
- 3. LOCATE PADS INSIDE THE UNEXCAVATED PORTION OF THE REMEDIAL EXCAVATION. PADS MAY NOT BE LOCATED ON COMPLETED WORK OR PARTIALLY BACKFILLED SURFACES.
- 4. IMPERMEABLE SUBGRADE: 6 INCHES AGGREGATE BASE, GEOTEXTILE, 40 MIL
- HDPE LINER, GEOTEXTILE, 6 INCHES CRUSHED STONE.
- 5. PROVIDE MEASURES TO SECURE POLY COVER FROM DISPLACEMENT BY WIND. REPLACE STOCKPILE COVER AS NEEDED.







3 DETAIL - ANTI TRACKING PAD SCALE: N.T.S.

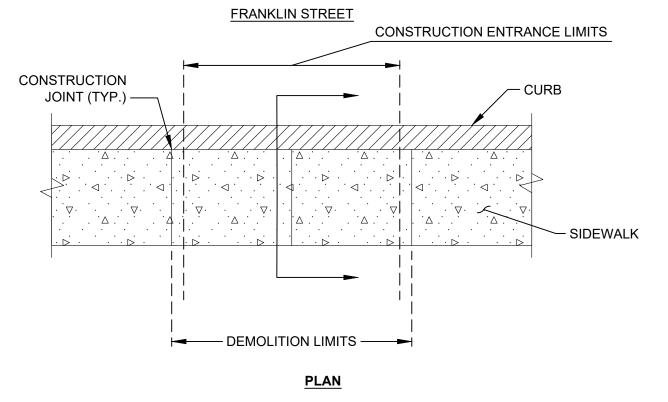


BARRIER FENCE SECTION

FENCING NOTES:

SCALE: N.T.S.

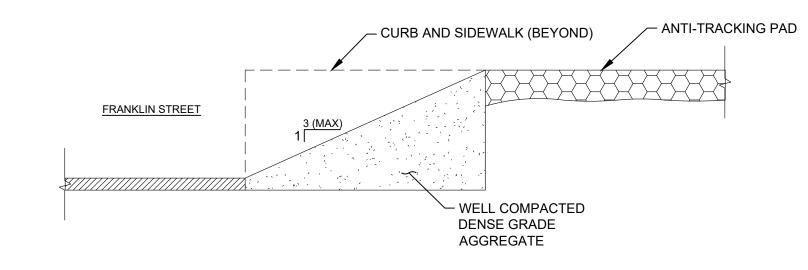
FENCING MAY BE OFFSET FROM BARRIER (CONTRACTOR OPTION).



7 DETAIL - CURB CUT (CONTRACTOR OPTION) S-010 SCALE: N.T.S.

CURB NOTES:

- 1. REMOVE SIDEWALK AND CURB FROM CONSTRUCTION JOINT TO CONSTRUCTION JOINT AND RESTORE IN KIND UPON COMPLETION OF THE WORK AS NEEDED.
- 2. REMOVE AND REPLACE CURBS AND SIDEWALKS AS SHOWN IF DAMAGED
- DURING THE PERFORMANCE OF THE WORK
- 3. ALTERNATIVE MEANS OF CURB PROTECTION MAY BE PROPOSED FOR APPROVAL BY THE ENGINEER TO MINIMIZE CURB DAMAGE AND THE POTENTIAL FOR CURB REPLACEMENT AT THE END OF WORK. RAMPS OR OTHER CURB PROTECTION SHALL NOT INTERFERE WITH ROADWAY TRAFFIC.



CURB CUT SECTION

SCALE: N.T.S.

FINAL DESIGN

	Attention:	4 8/20/2020	FINAL DESIGN	CRP	Designed: C. PRAY			Hornell Former MGP Site	DWG. NO.
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Consulting
Engineers and
Scientists

Community Air Monitoring Plan

Hornell Former MGP Site Hornell, New York Site No: 851032

Prepared for:

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August 2020 Project 1801687

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Attachment 1

1. NYSDOH Generic CAMP from DER-10 Appendix 1A

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Abbreviations and Acronyms

CAMP Community Air Monitoring Plan

DER-10 [Division of Environmental Remediation]-10, Technical Guidance

for Site Investigation and Remediation

GEI GEI Consultants, Inc., P.C.
MGP Manufactured Gas Plant

NYSDEC New York State Department of Environmental Conservation

NYSDOH New York State Department of Health

PM-10 Particulate Matter Less than 10 Micrometers in Size

TVOC Total Volatile Organic Compounds

USEPA United States Environmental Protection Agency

UST Underground Storage Tank
VOC Volatile Organic Compound

MEASUREMENTS

μg/m³ micrograms per cubic meter

ppm parts per million

Executive Summary

This Community Air Monitoring Plan (CAMP) Work Plan has been developed to provide procedures for measuring, documenting, and responding to potential airborne contaminants during intrusive remedial activities at the Hornell Former Manufactured Gas Plant (MGP) property. The procedures in this CAMP focus on air monitoring techniques and contingency measures designed to mitigate potential airborne contaminants. This CAMP Work Plan is based on the CAMP guidelines established by the New York State Department of Health (NYSDOH) in the New York State Department of Environmental Conservation (NYSDEC) *DER-10 Technical Guidance for Site Investigation and Remediation* (DER-10) (NYSDEC, 2010).

The CAMP provides Air Monitoring Procedures, Alert Levels, Response Levels, Action Levels, and Contingency Measures if Action Levels are approached. Alert Levels are internally established concentration levels for volatile organic compounds only and are not established by the NYSDOH or NYSDEC. Alert Levels are set below the levels established by the NYSDOH so that actions can be taken prior to exceeding a NYSDOH threshold. An Alert Level serves as a screening tool to trigger contingency measures if necessary, to assist in minimizing off-site transport of contaminants during remedial activities. A Response Level is a contaminant concentration level that triggers a temporary work stoppage, continued monitoring, and potential contingency measures. An Action Level is a contaminant concentration that triggers work stoppage and implementation of contingency measures to mitigate potential airborne contaminants prior to resuming work activities. Response Levels and Action Levels are NYSDOH threshold levels established in the May 2010 NYSDOH Generic CAMP presented in Appendix 1A of DER-10 (see Attachment 1). Exceedances of either Response Levels or Actions Levels will be reported to NYSDEC and NYSDOH.

During ground intrusive activities, perimeter air monitoring will be conducted using fixed-station equipment. To the extent possible, monitoring will be performed for total volatile organic compounds and dust along the Site perimeter 24 hours a day (except that dust monitoring may be suspended during rain events). The Contingency Plan defines Alert Levels, Response Levels, Action Levels, and specific contingency measures to be implemented. The response actions, potentially including work stoppage and work area controls by various methods, are intended to prevent or significantly reduce the migration of airborne contaminants from the Site.

GEI Consultants, Inc., P.C. (GEI) will implement the CAMP and will report any exceedance of Response Levels and Action Levels to the Contractor, National Fuel Gas, NYSDOH, and/or NYSDEC as prescribed in this plan. As specified in the DER-10, all

15-minute readings will be recorded and be available for State (NYSDEC and NYSDOH) personnel to review. The Contractor conducting intrusive activities below the soil cover will be responsible for enacting contingency measures to respond to Alert Levels, if necessary, and to the exceedances of Alert and Action Levels as they may occur. GEI will provide data summary reports to the Contractor, National Fuel Gas, and NYSDEC each week during ground intrusive activity.

1. Introduction

1.1 Purpose and Scope

The New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP), as presented in New York State Department of Environmental Conservation's (NYSDEC) document *DER-10 Technical Guidance for Site Investigation and Remediation* (DER-10), recommends that real-time monitoring for total volatile organic compounds (TVOC) and particulates (i.e., dust) be conducted at the downwind perimeter of each designated work area during ground intrusive activities at contaminated sites. As such, this work plan describes the proposed air monitoring means and methods that will be implemented during intrusive activities at the Hornell Former Manufactured Gas Plant (MGP). A site location map is shown in Figure 1.

The purpose of the CAMP is to provide early detection in the field of potential short-term emissions and will be conducted in accordance with the generic NYSDOH CAMP.

The objectives of the CAMP are as follows:

- Provide an early warning system that allows the Contractor, National Fuel Gas, and NYSDEC to assess if concentrations of TVOC or PM-10 [dust] in ambient air are approaching Action Levels due to Site activities.
- Provide potential contingency measures to be enacted by the Contractor conducting intrusive activities and related contractors that are designed to reduce the off-site migration of contaminants if established Action Levels are approached or exceeded.
- Determine whether construction controls are effective in reducing ambient air concentrations to below Action Levels and make appropriate and necessary adjustments.
- Develop a permanent record that includes a database of perimeter air monitoring results, equipment maintenance, calibration records, and other pertinent information.

1.2 Roles and Responsibilities

GEI Consultants, Inc., P.C. (GEI) will implement the monitoring and reporting components of this CAMP. The Contractor performing intrusive activities is responsible for the selection and implementation of appropriate contingency measures that will mitigate the potential for off-site migration of contaminants in response to Alert, Response, or Action Levels being approached or exceeded. The remainder of this section specifies the roles and responsibilities of each entity relative to the CAMP. A communication flowchart is shown in Figure 2 with each entity and lines of communication for the CAMP.

GEI, the Contractor, and any subcontractor(s) working at the site are responsible for the health and safety of their own employees, including the preparation and implementation of a site-specific Health and Safety Plan. The CAMP measures presented herein are in addition to any employee health and safety requirements and are aimed at protecting off-site receptors by monitoring, notifying, reporting, and controlling potential airborne contaminants at the work zone boundary.

1.2.1 GEI Consultants, Inc., P.C.

GEI's role in implementing the monitoring program will involve promptly notifying Contractor of Alert, Response, and Action Levels; and reporting the monitoring results. GEI's CAMP roles and responsibilities are further described below:

- GEI will monitor and record total volatile organic compounds (TVOC) and dust at various locations around the Site as described in the following sections of this CAMP.
- On a daily basis, GEI will communicate to the following entities whether TVOC or dust exceeded Response Levels or Action Levels specified in Section 2.1, and suggest corrective actions required to address the situation. GEI will convey the CAMP results to the entities listed below and inform them if the Alert or Response Levels have been exceeded. GEI will direct contractors at the Site to take corrective action if warranted by the monitoring data.
 - National Fuel Gas

Brad Walker Project Manager National Fuel Gas (716) 857-7247

Contractor – ENTACT

Brady Bonstead Project Coordinator 150 Bay Street, Suite 806 Jersey City, New Jersey 07302 (201) 984-1509

New York State Department of Environmental Conservation

Matt King

New York State Department of Environmental Conservation Remedial Bureau C Division of Environmental Remediation 625 Broadway Albany, New York 12233

(518) 402-7383

New York State Department of Health

Wendy S. Kuehner New York State Department of Health Empire State Plaza Corning Tower, Room 1787 Albany, New York 12237 (518) 402-7860

- GEI will provide, maintain, and operate the equipment used to implement the CAMP.
- GEI will provide data summary reports to the Contractor, National Fuel Gas, NYSDEC, and NYSDOH after the pre-construction baseline sampling, and each week during intrusive activity. The reports will identify Alert, Response, and Action Level exceedances, if any, as well as mitigation measures undertaken. They will also include data summary reports for all TVOC and dust data collected.

1.2.2 Contractor

The Contractor is responsible for conducting the intrusive activities associated with implementing the site remedial activities. The Contractor will be responsible for taking contingent actions in response to Response Level and Action Level exceedances. The Contractor will also be responsible for taking contingent actions in response to Alert Levels, when so directed by GEI.

1.2.3 National Fuel Gas

National Fuel is ultimately responsible for the remediation of the Site under an approved work plan with NYSDEC. National Fuel Gas addressed this responsibility by contracting GEI to procure a qualified remediation Contractor and to design and implement appropriate remediation measures per the Record of Decision (ROD). This includes GEI's development of this CAMP and the associated contingent actions for responding to exceedances of Alert Levels (TVOC only), Response Levels, and/or Action Levels in the course of implementing the remedial activities.

1.2.4 New York State Department of Environmental Conservation

NYSDEC is responsible for the environmental regulatory enforcement for all activities conducted at the Site including compliance with this CAMP, storm water runoff mitigation (erosion and sediment control), and all environmental and remediation regulations, policies, and guidance applicable to the Site. NYSDEC may provide on-site oversight personnel for the work being conducted.

1.2.5 New York State Department of Health

NYSDOH provides a Generic CAMP as provided in Appendix 1A of the NYSDEC DER-10 (Appendix 1). The Generic CAMP is intended to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. This CAMP was developed based on the NYSDOH requirements, but, in some cases, is more stringent than the Generic CAMP. NYSDOH personnel will be notified in the event of Response and Action Level exceedances, including subsequent response actions undertaken.

2. Sampling and Analytical Procedures

This section of the CAMP presents a detailed description of the air monitoring, air sampling, and analytical procedures, including data management that will be used during ground intrusive site activities. The intent of the real-time monitoring program is to provide early detection in the field of short-term emissions and potential off-site migration of site-related TVOC and dust.

Real-time monitoring methods will be utilized to measure ambient air concentrations during the project. Monitoring for TVOC and respirable particulate matter (particulate matter less than 10 micrometers in size [PM-10]) will occur at a minimum of four locations adjacent to the remedial boundary. Wind direction will be monitored in real-time when an automated monitoring system is utilized. Supplemental monitoring for TVOC and PM-10 may occur at additional locations along the perimeter of the project site on an as-needed basis. In the event of a possible exceedance of a Response Level or Action Level for TVOC or PM-10, GEI will compare upwind (background) concentrations to downwind concentrations within 60 minutes of the possible exceedance to determine if site activity is causing the Response Level or Action Level exceedance. The air monitoring procedures and equipment are detailed below.

2.1 Alert Level, Response Level, and Action Levels

Alert Levels are not established by the NYSDOH or NYSDEC. The Alert Level is a conservatively designed concentration level for TVOC only. An Alert Level is set below the Response Level established by the NYSDOH so that proactive action can be taken prior to exceeding a NYSDOH threshold. An Alert Level serves as a preemptive screening tool for TVOC 15-minute average concentrations to trigger contingent measures, if necessary, to assist in minimizing off-site transport of contaminants during intrusive activities.

Response Levels are NYSDOH threshold levels established in the May 2010 NYSDOH Generic CAMP presented in Appendix 1A of DER-10 (see Attachment 1). A Response Level is a measured concentration that triggers a temporary work stoppage, continued monitoring, reporting, and/or potential contingent measures. A Response Level serves as a preemptive tool for PM-10 and TVOC 15-minute average concentrations to trigger contingent measures, if necessary, to assist in minimizing off-site transport of contaminants during remedial ground intrusive activities.

Action Levels are NYSDOH threshold levels established in the May 2010 NYSDOH Generic CAMP presented in Appendix 1A of DER-10. An Action Level is a measured 15-minute average concentration, for PM-10 and TVOC, that triggers work stoppage, continued monitoring, reporting, and implementation of contingent measures to mitigate potential airborne contaminants prior to resuming ground intrusive activities.

The following target parameters and corresponding Alert Levels, Response Levels, and Action Levels were developed in accordance with the NYSDOH Generic CAMP.

Target Parameter	Alert Level
TVOC (15-minute average concentration)	3.7 ppm greater than background*
Target Parameter	Response Level
Respirable Particulate Matter (PM-10)	100 μg/m³ greater than background*
TVOC (15-minute average concentration)	5.0 ppm greater than background*
Target Parameters	Action Level (**)
TVOC (15-minute average concentration)	25 ppm
Respirable Particulate Matter (PM-10)	150 μg/m³ greater than background*

ppm – parts per million

μg/m³ – micrograms per cubic meter

TVOC – total Volatile Organic Compounds

2.2 Air Monitoring Procedures

During times of intrusive activities, GEI will conduct perimeter air monitoring using fixed air monitoring stations. To the extent possible, monitoring will be performed for TVOC and PM-10 24 hours a day at each air monitoring station using real-time monitoring equipment. (except that particulate monitoring may be suspended during rain events). Hand-held air monitoring equipment will be used during work hours if necessary. This may include monitoring directed by NYSDEC, or to supplement fixed monitoring station data in response to visible dust, elevated TVOC readings, or odors. Real-time TVOC and PM-10 measurements will be recorded once per minute and transmitted to a centralized data logger system. Each approach is detailed below.

2.2.1 Fixed-Station Monitoring Procedures

Real-time fixed-station monitoring equipment will be positioned at a minimum of four locations around the perimeter of the designated work area. The real-time fixed air monitoring stations will be positioned between the work zone and the location of potential off-site receptors. Therefore, the placement of the fixed air monitoring stations is based on the need to document all potential off-site migration at the perimeter, but also

^{*} Background is defined as the current upwind 15-minute average concentration

^{**} Action Level Exceedance Requires Work Stoppage and Mitigation of the condition causing the Exceedance

recognizes the potential off-site receptors and the location of the proposed construction activities. To the extent possible, real-time monitors will continuously gather data 24 hours a day 7 days a week.

The air monitoring stations will be supplemented with a meteorological station and a system of transmitting the real-time data to a central data storage location accessible by the project team in the project trailer or similar work area.

Each real-time fixed-station air monitoring station contains the following:

- Station enclosure;
- A MiniRAE 3000 photoionization detector (PID), or equivalent;
- A MetOne ES-642 particulate aerosol [dust] monitor equipped with a PM-10 cyclone filter, or equivalent; and
- A data logging device with modem communication for data transmittal and alerting.

Air monitoring equipment will be housed in a protective weather-tight enclosure. Each monitoring station will continuously measure and record TVOC and PM-10 at a rate of one sample per minute and record 15-minute averages. Figure 3 shows an example of a fixed air monitoring station.

In addition to the air monitoring stations, a meteorological monitoring station will be established on site to continuously monitor and record temperature, relative humidity, wind speed, and wind direction. One-minute data for each meteorological parameter will be transmitted to the central data storage location to assess upwind and downwind air monitoring stations for responding to Alert, Response, and Action Level exceedances.

All TVOC, PM-10, and meteorological data will be stored in data loggers located within each monitoring/meteorological station. Stored analytical data along with system performance data from each station will be sent in real-time, via telemetry, to a central computer system for monitoring and analysis. In the event of severe weather or power loss at the site, data recording and/or recovery may be affected.

2.2.2 Supplemental Hand-held Monitoring

Supplemental hand-held monitoring equipment will be recorded downwind of the designated work area on an as-needed basis. Specific site conditions that may trigger supplemental hand-held monitoring include:

- Visible dust;
- Detection of TVOC and/or PM-10 at an air monitoring station at concentrations exceeding an Alert Level, Response Level, or Action Level;
- Investigations into apparent sources of increased dust or TVOC concentrations; or
- As directed by NYSDEC.

When supplemental hand-held monitoring is conducted, TVOC and/or PM-10 readings will be recorded at a downwind location between the work area and the nearest receptors. In such cases, 15-minute averages will be manually calculated in the field to evaluate the data.

When a triggering condition is observed during ground intrusive activity, the supplemental downwind perimeter monitoring will occur until the conditions that triggered the monitoring have subsided. TVOC concentrations will be monitored and recorded using a photoionization detector. PM-10 will be measured and recorded using a particulate aerosol monitor equipped with a PM-10 impactor.

At each monitoring point, the 15-minute average value of TVOC and PM-10, sample time, and sample location will be collected and recorded. Additional temporary monitoring points may be established due to changing site or meteorological conditions.

2.2.3 Visible Dust

In addition to measured PM-10 levels, the CAMP requires monitoring of visible dust conditions. If visible airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques if downwind PM-10 levels do not exceed the Action Level concentration of $150 \ \mu g/m^3$ above the upwind level and if no visible dust is migrating from the work area.

2.2.4 Odor Response

Odors will be monitored at the perimeter of the Site periodically throughout the day, or in response to any odor complaints. GEI personnel will be trained using the n-butanol scale of 1 (little to no odors) to 10 (Strong) to quantify odors. The most noticeable odor at the Site is expected to be naphthalene, which has a pungent moth ball smell. An odor threshold of 3 (mild to moderate) will be used as a Response Level.

If odors are detected at or above 3 on the n-butanol scale during excavation activities, GEI will conduct an on-Site odor survey, and perform walkaround monitoring with a supplemental PID. If the odors are attributed to the excavation activities and PID

measurements are below the Alert Level for TVOC, GEI will instruct the Contractor to employ engineering controls to abate odor emissions. If the supplemental PID measurements are above the Alert Level for TVOCs, or in the event of an odor complaint from on-Site personnel, hotel personnel or the public, GEI will instruct the Contractor to temporarily halt work activities and employ engineering controls. Work activities can restart once odors fall to 2 or less and other applicable CAMP threshold values are met.

2.2.5 Equipment Calibration

GEI will perform equipment calibration according to manufacturer's instructions. Each photoionization detector will be calibrated once daily using an isobutylene gas mixture. Particulate monitors will be purged and zeroed daily. Other hand-held portable equipment will be calibrated before each use, or a minimum of once per week when not in use. Calibration time and the initial (post-calibration) reading of each instrument will be recorded in the field notebook along with the serial number for each instrument.

2.3 Pre-Construction Baseline Monitoring

GEI will conduct pre-construction baseline monitoring to assess ambient air concentrations prior to the start of excavation activities. Baseline conditions will be developed for TVOC and PM-10 in ambient air using real-time fixed air monitoring stations and methods as described in Section 2.2.1. TVOC and PM-10 data will be recorded 24 hours per day for a minimum of three days.

2.4 Data Management Procedures

This section of the Plan discusses the data management procedures that will be used during the remedy. Data may be generated from a variety of sources, including real-time fixed station monitoring, supplemental walk-around monitoring, and meteorological monitoring.

These data must be reduced, evaluated, verified, and presented to related parties in a timely manner to facilitate decision-making. The data management process for each source of data is discussed below.

Monitoring data generated at each fixed station are sent to the central computer system via radio telemetry or will be manually downloaded daily. The monitoring data will also be downloaded to the project database for data evaluation.

The following daily charts, tables, or figures will be prepared:

- 15-minute averaged TVOC concentrations compared to the TVOC Action Level
- 15-minute averaged PM-10 concentrations compared to the PM-10 Action Level
- Supplemental Hand-Held PM-10 concentrations compared to the Action Level (if any)
- Supplemental Hand-Held TVOC concentrations compared to the TVOC Action Level (if any)
- Air monitoring station locations

The following weekly charts, tables, or figures will be prepared:

- Maximum 15-minute average concentrations of TVOC and PM-10
- Upwind and downwind comparison of Response Level and Action Levels reached during the week if the daily maximum 15-minute average concentrations of TVOC and PM-10 exceeded a Response Level or Action Levels
- Summary of site activities
- Air monitoring station locations

GEI will review all real-time data in a timely manner following collection and, as indicated in Section 1.2.1, prepare and distribute weekly reports.

3. Response Plan

The purpose of this section is to identify the procedures to be followed in response to elevated levels of target compounds measured during intrusive activities. Response actions will be enacted by the Contractor as directed by GEI. GEI will report any occurrences where an Alert, Response, or Action Level is exceeded. Where necessary, response measures will be enacted. The NYSDEC will be notified of any occurrence where a Response Level and/or Action Level (NYSDOH threshold) is exceeded. If there is a verified exceedance, GEI will inform the Contractor, National Fuel Gas, and NYSDEC within 60 minutes of the exceedance via e-mail, and will also be summarized in weekly reporting. In general, a tiered approach to site conditions with corresponding response actions will be implemented during the air monitoring program. The four tiers of site conditions are defined as follows:

- **Site Condition 1.** Normal or ambient air-conditions where TVOC and PM-10 are less than the Alert and Response Levels, no visible dust is migrating off site, and the naphthalene odor threshold is 2 or less.
- **Preliminary Site Condition 2.** Concentrations of TVOC only is equal to or greater than the Alert Level, but less than the Response Level.
- **Site Condition 2.** Concentrations of PM-10 or TVOC, or both, is equal to or greater than Response Level, but less than the Action Level, visible dust is migrating off site, and/or the naphthalene odor threshold is equal to 3 (mild to moderate) or more.
- **Site Condition 3.** Concentrations of PM-10 or TVOC, or both, is equal to or greater than the Action Level and/or an odor complaint from on-Site personnel, hotel personnel or the public is received.

The response plan will rely on real-time data generated from the fixed-station equipment and tripod-mounted equipment, and meteorological equipment. These data sources will be evaluated together in order to make appropriate decisions concerning site conditions and potential control measures.

An explanation of the notification system, specific conditions, and response actions for TVOC and PM-10 is presented below.

PM-10 monitoring may be temporarily suspended during periods of rain. Figure 4 presents the TVOC decision diagram that will be used to determine the appropriate site condition based on contaminant concentrations. Figure 5 presents the PM-10 decision diagram.

Specific TVOC target concentrations for Site Condition 1, Preliminary Site Condition 2, Site Condition 2, and Site Condition 3 are summarized in Table 1.

3.1 Site Condition 1

Site Condition 1 represents normal site conditions and will be in effect when the TVOC concentration is less than the Alert Level of 3.7 ppm, PM-10 is less than the Response Level of $100 \mu g/m^3$, and naphthalene odors are observed to be 2 or less (little to no odors) on the n-butanol scale.

3.2 Preliminary Site Condition 2

Preliminary Site Condition 2 will be in effect if the TVOC concentration is greater than or equal to the Alert Level of 3.7 ppm but less than the Action Level of 5.0 ppm.

At this time, the upwind and downwind concentrations will be compared to determine if the Preliminary Site Condition 2 is due to site activities. If downwind TVOC concentrations are greater than upwind concentrations, then it will be assumed that the Preliminary Site Condition 2 is due to site activities.

If the above condition is true, then a Preliminary Site Condition 2 will be verified. Under a verified Preliminary Site Condition 2, GEI will inform National Fuel Gas and the Contractor. The Contractor will implement mitigation control measures to abate the emissions and reduce levels back below the Alert Level. Preliminary Site Condition 2 response actions are listed in Table 2. The Site will remain in Preliminary Site Condition 2 as long as the TVOC concentration is between 3.7 ppm (Alert Level) and 5.0 ppm (Response Level), based on 15-minute averages.

The Site will return to Site Condition 1 when the 15-minute average concentration of TVOC is less than the Alert Level of 3.7 ppm.

3.3 Site Condition 2

Site Condition 2 will be in effect if the 15-minute average PM-10 or TVOC concentrations at a station is greater than $100 \,\mu\text{g/m}^3$ or $5.0 \,\text{ppm}$ (respectively), and determined to be related to site activities. Additionally, Site Condition 2 will be in effect

if a naphthalene odor threshold of 3 (mild to moderate) or greater on the n-butanol scale is reached and determined to be related to site activities.

The upwind and downwind PM-10 or TVOC concentrations and naphthalene odor observations will be compared to determine if the elevated concentrations are due to site activities. If downwind PM-10 or TVOC concentrations are $100~\mu g/m^3$ or 5.0~ppm (respectively), greater than upwind concentrations (Response Level), or if naphthalene odor is more significant downwind relative to upwind observations, then it will be assumed that the Site Condition 2 is due to site activities. Additionally, GEI will use judgement to see if the equipment is being affected by another source such as humidity, precipitation, or a non-intrusive site activity.

Under Site Condition 2, GEI will inform National Fuel Gas, the Contractor, NYSDEC, and NYSDOH. The Site Condition 2 will remain in effect as long as the average PM-10 or TVOC concentration is greater than or equal to $100 \, \mu g/m^3$ or $5.0 \, ppm$ (respectively) above upwind conditions (Response Level), and less than or equal to $150 \, \mu g/m^3$ or (Action Level). Under a verified Site Condition 2, control measures must be implemented by the Contractor. At this point, routine monitoring continues and 15-minute averages continue to be evaluated. Work may continue with control measures if downwind TVOC concentrations do not exceed 3.7 ppm above upwind levels (Alert Level) and PM-10 levels do not exceed $100 \, \mu g/m^3$ above upwind levels (Response Level), and if no visible dust or naphthalene odor is migrating off site from the work area.

A contingency meeting/conference call attended by GEI, the Contractor, National Fuel Gas, and NYSDEC will be held within 60 minutes of the verified Site Condition 2 if the condition is not mitigated by dust suppression techniques. Response actions for dust control are listed in Table 2.

3.4 Site Condition 3

Site Condition 3 will be in effect if the TVOC concentrations increase to greater than the Action Level of 25 ppm or the average 15-minute PM-10 concentration exceeds 150 µg/m³ above the current average upwind concentration (Action Level), or if an odor complaint is received from on-Site personnel, hotel personnel or the public. Site Condition 3 will remain in effect if one or more of the following conditions is true:

- The TVOC concentration is equal or greater than 25 ppm (Action Level).
- The average 15-minute PM-10 concentration is equal or greater than 150 μ g/m³ above the current average upwind concentration (Action Level).

• Odor is verified by the Engineer to be attributable to site-related excavation activities.

Under Site Condition 3, GEI will inform National Fuel Gas, the Contractor, NYSDEC, and NYSDOH. All construction activities will be halted. The Contractor will implement mitigation control measures to abate the emissions and reduce levels back below the Action Levels. Possible Site Condition 3 corrective measures/actions are listed in Table 2. After appropriate corrective measures/actions are taken, work activities may resume if the following conditions are met:

- TVOC concentration at the Site perimeter is no more than 3.7 ppm above background for the 15-minute average; and
- Dust suppression measures and other controls are successful in reducing the downwind PM-10 concentration to within 100 μ g/m³ of the upwind level and in preventing visible dust migration.
- Odor control measures are successful in reducing naphthalene odor observations to 2 or less (little to no odor) on the n-butanol scale.

4. Reporting

GEI will prepare and submit weekly reports to the Contractor, National Fuel Gas, and NYSDEC summarizing the CAMP monitoring data. Each report will consist of a letter-style report and charts/tables summarizing the following:

- Maximum 15-minute average concentrations of TVOC, and PM-10
- Upwind and downwind comparison of Response Levels and Action Level reached during the weekly period
- Summary of site activities
- Air monitoring station locations
- Meteorological conditions

Following the completion of all work, a Final Engineering Report will be prepared for the Site. As part of the report, the CAMP activities will be documented.

5. References

New York State Department of Environmental Conservation. 2010. DER-10 / Technical Guidance for Site Investigation and Remediation. Division of Environmental Remediation. May 3, 2010. Appendix 1A. pp. 204-206.

Tables

Table 1. Target Concentrations for Site Conditions Community Air Monitoring Plan Hornell Former MGP Site Hornell, New York

Target Parameter	Internal Requirement ¹	DER-10 generic CAMP requirements ²								
raiget Farailletei	Alert Level	Response Level	Action Level							
TVOC (15-minute Average Concentration)	3.7 ppm	5.0 ppm	25 ppm							
PM-10 (15-minute Average Concentration)	NA	100 μg/m³	150 μg/m³							

Site Condition	TVOC	PM-10	Notification Required
Site Condition 1	Less than Alert Level (<3.7 ppm)	Less than Response Level (<100 μg/m³)	NA
Preliminary Site Condition 2	Greater than or equal to Alert Level less than Action Level (≥3.7 ppm and <5 ppm)	NA	National Fuel Gas, Construction manager (if applicable), Contractor
Site Condition 2	Greater than or equal to Alert Level less than Action Level (≥5.0 ppm and <25 ppm)	Greater than or equal to Response Level and less than Action Level (≥100 μg/m³ and <150 μg/m³)	National Fuel Gas, Construction manager (if applicable), Contractor.
Site Condition 3	Greater than or equal to Action Level (≥25 ppm)	Greater than or equal to Action Level (≥150 μg/m³)	NYSDEC, and NYSDOH

Notes:

μg/m³ - micrograms per cubic meter

ppm - parts per million by volume

TVOC - total volatile organic compounds

PM-10 - particulate matter (i.e. dust) less than 10 microns in diameter

NA - not applicable

¹ Alert Levels are not established by the NYSDOH or NYSDEC and are internally established concentration levels for total volatile organic compounds. Alert Levels are set below the levels established by the NYSDOH so that actions can be taken prior to exceeding a NYSDOH threshold. An Alert Level serves as a preemptive tool to trigger contingent measures, if necessary, to assist in minimizing off-site transport of contaminants during remedial activities.

² Response Levels and Action Levels are defined in Appendix 1A of the New York State Department of Environmental Conservation *DER-10 / Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010).

Table 2. Site Conditions and Response Actions Community Air Monitoring Plan Hornell Former MGP Hornell, New York

Site Condition	Control Measure
Site Condition 1	Normal site activities - No control measures required
Preliminary Site Condition 2	Establish trend of data and determine if evaluation/wait period is warranted
-	Cover all or part of the excavation area
	Apply VOC emission suppressant foam over open excavation areas
	Change construction process or equipment that minimize air emissions
Site Condition 2	Temporarily stop work
	Temporarily relocate work to an area with potentially lower emission levels
	Apply water to area of activity or haul roads to minimize dust levels
	Reschedule work activities
	Cover all or part of the excavation area
	Apply VOC emission suppressant foam over open excavation areas
	Slow the pace of construction activities
	Change construction process or equipment that minimize air emissions
	Install a perimeter barrier fence
	Apply water on haul roads*
	Wet equipment and excavation faces*
	Spray water on buckets during excavation and dumping*
	Haul materials in properly tarped or watertight containers*
	Restrict vehicle speeds to 10 mph* Cover excavated areas and material after excavation ceases*
	Reduce the excavation size and/or number of excavations*
Site Condition 3	Halt work
One Condition 5	Encapsulate construction area and treat air exhaust
	Perform work during cold weather
	Cease construction activities
	Re-evaluate air monitoring work plan
	nte-evaluate all monitoring work plan

Notes:

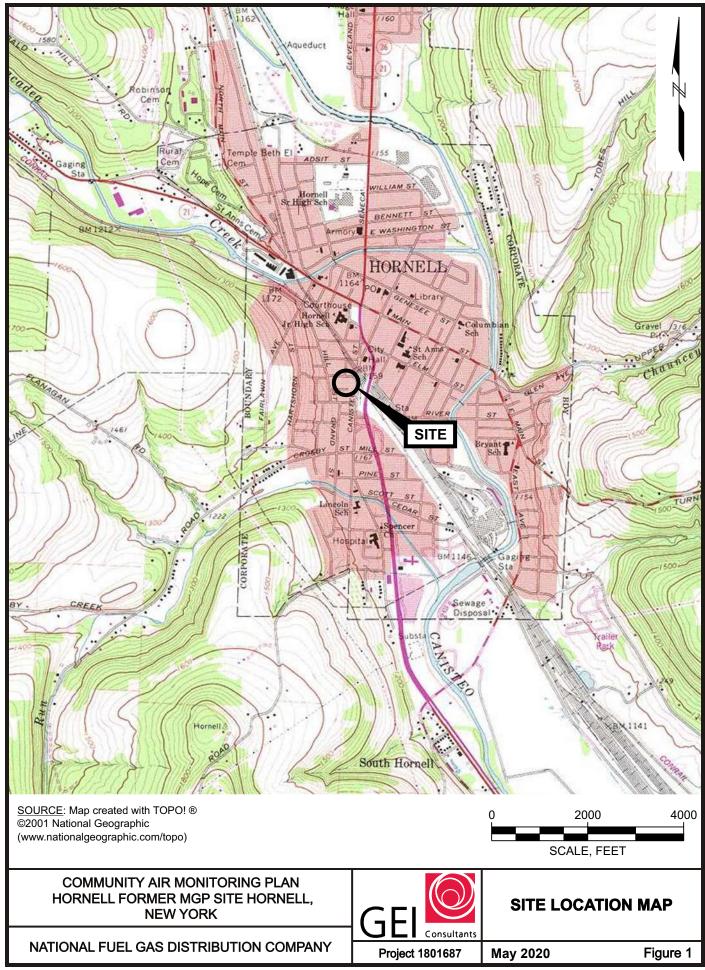
The control measures specified under each site condition can be implemented in any order that is most appropriate under the existing site conditions.

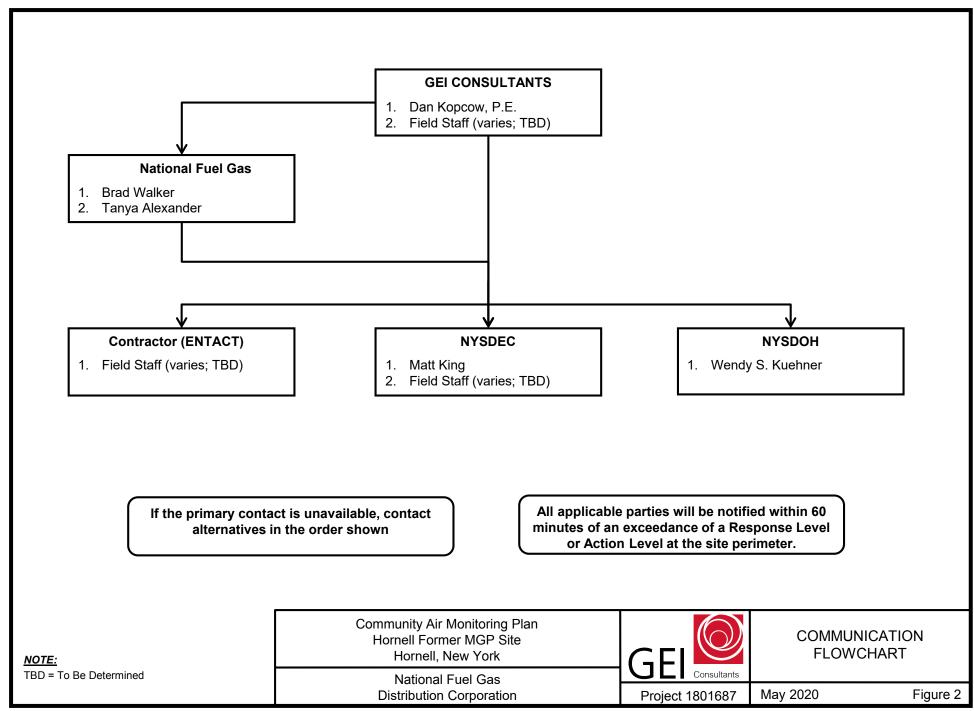
VOC - volatile organic compound

mph - miles per hour

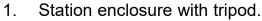
^{*} Control measures suggested in the New York State Department of Environmental Conservation DER-10 / Technical Guidance for Site Investigation and Remediation (NYSDEC, 2010)

Figures









- 2. RV-50 Communications Modem.
- 3. Campbell Scientific Data Logger.
- 4. MiniRAE 3000 Photoionization Detector (PID).
- 5. MiniRAE 3000 PID sample inlet tubing with moisture filter.
- 6. MetOne™ ES-642 aerosol [dust] monitor.
- 7. MetOne[™] ES-642 dust monitor cyclone sample inlet.





NOTE:

Figure depicts a GEI-owned portable air monitoring station as an example, and may not be representative of the actual system or components that will be employed at the site.

Community Air Monitoring Plan Hornell Former MGP Site Hornell, New York

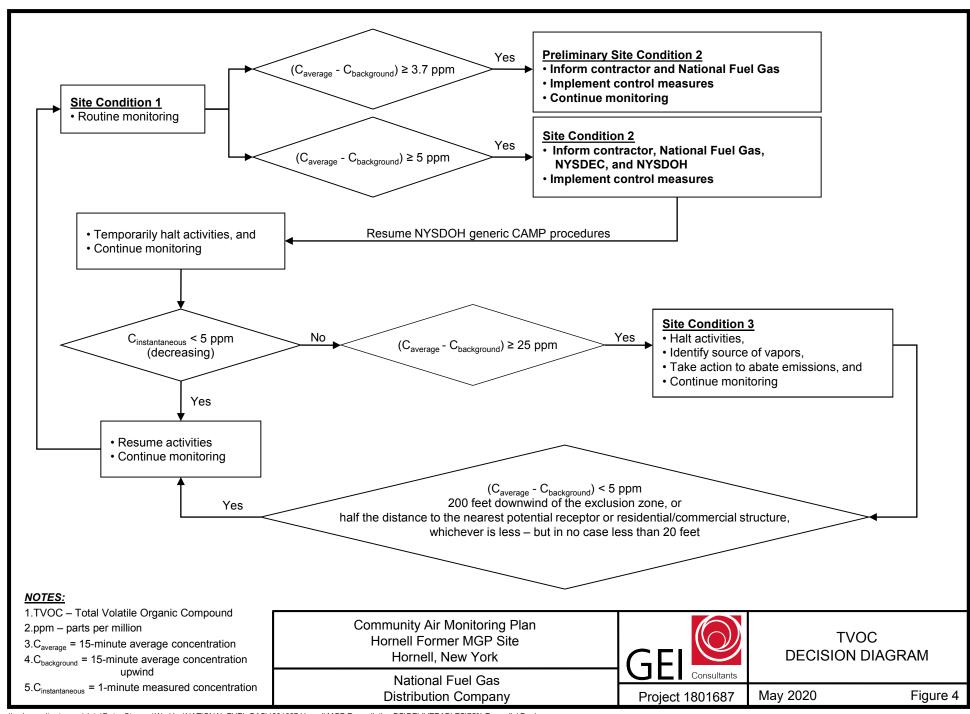
National Fuel Gas Distribution Company

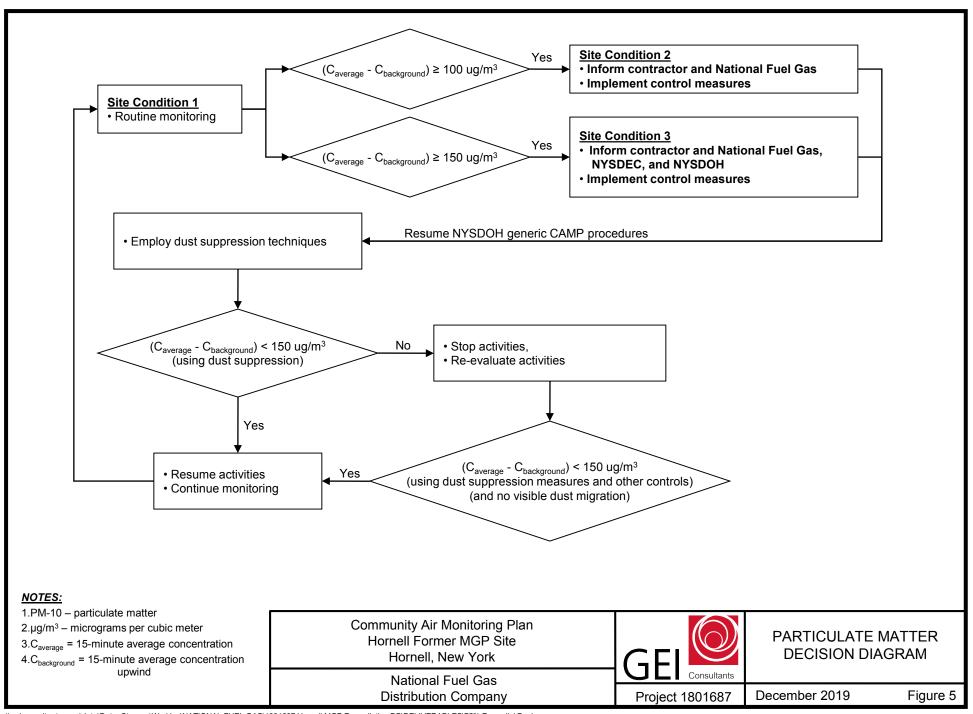


CONTINUOUS AIR
MONITORING STATION
INTERNAL COMPONENTS

Project 1801687 May 2020

Figure 3





Attachment 1

NYSDOH Generic CAMP from DER-10 Appendix 1A

Appendix 1A New York State Department of Health Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically, thereafter, to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- 1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- 2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- 3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.
- 4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- 1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m³) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m³ above the upwind level and provided that no visible dust is migrating from the work area.
- 2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m³ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m³ of the upwind level and in preventing visible dust migration.
- 3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

		Client	National Fuel Ga	s Distribut	Page		
		Project	Hornell Former	MGP Site		Pg. Rev.	
GFI		Ву	A. Parry	Chk.	C. Pray	App.	
Consulta	nts	Date	4/20/2020	Date	4/20/2020	Date	
GEI Project No.		.801687	Document No.	Revision	1		
Subject	Exc	avation Sh	oring Design				

We understand that the contractor hired to build the SOE has an existing stock of AZ-36 700N piles they would like to use for the sheet pile wall. We reran our analyses to confirm the different size sheeting will work for the design. Edits are included in the text below in *bold*, *italics*.

Purpose

This appendix includes analysis of a sheet pile shoring design for the excavation at the Former Hornell MGP Site. We developed two cross sections for analysis based on existing geotechnical data and other site conditions. The cross sections were analyzed in the computer program WALLAP version 6.05 to calculate a factor of safety for stability and maximum bending moment.

Procedure

For stability factor of safety (FS), WALLAP performs a limit equilibrium stability analysis for a cantilever wall. The FS is defined as the reduction factor applied to the soil strengths that produces failure. In our analysis our target FS is 1.5 for the design depth of excavation (10 feet), and a target FS greater than 1.3 for an excavation 11-feet deep (a one foot over dig allowance).

For bending moment, WALLAP performs a beam-on-elastic-foundation analysis to model the interaction between the sheet piles and the soil. The allowable stress design factor used to determine the maximum allowable moment on the sheets is 1.67.

Design Sections

Cross section A is considered the critical location because it represents the section of the shoring that will run parallel to Franklin Street. The stratigraphy at this location is typically a three to four-foot layer of fill, underlain by a three to four-foot layer of clay, followed by a layer of silty gravel with sand. We use a 250 psf surcharge four feet offset from the back of the wall to represent the vehicular loads on Franklin Street.

Cross Section B represents the section of the shoring on the south side of the excavation. The stratigraphy on this side of the site is generally a thin layer of fill, approximately 1 foot thick, followed by a ten-foot layer of sandy silt with lenses of gravelly silt with sand. Under the sandy silt is the same silty gravel with sand as in Cross Section A.

For the WALLAP analyses of each section we assume the clay and sandy silt layers are fill to produce a worst case result. The estimated soil properties are summarized in Table 1 below and cross sections are included on following pages.

GEI Project No.	\ \	Client	National Fuel Ga	s Distribut	Page		
		Project	Hornell Former	MGP Site		Pg. Rev.	
GFI		Ву	A. Parry	Chk.	C. Pray	App.	
Consulta	nts	Date	4/20/2020	Date	4/20/2020	Date	
GEI Project No.	1	.801687	Document No.	Revision	1		
Subject	Exc	avation Sh	oring Design				

Table 1: Soil Properties

Soil Type	γ _t (pcf)	c (psf)	φ (°)	E (psf)	dE/dy (psf/ft)
Fill	125	0	30	0	20,000
Clay	130	1,600	0	960,000	0
Sandy Silt	125	25	32	42,000	0
Silty Gravel w/Sand	135	0	36	0	42,000

Results

We designed the shoring using **AZ 36-700N** sheet piles ($F_y = 50ksi$) and assumed 15 feet of embedment from the bottom of excavation. The FS for Cross Section A for a 10-foot-deep cut and 11-foot-deep cut are **1.493** and **1.291**, respectively. The maximum moment on the sheets is **18.6** kip-ft/ft which is **11.2%** of the allowable moment capacity of the sheets and the maximum deflection is **1.54** in.

The FS for Cross Section B for a 10-foot-deep cut and 11-foot-deep cut are **1.573** and **1.364**, respectively. The maximum moment on the sheets is **15.6** *kip-ft/ft* which is **9.4%** of the allowable moment capacity if the sheets and the maximum deflection is **1.3** *in*.

The FS for Cross Section A are just shy of the target FS. We are comfortable, however, with these results because we are modeling the worst-case scenario when the clay layer is all fill. If the clay is included in the model the FS for a 10-foot-deep cut and 11 foot deep cut are **1.563** and **1.344**, respectively.

Hornell MGP Remediation DB Final Design - Shoring Design GEI Consultants, Inc. 4/9/2020

SOE Design - WALLAP Outputs

					Moment	
	Minimum FS - 10	Minimum FS - 11	Max Displ TOW	Max Displ BOW	Capacity Utilized	Depth of Sheeting
Analysis	ft cut	ft cut	(in)	(in)	(%)	(ft)
A: Franklin Street	1.493	1.291	1.54	0.06	11%	25
A2: Franklin Street with	1.563	1.344				
clay layer	1.503	1.344	-	-	-	-
B: South Street	1.573	1.364	1.33	0.05	9.4%	25

		Client			Page	
		Project			Pg. Rev.	
GEL		Ву		Chk.	App.	
ULI Cor	nsu l tants	Date		Date	Date	
Project No.			Document No.			
Subject						

Check Moment Output from WALLAP - 10 ft Excavation

A. Franklin Street Cross Section:

 $M_a := 17000lbf \cdot \frac{ft}{ft}$ Maximum moment:

 $\delta_{a_top} := 0.110 ft = 1.32 \, \text{in}$ Max. deflection at top of wall:

 $\delta_{\text{a bot}} \coloneqq \text{0.004ft} = \text{0.05\,in}$ Max. deflection at bottom of wall:

Factor of safety: $FS_a := 1.493$

Note: Including the clay layer instead of full fill

increases the FS to 1.563.

 $M_{check_a} := \begin{bmatrix} "OKAY" & if & M_a \le M_{allow} \\ "NOT OKAY" & otherwise \end{bmatrix}$ Check moment capacity:

 $M_{check_a} = "OKAY"$

 $a := \frac{M_a}{M_{allow}} = 10.20 \cdot \%$ Percent of moment capacity used:

B. South Cross Section

 $M_b := 14082lbf \cdot \frac{ft}{ft}$ Maximum moment:

 $\delta_{\mbox{\scriptsize b}} \;\; \mbox{\scriptsize top} := \mbox{\scriptsize 0.094ft} = \mbox{\scriptsize 1.13\,in}$ Max. deflection at top of wall:

 $\delta_{b_bot} := 0.003 ft = 0.04 \, \text{in}$ Max. deflection at bottom of wall:

Factor of safety: $FS_h := 1.573$

 $M_{check_b} := \begin{bmatrix} "OKAY" & if & M_b \le M_{allow} \\ "NOT OKAY" & otherwise \end{bmatrix}$ Check moment capacity:

 $M_{check_b} = "OKAY"$

 $b := \frac{M_b}{M_{allow}} = 8.45 \cdot \%$ Percent of moment capacity used:

		Client			Page	
((Project			Pg. Rev.	
GEL		Ву		Chk.	Арр.	
ULI Cor	ısultants	Date		Date	Date	
Project No.			Document No.			
Subject						

Check Moment Output from WALLAP - 11 ft Excavation

A. Franklin Street Cross Section:

 $M_{a11} := 18550lbf \cdot \frac{ft}{ft}$ Maximum moment:

 $\delta_{a11_top} := 0.128 ft = 1.54 \, \text{in}$ Max. deflection at top of wall:

 $\delta_{a11_bot} \coloneqq 0.005 ft = 0.06 \, \text{in}$ Max. deflection at bottom of wall:

 $FS_{a11} := 1.291$ Factor of safety:

Note: Including the clay layer instead of full fill

increases the FS to 1.344.

 $\label{eq:Mcheck_all} \mathsf{M}_{check_all} \coloneqq \left[\begin{array}{ccc} "\mathsf{OKAY"} & \mathsf{if} & \mathsf{M}_{all} \leq \mathsf{M}_{allow} \\ "\mathsf{NOT} \ \mathsf{OKAY"} & \mathsf{otherwise} \end{array} \right]$ Check moment capacity:

a11 := $\frac{M_{a11}}{M_{allow}} = 11.13 \cdot \%$ Percent of moment capacity used:

B. South Cross Section

 $\mathsf{M}_{b11} := 15603 \mathsf{lbf} \cdot \frac{\mathsf{ft}}{\mathsf{ft}}$ Maximum moment:

 $\delta_{b11 \ top} := 0.111 ft = 1.33 in$ Max. deflection at top of wall:

 $\delta_{b11_bot} \coloneqq 0.004 \text{ft} = 0.05 \, \text{in}$ Max. deflection at bottom of wall:

Factor of safety: $FS_{b11} := 1.364$

 $\label{eq:Mcheck_b11} \mathsf{M}_{check_b11} \coloneqq \left[\begin{array}{ccc} "\mathsf{OKAY"} & \mathsf{if} & \mathsf{M}_{b11} \leq \mathsf{M}_{allow} \\ \\ "\mathsf{NOT} \ \mathsf{OKAY"} & \mathsf{otherwise} \end{array} \right]$ Check moment capacity:

b11 := $\frac{M_{b11}}{M_{allow}} = 9.36 \cdot \%$ Percent of moment capacity used:

Hornell MGP Remediation DB Final Design - Shoring Design GEI Consultants, Inc. 4/9/2020

SOE Design - WALLAP Outputs

					Moment	
	Minimum FS - 10	Minimum FS - 11	Max Displ TOW	Max Displ BOW	Capacity Utilized	Depth of Sheeting
Analysis	ft cut	ft cut	(in)	(in)	(%)	(ft)
A: Franklin Street	1.493	1.291	1.54	0.06	11%	25
A2: Franklin Street with	1.563	1.344				
clay layer	1.503	1.344	-	-	-	-
B: South Street	1.573	1.364	1.33	0.05	9.4%	25

National Fuel Gas Hornell 95% Remedial Design Hornell Former Manufactured Gas Plant Site Hornell, New York Order No. A8-0634-02-10 Site No. 851032 May 2020

Appendix 3

NYSDEC Approval of Revised Target Remediation Limits

Kopcow, Dan

From:

King, Matthew A (DEC) < Matthew.King@dec.ny.gov>

Sent:

Thursday, November 7, 2019 3:32 PM

To:

Kopcow, Dan

Cc:

Tanya B. Alexander (alexandert@natfuel.com); Brad Walker (walkerb@natfuel.com);

Holden, Jeffrey; Eaton, Daniel J (DEC)

Subject:

[EXT] RE: National Fuel Gas Hornell - Proposed Revisions to Remedial Limits

Hi Dan,

I have reviewed the data from the Supplemental Pre-Design Investigation Data Report and GEI's revisions to the SOE plan. The Department accepts these revisions to the 50% design as outlined in the attached documents and looks forward to the submittal of the 95% design for this site in the spring.

Take Care.

Matt

Matthew King

Geologist Trainee, Remedial Bureau C Division of Environmental Remediation

New York State Department of Environmental Conservation

625 Broadway, Albany, NY 12233

P: 518-402-7383 | F: 518-402-9679 | Matthew.King@dec.ny.gov |

From: Kopcow, Dan <dkopcow@geiconsultants.com>

Sent: Thursday, October 31, 2019 11:50 AM

To: King, Matthew A (DEC) < Matthew.King@dec.ny.gov>

Cc: Tanya B. Alexander (alexandert@natfuel.com) <alexandert@natfuel.com>; Brad Walker (walkerb@natfuel.com)

<walkerb@natfuel.com>; Holden, Jeffrey <JHolden@geiconsultants.com>
Subject: National Fuel Gas Hornell - Proposed Revisions to Remedial Limits

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or un**expe**cted emails.

Hi Matt, on behalf of National Fuel Gas, we are proposing revisions to the vertical and horizontal remedial limits for the Hornell site based strictly on the current data set, including the recent Supplemental Pre-Design Investigation data. Before we get too far on the remedial design, we would like to discuss these revisions with you (see attached figure and justification) so we can obtain your concurrence.

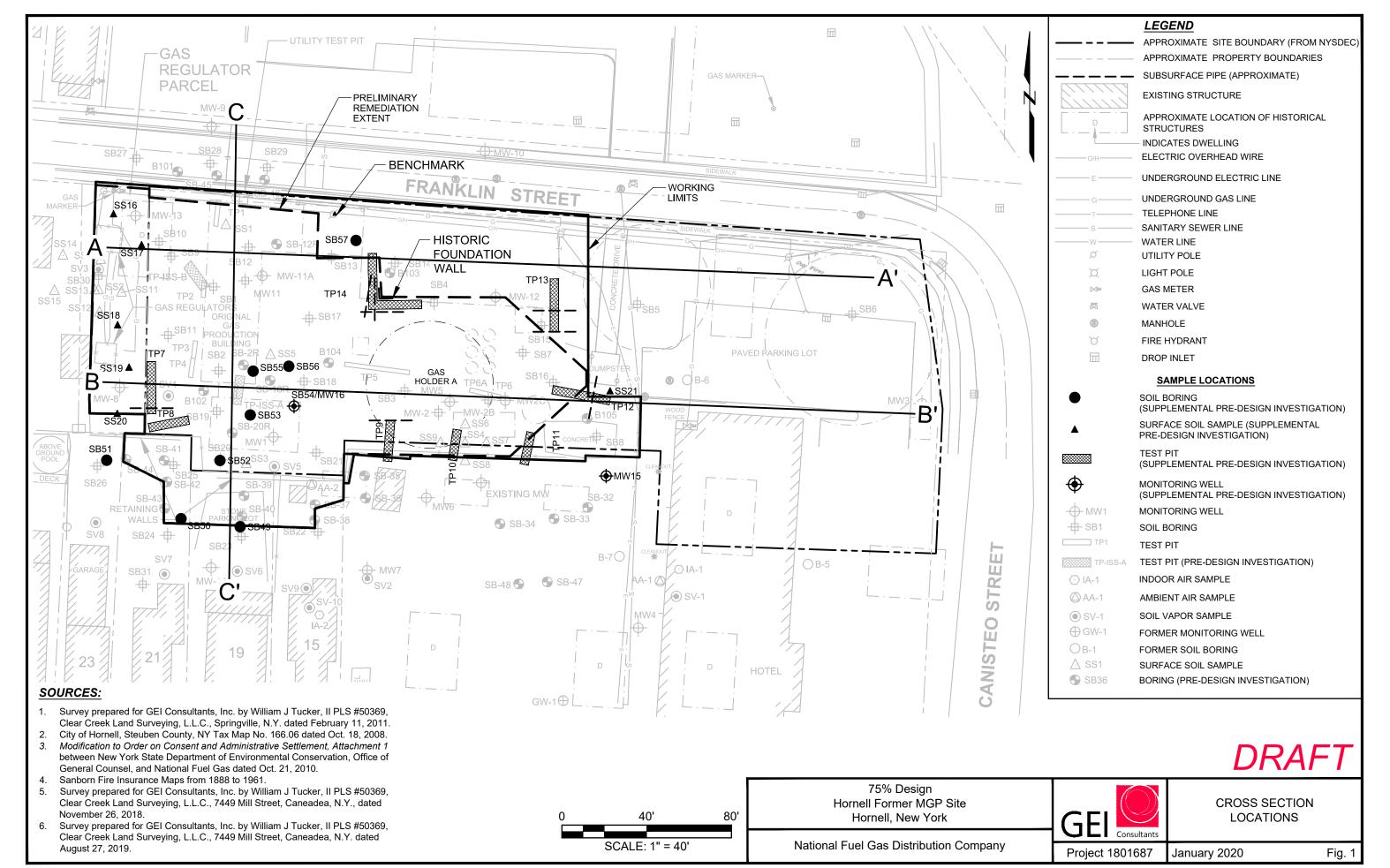
Are you available for a call to discuss tomorrow?

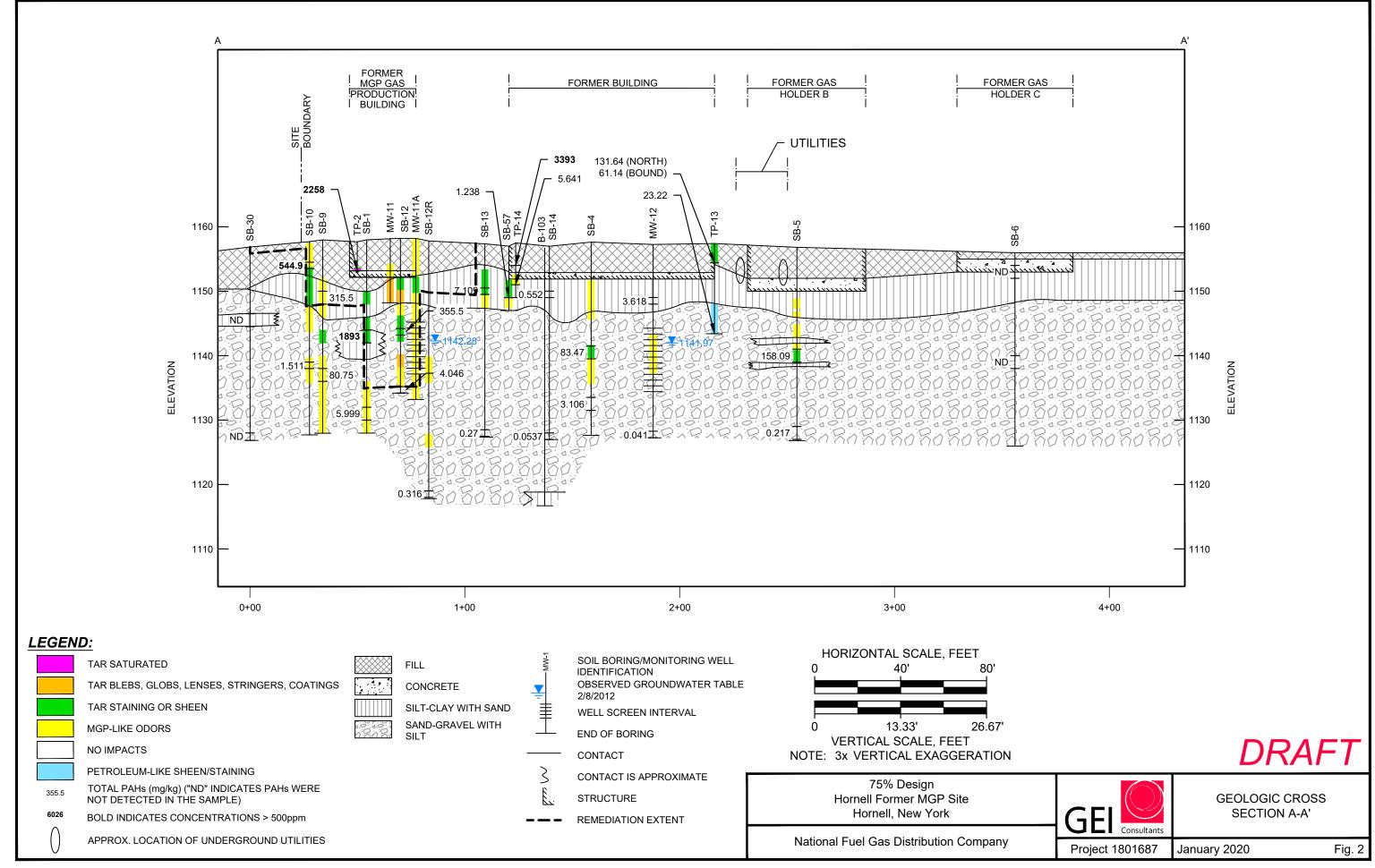


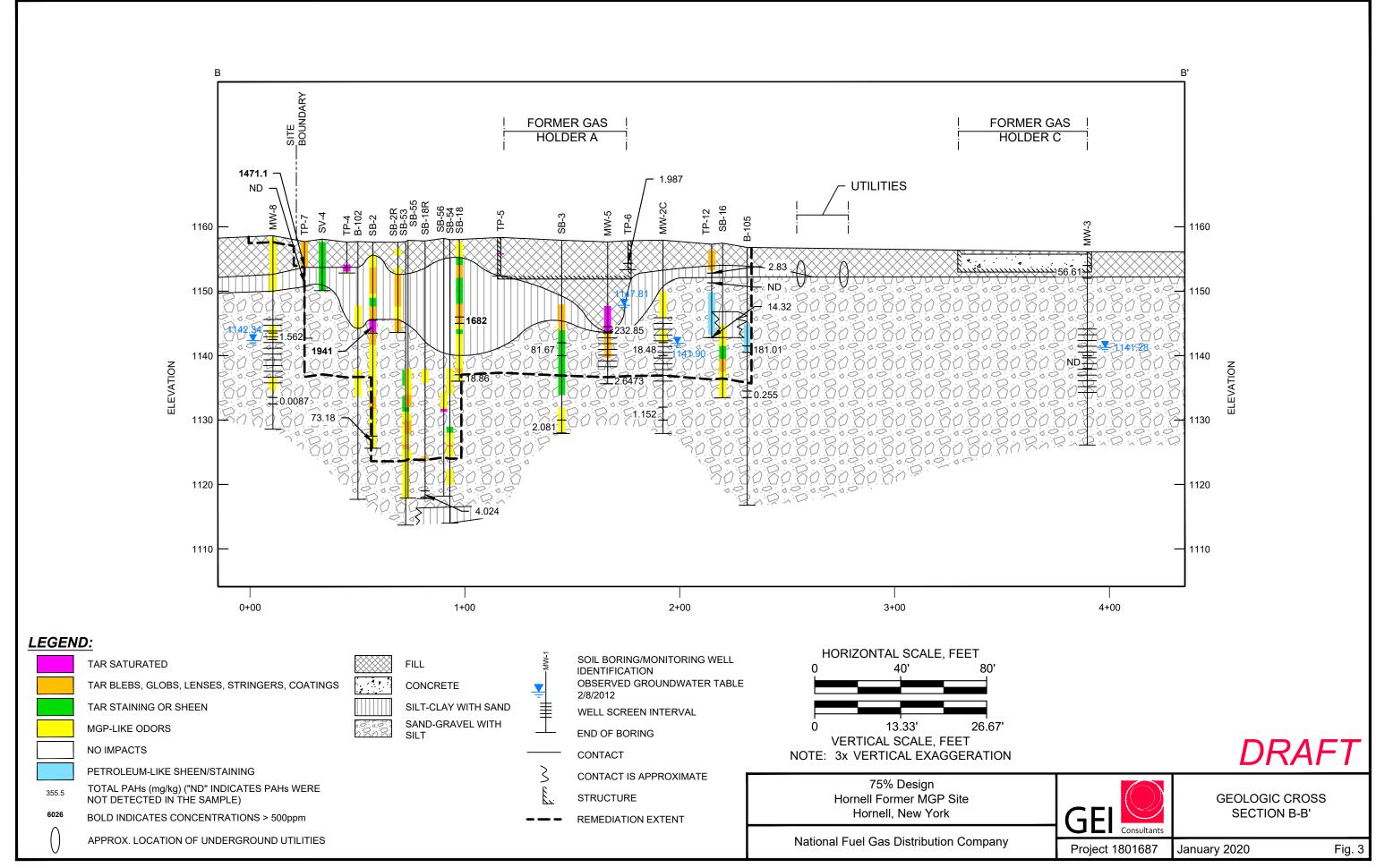
DANIEL KOPCOW, P.E., PMP Vice President/Branch Manager 607.216.8976 cell: 607.206.9075 1301 Trumansburg Road, Suite N, Ithaca, NY 14850 National Fuel Gas Hornell 95% Remedial Design Hornell Former Manufactured Gas Plant Site Hornell, New York Order No. A8-0634-02-10 Site No. 851032 May 2020

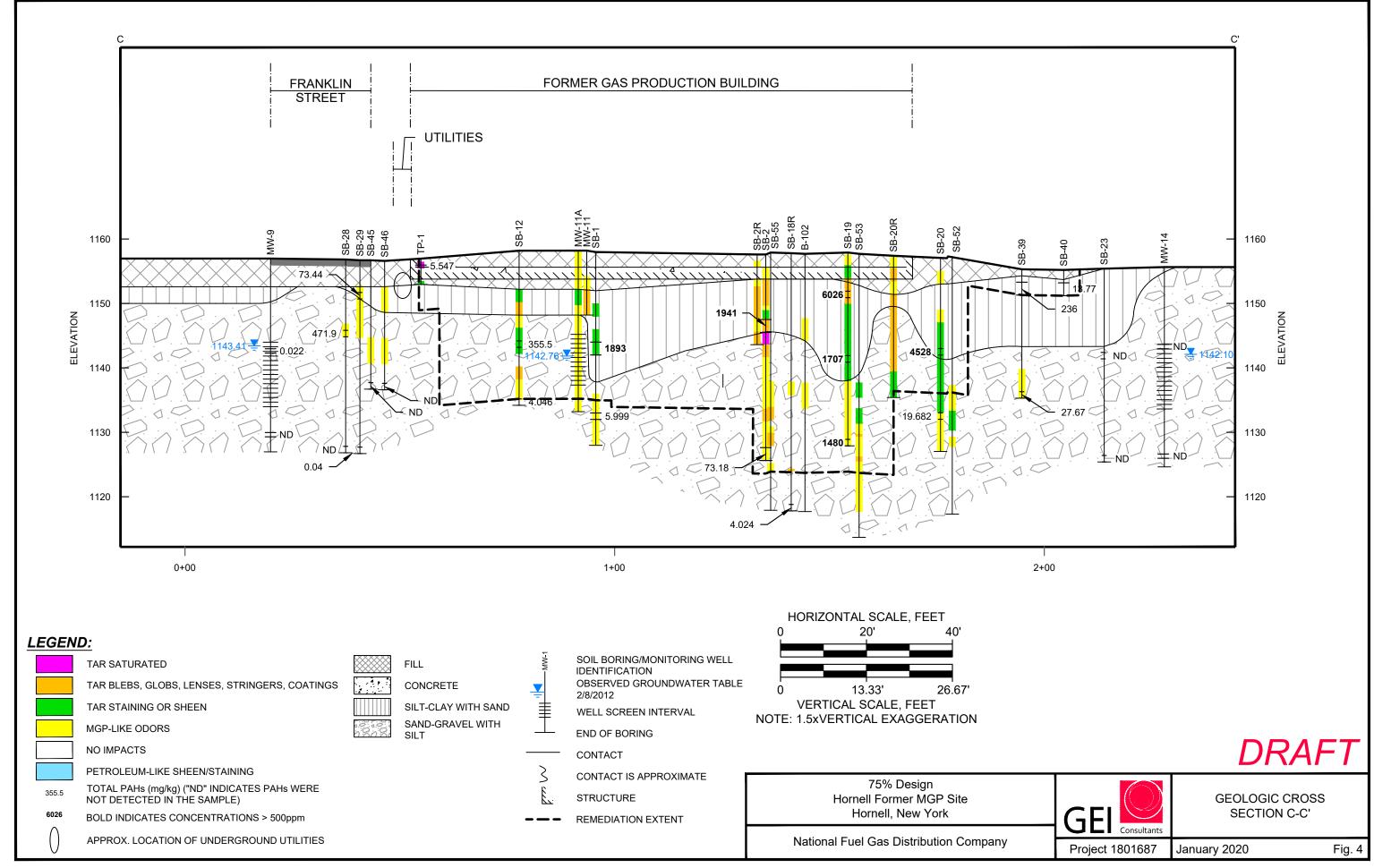
Appendix 4

Remediation Cross-Sections









National Fuel Gas Corporation Hornell Former MGP Site

Preliminary Shallow Soil Sampling Summary



Introduction

On behalf of National Fuel Gas Distribution Corporation (NFG), GEI Consultants, Inc., P.C. (GEI) submitted a work plan to New York State Department of Environmental Conservation (NYSDEC) for additional shallow soil sampling at the former Hornell Manufactured Gas Plant (MGP) Site on May 7, 2020. While prior sampling had delineated the extent of shallow soil requiring remediation in most areas of the site (including the residential properties to the south and the gas regulator parcel to the west), limited data was available on the commercial property to the northeast, east, and southeast outside the remediation limits specified in the Hornell 95% Design Document. Therefore, the purpose of the additional shallow sampling was to determine the horizontal and vertical extent of shallow soil removal that may be required to achieve soil cleanup objectives for soils located on commercial property outside the Support of Excavation (SOE) boundary to the north, east and southeast (Figure 1). Per the NYSDEC's 2018 Record of Decision (ROD), the goals for the commercial portions of the site include:

- Soils in the uppermost foot of soil cover must meet the NYSDEC's Commercial soil cleanup objectives (SCOs); and
- Soils deeper than one foot deep exceeding 500 parts per million (ppm) total for the 17 priority pollutant polycyclic aromatic hydrocarbons (PAHs) or exhibiting evidence of gross contamination must be addressed by the excavation and/or in-situ stabilization components of the remedy.

Following NYSDEC approval of the May 7 work plan on July 6, 2020, the sampling was performed on July 23, 2020. The initial sampling provided for delineation of non-PAH constituents and confirmed that soils greater than 1 foot deep did not exceed 500 ppm total PAHs in the investigation area. However, shallow soils continued to exceed Commercial SCOs for certain PAHs, particularly benzo(a)pyrene. On August 5, 2020 GEI provided a plan for additional shallow soil sampling and iterative analysis in an effort to delineate the extent of shallow soils exceeding Commercial SCOs for PAHs. Those samples were collected on August 7, 2020.

Available analytical results from the July 23 and August 7, 2020 sampling are summarized on Table 1, and the constituents that exceed Commercial SCOs in the upper foot of soil are indicated on Figure 1. These results have not yet delineated shallow soils to the NYSDEC-specified objective. However, the areas subject to ongoing delineation are largely outside the planned working and staging areas for the majority of the remediation activities. To avoid further delay in submitting the Final Design or the commencing the remedy construction, the Final Design reflects planned shallow soil removal where necessary based on available data and/or planned access/staging areas. It also shows additional (anticipated "worst case") areas where shallow soil removal may be required pending the results of outstanding laboratory analytical data and further coordination with the NYSDEC. This approach is possible because:

National Fuel Gas Corporation Hornell Former MGP Site

Preliminary Shallow Soil Sampling Summary

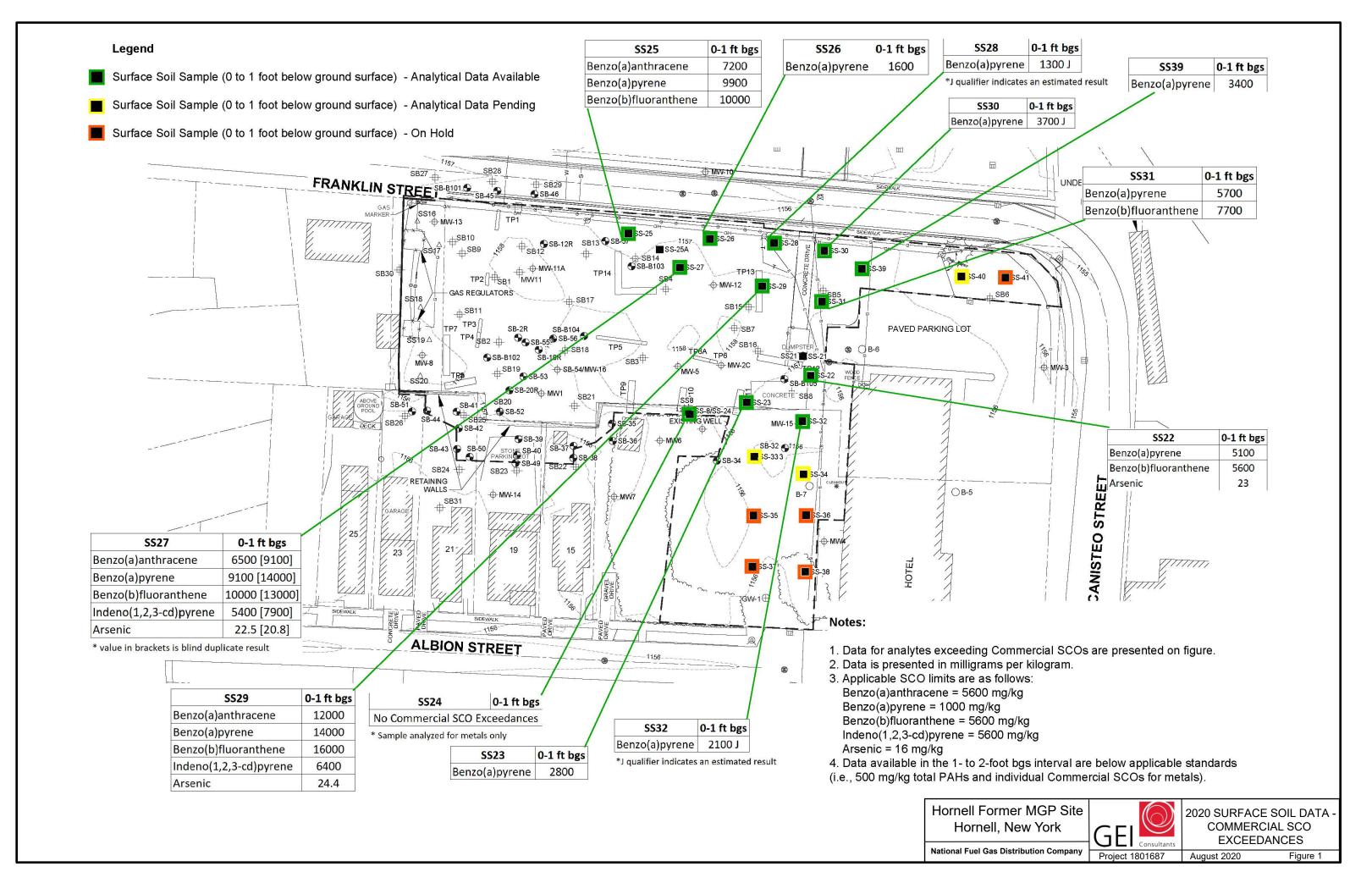
- Shallow soils are comparatively easy to address and thus do not represent a significant design component or constructability issue;
- The delineation can be completed concurrent with NYSDEC review of the final design and/or after mobilization for the primary remedial construction activities; and
- As needed, shallow soil excavations in the yet-to-be-delineated areas could largely be implemented at the end of the project where they do not interfere with access or staging for other components of the work.

Accordingly, the Final Design accommodates the need for shallow soil remediation to the east of the SOE, while recognizing that the specific limits are subject to confirmation pending outstanding laboratory analyses and additional coordination with NYSDEC. Once appropriate delineation is achieved, GEI will submit to NYSDEC a summary of the analytical data, including a Data Usability Summary Report (DUSR) and confirmation of the revised target shallow soil remediation area and rationale.

Analyte	Commercial SCOs	Units	SS22(0-1)	SS22(1-2)	SS23(0-1)	SS23(1-2)	SS24(0-1)	SS25(0-1)	SS25A(1-2)	SS26(0-1)	SS26(1-2)	SS27(0-1)	SS27(0-1) DUP	SS27(1-2)	SS28(0-1)	SS28(1-2)	SS29(0-1)	SS29(1-2)	SS30(0-1)	SS31(0-1)	SS32(0-1)	SS39(0-1)
Percent Moisture	N/A	%	11.1	11.9	14.9	13.8	11.2	14.7	10.2	7.2	12.3	9.5	12.8	11.0	9.5	10.4	12.4	12.3	12.4	9.9	31.5	8.5
Percent Solids	N/A	%	88.9	88.1	85.1	86.2	88.8	85.3	89.8	92.8	87.7	90.5	87.2	89.0	90.5	89.6	87.6	87.7	87.6	90.1	68.5	91.5
Cyanide, Total	27	mg/Kg	0.52 J		ND			ND		ND F1		0.76 J	ND F1		ND		0.90 J F1					
METALS																						
Mercury	2.8	mg/Kg	0.21		0.12		0.14	1.1		0.24		0.36	0.32		0.092		0.45					
Aluminum	NE	mg/Kg	9230		9410		11600	6460		7900 F1		9330	10300		9880		11000			8190		
Antimony	NE	mg/Kg	ND		ND		ND	3.7 J		ND F1		ND	ND		ND		ND			ND		
Arsenic	16	mg/Kg	23.0		6.4		8.9	11.6		6.5		22.5	20.8		12.1		24.4			15.1		
Barium	400	mg/Kg	98.5 ^		76.8 ^		115 ^	72.8 ^		48.2 ^		83.9 ^	84.0 ^		70.2 ^		113 ^			69.9^		
Beryllium	590 9.3	mg/Kg	0.58		0.49 0.18 J		0.62 0.37	0.37		0.40 0.068 J		0.51	0.53 0.87		0.53		0.69			0.43		
Cadmium Calcium	9.3 NE	mg/Kg	0.32 30400 B		23000 B		10300 B	0.37 36700 B		47400 B F2		0.85 38500 B	24800 B		0.24 32900 B		0.57 13800 B			64300 B		
Chromium	1900	mg/Kg	13.2		11.8		10300 B 15.1	8.7		10.2		12.2	12.8		12.3		14.5			10.6		
Cobalt	NE	mg/Kg mg/Kg	9.3		7.1		8.9	5.1		6.5		7.4	8.5		7.8		8.2			5.8		
Copper	270	mg/Kg	28.1		20.3		21.7	69.5		21.2		41.6	30.3		19.7		27.6			22.7		
Iron	NE NE	mg/Kg	20600		16800		19600	12100		14700		18500	20100		19300		21400			16800 B		
Lead	1000	mg/Kg	229		53.3		204	136		96.2 F1 F2		265	309		67.9		162			92.5		
Magnesium	NE	mg/Kg	8240		6330		4240	6660 B		7980 F1		4970	5830		8780 B		4650 B			11300 B		
Manganese	10000	mg/Kg	447 B		460 B		575 B	278 B		421 B F2		325 B	394 B		415 B		501 B			457 B		
Nickel	310	mg/Kg	20.3		17.4		21.2	12.2		15.1		17.1	18.8		19.8		20.1			15.2		
Potassium	NE	mg/Kg	1540		1950		2130	1320 ^ B		1600 F1		1740	1790		1740 B		1690 B			1560		
Selenium	1500	mg/Kg	1.7 J		1.2 J		1.4 J	1.1 J		1.3 J		2.0 J	2.0 J		1.3 J		2.1 J			ND		
Silver	1500	mg/Kg	0.36 J		ND		0.35 J	0.28 J		0.22 J		0.24 J	0.29 J		0.25 J		0.39 J			ND		
Sodium	NE	mg/Kg	70.8 J		60.2 J		52.3 J	81.9 J		81.2 J		73.7 J	75.2 J		73.7 J		69.8 J			115 J		
Thallium	NE	mg/Kg	ND		ND		ND	ND		ND		ND	ND		ND		ND			ND		
Vanadium	NE	mg/Kg	17.2		15.7		20.7	16.4		14.0		17.4	18.2		15.6		19.9			14.3		
Zinc	10000	mg/Kg	134		101		165	98.3		63.9		119	127		94.6		146			83.4		
PAHS																						
2-Methylnaphthalene	NE	ug/Kg	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	500000	ug/Kg	ND	ND	ND	ND		350 J	ND	ND	ND	ND	550 J	400 J	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	500000	ug/Kg	1000 J	550 J	ND	ND		730 J	180 J	ND	500 J	730 J	1000 J	2300	ND	920 J	2000	1900	780 J	1400 J	410 J	490 J
Anthracene	500000	ug/Kg	1300 J	590 J	550 J	1100 J		1600 J	ND	ND	670 J	1300 J	1800 J	3200	ND	1600 J	3100	2700	3900	1300 J	ND	940 J
Benzo[a]anthracene	5600	ug/Kg	4300	2700	2500	3000		7200	920 J	900 J	8700	6500	9100	14000	1100 J	5700	12000	10000	3200 J	5300	1500 J	3200
Benzo[a]pyrene	1000	ug/Kg	5100	3300	2800	3400		9900	1300	1600	15000	9100	14000	16000	1300 J	6500	14000	11000	3700 J	5700	2100 J	3400
Benzo[b]fluoranthene	5600	ug/Kg	5600	4000	3800	4100		10000	1300	2100	18000	10000	13000	17000	1400 J	7600	16000	11000	3900	7700	1900 J	3700
Benzo[g,h,i]perylene	500000	ug/Kg	3700 J	2600	1900 J	2300		5100	720 J	1300	11000	5700	7900	9300	760 J	3300	6100	5600	3300 J	2600	1900 J	2100
Benzo[k]fluoranthene	56000	ug/Kg	2100 J	1600 J	1500 J	1600 J		5000	700 J	660 J	7600	3600	7700	7300	790 J	2800	6500	7000	1500 J	3100	930 J	1800
Chrysene	56000	ug/Kg	4400	2900	3100	3400		6800	860 J	890 J	9300	6200	8800	12000	1000 J	5600	11000	9600	4200	5800	1200 J	3200
Dibenz(a,h)anthracene	5600	ug/Kg	980 J	640 J	510 J	640 J		1500 J	210 J	440 J	3500	1600 J	2100	2900	ND 1000	940 J	2200	1900	ND 7200	830 J	ND	710 J
Fluoranthene	500000 500000	ug/Kg	8700 570 J	4900	6700 ND	7100 ND		11000 290 J	1300 ND	800 J ND	8400 ND	9000	13000 450 J	21000 970 J	1900 ND	11000	20000 660 J	17000 540 J	7200 ND	13000 810 J	2400 ND	6000 250 J
Fluorene Indeno[1,2,3-cd]pyrene	5600	ug/Kg ug/Kg	570 J 3300 J	ND 2200	1800 J	2100		5000	660 J	1200	11000	310 J 5400	7900	9200	ND 700 J	360 J 3300	6400	5900	2300 J	2700	1400 J	2000
Naphthalene	500000	ug/Kg ug/Kg	ND	2200 ND	ND	ND		ND	ND	ND	ND	ND	320 J	490 J	700 J	ND	360 J	5900 ND	ND	490 J	1400 J ND	2000 ND
Phenanthrene	500000	ug/Kg	6100	1900	3100	3900		4600	560 J	240 J	1800 J	3500	5300	10000	730 J	5900	7900	6900	2200 J	9700	1300 J	2900
Pyrene	500000	ug/Kg	8800	4400	5000	5100		9500	1100	730 J	7500	8100	11000	18000	1500 J	9400	17000	14000	9100	9600	3000	4900
TOTAL PAHS	500000	ug/Kg	55950	32280	33260	37740		78570	9810	10860	102970	71040	103920	144060	11180	64920	125220	105040	45280	70030	18040	35590
BTEX	303000	48/ NB	33330	32200	33200	3,740		70370	3010	10000	102370	7.1040	103320	117000	11100	0.1320	123220	103040	13200	70000	10040	33330
Benzene	44000	ug/Kg	ND		ND			ND		ND		ND	ND		ND		0.35 J					
Ethylbenzene	390000	ug/Kg	ND		ND			ND		ND		ND	ND		ND		ND					
m-Xylene & p-Xylene	500000	ug/Kg	ND		ND			ND		ND		ND	ND		ND		ND					
o-Xylene	500000	ug/Kg	ND		ND			ND		ND		ND	ND		ND		ND					
Toluene	500000	ug/Kg	ND		ND			ND		ND		ND	ND		ND		ND					
Total BTEX	NE	ug/Kg	ND		ND			ND		ND		ND	ND		ND		ND					
Xylenes, Total	500000	ug/Kg	ND		ND			ND		ND		ND	ND		ND		ND					
NOTES:																						

NOTES:

- 1. This data represents DRAFT UNVALIDATED RESULTS. Exceedances of the Commercial Soil Cleanup Objective are shaded yellow.
- 2. ND indicates that the analyte was not detected.
- 3. Blank cell indicates that the chemical was not analyzed in this sample.
- 4. J indicates that result is less than the Reporting Limit but greater than or equal to the Method Detection Limit and the concentration is an approximate value.
- 5. B indicates that analyte was also found in blank sample.
- 6. ^ indicates that instrument-related QC is outside acceptance limits related to this result.
- 7. NE indicates that no standard is available for this analyte.



									יום	RAFT SCH	ILDULL														
ID	Task Name	Duration	Start	Finish									Otr 4	2020										Qtr 1, 20	021
					29 3	Septem	ber 2020	20	2 0	October 202	20	20 2	Noveml	per 2020	27 (Dece	ember 2020	00 07	1 ,	Januar	y 2021	26	24 5	ebruary 2	2021
1	Construction Work	113 days	Mon 9/14/20	Tue 2/23/21		0 0 1.	3 18 23	20	3 0	13 1	0 23 2	20 2	7 12	17 22		2 1	12 17	22 21	1 ()	10 21	20	31 5	10 1	15 20
2	Mobilization & Setup	2 days	Mon 9/14/20	Tue 9/15/20	- !	_	H								 										
3	Underground Utility Survey GPR and Waste Characterization Sampling	3 days	Wed 9/16/20	Fri 9/18/20				 				 			 				 			 			
4	Install Fence, Privacy Screen, Signs	3 days	Wed 9/16/20	Fri 9/18/20	. !		_	 				 			 				 			 			
5	Install Erosion & Sediment Controls	1 day	Wed 9/16/20	Wed 9/16/20	- !	,	-	 				 			 				 			 			
6	Select Demolition	10 days	Thu 9/17/20	Wed 9/30/20			<u> </u>					 			 				 			 			
7	Soft Dig Gas Regulator Area	3 days	Thu 10/1/20	Mon 10/5/20								 			 				 			 			
8	Excavate 4-foot on Residential Properties	2 days	Tue 10/6/20	Wed 10/7/20	 - 			 				 			 				 			 			
9	Backfill & Restore Residential Properties	4 days	Tue 10/6/20	Fri 10/9/20								 			 				 			 			
10	Install Sheet Piling	14 days	Mon 10/12/20	Thu 10/29/20				 				Η			 				 			 			
11	Excavation & Loadout	20 days	Fri 10/30/20	Mon 11/30/20				 											 			 			
12	ISS	28 days	Tue 12/1/20	Mon 1/11/21	-			 				 										 			
13	Core Samples & Testing Samples	28 days	Thu 12/10/20	Wed 1/20/21	-																				
14	Backfill	16 days	Tue 1/12/21	Tue 2/2/21																					
15	Excavate 1' Areas Outside of Exc Area	5 days	Wed 1/27/21	Tue 2/2/21				 				 			 										
16	Backfill 1' Areas	2 days	Wed 2/3/21	Thu 2/4/21				 				 			 				; 			 			
17	Cut/Remove Sheet Piling	7 days	Wed 2/3/21	Thu 2/11/21				 				: 			 				 			 			
18	Seeding/Restoration	5 days	Fri 2/12/21	Thu 2/18/21				 				 			 				 			 			
19	Final Cleanup	2 days	Fri 2/19/21	Mon 2/22/21				 				 			 				 			 			
20	Demobilize	1 day	Tue 2/23/21	Tue 2/23/21				 				 							 						



National Fuel Former MCP Site Hornell NY

TABLE 1 - E	ABLE 1 - ENTACT Treatability Laboratory Results Table - E7895 - Hornell MGP ISS												5/19/2020				
		Dry Reagents Addition to Soil by	W/C Ratio	Density	Penetrometer				Treated Waste UCS Breaks (psi)		Treated Waste % Moisture		Permeability (cm/sec)				
Sample ID	Sample Mixing Date	Weight (%)	W/C Ratio	(pcf)	3 Days	7 Days	14 Days	28 Days	7 Day	14 Day	28 Day	7 Day	14 Day	28 Day	14 Day	28 Day	Comments
Spec Requirements											50psi - 500psi					< 1E-6 cm/sec	Requirements from Spec
GEI Mix 1A		4% PC,, 4% GGBFS, 0.25% Cetco Bentonite	0.7:1						160	193	220				5.37E-07	2.48E-08	Mix 1A From GEI's PDI Report
Raw	04/10/20	N/A	N/A	126.1	\times	\times	\times	\times	\times	> <	\times	\times	> <	\times	\times	\times	$\overline{}$
1-1	04/10/20	4% PC,, 4% GGBFS, 0.25% Cetco Bentonite	0.8:1	122.3	3.50	4.50	4.50		72.23	126.70	154.81	22.63	27.14	20.56	1.30E-07	6.10E-08	meets spec
2-1	04/10/20	4% PC,, 4% GGBFS	0.8:1	122.8	3.00	4.50	4.50		78.41	122.56	173.31	21.92	22.44	22.57	8.20E-08	1.10E-07	meets spec
3-1	04/10/20	2% PC,, 4% GGBFS	0.8:1	127.1	3.00	4.00	4.50		43.10	87.88	152.97	21.41	20.78	21.62	7.30E-08	3.70E-08	meets spec
1-2	04/10/20	4% PC,, 4% GGBFS, 0.25% Cetco Bentonite	1.25:1	122.7	3.00	4.50	4.50		53.48	77.60	119.13	25.82	25.91	24.49	2.60E-07	1.90E-07	meets spec
2-2	04/10/20	4% PC,, 4% GGBFS	1.25:1	123.3	3.00	4.50	4.50		54.45	83.95	119.24	27.02	24.98	23.43	3.10E-07	1.50E-07	meets spec
3-2	04/10/20	2% PC,, 4% GGBFS	1.25:1	124.2	2.50	3.50	4.50		31.50	65.68	98.29	24.40	24.04	24.47	2.40E-07	1.40E-07	meets spec

National Fuel Gas Hornell 95% Remedial Design Hornell Former Manufactured Gas Plant Site Hornell, New York Order No. A8-0634-02-10 Site No. 851032 May 2020

Appendix 8

Anticipated Disposal Facilities

Appendix 8 Anticipated Disposal Facilities National Fuel Gas Hornell Former MGP Site 95% Design Submittal

Waste Type	Anticipated Facility	Alternate Facility	Comments	
	MG	P SOIL & DEBRIS (MIXED) OR C&D		
Impacted Soil & Debris (< 6")	Steuben County Landfill 5632 Turnpike Road Bath, NY 14810 NYSDEC Operating Permit# 8-4624-00031/00009	Casella Waste Hyland Landfill 6653 Herdman Road Angelica, NY 14709 NYSDEC Operating Permit#:9-0232-00003/00012	Excavated material is anticipated to be non-hazardous and disposed of as Alternate Daily Cover under a Beneficial Use Determination (BUD)	
MGP Impacted Debris/Soil (> 6")	Casella Waste Hyland Landfill 6653 Herdman Road Angelica, NY 14709 NYSDEC Operating Permit#:9-0232-00003/00012	Steuben County Landfill 5632 Turnpike Road Bath, NY 14810 NYSDEC Operating Permit# 8-4624-00031/00009	Large debris/soil anticipated to be disposed as non-hazardous waste	
	LOW TEMPERATURE TH	ERMAL DESORPTION OF MGP IMPACTED SOILS/D	EBRIS	
Low Temperature Thermal Desorption of MGP Impacted Soils	Clean Earth Fort Edward 304 Towpath Lane Fort Edward, NY 12828 NYSDEC Permit # 5-5330-0038/00019	NONE	Alternate treatment and disposal method in the event that excavated material/debris unsuitable for disposal at planned landfills	
	RCRA	HAZARDOUS WASTE SOILS/DEBRIS		
Treatment & Subtitle D Landfill	US ECOLOGY Michigan Disposal Site 49350 North I-94 Service Drive Belleville, MI 48111 EPA ID#: MID000724831	NONE	Alternate disposal method in the event that certain material is characterized as hazardous waste	
	LIQUID WASTE	(GROUNDWATER/DECONTAMINATION WATER)		
Non-Hazardous Bulk Liquid Waste Processing	Covanta Environmental Services- Niagara 100 Energy Boulevard Niagara Falls, NY 14304 NYSDEC Permit# NYR000005298	NONE	Liquid waste is anticipated to be processed/disposed as non- hazardous waste	

Note:

Anticipated disposal and treatment facilities are subject to confirmation based on waste profiling to be performed prior to shipping to confirm material compliance with facilities' acceptance criteria. Other appropriately licensed and permitted facilities may be designated based on waste acceptance, schedule, capacity limitations, or other factors prior to or during project implementation. Regardless of the disposal and/or treatment facilities used, transportation and disposal of waste will be conducted consistent with applicable local, state, and federal laws.





Consulting Engineers and Scientists

Health and Safety Plan

Hornell Former Manufactured Gas Plant Site Remedial Implementation Hornell, New York

Prepared For:

National Fuel Gas Distribution Corporation

Submitted by:

GEI Consultants, Inc., P.C. 1301 Trumansburg Road, Suite N Ithaca, New York 14850 (607) 216-8955

May 2020

Project No. 1801687

Daniel Kopcow, P.E., PMP

Project Manager

Jeena Sheppard Regional Safety Manager

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lables

- **Emergency Contact Information**
- 2. **Activity Hazard Analysis**
- 3. Chemical Data
- 4. Summary of PPE by Level
- 5. OSHA Standards for PPE
- 6. Real-Time Work Zone Air Monitoring Action Levels

Appendices

- Map to Hospital and Occupational Health Clinic
- Safety Data Sheets В.
- C. Heat and Cold Stress Guidelines
- D. **Forms**
- E. GEI Health and Safety SOPs
- **Utility Clearance Documentation** F.
- G. COVID-19 Field Guidance

1. Emergency Contact Information

Table 1. Emergency Contact Information

Important Phone Numbers						
Local Police:	911, (607) 324-2860					
Fire Department:	911					
Ambulance:	911					
Hospital and Occupational Clinic Information (See Attached Maps and Directions in Appendix A)						
St. James Mercy Hospital 411 Canisteo St. Hornell, NY 14843	(607) 324-8000					
Express Care 20 Elm Street (1st Floor) Hornell, NY 14843	(607) 324-0490					
Contacts						
Project Manager: Daniel Kopcow	(607) 216-8976 office (607) 206-9075 cell					
Corporate Health and Safety Officer: Steve Hawkins	(860) 368-5348 office (860) 916-4167 cell					
Regional Safety Manager: Jeena Sheppard	(856) 291-5663 office (856) 298-7138 cell					
GEI People Team:	(781) 721-4117 Boston (916) 631-4596 Sacramento					
Medcor Triage	1-800-775-5866					
Client Contact: Brad Walker	(716) 857-7247 office (716) 517-5146 cell					
Secondary Client Contact:	(716) 857-7410 office					
Tanya Alexander	(716) 864-5318 cell					
Other Information	204 004 4500 office					
Contractor Requesting/Performing Utility Clearance: ENTACT, LLC	201-984-1509 office					
Nearest Telephone Location (or alternate means of communication)	On-site Cellular					

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2. Background

Project Name: Hornell Former Manufactured Gas Plant Site

Project Location: Hornell, New York

GEI Project No: 1801687

This Health and Safety Plan (HASP) establishes policies and procedures to protect GEI personnel from the potential hazards posed by the activities at the Hornell Former Manufactured Gas Plant Site, Hornell, New York. Reading of the HASP is required of onsite GEI personnel and will be reviewed by GEI subcontractors. Subcontractors will prepare their own Site-specific HASP and may use this as a guide. The plan identifies measures to minimize accidents and injuries, which may result from project activities or during adverse weather conditions. Additionally, federal, state and local representatives, as well as National Fuel Gas employees may be required to sign and adhere to this HASP, depending on the nature of their presence on site during activities conducted by GEI. A copy of this HASP will be maintained on site for the duration of the work.

Included in Section 1 and Appendix A is a route to the nearest medical facility from the Site with directions and contact information. Safety data sheets (formerly known as Material Safety Data Sheets [MSDS]), specific to chemicals that may be encountered while working at the Site, are in Appendix B. Appendix C details the signs, symptoms, care and procedures to both heat and cold stress. Appendix D includes the Tailgate Safety Briefing form, the Project Safety Briefing form, the Accident/Incident Report Form and the Near Miss Reporting Form. Appendix E contains the GEI Health and Safety (H&S) Standard Operating Procedures (SOPs) that apply to this project. Utility clearance documentation is provided in Appendix F. Also included as Appendix G is the COVID-19 Field Work Guidance.

2.1 Scope of Field Work

GEI will be providing construction management and engineering support for remedial implementation at the former Hornell Manufactured Gas Plant (MGP) site. Remediation activities will include the excavation, in-situ solidification (ISS), and off-site disposal of MGP-impacted material, plus areas of shallow excavation of surface soils within the former MGP parcel and on an adjacent natural gas regulator parcel and other adjacent residential and commercial properties.

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2.2 Site Description

The Hornell Former Manufactured Gas Plant Site is located at the corner of Canisteo and Franklin Streets at the southwest side of the downtown area of Hornell. The Site is on the border between the modern and historic commercial/industrial area and a residential area.

The eastern third of the Site is currently developed as part of the hotel, with a portion of the building and parking areas present on the property. The central and western portion of the Site is a grassy vacant lot. A line of trees is found along the southern property line which borders residential backyards. The site is generally flat-lying and does not appear to have any surface water features present.

To the north and east across Franklin and Canisteo Streets, respectively, the Site is bordered by commercial properties. Single-family residential properties are found to the northwest, and directly bordering the Site to the west and south sides. Approximately 120 feet to the northeast of the Site is the active Norfolk Southern railroad line.

3. Statement of Safety and Health Policy

GEI is committed to providing a safe and healthy work environment for its employees. To maintain a safe work environment, GEI has established an organizational structure and a Corporate Health and Safety Program to promote the following objectives:

- Reduce the risk of injury, illness, and loss of life to GEI employees.
- Maintain compliance with federal, state, and other applicable safety regulations; and minimize GEI employees' work exposure to potential physical, chemical, biological, and radiological hazards.

Safety policy and procedure on any one project cannot be administered, implemented, monitored, and enforced by any one individual. The total objective of a safe, accident free work environment can only be accomplished by a dedicated, concerted effort by every individual involved with the project from management down to all employees.

Each GEI employee must understand their value to the company; the costs of accidents, both monetary, physical, and emotional; the objective of the safety policy and procedures; the safety rules that apply to the safety policy and procedures; and what their individual role is in administering, implementing, monitoring, and compliance of their safety policy and procedures. This allows for a more personal approach to compliance through planning, training, understanding, and cooperative effort, rather than by strict enforcement. If for any reason an unsafe act persists, strict enforcement will be implemented.

4. Hazard/Risk Analysis

The potential hazards associated with site conditions and activity hazards related to GEI onsite activities have been identified in this section.

4.1 Special Site Conditions or Concerns

- Traffic The majority of traffic on the project site will be construction traffic and commercial hotel traffic.
- Construction Equipment Contractor will use heavy equipment to complete
 the remedy, including excavators, loader, roller, skid steer, and several other
 pieces of equipment. Specific attention given to rotating equipment, pinch
 points, and overhead equipment. Specific care will be taken to stay out of the
 swing radius of the excavators.
- Bio hazards (insect bites, poison ivy, etc.) Poison ivy is present along with black flies and ticks.
- Difficult or remote site access Site access is moderate due to unpaved roads.
- Hazardous winter conditions Cold stress, slippery surfaces, and icy conditions are possible dangers.
- Heat Stress Fainting, fatigue or heat stroke are possible dangers.

Safety equipment will include: First aid kit, fire extinguisher, adequate supply of drinking water and electrolyte fluids, hand cleaner, insect repellent, sunscreen, and cell phone.

4.2 Activity Hazard Analysis

The potential hazards for this project associated with site conditions and activity hazards associated with GEI on-site activities have been identified in Table 2. General hazards and control measures that are applicable to all site activities are identified in the General Hazards section. The site-specific tasks, potential hazards, and control measures established to reduce the risk of injury or illness are identified in the Activity Hazard section of Table 2. Health and Safety SOPs for routine hazards and common site conditions are referenced in the table below and included in Appendix E.

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Table 2. Activity Hazard Analysis

General Hazards	Control Measure
These Hazards Apply to All Site Activities	
Construction Safety	 Identify yourself and your work location to heavy equipment operators, so they may incorporate you into their operations. Coordinate hand signals with operators. Stay Alert! Pay attention to equipment backup alarms and swing radii. Wear a high visibility vest when working near equipment or motor vehicle traffic. Position yourself in a safe location when filling out logs and talking with the contractor. Notify the contractor immediately if any problems arise. Do not stand or sit under suspended loads or near any pressurized equipment lines. Do not operate cellular telephones in the vicinity of heavy equipment operation.
Inclement Weather	 Listen to local forecasts for warnings about specific weather hazards such as tornados, thunder storms, and flash floods. If the storms produce thunder and/or lightning, leave the work area immediately and move to a safe area. Discuss an action plan prior to the severe weather. Wear appropriate PPE for the type of weather that could be encountered. Stop work until conditions are suitable. Take cover in vehicles or shelter as appropriate. See SOP HS-010
Physical Injury	 Wear work boots in good condition with non-slip soles. Maintain good visibility of the work area. Avoid walking on uneven or debris ridden ground surfaces.
Chemical / Contaminant Exposure – Skin and eye injury/irritation	 Wear protective coveralls (e.g. Tyvek ®) with shoe covers, safety glasses, face shield, Nitrile gloves. Dispose of gloves after use and wash hands. Avoid contact with pooled liquids and limit contact with contaminated soils/groundwater. See SOP HS-009

General Hazards These Hazards Apply to All Site Activities	Control Measure
Driving	 Employees must wear their safety belt while in a moving vehicle. Vehicle accidents will be reported in accordance with GEI's accident reporting procedures. Vehicles will be properly maintained and safely operated (refer to GEI's Fleet Maintenance Program). Employees will follow safe driving behaviors, which include limiting distractions such as manipulating radios or other equipment that may cause a distraction. Employees will not exceed the posted speed limit and will maintain a safe distance between other vehicles. Use defensive driving techniques. Driving distance and time after a 12-hour shift will not exceed 30 miles or 30 minutes (whichever is greater). See SOP HS-004
Noise	 Wear hearing protection when near loud noises. Wear hearing protection whenever you need to raise your voice above normal conversational speech due to a loud noise source; this much noise indicates the need for protection.
Heat Stress	 Increase water intake while working. Increase number of rest breaks and/or rotate workers in shorter work shifts. Rest in cool, dry areas. Watch for signs and symptoms of heat exhaustion and fatigue. In the event of heat stroke, bring the victim to a cool environment, call for help, and initiate first aid procedures. See Heat Stress Guidelines in Appendix C.
Vehicular Traffic	 Wear traffic safety vest at all times. Use cones, flags, barricades, and caution tape to define work area. Use a "spotter" to locate oncoming vehicles. Use vehicle to block work area. Engage police detail if needed.

General Hazards These Hazards Apply to All Site Activities	Control Measure
	Check that contractor has cleared underground utilities before any intrusive activities, and that contractor has coordinated with utility locating services, property owner(s) or utility companies (see Utility Clearance Documentation in Appendix F).
Utilities	Utilities are to be considered live or active until documented otherwise.
	For overhead utilities within 50 feet, have contractor determine with the utility company the appropriate safe distance. Minimum distance for clearance is based on voltage of the line.
	An observer will be established when operating drilling rigs near overhead utilities.
Insects – Bites, Stings, Allergic Reactions	 Apply insect repellent prior to performing field work and as often as needed throughout the work shift Wear proper protective clothing (work boots, socks and light colored clothing) Wear shoes, long pants with bottoms tucked into boots or socks, and a long-sleeved shirt when outdoors for long periods of time, or when many insects are most active (between dawn and dusk). When walking in wooded areas, avoid contact with bushes, tall grass, or brush as much as possible Field personnel who may have insect allergies will have bee sting allergy medication on site and will provide this information to the SSO and the CHSO prior to commencing work. Field personnel will perform a self-check at the end of the day for ticks. See SOP HS-001

Activity	Potential Hazard	Control Measures
Entering Construction Site	Heavy equipment, dust, noise.	Wear hardhat; safety vest; steel-toed, steel-shank boots; safety glasses; nitrile/neoprene gloves; and earplugs.
	Heavy equipment/proximity to heavy equipment	Distancing, safe work practices, inspections, wear hard hat, safety glasses and hearing protection. Maintain eye contact with equipment operator.
	Adverse weather	Monitor weather daily. Discontinue work as necessary based on lightning, limited visibility, impaired mobility, etc.
	Heat/Cold Stress	Acclimatization, work/rest regimes, drinking warm/cold fluids.
	Slip/Trip/Fall	Maintain safe and orderly work areas. Unloading areas should be on even terrain. Identify and repair potential tripping hazards.
	Noise	Distancing form noise, hearing protection.
Construction	Traffic Hazards	Use traffic cones, signage, and traffic safety vests in accordance with Traffic Regulations. Use a traffic spotter.
Management & Community Air Monitoring	Contaminant Contact	Wear protective coveralls (e.g., Tyvek™) (if needed) with shoe covers, nitrile gloves, and safety glasses when handling samples. Dispose of gloves after sampling. Personal protective equipment will be decontaminated and disposed of in general accordance with Section 12 of this HASP.
	Exposure to vapors from contaminated soils	Use work zone air monitoring equipment including photoionization detector and multiple gas meter (that monitors % oxygen, lower explosive limit, hydrogen sulfide and hydrogen cyanide), and dust monitor to monitor the work zone as specified in Section 8.0 of the HASP. If air monitoring action levels are exceeded, then engineering controls will be implemented. If excursions of the action levels persist, then upgrade to half or full face respirator with HEPA/organic vapor cartridge as indicated in Section 4.4 of the HASP. Community air monitoring of the area immediately surrounding the work zone will be completed in accordance with Section 9.0 of this HASP.
Soil Sampling	Contaminant Exposure, Cuts/Scrapes, Heavy Lifting, Repetition, Slips/Trips/Falls	Wear hardhat; high visibility reflective safety vest; steel-toed, steel-shank boots or composite toe and shank; safety glasses; Nitrile/neoprene gloves; and earplugs as necessary. Dispose of gloves after use and wash hands. Wear work gloves over nitrile gloves. Excavation entry will be allowed only with proper sloping or shoring. Take regular breaks and do not work in unusual positions for long periods of time. Keep trafficked areas free from slip/trip/fall hazards.

Activity	Potential Hazard	Control Measures			
Excavation Oversight	Crushing, entrapment, falls, fire/explosion	Prior to excavating, determine utility locations and have locations marked by utility companies and the property owner. Utilities shall be properly supported and barriers will be erected around excavations in remote areas. Backfill temporary excavations when work is completed. Personnel must remain 2 feet from the face of the excavation. Sides, slopes, and faces shall meet OSHA requirements. Excavation entry will be allowed only with proper sloping or shoring.			
		See SOP HS-006			
	Adverse weather	Monitor weather daily. Discontinue work as necessary based on lightning, limited visibility, impaired mobility, etc.			
Survey	Heat/Cold Stress	Acclimatization, work/rest regimes, drinking warm/cold fluids.			
	Slip/Trip/Fall	Maintain safe and orderly work areas. Unloading areas should be on even terrain. Identify and repair potential tripping hazards.			
Groundwater Sampling	Contaminant Exposure, Heavy Lifting, Repetition, Slips/Trips/Falls	Wear hardhat; high visibility reflective safety vest; steel-toed, steel-shank boots or composite toe and shank; safety glasses and Nitrile/neoprene gloves. Dispose of gloves after use and wash hands. User proper lifting techniques. Take regular breaks and do not work in unusual positions for long periods of time. Keep trafficked areas free from slip/trip/fall hazards.			
Hand Augering	Repetition, pinch point, back/wrist/knee injury, cuts and scrapes	Wear appropriate PPE including safety glasses and gloves that provide protection and grip. Remove excavated soil only after stopping the hand auger. Keep trafficked areas free from slip/trip/fall hazards. An underground utility survey must be conducted prior to intrusive activities. Coordination with utility locating services, property owner(s) or utility companies must be conducted. Inspect hand auger prior to use to determine if it is functioning properly and free of metal burs. Use the appropriate size hand auger for the job. Use hand movements that exert minimum pressure on wrist bones. Take regular breaks and do not work in unusual positions for long periods of time.			

Personal Protective Equipment (PPE) is the initial level of protection based on the activity hazards and Site conditions which have been identified. Upgrades to respiratory protection may be required based on the designated Action Levels found in Section 9. General on-site provisions will include: extra nitrile, leather, and/or Kevlar gloves, extra protective coveralls (e.g. Tyvek®) with boot covers, drinking water and electrolyte fluids, reflective vest, first aid kit, fire extinguisher, hearing protection, and washing facilities.

If Site conditions suggest the existence of a situation more hazardous than anticipated, the Site personnel will evacuate the immediate area. The hazard, the level of precautions, and the PPE will then be reevaluated with the assistance and approval of the CHSO and the Project Manager (PM).

4.3 Personal Safety

Field activities have the potential to take employees into areas which may pose a risk to personal safety. The following websites (sources) have been researched to identify potential crime activity in the area of the project:

• www.areavibes.com: According to the annual crime data, the crime rate in Hornell, NY is 11% lower than the average of the whole of the state of New York. When compared with the national average, the crime rate in Hornell is 40% lower. When looking at violent crimes, Hornell, NY has 87% lower violent crime rate than the New York average and 88% lower than the national average. In property crime, Hornell, NY is 7% higher than the average of New York and is 33% lower than the national average.

To protect yourself, take the following precautions:

- If deemed necessary by the PM, use the buddy system (teams of a minimum of two persons present);
- Let the Site Safety Officer (SSO) know when you begin work in these areas and when you leave;
- Call in regularly;
- Pay attention to what is going on around you; and
- If you arrive in an area and it does not look safe to get out of your vehicle, lock the doors and drive off quickly but safely.

Employees must not knowingly enter into a situation where there is the potential for physical and violent behaviors to occur. If employees encounter hostile individuals or a confrontation develops in the work area, suspend work activities, immediately leave the area of concern, and contact local 911 for assistance. Notify the SSO and Safety Team (Corporate Health and Safety Officer and Regional Safety Managers – <u>SafetyTeam@geiconsultants.com</u>) of any incidents once you are out of potential danger.

In the event of an emergency, prompt communications with local emergency responders is essential. At least one charged and otherwise functioning cell phone to facilitate emergency communications will be on-site. Confirmation of cellular phone operation will be confirmed at the start of each working day.

4.3.1 Coronavirus (COVID-19)

GEI field employees will follow the COVID-19 Field Guidance in Appendix G.

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Distancing

COVID-19 spreads from person-to-person primarily through droplets that are emitted from the initial person to a distance of 6 feet.

- Maintain a distance of at least 6 feet (2 meters) from others. This includes during site meetings and breaks and while performing work tasks. Meetings should be held outside or by phone/video.
- Minimize the number of employees in one location to the extent possible. Follow local restrictions for maximum number of people congregated in one location at a time.
- If tasks need to be performed close to others (within 6 feet) and that cannot be avoided, wear appropriate PPE including a face mask (surgical or cloth), gloves, and eye protection.
 - NOTE: Face masks are not a substitute for distancing. Masks are meant to protect others in case you are infected. Contact the Safety Team (safetyteam@geiconsultants.com) to discuss any special circumstances and the PPE warranted.
- Wear nitrile gloves as much as practicable and change them frequently. As practicable, wash your hands or use sanitizer between glove changes. Wash your hands after wearing gloves.
- Minimize and stagger time in office spaces to performing essential duties such as picking up and dropping off equipment and samples. If you need to spend more time in a project office (e.g., a construction trailer), it's important that the workspace allows for proper social distancing.
- When traveling to project sites, travel in separate vehicles. Do not travel in the same vehicle.

Hygiene Practices

The hygiene practices we have been instructed to perform more routinely apply to performing field work as well, such as:

- Frequent hand washing with soap and warm water for 20 seconds. If soap and water are not readily available, use hand sanitizer (containing 60% alcohol) until soap and water can be used. If sanitizer is not available, bringing gallon containers of water and soap may be a good substitute.
- If you are filling water bottles (for drinking or hand washing) keep the bottle away from the spigot to avoid transfer of germs or contaminants.
- Wipe down surfaces with disinfectant on a routine basis (at least once per day). This includes field equipment and other items that may have previously been used

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by others. This is especially important while working in construction trailers. When using company and personal vehicles, wipe surfaces including the steering wheel, gear shifter, controls, and door handles before and after use.

- Wear nitrile gloves as frequently as possible. Hand washing is necessary after removing gloves.
- When greeting others avoid handshaking, hugging, or other personal contact. A greeting from a distance such as a wave is suggested.
- Avoid sharing field equipment and other materials with others. Before using field equipment or putting it away, wipe it down with disinfectant or wash it with soap and water. Note, use extra caution using disinfectants while collecting environmental samples to ensure that the samples are not compromised.

4.3.2 Handling Drums and Containers

Regulations for handling drums and containers are specified by Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120(j). Potential hazards associated with handling drums include vapor generation, fire, explosions, and possible physical injury. Handling of drums/containers during the site investigation and remediation activities may be necessary. If drum/container handling is necessary, it will be performed in accordance with all applicable regulations.

4.3.3 Electrical Hazards

4.3.3.1 Utilities

The Site may have shallow, buried utilities and also overhead utilities in certain areas. It will be necessary for parties disturbing the existing ground surface and conducting operations with heavy equipment having high clearances to exercise caution in performing project-related work with respect to the presence of utilities. Utility companies with active, buried lines in the Site area will be asked by the Contractor performing intrusive activities to mark their facilities. Employees will use these data to choose work locations.

4.3.3.2 Underground Utilities

No excavating, drilling, boring, or other intrusive activities will be performed until an underground utility survey, conducted by knowledgeable persons or agencies, has been made. This survey will identify underground and in-workplace utilities such as the following:

- Electrical lines and appliances;
- Telephone lines;
- Cable television lines:

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- Gas lines:
- Pipelines;
- Steam lines;
- Water lines;
- Sewer lines: and/or
- Pressurized air lines.

The location of utilities will be discussed with GEI employees and subcontractors during a Site Safety Briefing. Identified utilities should be marked or access otherwise restricted to avoid chance of accidental contact.

Even when a utility search has been completed, drilling, boring, and excavation should commence with caution until advanced beyond the depth at which such utilities are usually located. Utilities will be considered "live" or active until reliable sources demonstrate otherwise.

4.3.3.3 Overhead Utilities

Overhead transmission and distribution lines will be carried on towers and poles which provide adequate safety clearance over roadways and structures. Clearances will be adequate for the safe movement of vehicles and for the operation of construction equipment.

Overhead or above-ground electric lines should be considered active until a reliable source has documented them to be otherwise. Elevated work platforms, ladders, scaffolding, manlifts, and drill or vehicle superstructures will be erected a minimum of 20 feet (the actual distance is dependent upon the voltage of the line) from overhead electrical lines until the line is de-energized, grounded, or shielded so arcing cannot occur between the work location or superstructure.

4.3.4 Fire and Explosion

When conducting excavating activities, the opportunity for encountering fire and explosion hazards exists from contamination in soil and the possibility of free product in underground structures and pipelines. Additionally, the use of diesel-powered excavating equipment could present the possibility of encountering fire and explosion hazards.

4.3.5 Heat Stress

Employees may be exposed to the hazards associated with heat stress when ambient temperatures exceed 70°F. Employees should increase water intake while working in conditions of high heat. Enough water should be available so that each employee can consume 1 quart of water per hour. In addition, they should increase number of rest breaks

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and/or rotate employees in shorter work shifts. Employees should rest in cool, dry, shaded areas for at least 5 minutes. Employees should not wait until they feel sick to cool down. Watch for signs and symptoms of heat exhaustion and fatigue. In the event of heat stroke, bring the victim to a cool environment, call for help, and initiate first aid procedures

The procedures to be followed regarding avoiding heat stress are provided in Appendix C – Heat Stress Guidelines and in GEI's Heat Stress program.

4.3.6 Cold Stress

Employees may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia, as well as slippery surfaces, brittle equipment, and poor judgment. The procedures to be followed regarding avoiding cold stress are provided in Appendix C – Cold Stress Guidelines and in GEI's Cold Stress program.

4.3.7 Noise

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps, and generators. Employees who will perform suspected or established high noise tasks and operations will wear hearing protection. If deemed necessary by the SSO, the CHSO will be consulted on the need for additional hearing protection and the need to monitor sound levels for Site activities. Other employees who do not need to be in proximity of the noise should distance themselves from the equipment generating the noise.

4.3.8 Slips, Trips, and Falls

Working in and around the Site may pose slip, trip, and fall hazards due to slippery and uneven surfaces. Excavation at the Site may cause uneven footing in trenches and around the soil piles. Steep slope and uneven terrain conditions at the Site are also a primary concern. GEI employees will wear proper foot gear and will employ good work practice and housekeeping procedures to minimize the potential for slips, trips, and falls.

4.3.9 Manual Lifting

Manual lifting of objects and equipment may be required. Failure to follow proper lifting technique can result in back injuries and strains. Employees should use a buddy system and/or power equipment to lift heavy loads whenever possible and should evaluate loads before trying to lift them (i.e., they should be able to easily tip the load and then return it to its original position). Carrying heavy loads with a buddy and proper lifting techniques include: 1) make sure footing is solid; 2) make back straight with no curving or slouching; 3) center body over feet; 4) grasp the object firmly and as close to your body as possible; 5) lift with legs; and 6) turn with your feet, don't twist.

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4.3.10 Projectile Objects and Overhead Dangers

Overhead dangers, including but not limited to falling debris and equipment, can occur while operating drill rigs. GEI employees will maintain a minimum distance from large overhead operations and to maintain proper communication with heavy equipment operators and their handlers, should work necessitate their presence beyond the minimum safety distance. Proper PPE will be worn during these types of activities including steel-toed/shank boots, safety vests, and hard hats.

4.3.11 Cuts and Lacerations

The core sampling program may require employees to use powered cutting tools (circular saw or shears) or a hooked knife to cut open the sample liner. Safety box cutters will be utilized for routine operations such as opening boxes of supplies or cutting rope or string. When using cutting tools, follow the safety precautions listed below:

- Keep free hand out of the way.
- Secure work if cutting through thick material.
- Use only sharp blades; dull blades require more force that results in less knife control.
- Pull the knife through the object and away from your body; pulling motions are easier to manage.
- Do not put the knife in your pocket.
- Wear leather or Kevlar® gloves when using knives or blades, or when removing sharp objects caught or dangling in sampling gear.

4.4 Chemical Hazards

The characteristics of compounds at the Site are discussed below for information purposes. Adherence to the safety and health guidelines in this HASP should reduce the potential for exposure to the compounds discussed below.

4.4.1 Volatile Organic Compounds (VOCs)

Volatile organic chemicals (VOCs), such as benzene, toluene, ethyl benzene, and xylenes (BTEX) are present as soil and groundwater contaminants and in some cases chemical components in non-aqueous phase liquids (NAPL) such as oil or tar within soils and abandoned pipelines. At high concentrations these compounds generally have a depressant effect on the central nervous system (CNS), may cause chronic liver and kidney damage, and some are suspected human carcinogens. Benzene is a known human carcinogen. Acute exposure may include headache, dizziness, nausea, and skin and eye irritation. The primary

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route of exposure to VOCs is through inhalation and therefore respiratory protection is the primary control against exposure to VOCs.

4.4.2 Coal Tar and Coal Tar Products

Coal tar products, which are semi-volatile organic compounds (SVOCs) consist of a mixture of acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(e)pyrene, benzo(g,h,i)peryline, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methyl naphthalene, naphthalene, phenanthrene, phenols, pyrene.

Coal tar products and other SVOCs are present at the Site within impacted soil and groundwater and as a dense non-aqueous phase liquid (DNAPL) by-product of gas production within soils, former MGP structures, and abandoned pipelines.

Coal tar products such as those listed above may cause contact dermatitis. Direct contact can be irritating to the skin and produce itching, burning, swelling and redness. Direct contact or exposure to the vapors may be irritating to the eyes. Conjunctivitis may result from prolonged exposure. Coal tar is considered to be very toxic, if ingested. High levels of exposure to coal tar, though not anticipated during work activities conducted during this project, may increase the risk of cancer including lung, kidney and skin cancer. Naphthalene is also an eye and skin irritant and can cause nausea, headache, fever anemia, liver damage, vomiting convulsions and coma. Poisoning may occur by ingestion of large doses, inhalation or skin absorption.

The major route of entry for the work activities to be conducted at this site is through direct contact. Exposure is most likely when handling soil and water samples. Inhalation may occur when the soil is disturbed causing respirable and nuisance dust particles to become airborne.

4.4.3 Heavy Metals

The Site contains elevated levels of metals including arsenic, chromium, lead, mercury, and selenium.

Exposure to high concentrations of arsenic can cause dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, and hyperpigmentation of skin. Chronic exposure to arsenic has resulted in lung cancer in humans.

Exposure to high concentrations of lead may cause acute symptoms such as eye irritation, weakness, weight loss, abdominal pain, and anemia. Chronic exposure to lead may result in kidney disease, effects to the reproductive system, blood forming organs, and CNS.

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Both lead and arsenic are regulated by specific OSHA standards. They are 29 CFR 1910.1025/1926.52 and 29 CFR 1910.1018/1926.1118, respectively. These standards include specific requirements for air monitoring, signs and labels, training and medical surveillance.

Exposure to high concentrations of chromium can cause acute symptoms such as irritation of the eyes, nose and throat as well as wheezing and coughing. Chronic effects include nosebleeds, nasal congestion, dermatitis, and loss of sight.

Exposure to high concentrations of mercury can cause dizziness, salivation nausea, vomiting, diarrhea, constipation, emotional disturbance, and kidney injury. Chronic exposure to mercury can cause CNS damage.

Exposure to high concentrations of selenium can cause mucous membrane irritation, coughing, sneezing, shortness of breath, chills, headaches, hypotension, and CNS depression. Chronic exposure to selenium could cause bronchial irritation, gastrointestinal distress, excessive fatigue, and skin discoloration.

As with SVOCs, the primary route of exposure is through inhalation of dust particles when soil is disturbed and becomes airborne.

4.4.4 Asbestos-Containing Materials

During the initial site characterization, excavation of a test pit in the area of the relief holder did not reveal the presence of asbestos containing materials (ACM). However, there may be potentially-ACM containing materials below ground surface in the form of demolition debris, ACM pipe insulation, and asbestos cement pipe. Chronic exposure to asbestos may cause asbestosis and mesothelioma. The primary route of exposure for asbestos is inhalation during the disturbance and/or removal of asbestos from the pipe insulation and cement pipes.

Asbestos is strictly regulated under OSHA 29 CFR 1910.1001/1926.1101. Employees that may be potentially exposed to ACM must participate in a medical surveillance program, have specific training in the hazards and controls of exposure to asbestos and wear respirators with high efficiency particulate (HEPA) filters. All work must be conducted in demarcated regulated areas to minimize the amount of people within the exposure area. Employers must conduct air sampling and provide signs and labels regarding the presence of asbestos.

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4.4.5 Polychlorinated Biphenyls

Polychlorinated Biphenyls (PCBs) have previously been encountered during MGP site investigations at other sites. Analysis of soils from the Site did not indicate elevated PCB concentrations.

4.4.6 Cyanide

Cyanide compounds are common by-products of manufactured gas production. Hydrogen cyanide is toxic because it is a chemical asphyxiant. It replaces the oxygen in the blood and thereby suffocates the cells. Ferrocyanides are not considered toxic because the hydrogen cyanide ion is bound too tightly to the iron and cannot therefore replace the oxygen. It takes a great amount of heat and/or acid to release cyanide gas from the ferrocyanide molecule, therefore hydrogen cyanide is not a concern at this site.

4.4.7 Evaluation of Organic Vapor Exposure

Air monitoring reduces the risk of overexposure by indicating when action levels have been exceeded and when PPE must be upgraded or changed. Action Levels for VOCs and associated contingency plans for the work zone are discussed within Section 9 of this HASP.

Exposure to organic vapors will be evaluated and/or controlled by:

- Monitoring air concentrations for organic vapors in the breathing zone with a photoionization detector (PID) or a flame ionization detector (FID).
- When possible, engineering control measures will be utilized to suppress the volatile organic vapors. Engineering methods can include utilizing a fan to promote air circulation, utilizing volatile suppressant foam, providing artificial ground cover, or covering up the impacted material with a tarp to mitigate volatile odors.
- When volatile suppression engineering controls are not effective and organic vapor meters indicate concentrations above the action levels, then appropriate respiratory protection (i.e., air purifying respirator with organic vapor cartridge) will be employed.

4.4.8 Evaluation of Skin Contact and Absorption

Skin contact by contaminants may be controlled by use of proper hygiene practices, PPE, and good housekeeping procedures. The proper PPE (e.g., Tyvek[®], gloves, safety glasses) as described in Section 5 will be worn for activities where contact with potential contaminated media or materials are expected.

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SDSs for decontamination chemicals and laboratory reagents that may be used on Site are included in Appendix B. Specific chemical hazards information from the occupational health sources are summarized in Table 3.

Table 3. Chemical Data

Compound	CAS#	ACGIH TLV	OSHA PEL	Route of Exposure	Symptoms of Exposure	Target Organs	Physical Data
Asbestos	1332-21-4	0.1 f/cc	0.1 f/cc over 8 hr period or 1.0f/cc over 30 min.	Inhalation Ingestion Skin Contact	Asbestosis (chronic exposure); mesothelioma, breathing difficulty, interstitial fibrosis' restricted pulmonary function, finger clubbing; irritate eyes, known human carcinogen	Respiratory system, eyes	White, greenish, blue, or gray-green fibrous solids FP: NA LEL: NA UEL NA VP: 0 mm
Arsenic	7440-38-2	0.01 mg/m ³	0.01 mg/m ³ A.L. .005mg/m3	Inhalation Skin Absorption Ingestion Skin Contact	Ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, potential carcinogen	Liver, kidneys, skin, lungs, lymphatic system	Metal: Silver-gray or tin- white, brittle, odorless solid FP: NA LEL: NA UEL: NA VP: 0 mm
Benzene	71-43-2	0.5 ppm (Skin)	1 ppm TWA 5 ppm STEL	Inhalation Skin Absorption Ingestion Skin Contact	Irritation of eyes, skin, nose, respiratory system, giddiness, headache, nausea; staggering gait, fatigue, anorexia, weakness, dermatitis, bone marrow depression, known human carcinogen	Eyes, skin, CNS, bone marrow, blood	FP: 12° F LEL: 1.2% UEL:7.8% VP: 75 mm
Chromium (Chromic Acid and Chromates)	1333-82-0	0.05 mg/m ³	0.1 mg/m ³	Inhalation Ingestion Skin Contact	Irritates respiratory system, nasal, septum perforation, liver and kidney damage, leucocytosis (increased blood leucocytes), leukopenia (reduced blood leucocytes), moncytosis (increased monocytes), Eosinophilia, eye injury, conjunctivitis, skin ulcer, sensitivity dermatitis, potential carcinogen	Blood, respiratory system, liver, kidney, eyes, skin, lung cancer	FP:NA VP: Very Low LEL: NA UEL: NA
Ethylbenzene	100-41-4	100 ppm	100 ppm	Inhalation Ingestion Skin Contact	Eye, skin, mucous membrane irritation; headache; dermatitis, narcosis; coma	Eyes, skin, respiratory system, Central Nervous System	FP: 55° F LEL: 0.8% UEL:6.7% VP: 7 mm

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Table 3. Chemical Data

Compound	CAS#	ACGIH TLV	OSHA PEL	Route of Exposure	Symptoms of Exposure	Target Organs	Physical Data
Lead	7439-92-1	0.050 mg/m ³	0.05 mg/m ³ A.L. 0.03 mg/m ³	Inhalation Ingestion Skin Contact	Weakness, insomnia; facial pallor; pal eye, anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis of wrist and ankles; irritates eyes, hypo tension	Eyes, GI tract, Central Nervous System, kidneys, blood, gingival tissue	A heavy, ductile, soft, gray solid. FP: NA LEL: NA UEL: NA VP: 0 mm
Mercury	7439-97-6	0.025 mg/m ³	0.10 mg/m3	Inhalation Ingestion Skin Contact Skin Absorption	Irritates eyes and skin, chest pain, cough, difficulty breathing, bronchitis, pneumonitis, tremor, insomnia, irritability, indecision, headache, fatigue, weakness, stomatitis, salivation, Gastrointestinal disturbance, weight loss, proteinuria	Eyes, skin, respiratory tract, central nervous system	Silver-white, heavy odorless liquid FP: NA LEL: NA UEL:NA VP: 0.0012 mm
Naphthalene	91-20-3		10 ppm (50 mg/m³) TWA	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage	Eyes, skin, blood, liver, kidneys, central nervous system	FP: 174 F IP: 8.12 eV, LEL: 0.8% UEL:6.7%, VP: 0.08 mm
PAH's as Coal tar pitch Volatiles (CTPV)	65996-93-2	0.2 mg/m3	0.2 mg/m3	Inhalation Skin contact Ingestion	Irritant to eyes, swelling, acne contact dermatitis, chronic bronchitis	Respiratory system, Central Nervous System, liver, kidneys, skin, bladder,	Black or dark brown amorphous residue.

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Table 3. Chemical Data

Compound	CAS#	ACGIH TLV	OSHA PEL	Route of Exposure	Symptoms of Exposure	Target Organs	Physical Data
PCBs	11097-69-1	0.5 mg/m ³ (Skin)	0.5 mg/m ³ (Skin)	Inhalation Skin Absorption Ingestion Skin Contact	Irritate eyes; chloracne; liver damage;	Skin, eyes, liver, reproductive system	Colorless liquid or solid with a mild, hydro-carbon odor VP = 0.00006 mm
Phenol	108-95-2	10 ppm (skin)	5 ppm (19 mg/m³) [skin]	Inhalation Skin Absorption Ingestion Skin Contact	Irritates eyes, nose, throat, anorexia, weight loss, weakness, muscle ache, pain, dark urine, cyanosis, liver and kidney damage, skin burns, dermatitis, tremors, convulsions, twitching,	Eyes, skin, respiratory system, liver, kidneys	Colorless to light pink crystalline solid with sweet, acrid odor. FP:175 °F IP:8.5 LEL:1.8% UEL: 8.6% VP: 0.4 mm
Selenium	7782-49-2	0.2 mg/m ³	0.2 mg/m ³	Inhalation Ingestion Skin Contact	Irritant to eyes, skin, nose and throat, visual disturbance, headache, chills, fever, breathing difficulty, bronchitis, metallic taste, garlic breath, GI disturbance, dermatitis, eye and skin burns,	Eyes, skin, respiratory system, liver, kidneys, blood spleen	Amphorous or crystalline, red to gray solid FP: NA LEL: NA UEL: NA VP: 0 mm
Toluene	108-88-3	50 ppm	200 ppm	Inhalation Skin Absorption Ingestion Skin Contact	Eye, nose irritation; fatigue, weakness, confusion, euphoria, dizziness, headache; dilated pupils, tearing of eyes; nervousness, muscle fatigue, insomnia, tingling in limbs; dermatitis	Eyes, skin, respiratory system, Central Nervous System, liver, kidneys	FP: 40°F LEL: 1.1% UEL:7.1% VP: 21 mm
Xylene	1330-20-7	100 ppm	100 ppm	Inhalation Skin Absorption Ingestion Skin Contact	Eye, skin, nose, throat irritation; dizziness, excitement, drowsiness; incoordination, staggering gait; corneal damage; appetite loss, nausea, vomiting, abdominal pain; dermatitis	Eyes, skin, respiratory system, Central Nervous System, GI tract, blood, liver, kidneys	FP: 90°F LEL: 0.9% UEL: 6.7% VP: 9 mm

Abbreviations:

°F = degrees Fahrenheit

IP = Ionization Potential

Table 3. Chemical Data

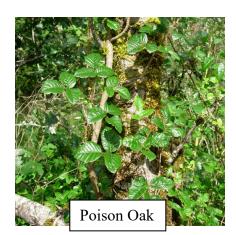
Compound	CAS#	ACGIH TLV	OSHA PEL	Route of Exposure	Symptoms of Exposure	Target Organs	Physical Data	
ACGIH = American Conference of Industrial Hygienists					LEL = Lower explosive limit			
A.L. = Action Leve	I				mg/m³ = micrograms per cubic meter			
atm = atmosphere					min = minute			
C = ceiling limit, no	ot to be exceede	ed			mm = millimeter			
CAS # = chemical abstract services number					mmHg = millimeters of mercury			
CNS = Central Ner	vous System				N/A = not applicable			
CTPV = Coal Tar F	Pitch Volatiles				OSHA = Occupational Safety and Health Administration			
CVS = Cardiovascular System					PAH = Polycyclic Aromatic Hydrocarbons			
eV = electron volt					PCB = Polychlorinated Biphenyls			
f/cc = fibers per cubic centimeter					PEL = Permissible exposure limit			
FP = Flash point					ppm = parts per million			
GI = Gastro-intestinal					Skin = significant route of exposure			
H2S = Hydrogen Sulfide					STEL = Short-term exposure limit (15 minutes)			
HCN = Hydrogen Cyanide					TWA = Time-weighted average (8 hours)			
hr = hour					VP = vapor pressure approximately 68°F in mm Hg			

4.5 Biological Hazards

Areas of the Site may be wooded, surrounded with brush, or landscaped. Therefore, employees working on this project should be aware of the potential biological hazards at this Site. Each is discussed in detail below:

4.5.1 Poisonous Plants

Persons working on the Site should be aware of the possible presence of poisonous plants and insects. Poison ivy is a climbing plant with leaves that consist of three glossy, greenish leaflets. Poison ivy has conspicuous red foliage in the fall. Small yellowish-white flowers appear in May through July at the lower leaf axils of the plant. White berries appear from August through November. Poison ivy is typically found east of the Rockies. Poison oak is similar to poison ivy but its leaves are oak-like in form. Poison oak occurs mainly in the south and southwest. Poison sumac typically occurs as a small tree or shrub and may be 6 to 20 feet in height. The bark is smooth, dark and speckled with darker spots. Poison sumac is typically found in swampy areas and east of the Mississippi. The leaves have 7 to 13 smooth-edged leaflets and drooping clusters of ivory-white berries that appear in August and last through spring.







The leaves, roots, stems and fruit of these poisonous plants contain urushiol. Contact with the irritating oil causes an intensely itching skin rash and characteristic, blister-like lesions.

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The oil can be transmitted on soot particles when burned and may be carried on the fur of animals, equipment, and apparel.

Proper identification of these plants is the key to preventing contact and subsequent dermatitis. Wear long sleeves and pants when working in wooded areas. In areas of known infestation, wear Tyvek® coveralls and gloves. Oils are easily transferred from one surface to another. If you come in contact with these poisonous plants, wash exposed areas immediately with cool water to remove the oils. Some commercial products such as Tecnu's Poison Oak-n-Ivy Cleanser claim to further help with the removal of oils.

4.5.2 Ticks

4.5.2.1 Lyme Disease

Ticks are bloodsuckers, attaching themselves to warm-blooded vertebrates to feed. Deer ticks are associated with the transmission the bacteria that causes Lyme disease. Female deer ticks are about ¼-inch in length and are black and brick red in color. Males are smaller and all black. If a tick is not removed, or if the tick is allowed to remain for days feeding on human blood, a condition known as tick paralysis can develop. This is due to a neurotoxin, which the tick apparently injects while engorging. This neurotoxin acts upon the spinal cord causing incoordination, weakness, and paralysis.

The early stages of Lyme disease, which can develop within a week to a few weeks of the tick bite, are usually marked by one or more of these signs and symptoms:

- Tiredness
- Chills and fever
- Headache
- Muscle and/or join pain
- Swollen lymph glands
- Characteristic skin rash (i.e. bullseye rash)

4.5.2.2 Rocky Mountain Spotted Fever

Rocky Mountain spotted fever is spread by the American dog tick, the lone-star tick, and the wood tick, all of which like to live in wooded areas and tall, grassy fields. The disease is most common in the spring and summer when these ticks are active, but it can occur anytime during the year when the weather is warm.

Initial signs and symptoms of the disease include sudden onset of fever, headache, and muscle pain, followed by development of a rash. Initial symptoms may include fever, nausea, vomiting, severe headache, muscle pain, and/or lack of appetite.

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The rash first appears 2 to 5 days after the onset of fever and is often not present or may be very subtle. Most often it begins as small, flat, pink, non-itchy spots on the wrists, forearms, and ankles. These spots turn pale when pressure is applied and eventually become raised on the skin. Later signs and symptoms include rash, abdominal pain, joint pain, and/or diarrhea.

The characteristic red, spotted rash of Rocky Mountain spotted fever is usually not seen until the 6th day or later after onset of symptoms, and this type of rash occurs in only 35% to 60% of patients with Rocky Mountain spotted fever. The rash involves the palms or soles in as many as 50% to 80% of patients; however, this distribution may not occur until later in the course of the disease.

4.5.2.3 Prevention

Tick season lasts from April through October; peak season is May through July. You can reduce your risk by taking these precautions:

- During outside activities, wear long sleeves and long pants tucked into socks. Wear a hat, and tie hair back.
- Use insecticides to repel or kill ticks. Repellents containing the compound n,n-diethyl-meta-toluamide (DEET) can be used on exposed skin except for the face, but they do not kill ticks and are not 100% effective in discouraging ticks from biting. Products containing permethrin kill ticks, but they cannot be used on the skin -- only on clothing. When using any of these chemicals, follow label directions carefully.
- After outdoor activities, perform a tick check. Check body areas where ticks are commonly found: behind the knees, between the fingers and toes, under the arms, in and behind the ears, and on the neck, hairline, and top of the head. Check places where clothing presses on the skin.
- Remove attached ticks promptly. Removing a tick before it has been attached for
 more than 24 hours greatly reduces the risk of infection. Use tweezers, and grab as
 closely to the skin as possible. Do not try to remove ticks by squeezing them, coating
 them with petroleum jelly, or burning them with a match. Keep ticks in a zip-lock
 baggie in case testing needs to be performed.
- Report any of the above symptoms and all tick bites to the PM and Safety Team for evaluation.

4.5.3 Mosquito- Borne Disease – West Nile Virus

West Nile encephalitis is an infection of the brain caused by the West Nile virus, which is transmitted by infected mosquitoes. Following transmission from an infected mosquito, West Nile virus multiplies in the person's blood system and crosses the blood-brain barrier to reach the brain. The virus interferes with normal CNS functioning and causes inflammation

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of the brain tissue. However, most infections are mild and symptoms include fever, headache, and body aches. More severe infections may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and rarely, death. Persons over the age of 50 have the highest risk of severe disease.

Prevention centers on public health action to control mosquitoes and on individual action to avoid mosquito bites. To avoid being bitten by the mosquitoes that cause the disease, use the following control measures:

If possible, stay inside between dusk and dark. This is when mosquitoes are most active. When outside (between dusk and dark), wear long pants and long-sleeved shirts. Spray exposed skin with an insect repellent, preferably containing DEET.

4.5.4 Wasps and Bees

Wasps (hornets and yellow-jackets) and bees (honeybees and bumblebees) are common insects that may pose a potential hazard to the field team if work is performed during spring, summer, or fall. Bees normally build their nests in the soil. However, they use other natural holes such as abandoned rodent nests or tree hollows. Wasps make a football-shaped, paper-like nest either below or above the ground. Yellow-jackets tend to build their nests in the ground but hornets tend to build their nests in trees and shrubbery. Bees are generally more mild-mannered than wasps and are less likely to sting. Bees can only sting once while wasps sting multiple times because their stinger is barbless. Wasps sting when they feel threatened. By remaining calm and not annoying wasps by swatting, you lessen the chance of being stung.

Wasps and bees inject a venomous fluid under the skin when they sting. The venom causes a painful swelling that may last for several days. If the stinger is still present, carefully remove it with tweezers. Some people may develop an allergic reaction (i.e. anaphylactic shock) to a wasp or bee sting. If such a reaction develops, seek medical attention at once. If a GEI employee is allergic to bees or wasps notify the SSO and, if needed, the location of the epi pen.

4.5.5 Sun Exposure

Employees are encouraged to liberally apply sunscreen, with a minimum sun protection factor (SPF) of 30, 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 ultraviolet A and B (UVA/UVB) rays.

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5. Personal Protective Equipment

The PPE specified in Table 4 represents PPE selection required by 29 CFR 1910.132, and is based on the Activity Hazard Analysis of Section 4 (Table 2). Specific information on the selection rationale activity can be found in the GEI Health and Safety Manual.

The PPE program addresses elements, such as PPE selection based on Site hazards, use and limitations, donning and doffing procedures, maintenance and storage, decontamination and disposal, training and proper fitting, inspection procedures prior to / during / and after use, evaluation of the effectiveness of the PPE program, and limitations during temperature extremes, heat stress, and other appropriate medical considerations. A summary of PPE for each level of protection is in Table 4.

Table 4. Site-Specific PPE

Task	PPE Level	Site-Specific Requirements	Respirator				
Mobilization/Demobilization							
Reconnaissance	D	Hard hat, safety glasses, steel toe/shank safety boot, reflective vest, leather work gloves, hearing protection as needed	D - None				
Mobilization/Demobilization of Equipment and Supplies	D	Hard hat, safety glasses, steel toe/shank safety boot, reflective vest, leather work gloves, hearing protection as needed	D – None				
Establishment of Site Security, Work Zones, and Staging Area	D	Hard hat, safety glasses, steel toe/shank safety boot, reflective vest, leather work gloves, hearing protection as needed	D - None				
Construction							
Excavation, Mixing, Drilling, Backfilling, Sampling	D	Hard hat, safety glasses, steel toe/shank safety boot with overboot as needed, reflective vest, leather work gloves as needed, nitrile gloves, hearing protection as needed, Tyvek as needed	Level D initially, Level C-If action levels exceeded (see Section 9 of HASP)				
Hazardous Materials Assessment							
Sampling: Soil	D	Hard hat, safety glasses, steel toe/shank safety boot with overboot as needed, reflective vest, leather work gloves as needed, nitrile gloves, hearing protection as needed, Tyvek as needed	D - None				
Demolition/Remediation Obse	Demolition/Remediation Observation						
Observe Contractor Activities, CAMP monitoring,	D	Hard hat, safety glasses, steel toe/shank safety boot with overboot as needed, reflective vest, leather work gloves as needed, nitrile gloves, hearing protection as needed, Tyvek as needed	D - None				

Use of Level A or Level B PPE is not anticipated. If conditions indicating the need for Level A or Level B PPE are encountered, personnel will leave the Site and this HASP will be

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revised with oversight of the CHSO or GEI personnel will not re-enter the Site until conditions allow.

For most work conducted at the site, Level D PPE will include long pants, hard hats, safety glasses with side shields, and steel toe/shank or EH-rated safety boots. When work is conducted in areas where non-aqueous phase liquid (NAPL) or tar-saturated soil is anticipated, employees will wear, at a minimum, modified Level D PPE, which can include Tyvek® coveralls and safety boots with overboots.

5.1 OSHA Requirements for PPE

Personal protective equipment used during the course of this field investigation must meet the following OSHA standards:

Table 5. OSHA Standards for PPE

Type of Protection	Regulation	Source
Eye and Face	29 CFR 1910.133	ANSI Z87.1 1968
Respiratory	29 CFR 1910.134	ANSI Z88.1 1980
Head	29 CFR 1910.135	ANSI Z89.1 1969
Foot	29 CFR 1910.136	ANSI Z41.1 1999 or ASTM F-2412-2005, and ASTM F-2413-2005

CRF = Code of Federal Regulations

ANSI = American National Standards Institute

ASTM = American Society For Testing and Materials

On-site GEI personnel who have the potential to don a respirator must have a valid fit test certification and documentation of medical clearance. The CHSO will maintain such information on file for on-site personnel. The PM will obtain such information from the subcontractor's site supervisor prior to the initiation of such work. Both the respirator and cartridges specified for use in Level C protection must be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910.134). Air purifying respirators cannot be worn under the following conditions:

- Oxygen deficiency (less than 20.7%).
- Imminent Danger to Life and Health (IDLH) concentrations.
- If contaminant levels exceed designated use concentrations.

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6. Key Project Personnel/Responsibilities and Lines of Authority

6.1 GEI Personnel

• Daniel Kopcow Project Manager, Engineer of Record

TBD Site Safety OfficerTBD Field Personnel

• Steve Hawkins Corporate Health and Safety Officer

Jeena Sheppard
 Regional Safety Manager

The implementation of health and safety at this project location will be the shared responsibility of the PM, the CHSO, Regional Safety Manager (RHSO), the SSO, other GEI personnel implementing the proposed scope of work.

6.1.1 GEI Project Manager

The PM, Daniel Kopcow, is responsible for confirming that the requirements of this HASP are implemented. Some of the PM's specific responsibilities include:

- Conducting and documenting the Project Safety Briefing for GEI project employees and forwarding the signed form (Appendix D) to the Safety Team;
- Verifying that the GEI staff selected to work on this program are sufficiently trained for Site activities;
- Assuring that personnel to whom this HASP applies, including subcontractor personnel, have received a copy of it;
- Providing the CHSO with updated information regarding conditions at the Site and the scope of Site work;
- Providing adequate authority and resources to the on-site SSO to allow for the successful implementation of necessary safety procedures;
- Supporting the decisions made by the SSO and CHSO;
- Maintaining regular communications with the SSO and, if necessary, the CHSO;
- Verifying that the subcontractors selected by GEI to work on this program have completed GEI environmental, health and safety requirements and has been deemed acceptable for the proposed scope of work; and

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• Coordinating the activities of GEI subcontractors and confirming that they are aware of the pertinent health and safety requirements for this project.

6.1.2 GEI Corporate Health and Safety Officer

The CHSO is the individual responsible for the review, interpretation, and modification of this HASP. Modifications to this HASP which may result in less stringent precautions cannot be undertaken by the PM or the SSO without the approval of the CHSO. Specific duties of the CHSO include:

- Writing, approving, and amending the HASP for this project;
- Advising the PM and SSO on matters relating to health and safety on this Site;
- Recommending appropriate PPE and safety equipment to protect personnel from potential Site hazards;
- Conducting accident investigations; and
- Maintaining regular contact with the PM and SSO to evaluate Site conditions and new information which might require modifications to the HASP.

6.1.3 GEI Site Safety Officer

GEI field staff are responsible for implementing the safety requirements specified in this HASP. However, one person will serve as the SSO. The SSO will be on-site during all activities covered by this HASP. The SSO is responsible for enforcing the requirements of this HASP once work begins. The SSO has the authority to immediately correct situations where noncompliance with this HASP is noted and to immediately stop work in cases where an immediate danger is perceived. Some of the SSO's specific responsibilities include:

- Conducting/attending the Project Safety Briefing prior to beginning work, and subsequent safety meetings as necessary;
- Conduct daily Safety Tailgate meeting in accordance with National Fuel Gas requirements (can be combined with "pre-entry") briefing for Site-related work;
- Verifying that personnel to whom this HASP applies have attended and participated in the Project Safety Briefing and subsequent safety meetings that are conducted during the implementation of the program;
- Maintaining a high level of health and safety consciousness among employees implementing the proposed activities;
- Procuring the air monitoring instrumentation required and performing air monitoring for investigative activities;

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- Procuring and distributing the PPE and safety equipment needed for this project for GEI employees;
- Verifying that PPE and health and safety equipment used by GEI is in good working order;
- Verifying that the selected contractors are prepared with the correct PPE and safety equipment and supplies;
- Notifying the PM of noncompliance situations and stopping work in the event that an immediate danger situation is perceived;
- Monitoring and controlling the safety performance of personnel within the established restricted areas to confirm that required safety and health procedures are being followed;
- Stopping work in the event that an immediate danger situation is perceived; and
- Reporting accident/incident and preparing accident/incident reports, if necessary.

6.1.4 GEI Field Personnel

GEI field personnel covered by this HASP are responsible for following the health and safety procedures specified in this HASP and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

- Reading and signing the HASP in its entirety prior to the start of on-site work;
- Attending and actively participating in the required Project Safety Briefing prior to beginning on-site work and any subsequent safety meetings that are conducted during the implementation of the program;
- Stopping work in the event that an immediate danger situation is perceived;
- Bringing forth any questions or concerns regarding the content of the HASP to the PM or the SSO, prior to the start of work;
- Reporting accidents, injuries, and illnesses, regardless of their severity, to the SSO, CHSO, and HR; and
- Complying with the requirements of this HASP and the requests of the SSO.

6.1.5 Lines of Authority will be as follows:

On Site – GEI will have responsibility for safety of its employees during the work performed at the Hornell Former Manufactured Gas Plant Site. GEI's field representative will have a cell phone available to contact the appropriate local authorities, in the event of an emergency.

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GEI's field representative will be available for communication with the GEI PM and with the National Fuel Gas representative.

GEI employees have the authority to stop work activities if an unanticipated hazard is encountered or a potential unsafe condition is observed. The GEI employee should contact the Corporate Health and Safety Officer and the Project Manager to discuss the stop work conditions and potential control methods that can be implemented.

6.2 Subcontractors

GEI has subcontracted the following firms to assist in performing work on this project:

Subcontractor Name	Contact Name
ENTACT, LLC (Remediation Contractor)	Brady Bonsted
	Office: (201) 984-1509
TBD	
	Office:

Other subcontractors (e.g., drillers, surveyors) may be retained for specific site activities. GEI requires its subcontractors to work in a responsible and safe manner. Subcontractors hired by GEI are required to submit documentation of their safety practices as part of GEI's Subcontractor Management Program for evaluation and approval before the start of work. Subcontractors for this project will be required to develop their own HASP for protection of their employees, but, at a minimum, must adhere to applicable requirements set forth in this HASP.

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7. Training Program

7.1 HAZWOPER Training

In accordance with OSHA Standard 29 CFR 1910.120 "Hazardous Waste Operations and Emergency Response" (HAZWOPER) responders will, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations. At a minimum, the training will have consisted of instruction in the topics outlined in the standard. Personnel who have not met the requirements for initial training will not be allowed to work in any Site activities in which they may be exposed to hazards (chemical or physical). Proof of training will be submitted to the PM or his/her representative prior to the start of field activities.

7.2 Annual 8-Hour Refresher Training

Annual 8-hour refresher training will be required of hazardous waste site field personnel in order to maintain their qualifications for fieldwork. The training will cover a review of 29 CFR 1910.120 requirements and related company programs and procedures. Proof of current 8-hour refresher training will be submitted to the PM or his/her representative prior to the start of field activities.

7.3 Supervisor Training

Personnel acting in a supervisory capacity will have received 8 hours of instruction in addition to the initial 40-hour training. In addition supervisors will have 1 year of field experience and training specific to work activities (i.e., sampling, construction observation, etc.)

7.4 Site-Specific Training

Prior to commencement of field activities, the PM or the SSO will verify GEI field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the Site operations. It will include Site and facility layout, hazards, and emergency services at the Site, and will highlight the provisions contained within this HASP and applicable GEI H&S SOPs (Appendix E). This training will be documented on the Project Safety Briefing Form Appendix D). The signed form will be forwarded to the Safety Team at SafetyTeam@geiconsultants.com. In addition, GEI personnel will sign the plan to document that they understand the hazards and control measures presented and agree to comply with the procedures established in the HASP. Personnel that have not received project-specific training will not be allowed on-site.

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7.5 On-Site Safety Briefings

Other GEI personnel will be given health and safety briefings daily by the SSO or field representative to assist GEI personnel in safely conducting work activities. The briefing will include GEI subcontractors. The briefings can include information on new operations to be conducted, changes in work practices, or changes in the Site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. Documentation of these briefings will be recorded in the GEI field book, if the project duration is less than 5 days. If the project is longer than 5 days, the Tailgate Safety Briefing Form (Appendix D) will be used to document briefings. The meetings will also be an opportunity to periodically update the employees on monitoring results.

7.6 First Aid and CPR

The PM will verify that GEI field staff has current certifications in first aid and Cardiopulmonary Resuscitation (CPR), so that emergency medical treatment is available during field activities. The training will be consistent with the requirements of the American Red Cross Association. GEI employees also attend annual Bloodborne Pathogens training in compliance with OSHA regulations.

7.7 OSHA 10-hour Construction Safety Training

GEI employees will have received 10-hour construction safety training through the OSHA Outreach Training Program when required for a specific site, client, or based on the type work activities that are being performed. This training provides employees with an awareness level training in recognizing and preventing the hazards associated with the construction industry. Employees receive training in hazard identification, avoidance, control, and prevention; not OSHA standards. The training implies an increased level of safety training has become a widely known standard for OSHA orientation training in the construction industry. The PM will verify that GEI staff requiring this training has an OSHA issued completion card.

8. Medical Surveillance Program

GEI maintains a continuous, corporate, medical surveillance program that includes a plan designed specifically for field personnel engaged in work at sites where hazardous or toxic materials may be present. GEI's CHSO is responsible for the administration and coordination of medical evaluations conducted for GEI's employees at branch office locations. Comprehensive examinations are given to GEI field personnel on an annual or biennial basis (as determined to be appropriate by the CHSO) participating in hazardous waste operations. The medical results of the examinations aid in determining the overall fitness of employees participating in field activities.

Under the CHSO's supervision, field personnel undergo a complete initial physical examination, including a detailed medical and occupational history, before they participate in hazardous waste site investigations. Extensive annual/biennial reexaminations are also performed. Upon completion of these tests, personnel are certified by an occupational health physician as to whether they are fit for field work in general, and fit to use respiratory protection.

If a GEI employee or other project worker shows symptoms of exposure to a hazardous substance and wishes to be rechecked, he/she will be directed to the nearest area hospital or medical facility.

GEI subcontractor personnel that will enter any active waste handling or other active non"clean" area must certify that they are participating in a medical surveillance program that
complies with OSHA regulations for hazardous waste operations (i.e., 29 CFR 1910.120 and
29 CFR 1926.65). Proof of medical clearance will be submitted to the GEI PM or SSO prior
to the start of field activities.

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9. Atmospheric Monitoring

Air monitoring will be performed to identify and quantify airborne levels of hazardous substances and safety and health hazards in order to determine the appropriate level of worker protection needed on site. Work requiring air monitoring includes excavation, in-situ soil solidification (auger mixing), and backfilling activities.

GEI will conduct perimeter air monitoring, as well as work zone monitoring for on-site GEI workers. GEI will monitor and document daily site conditions and operations and inform field representative of results. If action levels are exceeded GEI's field representative will immediately implement dust suppression activities and notify GEI's Project Manager.

GEI will provide the following equipment for health and safety monitoring of on-site GEI personnel:

- Particulate Meter (PM-10 capable)
- Sound Level Meter if deemed necessary by the CHSO or PM (type to be appropriate to the activities performed)
- PID with 10.6 eV lamp or equivalent

The perimeter and work zone air monitoring will be conducted during ground intrusive and dust generating activities. Table 6 provides a summary of real time air monitoring action levels and contingency plans for work zone activities. The below Action Levels are determined by halving the Permissible Exposure Limits (PELs) or Threshold Limit Values (TLVs) as set forth by OSHA and the American Conference of Government Industrial Hygienists (ACGIH).

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Table 6. Real-Time Work Zone Air Monitoring Action Levels

Air Monitoring Instrument	Action Level (above background)	Site Action
PID	1.0 ppm	Use detector tube for benzene or zNose® to verify if concentration is benzene. No respiratory protection is required if benzene is not present.
PID	1.0 - 10 ppm	Use Sensidyne detector tube for naphthalene or zNose® to verify if concentration is naphthalene. No respiratory protection is required if naphthalene is not present.
10 – 50 ppm No respiratory protection is require present.		No respiratory protection is required if benzene or naphthalene is not present.
	50 – 100 ppm	Stop work, withdrawal from work area, institute engineering controls, if levels persist, upgrade to Level C.
	> 100 ppm	Stop work, withdraw from work area, notify PM and Safety Team.
Particulate Meter	150 μg/m ³	Implement work practices to reduce/minimize airborne dust generation, e.g., spray/misting of soil with water.

9.1 Equipment Use

9.1.1 Calibration

Air monitoring equipment will be calibrated and maintained in accordance with manufacturer's requirements. Calibrations will be recorded in the project notes daily or on a daily calibration form.

9.1.2 Photoionization Detector

Organic vapor concentrations will be measured using a PID during intrusive activities. During intrusive operations, organic vapor concentrations will be measured continuously. Organic vapor concentrations will be measured upwind of the work site(s) to determine background concentrations at least twice a day, (once in the morning and once in the afternoon). The SSO will interpret monitoring results using professional judgment and according to the alert and Action Limits set forth in the associated Site Work Plan.

9.2 Particulate Meter

A particulate meter will be used to measure airborne particulate matter during intrusive activities. Monitoring will be continuous and readings will be averaged over a 15-minute period for comparison with the Action Levels. Monitoring personnel will make a best effort to collect dust monitoring data from downwind of the intrusive activity. If off-site sources are considered to be the source of the measured dust, upwind readings will also be collected.

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10. Site Control Measures

10.1 Site Zones

Site zones are intended to control the potential spread of contamination and to assure that only authorized individuals are permitted into potentially hazardous areas. A three-zone approach will be utilized. It will include an Exclusion Zone (EZ), Contamination Reduction Zone (CRZ) and a Support Zone (SZ). Specific zones will be established on the work site by the Contractor when operations begin for each task requiring such delineation. Maps depicting the zones will be available at the Site.

This project is being conducted under the requirements of 29 CFR 1910.120, and any personnel working in an area where the potential for exposure to Site contaminants exists, will only be allowed access after proper training and medical documentation.

The following will be used for guidance in revising these preliminary zone designations, if necessary.

Support Zone – The SZ is an uncontaminated area that will be the field support area for most operations. The SZ provides for field team communications and staging for medical emergency. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. The SZ should be established up-wind of the work area if possible.

Contamination Reduction Zone – The CRZ is established between the EZ and the SZ. The CRZ contains the contamination reduction corridor and provides an area for decontamination of personnel and portable hand-held equipment, tools and heavy equipment. A personnel decontamination area will be prepared at each exclusion zone. The CRZ will be used for EZ entry and egress in addition to access for heavy equipment and emergency support services.

Exclusion Zone – Activities which may involve exposure to Site contaminants, hazardous materials, and/or conditions should be considered an EZ. This zone will be clearly delineated by cones, tapes, or other means. The Contractor may establish more than one EZ where different levels of protection may be employed or different hazards exist. The size of the EZ will be determined by the Contractor allowing adequate space for the activity to be completed, field members, and emergency equipment.

The Contractor is responsible for constructing, maintaining, and enforcing the zones.

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10.2 Buddy System

GEI personnel should be in line-of-site or communication contact with another on-site person. The other on-site person should be aware of his or her role as a "buddy" and be able to provide assistance in the event of an emergency. A copy of this plan will be given to any person acting as a GEI "buddy" for informational purposes.

10.3 Sanitation for Temporary Work Sites

Sanitation requirements identified in the OSHA Standard 29 CFR 1926.51 "Sanitation" specifies that employees working at temporary project sites have at least one sanitary facility available to them. When sanitary facilities are not otherwise available on site (i.e., dedicated sanitary facilities will be available during remedy construction, but may not be available during prior and subsequent site tasks), other nearby commercial facilities are available within close proximity and may be utilized.

10.4 Illumination

Illumination requirements identified by OSHA are directed to work efforts inside buildings and/or during non-daylight hours. Activities planned for the Site are anticipated to occur outside during daylight hours. However, if work areas do not meet illumination requirements, they will be equipped with appropriate illumination that meets or exceeds requirements specified in OSHA Standard 29 CFR 1926.56 "Illumination." Employees will not work on sites that are not properly lighted.

10.5 Smoking

Smoking is prohibited at or in the vicinity of hazardous operations or materials. Where smoking is permitted, safe receptacles will be provided for smoking materials.

10.6 Alcohol and Drug Abuse Prevention

Alcohol and drugs will not be allowed on the Site. Project personnel under the influence of alcohol or drugs will not be allowed to enter the Site.

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11. Incident Reporting

GEI will report incidents involving GEI personnel or subcontractor personnel, such as: lost time injuries, injuries requiring medical attention, near miss incidents, fires, fatalities, accidents involving the public, chemical spills, vehicle accidents, and property damage. The following steps must be followed when an incident occurs:

- 1. In life-threatening situations, immediately call 9-1-1.
- 2. Stop work activity to address any injury, illness, property damage, spill or other emergency.
- **3. Immediately** report any incidents to your Supervisor/Project Manager and Regional Health & Safety Officer.
- **4.** If your injury or illness is not life-threatening, call Medcor Triage at 1-800-775-5866 to speak with a medical professional.
- 5. Complete an Incident Report Form immediately after addressing the incident.

For vehicle accidents involving another vehicle or damage to property, the employee will take pictures of each vehicle or property involved in the incident and obtain a police report. In some municipalities police will not be dispatched to a non-injury accident, but every effort needs to be made to try and obtain the report.

The Incident Report Form and the Near Miss Reporting Form can be found in Appendix D, on the GEI Health and Safety smartphone app, or on the Safety page of the GEI Intranet. To report subcontractor injuries or incidents, follow the same verbal reporting procedures and submit an email describing the event to the PM and the Safety Team.

11.1 Injury Triage Service

If a GEI employee experiences a work related injury that is not life-threatening, the employee will initiate a call to Medcor Triage at 1-800-775-5866. The injured employee will detail any medical symptoms or complaints which will be evaluated by a Registered Nurse (RN) specially trained to perform telephonic triage. The RN will recommend first aid self-treatment or refer the injured employee for an off-site medical evaluation by a health professional at a clinic within GEI's workers compensation provider network. GEI employees are still required to follow our Accident Reporting procedures as listed above.

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12. Decontamination Procedures

The contractor will establish a decontamination pad for personnel decontamination and equipment decontamination.

12.1 Personnel Decontamination Station

A personnel decontamination station where employees can drop equipment and remove PPE will be set up at the decontamination pad by the Contractor. It will be equipped with basins for water and detergent, and trash bag(s), or cans for containing disposable PPE and discarded materials. Once personnel have decontaminated at this station and taken off their PPE, they will proceed to a sink where they will wash themselves wherever they have potentially been exposed to any contaminants (e.g., hands, face, etc.)

The following specific decontamination procedure will be used as necessary by GEI personnel or subcontractor personnel wearing PPE from Level D through Level C.

- *Step 1* Equipment drop (respirator, tools, monitoring equipment, etc.) Decontaminate as appropriate (per GEI's field representative's instructions).
- Step 2 Boot wash/rinse (wash with non-foaming detergent, rinse with fresh water spray). Remove boots. If inner and outer gloves are worn, wash outer gloves, remove and save for later use, or remove and discard outer gloves and place in trash bag/can provided in the decontamination area.
- *Step 3* Hard hat removal; wash if visibly contaminated (use same wash as in Step 2).
- Step 4 If Tyvek® (or equivalent) suit was worn and is visibly contaminated, remove and place in trash bag/can provided in the decontamination area or decontaminate (wash) and store for reuse. Contaminated washable coveralls should be removed and bagged for washing.
- **Step 5** Respirator and/or eye protection removal (as applicable). Wash (per Step 2) to remove visible contamination.
- *Step 6* Remove outer gloves.
- Step 7 Wash potentially exposed skin (use water and soap at indoor sink).
- Step 8 Disinfect respirator per manufacturer's recommendations.

Contaminated PPE (gloves, suits, etc.) will be decontaminated and stored for reuse or placed in plastic bags (or other appropriate containers) and disposed of in an approved facility.

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Decontamination wastewater and used cleaning fluids will be collected and disposed of in accordance with applicable state and federal regulations.

12.2 Heavy Equipment Decontamination

Heavy equipment decontamination will be performed by the Contractor within the limits of the on-site decontamination pad in accordance with the contract specifications. A steam generator and brushes will be used to clean demolition equipment and other tools. No heavy equipment will be permitted to leave the Site unless it has been thoroughly decontaminated.

Wastewater from the heavy equipment and personnel decontamination areas will be collected and disposed of in accordance with applicable state and federal regulations. The Contractor will be responsible for ultimate disposal of investigation-derived wastes.

12.3 Decontamination Equipment Requirements

The following equipment, if required, should be in sufficient supply to implement decontamination procedures for GEI's equipment.

- Buckets
- AlconoxTM detergent concentrate
- Hand pump sprayers
- Long handled soft bristle brushes
- Large sponges
- Cleaning wipes for respirators
- Bench or stool(s)
- Methanol and/or Nitric Acid
- Liquid detergent and paper towels
- Plastic trash bags

The Contractor performing decontamination procedures is responsible for verifying that the above materials, as required for their operation, are in sufficient supply.

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13. Supplemental Contingency Plan Procedures

13.1 Hazard Communication Plan

GEI personnel have received hazard communication training as part of their annual health and safety training and new employee health and safety orientation training. Hazardous materials used on the Site will be properly labeled, stored, and handled. SDS will be available to potentially exposed employees.

13.2 Fire

In the event of a fire personnel will evacuate the area. GEI's field representative will contact the local fire department with jurisdiction and report the fire. Notification of evacuation will be made to the PM and the Safety Team. The field representative will account for GEI personnel and subcontractor personnel and report their status to the PM.

13.3 Medical Support

In case of minor injuries, on-site care will be administered with the Site first aid kit. For serious injuries, call 911 and request emergency medical assistance. Seriously injured persons should not be moved, unless they are in immediate danger. Notify the PM and the Safety Team of the emergency.

Section 1 and Table 1 of this HASP contain detailed emergency information, including directions to the nearest hospital, and a list of emergency services and their telephone numbers. In addition, Appendix A includes maps to the hospital and/or occupational health clinic. GEI field personnel will carry a cellular telephone.

13.4 Severe Weather

The contingency plan for severe weather includes reviewing the expected weather to determine if severe weather is in the forecast. Severe weather includes high winds over 40 miles per hour (mph), heavy rains or snow squalls, thunderstorms, tornados, and lightning storms. If severe weather is approaching, the decision to evacuate GEI personnel and subcontractor personnel from the Site will be the responsibility of GEI's field representative. Notification of evacuation will be made to the PM and the Safety Team. The field representative will account for GEI personnel and subcontractor personnel and report their status to the PM. If safe, work can resume 30 minutes after the last clap of thunder or flash of lightening.

GEI Consultants, Inc. 45 2018 Template

13.5 Spills or Material Release

If a hazardous waste spill or material release occurs, if safe, the SSO or their representative will immediately assess the magnitude and potential seriousness of the spill or release based on the following:

- SDS for the material spilled or released;
- Source of the release or spillage of hazardous material;
- An estimate of the quantity released and the rate at which it is being released;
- The direction in which the spill or air release is moving;
- Personnel who may be or may have been in contact with the material, or air release, and possible injury or sickness as a result;
- Potential for fire and/or explosion resulting from the situation; and
- Estimates of area under influence of release.

If the spill or release is determined to be within the on-site emergency response capabilities, the SSO will verify implementation of the necessary remedial action. If the release is beyond the capabilities of the Site personnel, personnel will be evacuated from the immediate area and the local fire department will be contacted. The SSO will notify the PM and the Safety Team.

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14. Health and Safety Plan Sign-Off

GEI personnel conducting site activities will be familiar with the information in this HASP. After reviewing this plan, please sign the copy in the project files, and bring a copy of the plan with you to the Site. By signing this site-specific HASP you are agreeing that you have read, understand, and will adhere to the provisions described in this plan while working on the Project Site below.

Site Name: Hornell Former Manufactured Gas Plant Site

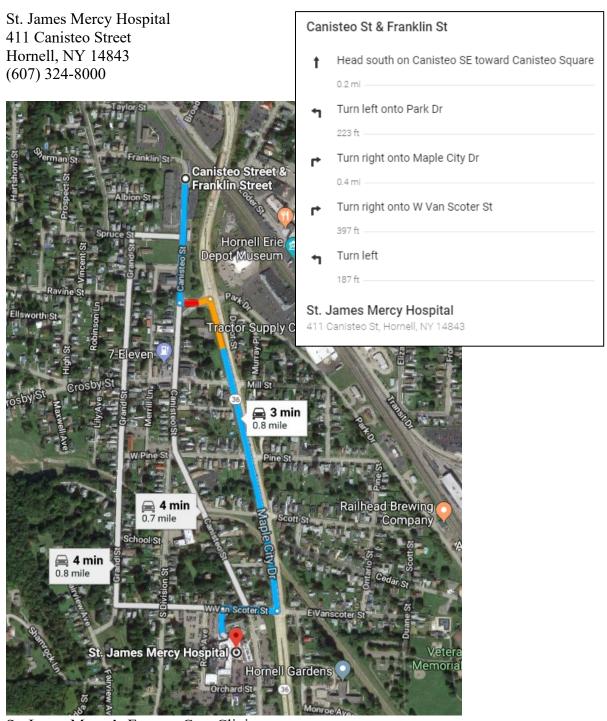
Work Scope: Remedial Implementation

GEI Project No: 1801687

Print Name	Signature
Project Manager: Daniel Kopcow	

Appendix A

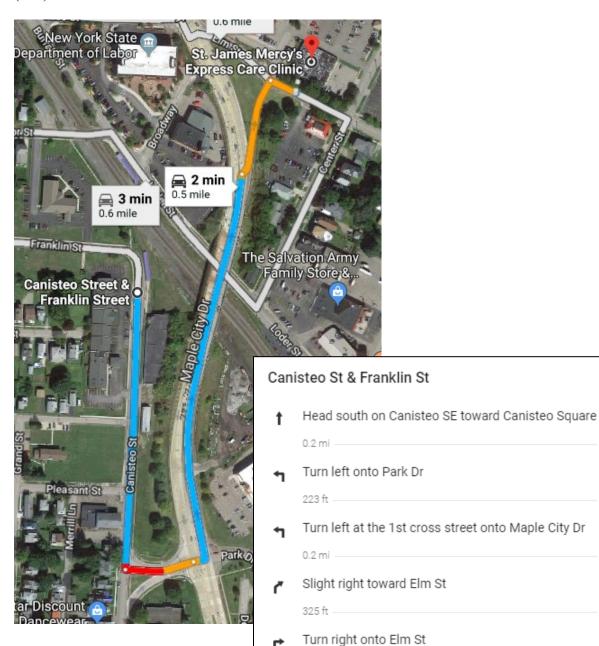
Map to Hospital and Occupational Health Clinic



St. James Mercy's Express Care Clinic

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20 Elm St. Hornell, NY 14843 (607) 324-0490



St. James Mercy's Express Care Clinic 20 Elm St, Hornell, NY 14843

1 Destination will be on the left

GEI Consultants, Inc. 2018 Template

89 ft

Appendix B

Safety Data Sheets

GEI Consultants, Inc. 2018 Template

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

I Identification of the substance/mixture and of the supplier

I.I Product identifier

Trade Name: Alconox

Synonyms:

Product number: 1104-1, 1104, 1125, 1150, 1101, 1103, 1112-1, 1112

1.2 Application of the substance / the mixture : Cleaning material/Detergent

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer

Supplier

Alconox, Inc. 30 Glenn Street White Plains, NY 10603 1-914-948-4040

Emergency telephone number:

ChemTel Inc

North America: 1-800-255-3924 International: 01-813-248-0585

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments.

Hazard-determining components of labeling:

Tetrasodium Pyrophosphate

Sodium tripolyphosphate

Sodium Alkylbenzene Sulfonate

2.2 Label elements:

Skin irritation, category 2. Eye irritation, category 2A.

Hazard pictograms:



Signal word: Warning

Hazard statements:

H315 Causes skin irritation.

H319 Causes serious eye irritation.

Precautionary statements:

P264 Wash skin thoroughly after handling.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P302+P352 If on skin: Wash with soap and water.

P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.

P321 Specific treatment (see supplemental first aid instructions on this label).

P332+P313 If skin irritation occurs: Get medical advice/attention.

P362 Take off contaminated clothing and wash before reuse.

P501 Dispose of contents and container as instructed in Section 13.

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Additional information: None.

Hazard description

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization: None

3.2 Description: None

3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	W t. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	12-28
		Acute Tox. 4; H303 Skin Irrit. 2; H315 Eye Irrit. 2; H319	8-22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	2-16

3.4 Additional Information: None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

Remove contact lens(es) if able to do so during rinsing.

Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.

Seek medical attention if irritation, discomfort, or vomiting persists.

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

4.2 Most important symptoms and effects, both acute and delayed

None

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents: None

5.2 Special hazards arising from the substance or mixture:

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.

Refer to Section 8.

5.4 Additional information:

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.

Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

Ensure adequate ventilation.

Ensure air handling systems are operational.

6.2 Environmental precautions:

Should not be released into the environment.

Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up:

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections: None

7 Handling and storage

7.1 Precautions for safe handling:

Avoid breathing mist or vapor.

Do not eat, drink, smoke or use personal products when handling chemical substances.

7.2 Conditions for safe storage, including any incompatibilities:

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

8 Exposure controls/personal protection





8.1 Control parameters:

- a) 7722-88-5, Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3
- b) Dusts, non-specific OEL, Irish Code of Practice
 - (i) Total inhalable 10 mg/m3 (8hr)
 - (ii) Respirible 4mg/m3 (8hr)
 - (iii) Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3, (8hr)

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal use conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance or preparation. Protective gloves recommended to comply with EN 374. Take note of break through times, permeability, and special workplace conditions, such as mechanical strain, duration of contact, etc. Protective gloves should be replaced at the first sign of wear.

Eye protection:

Safety goggles or glasses, or appropriate eye protection. Recommended to comply with ANSI Z87.1 and/or EN 166.

General hygienic measures:

Wash hands before breaks and at the end of work.

Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

Appearance (physical state, color):	White and cream colored flakes - powder	Explosion limit lower: Explosion limit upper:	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	Vapor pressure at 20°C:	Not determined or not available.
Odor threshold:	Not determined or not available.	Vapor density:	Not determined or not available.
pH-value:	9.5 (aqueous solution)	Relative density:	Not determined or not available.
Melting/Freezing point:	Not determined or not available.	Solubilities:	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	Partition coefficient (noctanol/water):	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	Auto/Self-ignition temperature:	Not determined or not available.
Evaporation rate:	Not determined or not available.	Decompositio n	Not determined or not available.

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

•	Not determined or not available.	Viscosity [,]	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

10.1 Reactivity: None

10.2 Chemical stability: None

10.3 Possibility hazardous reactions: None

10.4 Conditions to avoid: None

10.5 Incompatible materials: None

10.6 Hazardous decomposition products: None

II Toxicological information

II.I Information on toxicological effects:

Acute Toxicity:

Oral:

: LD50 > 5000 mg/kg oral rat - Product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation. .

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation .

Tetrasodium Pyrophosphate: Rabbit - Risk of serious damage to eyes .

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information. **Reproductive toxicity:** No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.

Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours. Sodium

Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours. Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.

Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

- **12.2** Persistence and degradability: No additional information.
- **12.3 Bioaccumulative potential:** No additional information.
- 12.4 Mobility in soil: No additional information.General notes: No additional information.
- 12.5 Results of PBT and vPvB assessment:

PBT: No additional information. **vPvB:** No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal) Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1	UN Number: ADR, ADN, DOT, IMDG, IATA		None
14.2	UN Proper shipping name: ADR, ADN, DOT, IMDG, IATA		None
14.3	Transport hazard classes: ADR, ADN, DOT, IMDG, IATA	Class: Label: LTD. QTY:	None None None
	US DOT Limited Quantity Exception:		None
	Bulk: RQ (if applicable): None Proper shipping Name: None Hazard Class: None Packing Group: None Marine Pollutant (if applicable): Nadditional information.	No	Non Bulk: RQ (if applicable): None Proper shipping Name: None Hazard Class: None Packing Group: None Marine Pollutant (if applicable): No additional information.

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision:** 10.18.2017

Trade Name: Alconox

	Comments: None	Comments: None
14.4	Packing group: ADR, ADN, DOT, IMDG, IATA	None
14.5	Environmental hazards:	None
14.6	Special precautions for user:	None
	Danger code (Kemler):	None
	EMS number:	None
	LITS HUITIDEL.	None
	Segregation groups:	None
14.7	Segregation groups:	
	Segregation groups: Transport in bulk according to Annex	None
	Segregation groups: Transport in bulk according to Annex Transport/Additional information:	None x II of MARPOL73/78 and the IBC Code: Not applicable.

15 Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed. **Section 302 (extremely hazardous substances):** None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed. **Rules and Orders**: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are

listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

Canadian

Canadian Domestic Substances List (DSL):

All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Germany MAK: Not classified.

EC 648/2004 – This is an industrial detergent. Contains >30% phosphate, 15-30% anionic

surfactant, <5% EDTA salts

EC 551/2009 – This is not a laundry or dishwasher detergent

EC 907/2006 – Contains no enzymes, optical brighteners, perfumes, allergenic fragrances, or

preservative agents

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements: NFPA: 1-0-0 H315 Causes skin irritation. HMIS: 1-0-0

H319 Causes serious eye irritation.

Precautionary statements:

P264 Wash skin thoroughly after handling.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P302+P352 If on skin: Wash with soap and water.

P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.

P321 Specific treatment (see supplemental first aid instructions on this label).

P332+P313 If skin irritation occurs: Get medical advice/attention.

P362 Take off contaminated clothing and wash before reuse.

P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET



Isobutylene

Section 1. Identification

GHS product identifier

: Isobutylene

Chemical name

: 2-methylpropene

Other means of identification

: 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1,

1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene;

2-Methyl-2-propene; 2-Methyl-1-propene

Product type

: Gas.

Product use

: Synthetic/Analytical chemistry.

Synonym

: 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1,

1-Dimethylethylene: Isopropylidenemethylene: iso-Butene: i-Butene:

2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

SDS#

: 001031

Supplier's details

: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road

Suite 100

Radnor, PA 19087-5283

1-610-687-5253

24-hour telephone

: 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status

: This material is considered hazardous by the OSHA Hazard Communication Standard

(29 CFR 1910.1200).

Classification of the substance or mixture

: FLAMMABLE GASES - Category 1

GASES UNDER PRESSURE - Liquefied gas

GHS label elements

Hazard pictograms





Signal word

: Danger

Hazard statements

: Extremely flammable gas.

May form explosive mixtures with air.

Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.

Precautionary statements

General

: Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position. Approach suspected leak area with caution.

Prevention

Response

: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No

smoking.

: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all

ignition sources if safe to do so.

Storage

: Protect from sunlight. Store in a well-ventilated place.

Disposal

: Not applicable.

Hazards not otherwise classified

: In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

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Isobutylene

Section 3. Composition/information on ingredients

Substance/mixture

: Substance

Chemical name

: 2-methylpropene

Other means of identification

: 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene;

2-Methyl-2-propene; 2-Methyl-1-propene

Product code : 001031

CAS number/other identifiers

CAS number : 115-11-7

Ingredient name	%	CAS number
Isobutylene	100	115-11-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact

: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation

: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact

: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion: As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact
 Inhalation
 No known significant effects or critical hazards.
 Skin contact
 No known significant effects or critical hazards.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion: As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician

: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

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Isobutylene

Section 4. First aid measures

Protection of first-aiders

: No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media

: None known.

Specific hazards arising from the chemical

: Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Hazardous thermal decomposition products

 Decomposition products may include the following materials: carbon dioxide carbon monoxide

Special protective actions for fire-fighters

: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

Special protective equipment for fire-fighters

: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

: Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders

If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions

: Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill

: Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill

: Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

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Section 7. Handling and storage

Precautions for safe handling

Protective measures

Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Use only non-sparking tools. Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.

Advice on general occupational hygiene

: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

including any incompatibilities

Conditions for safe storage, : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Isobutylene	ACGIH TLV (United States, 3/2017). TWA: 250 ppm 8 hours.

Appropriate engineering controls

: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls

: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures

: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection

: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with sideshields.

Skin protection

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Section 8. Exposure controls/personal protection

Hand protection

: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection

: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear antistatic protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection

Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection

Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Compressed gas.]

Colorless. Color : Characteristic. Odor Not available. **Odor threshold** : Not available. рH

: -140.7°C (-221.3°F) **Melting point** : -6.9°C (19.6°F) **Boiling point** : 144.75°C (292.6°F) **Critical temperature**

: Closed cup: -76.1°C (-105°F) Flash point

: Not available. **Evaporation rate**

: Extremely flammable in the presence of the following materials or conditions: open Flammability (solid, gas)

flames, sparks and static discharge and oxidizing materials.

Lower and upper explosive

: Lower: 1.8% Upper: 9.6% (flammable) limits Vapor pressure : 24.3 (psig) Vapor density 1.94 (Air = 1)Specific Volume (ft 3/lb) : 6.6845

: 0.1496 (25°C / 77 to °F) Gas Density (lb/ft 3)

Relative density : Not applicable. **Solubility** Not available. : 0.26 g/l Solubility in water Partition coefficient: n-2.34

Auto-ignition temperature

octanol/water

: 465°C (869°F) : Not available.

Decomposition temperature Viscosity : Not applicable. Flow time (ISO 2431) : Not available. Molecular weight : 56.12 g/mole

Aerosol product

Heat of combustion -45029034 J/kg

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Isobutylene

Section 10. Stability and reactivity

Reactivity

: No specific test data related to reactivity available for this product or its ingredients.

Chemical stability

: The product is stable.

Possibility of hazardous reactions

: Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid

: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatible materials

: Oxidizers

Hazardous decomposition products

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization

: Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Isobutylene	LC50 Inhalation Vapor	Rat	550000 mg/m³	4 hours

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure

: Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

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Isobutylene

Section 11. Toxicological information

Inhalation: No known significant effects or critical hazards.Skin contact: No known significant effects or critical hazards.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate : Not available.

effects

Potential delayed effects : Not available.

Long term exposure

Potential immediate : Not available.

effects

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.
 Carcinogenicity : No known significant effects or critical hazards.
 Mutagenicity : No known significant effects or critical hazards.
 Teratogenicity : No known significant effects or critical hazards.
 Developmental effects : No known significant effects or critical hazards.
 Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	LogPow	BCF	Potential
Isobutylene	2.34	-	low

Mobility in soil

Soil/water partition : Not available. coefficient (Koc)

Section 12. Ecological information

Other adverse effects

: No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods

: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1055	UN1055	UN1055	UN1055	UN1055
UN proper shipping name	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE
Transport hazard class(es)	2.1	2.1	2.1	2.1	2.1
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

[&]quot;Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Additional information

DOT Classification

: Limited quantity Yes.

Quantity limitation Passenger aircraft/rail: Forbidden. Cargo aircraft: 150 kg.

Special provisions 19, T50

TDG Classification

IATA

Product classified as per the following sections of the Transportation of Dangerous

Goods Regulations: 2.13-2.17 (Class 2).

Explosive Limit and Limited Quantity Index 0.125

ERAP Index 3000

Passenger Carrying Ship Index Forbidden

Passenger Carrying Road or Rail Index Forbidden

Special provisions 29

: Quantity limitation Passenger and Cargo Aircraft: Forbidden. Cargo Aircraft Only: 150

Special precautions for user : Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the

event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code

: Not available.

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Section 15. Regulatory information

U.S. Federal regulations : TSCA 8(a) CDR Exempt/Partial exemption: Not determined

Clean Air Act (CAA) 112 regulated flammable substances: Isobutylene

Clean Air Act Section 112

(b) Hazardous Air **Pollutants (HAPs)** : Not listed

Clean Air Act Section 602

Class I Substances

: Not listed

Clean Air Act Section 602

Class II Substances

: Not listed

DEA List I Chemicals

(Precursor Chemicals)

: Not listed

DEA List II Chemicals

: Not listed

(Essential Chemicals)

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

: Refer to Section 2: Hazards Identification of this SDS for classification of substance. Classification

State regulations

Massachusetts : This material is listed. **New York** : This material is not listed. **New Jersey** : This material is listed. : This material is listed. **Pennsylvania**

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : This material is listed or exempted. Canada : This material is listed or exempted. China : This material is listed or exempted. **Europe** : This material is listed or exempted.

Japan : Japan inventory (ENCS): This material is listed or exempted.

Japan inventory (ISHL): Not determined.

Malaysia : Not determined.

New Zealand : This material is listed or exempted. **Philippines** : This material is listed or exempted. Republic of Korea : This material is listed or exempted.

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Section 15. Regulatory information

Taiwan : This material is listed or exempted.

Thailand : Not determined.

Turkey : Not determined.

United States : This material is listed or exempted.

Viet Nam : Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
	Expert judgment Expert judgment

History

Date of printing : 5/10/2018

Date of issue/Date of : 5/10/2018

revision

Date of previous issue : 7/11/2016 Version : 0.02

Key to abbreviations : ATE = Acute Toxicity Estimate

BCF = Bioconcentration Factor

GHS = Globally Harmonized System of Classification and Labelling of Chemicals

IATA = International Air Transport Association

IBC = Intermediate Bulk Container

IMDG = International Maritime Dangerous Goods

LogPow = logarithm of the octanol/water partition coefficient

MARPOL = International Convention for the Prevention of Pollution From Ships, 1973

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Section 16. Other information

as modified by the Protocol of 1978. ("Marpol" = marine pollution) UN = United Nations

References : Not available.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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SAFETY DATA SHEET

Creation Date 12-Mar-2009 Revision Date 25-Apr-2019 Revision Number 10

1. Identification

Product Name Nitric acid (65 - 70%)

Cat No. : A198C-212, A200-212, A200-212LC, A200-500, A200-500LC,

A200-612GAL, A200C-212, A200S-212, A200S-212LC, A200S-500, A200SI-212, A467-1, A467-2, A467-250, A467-500, A483-212; S719721

CAS-No 7697-37-2

Synonyms Azotic acid; Engraver's acid; Aqua fortis

Recommended Use Laboratory chemicals.

Uses advised against Food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company

Fisher Scientific One Reagent Lane Fair Lawn, NJ 07410 Tel: (201) 796-7100

Emergency Telephone Number

CHEMTREC®, Inside the USA: 800-424-9300 CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Oxidizing liquids
Corrosive to metals
Category 1
Acute Inhalation Toxicity - Dusts and Mists
Category 3
Skin Corrosion/irritation
Category 1
Acute Damage/Eye Irritation
Category 1
Category 1

Label Elements

Signal Word

Danger

Hazard Statements

May intensify fire; oxidizer May be corrosive to metals

Causes severe skin burns and eye damage

Nitric acid (65 - 70%)

Revision Date 25-Apr-2019

Toxic if inhaled



Precautionary Statements

Prevention

Do not breathe dust/fume/gas/mist/vapors/spray

Wash face, hands and any exposed skin thoroughly after handling

Wear protective gloves/protective clothing/eye protection/face protection

Use only outdoors or in a well-ventilated area

Keep away from heat/sparks/open flames/hot surfaces. - No smoking

Keep/Store away from clothing/ other combustible materials

Take any precaution to avoid mixing with combustibles

Keep only in original container

Wear respiratory protection

Response

Immediately call a POISON CENTER or doctor/physician

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Immediately call a POISON CENTER or doctor/physician

Skin

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower

Wash contaminated clothing before reuse

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing **Ingestion**

IF SWALLOWED: Rinse mouth. DO NOT induce vomiting

Fire

In case of fire: Use CO2, dry chemical, or foam for extinction

Spills

Absorb spillage to prevent material damage

Storage

Store locked up

Store in a well-ventilated place. Keep container tightly closed

Store in corrosive resistant polypropylene container with a resistant inliner

Store in a dry place

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Corrosive to the respiratory tract

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Nitric acid	7697-37-2	65 - 70
Water	7732-18-5	30 - 35

4. First-aid measures

General Advice

Immediate medical attention is required. Show this safety data sheet to the doctor in

Nitric acid (65 - 70%) Revision Date 25-Apr-2019

attendance.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Remove and wash

contaminated clothing before re-use. Call a physician immediately.

Inhalation If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or

inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Remove from exposure, lie

down. Call a physician immediately.

Ingestion Do not induce vomiting. Never give anything by mouth to an unconscious person. Clean

mouth with water. Call a physician immediately.

Most important symptoms and

effects

Causes burns by all exposure routes. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Product is a corrosive material. Use of gastric

lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should

be investigated

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media CO 2, dry chemical, dry sand, alcohol-resistant foam.

Unsuitable Extinguishing Media No information available

Flash Point Not applicable

Method - No information available

Autoignition Temperature

Explosion Limits
Upper

Lower

No information available

No data available No data available

Oxidizing Properties Oxidizer

Sensitivity to Mechanical Impact No information available Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes. Oxidizer: Contact with combustible/organic material may cause fire. May ignite combustibles (wood paper, oil, clothing, etc.).

Hazardous Combustion Products

Nitrogen oxides (NOx) Thermal decomposition can lead to release of irritating gases and vapors

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

HealthFlammabilityInstabilityPhysical hazards400OX

6. Accidental release measures

Personal Precautions

Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Ensure

adequate ventilation. Use personal protective equipment.

Environmental Precautions Should not be released into the environment. Do not flush into surface water or sanitary

sewer system. See Section 12 for additional ecological information.

Revision Date 25-Apr-2019 Nitric acid (65 - 70%)

Methods for Containment and Clean Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

Up

Sweep up and shovel into suitable containers for disposal. Wear self-contained breathing

apparatus and protective suit.

7. Handling and storage

Use only under a chemical fume hood. Wear personal protective equipment. Do not get in Handling

eyes, on skin, or on clothing. Do not ingest. Do not breathe vapors or spray mist. Keep

away from clothing and other combustible materials.

Keep containers tightly closed in a cool, well-ventilated place. Do not store near Storage

combustible materials.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Nitric acid	TWA: 2 ppm	(Vacated) TWA: 2 ppm	IDLH: 25 ppm	TWA: 2 ppm
	STEL: 4 ppm	(Vacated) TWA: 5 mg/m ³	TWA: 2 ppm	STEL: 4 ppm
		(Vacated) STEL: 4 ppm	TWA: 5 mg/m ³	
		(Vacated) STEL: 10 mg/m ³	STEL: 4 ppm	
		TWA: 2 ppm	STEL: 10 mg/m ³	
		TWA: 5 mg/m ³	-	

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers

are close to the workstation location. Ensure adequate ventilation, especially in confined

areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by

OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard

EN166. Tightly fitting safety goggles. Face-shield.

Skin and body protection Long sleeved clothing.

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard **Respiratory Protection**

> EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Keep away from food, drink and animal feeding stuffs. When using, do not eat, drink or

smoke. Contaminated work clothing should not be allowed out of the workplace. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and clothing. For environmental protection remove and wash all contaminated protective

equipment before re-use. Wear suitable gloves and eye/face protection.

Physical and chemical properties

Physical State Liquid

Clear Colorless, Light yellow **Appearance**

Odor Strong Acrid

Odor Threshold No information available

< 1.0 (0.1M) -41 °C / -41.8 °F Melting Point/Range

Nitric acid (65 - 70%)

Boiling Point/RangeNot applicableFlash PointNot applicable

Evaporation RateNo information available

Flammability (solid,gas) Not applicable

Flammability or explosive limits

UpperNo data availableLowerNo data availableVapor Pressure0.94 kPa (20°C)Vapor DensityNo information available

Specific Gravity 1.40

Solubility miscible
Partition coefficient; n-octanol/water No data available

Autoignition Temperature

Decomposition Temperature

Viscosity

No information available
No information available
No information available

Molecular FormulaHNO3Molecular Weight63.01

10. Stability and reactivity

Reactive Hazard Yes

Stability Oxidizer: Contact with combustible/organic material may cause fire.

Conditions to Avoid Incompatible products. Combustible material. Excess heat. Exposure to air or moisture over

prolonged periods.

Incompatible Materials Combustible material, Strong bases, Reducing agents, Metals, Powdered metals, Organic

materials, Aldehydes, Alcohols, Cyanides, Ammonia, Strong reducing agents

Hazardous Decomposition Products Nitrogen oxides (NOx), Thermal decomposition can lead to release of irritating gases and

vapors

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50

Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Dermal LD50

Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Mist LC50 Category 3. ATE = 1 - 5 mg/l. Category 4.

Vapor LC50 Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

Component Information

Component LD50 Oral		LD50 Dermal	LC50 Inhalation	
Nitric acid	Not listed	Not listed	LC50 = 2500 ppm. (Rat) 1h	
Water	-	Not listed	Not listed	

Toxicologically Synergistic No information available

Products

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Causes severe burns by all exposure routes

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico

Nitric acid (65 - 70%)

| Nitric acid | 7697-37-2 | Not listed |
|-------------|-----------|------------|------------|------------|------------|------------|
| Water | 7732-18-5 | Not listed |

Mutagenic Effects

No information available

Reproductive Effects

No information available.

Developmental Effects

No information available.

Teratogenicity

No information available.

STOT - single exposure STOT - repeated exposure None known None known

Aspiration hazard

No information available

delayed

Symptoms / effects,both acute and Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Product is a corrosive material. Use of gastric lavage or emesis is

contraindicated. Possible perforation of stomach or esophagus should be investigated

Endocrine Disruptor Information

No information available

Other Adverse Effects

The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains. Large amounts will affect pH and harm aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Nitric acid	Not listed	LC50: = 72 mg/L, 96h (Gambusia affinis)	Not listed	Not listed

Persistence and Degradability

Miscible with water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation

No information available.

Mobility

Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Nitric acid	-2.3

13. Disposal considerations

Waste Disposal Methods

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No Proper Shipping Name UN2031 NITRIC ACID

Hazard Class

Subsidiary Hazard Class Packing Group

5.1

TDG

Ш

UN-No UN2031 **Proper Shipping Name**

NITRIC ACID

Hazard Class Subsidiary Hazard Class

5.1

Packing Group

<u>IATA</u>

UN-No UN2031
Proper Shipping Name UN2031
NITRIC ACID

Hazard Class 8
Subsidiary Hazard Class 5.1
Packing Group II

IMDG/IMO

UN-No UN2031
Proper Shipping Name NITRIC ACID

Hazard Class 8
Subsidiary Hazard Class 5.1
Packing Group ||

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Nitric acid	7697-37-2	X	ACTIVE	-
Water	7732-18-5	X	ACTIVE	-

Legend:

TSCA - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Nitric acid	7697-37-2	Х	-	231-714-2	Х	X	Х	Χ	KE-25911
Water	7732-18-5	Х	-	231-791-2	X	-	X	Х	KE-35400

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Nitric acid	7697-37-2	65 - 70	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

OTTA (Olcail Hatel Act)				
Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Nitric acid	X	1000 lb	-	-

Clean Air Act Not applicable

OSHA - Occupational Safety and

Health Administration

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Nitric acid	-	TQ: 500 lb

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous

substance under the Comprehensive Environmental Response Compensation and Liability

Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Nitric acid	1000 lb	1000 lb

California Proposition 65

This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know

Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Nitric acid	X	X	X	X	X
Water	=	-	X	=	-

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland

Security

This product contains the following DHS chemicals:

Legend - STQs = Screening Threshold Quantities, APA = A placarded amount

Component	DHS Chemical Facility Anti-Terrorism Standard		
Nitric acid	Release STQs - 15000lb		
	Theft STQs - 400lb		

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Regulatory Affairs

Thermo Fisher Scientific

Email: EMSDS.RA@thermofisher.com

 Creation Date
 12-Mar-2009

 Revision Date
 25-Apr-2019

 Print Date
 25-Apr-2019

Revision Summary SDS sections updated. 2. 11.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS



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Date of issue: 07/03/2013 Revision date: 12/12/2017 Supersedes: 12/12/2017

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier

Product form : Substance Substance name : Methanol CAS-No. 67-56-1 Product code VT430 Formula : CH4O

Synonyms : acetone alcohol / alcohol C1 / alcohol, methyl / carbinol / colonial spirits / columbian spirits /

green wood spirits / manhattan spirits / methyl alcohol / methyl hydrate / methyl hydroxide / methylen / methylol / monohydroxymethane / pyroligneous spirit / pyroxylic spirit / wood alcohol

Version: 1.3

/ wood naphtha

Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Solvent

Details of the supplier of the safety data sheet

Val Tech Diagnostics, A Division of LabChem Inc Jackson's Pointe Commerce Park Building 1000 1010 Jackson's Pointe Court Zelienople, PA 16063 T 412-826-5230 F 724-473-0647

Emergency telephone number

: CHEMTREC: 1-800-424-9300 or +1-703-741-5970 Emergency number

SECTION 2: Hazards identification

Classification of the substance or mixture

GHS-US classification

Flam. Liq. 2 H225 Acute Tox. 3 (Oral) H301 Acute Tox. 3 (Dermal) H311 Acute Tox. 3 (Inhalation) H331 STOT SE 1 H370

Full text of H statements : see section 16

2.2. Label elements

GHS US labeling

Hazard pictograms (GHS US)





GHS06 GHS02

: Danger

Signal word (GHS US) Hazard statements (GHS US)

H225 - Highly flammable liquid and vapour

H301+H311+H331 - Toxic if swallowed, in contact with skin or if inhaled

H370 - Causes damage to organs (liver, kidneys, central nervous system, optic nerve) (Dermal,

Precautionary statements (GHS US) P210 - Keep away from heat, sparks, open flames, hot surfaces. - No smoking.

P233 - Keep container tightly closed.

P240 - Ground/bond container and receiving equipment.

P241 - Use explosion-proof electrical, ventilating, lighting equipment

P242 - Use only non-sparking tools.

P243 - Take precautionary measures against static discharge.

P260 - Do not breathe mist, vapors, spray.

P264 - Wash exposed skin thoroughly after handling.

P270 - Do not eat, drink or smoke when using this product. P271 - Use only outdoors or in a well-ventilated area.

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P280 - Wear protective gloves, protective clothing, eye protection, face protection.

P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P330 - If swallowed, rinse mouth

P361+P364 - Take off immediately all contaminated clothing and wash it before reuse. P370+P378 - In case of fire: Use carbon dioxide (CO2), powder, alcohol-resistant foam to extinguish

P403+P235 - Store in a well-ventilated place. Keep cool.

P405 - Store locked up.

P501 - Dispose of contents/container to comply with local, state and federal regulations

2.3. Other hazards

Other hazards not contributing to the classification

: None.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type : Mono-constituent

Name	Product identifier	%	GHS-US classification
Methanol (Main constituent)	(CAS-No.) 67-56-1	100	Flam. Liq. 2, H225 Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Dermal), H311 Acute Tox. 3 (Inhalation), H331 STOT SE 1, H370

Full text of H-phrases: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general

: Check the vital functions. Unconscious: maintain adequate airway and respiration. Respiratory arrest: artificial respiration or oxygen. Cardiac arrest: perform resuscitation. Victim conscious with labored breathing: half-seated. Victim in shock: on his back with legs slightly raised. Vomiting: prevent asphyxia/aspiration pneumonia. Prevent cooling by covering the victim (no warming up). Keep watching the victim. Give psychological aid. Keep the victim calm, avoid physical strain.

First-aid measures after inhalation

First-aid measures after skin contact

: Remove the victim into fresh air. Immediately consult a doctor/medical service.

: Wash immediately with lots of water. Soap may be used. Do not apply (chemical) neutralizing agents. Remove clothing before washing. Consult a doctor/medical service.

First-aid measures after eye contact

: Rinse with water. Remove contact lenses, if present and easy to do. Continue rinsing. Take victim to an ophthalmologist if irritation persists.

First-aid measures after ingestion

Rinse mouth with water. Immediately after ingestion, give alcohol to drink. Give nothing to drink. Do not induce vomiting. Immediately consult a doctor/medical service. Take the container/vomit to the doctor/hospital. Call Poison Information Centre (www.big.be/antigif.htm).

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects after inhalation

 EXPOSURE TO HIGH CONCENTRATIONS: Coughing. Symptoms similar to those listed under ingestion.

Symptoms/effects after skin contact

: Symptoms similar to those listed under ingestion.

Symptoms/effects after eye contact

: Redness of the eye tissue. Lacrimation.

Symptoms/effects after ingestion

: Nausea. Vomiting. AFTER ABSORPTION OF LARGE QUANTITIES: FOLLOWING

SYMPTOMS MAY APPEAR LATER: Change in the blood composition. Headache. Feeling of weakness. Abdominal pain. Muscular pain. Central nervous system depression. Dizziness. Mental confusion. Drunkenness. Coordination disorders. Disturbed motor response. Disturbances of consciousness. Visual disturbances. Blindness. Respiratory difficulties.

Cramps/uncontrolled muscular contractions.

Chronic symptoms

: Red skin. Dry skin. Skin rash/inflammation. Headache. Disturbed tactile sensibility. Visual disturbances. Sleeplessness. Gastrointestinal complaints. Cardiac and blood circulation effects.

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4.3. Indication of any immediate medical attention and special treatment needed

Immediately after ingestion, give a glass of strong drink, beer or wine to drink. Hospitalize at once for treatment with the right antidotes.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media

: Quick-acting ABC powder extinguisher. Quick-acting BC powder extinguisher. Quick-acting class B foam extinguisher. Quick-acting CO2 extinguisher. Class B foam (alcohol-resistant).

Water spray if puddle cannot expand.

Unsuitable extinguishing media

: Water (quick-acting extinguisher, reel); risk of puddle expansion. Water; risk of puddle

expansion.

5.2. Special hazards arising from the substance or mixture

Fire hazard

: DIRECT FIRE HAZARD. Highly flammable liquid and vapour. Gas/vapor flammable with air within explosion limits. INDIRECT FIRE HAZARD. May be ignited by sparks.

Explosion hazard

: DIRECT EXPLOSION HAZARD. Gas/vapour explosive with air within explosion limits. INDIRECT EXPLOSION HAZARD. may be ignited by sparks. Reactions with explosion hazards: see "Reactivity Hazard".

Reactivity

: Violent to explosive reaction with (some) metal powders and with (strong) oxidizers. Violent exothermic reaction with (some) acids and with (some) halogens compounds.

5.3. Advice for firefighters

Firefighting instructions

: Cool tanks/drums with water spray/remove them into safety. Do not move the load if exposed to heat. Take account of toxic fire-fighting water. Use water moderately and if possible collect or contain it.

Protection during firefighting

: Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures

: No flames, no sparks. Eliminate all sources of ignition. No naked lights. No smoking. Dike and contain spill.

6.1.1. For non-emergency personnel

Protective equipment

: Gas-tight suit.

Emergency procedures

: Keep upwind. Mark the danger area. Consider evacuation. Close doors and windows of adjacent premises. Stop engines and no smoking. No naked flames or sparks. Spark- and explosion-proof appliances and lighting equipment. Keep containers closed. Wash contaminated clothes.

6.1.2. For emergency responders

Protective equipment Emergency procedures Equip cleanup crew with proper protection.Stop leak if safe to do so. Ventilate area.

6.2. Environmental precautions

Prevent soil and water pollution. Prevent spreading in sewers.

6.3. Methods and material for containment and cleaning up

For containment

: Contain released substance, pump into suitable containers. Plug the leak, cut off the supply. Dam up the liquid spill. Try to reduce evaporation. Measure the concentration of the explosive gas-air mixture. Dilute combustible/toxic gases/vapours with water spray. Take account of toxic/corrosive precipitation water. Provide equipment/receptacles with earthing. Do not use compressed air for pumping over spills.

Methods for cleaning up

: Take up liquid spill into a non combustible material e.g.: sand, earth, vermiculite slaked lime or soda ash. Scoop absorbed substance into closing containers. Carefully collect the spill/leftovers. Damaged/cooled tanks must be emptied. Do not use compressed air for pumping over spills. Clean contaminated surfaces with an excess of water. Take collected spill to manufacturer/competent authority. Wash clothing and equipment after handling.

6.4. Reference to other sections

No additional information available

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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling

: Use spark-/explosionproof appliances and lighting system. Take precautions against electrostatic charges. Keep away from naked flames/heat. Keep away from ignition sources/sparks. Measure the concentration in the air regularly. Work under local exhaust/ventilation. Comply with the legal requirements. Remove contaminated clothing immediately. Clean contaminated clothing. Handle uncleaned empty containers as full ones. Thoroughly clean/dry the installation before use. Do not discharge the waste into the drain. Do not use compressed air for pumping over. Keep container tightly closed.

Hygiene measures

: Do not eat, drink or smoke when using this product. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Incompatible products

: Strong oxidizers. Strong bases. Strong acids. Acid anhydrides. Acid chlorides.

Incompatible materials

: Direct sunlight. Heat sources. Sources of ignition.

Heat-ignition

: KEEP SUBSTANCE AWAY FROM: heat sources. ignition sources.

KEEP SUBSTANCE AWAY FROM: combustible materials. oxidizing agents. strong acids.

(strong) bases. halogens. amines. water/moisture.

Storage area

Store in a cool area. Store in a dry area. Keep container in a well-ventilated place. Fireproof storeroom. Keep locked up. Provide for a tub to collect spills. Provide the tank with earthing. Unauthorized persons are not admitted. Aboveground. Meet the legal requirements.

Special rules on packaging

Prohibitions on mixed storage

: SPECIAL REQUIREMENTS: closing. dry. clean. correctly labelled. meet the legal

requirements. Secure fragile packagings in solid containers.

Packaging materials

: SUITABLE MATERIAL: steel. stainless steel. iron. glass. MATERIAL TO AVOID: lead.

aluminium. zinc. polyethylene. PVC.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Methanol (67-56-1)		
USA ACGIH	ACGIH TWA (ppm)	200 ppm
USA ACGIH	ACGIH STEL (ppm)	250 ppm

8.2. Exposure controls

Appropriate engineering controls

: Emergency eye wash fountains should be available in the immediate vicinity of any potential exposure. Keep concentrations well below lower explosion limits.

Personal protective equipment

: Safety glasses. Protective clothing. Gloves. Full protective flameproof clothing. Face shield.









Materials for protective clothing

: GIVE GOOD RESISTANCE: polyethylene/ethylenevinylalcohol. styrene-butadiene rubber. viton. GIVE LESS RESISTANCE: chloroprene rubber. chlorinated polyethylene. natural rubber. nitrile rubber/PVC. GIVE POOR RESISTANCE: leather. neoprene. nitrile rubber. polyethylene. PVA. PVC. polyurethane.

Hand protection

: Protective gloves against chemicals (EN374).

Eve protection

: Safety glasses.

Skin and body protection

: Head/neck protection. Protective clothing.

Respiratory protection

: Full face mask with filter type AX at conc. in air > exposure limit. High vapour/gas

concentration: self-contained respirator.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid
Appearance : Liquid.
Molecular mass : 32.04 g/mol
Color : Colourless.

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Odor : Characteristic odour. Mild odour. Pleasant odour. Alcohol odour. Commercial/unpurified

substance: irritating/pungent odour.

Odor threshold : No data available pH : No data available

Relative evaporation rate (butyl acetate=1) : 4.1
Relative evaporation rate (ether=1) : 6.3
Melting point : -97.8 °C

Freezing point : No data available
Boiling point : 64.7 °C (1013 hPa)

Flash point : 9.7 °C (Closed cup, 1013 hPa, EU Method A.9: Flash-Point)

Critical temperature : 240 °C

Auto-ignition temperature : 455 °C (1013 hPa, DIN 51794: Self-ignition temperature)

Decomposition temperature : No data available
Flammability (solid, gas) : No data available
Vapor pressure : 128 hPa (20 °C)
Vapor pressure at 50 °C : 552 hPa
Critical pressure : 79547 hPa

Relative vapor density at 20 °C : 1.1

Relative density : 0.79 - 0.80 (20 °C)

Relative density of saturated gas/air mixture : 1

Specific gravity / density : 790 - 800 kg/m³ (20 °C)

Solubility : Soluble in water. Soluble in ethanol. Soluble in ether. Soluble in acetone. Soluble in chloroform.

Water: 100 g/100ml (20 °C)

Ethanol: complete Ether: complete Acetone: complete

Log Pow : -0.77 (Experimental value)

Log Kow : No data available Viscosity, kinematic : No data available

Viscosity, dynamic : 0.544 - 0.59 mPa·s (25 °C)

Explosive properties : No data available
Oxidizing properties : No data available
Explosion limits : 5.5 - 36.5 vol %

9.2. Other information

Minimum ignition energy : 0.14 mJ
Saturation concentration : 166 g/m³
VOC content : 100 %

Other properties : Clear. Hygroscopic. Volatile. Neutral reaction.

SECTION 10: Stability and reactivity

10.1. Reactivity

Violent to explosive reaction with (some) metal powders and with (strong) oxidizers. Violent exothermic reaction with (some) acids and with (some) halogens compounds.

10.2. Chemical stability

Hygroscopic.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

Direct sunlight. High temperature. Incompatible materials. Open flame. Sparks. Overheating.

10.5. Incompatible materials

Strong oxidizers. Strong bases. Strong acids. Peroxides. Acid anhydrides. Acid chlorides.

10.6. Hazardous decomposition products

Carbon dioxide. Carbon monoxide.

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SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	: Not classified
Methanol (\f)67-56-1	
LD50 oral rat	1187 - 2769 mg/kg body weight (BASF test, Rat, Male / female, Weight of evidence, Aqueous solution, Oral, 7 day(s))
LD50 dermal rabbit	17100 mg/kg (Rabbit, Inconclusive, insufficient data, Dermal)
LC50 inhalation rat (mg/l)	128.2 mg/l air (BASF test, 4 h, Rat, Male / female, Experimental value, Inhalation (vapours))
ATE CLP (oral)	100 mg/kg body weight
ATE CLP (dermal)	300 mg/kg body weight
ATE CLP (gases)	700 ppmV/4h
ATE CLP (vapors)	3 mg/l/4h
ATE CLP (dust, mist)	0.5 mg/l/4h
Skin corrosion/irritation	: Not classified
Serious eye damage/irritation	: Not classified
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity – single exposure	: Causes damage to organs (liver, kidneys, central nervous system, optic nerve) (Dermal, oral).
Specific target organ toxicity – repeated exposure	: Not classified
Aspiration hazard	: Not classified
Potential Adverse human health effects and symptoms	: Toxic in contact with skin. Toxic if swallowed. Toxic if inhaled.
Symptoms/effects after inhalation	: EXPOSURE TO HIGH CONCENTRATIONS: Coughing. Symptoms similar to those listed under ingestion.
Cumptomo/offooto ofter alsin contact	Communication of invitants the security of the

Symptoms/effects after skin contact : Symptoms similar to those listed under ingestion.

Symptoms/effects after eye contact : Redness of the eye tissue. Lacrimation.

Symptoms/effects after ingestion : Nausea. Vomiting. AFTER ABSORPTION OF LARGE QUANTITIES: FOLLOWING

SYMPTOMS MAY APPEAR LATER: Change in the blood composition. Headache. Feeling of weakness. Abdominal pain. Muscular pain. Central nervous system depression. Dizziness. Mental confusion. Drunkenness. Coordination disorders. Disturbed motor response. Disturbances of consciousness. Visual disturbances. Blindness. Respiratory difficulties.

Cramps/uncontrolled muscular contractions.

Chronic symptoms : Red skin. Dry skin. Skin rash/inflammation. Headache. Disturbed tactile sensibility. Visual disturbances. Sleeplessness. Gastrointestinal complaints. Cardiac and blood circulation effects.

SECTION 12: Ecological information

12.1. Toxicity	
Ecology - general	 Not classified as dangerous for the environment according to the criteria of Regulation (EC) No 1272/2008.
Ecology - air	 Not included in the list of substances which may contribute to the greenhouse effect (IPCC). Not included in the list of fluorinated greenhouse gases (Regulation (EU) No 517/2014). Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009).
Ecology - water	 Not harmful to crustacea. Not harmful to fishes. Groundwater pollutant. Inhibition of activated sludge. Nitrification of activated sludge is inhibited. Not harmful to algae. Not harmful to bacteria.
Methanol (67-56-1)	
LC50 fish 1	15400 mg/l (EPA 660/3 - 75/009, 96 h, Lepomis macrochirus, Flow-through system, Fresh water, Experimental value, Lethal)
EC50 Daphnia 1	18260 mg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 96 h, Daphnia magna, Semistatic system, Fresh water, Experimental value, Locomotor effect)
ErC50 (algae)	22000 mg/l (OECD 201: Alga, Growth Inhibition Test, 96 h, Pseudokirchneriella subcapitata, Static system, Fresh water, Experimental value)

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12.2. Persistence and degradability

Methanol (67-56-1)			
Persistence and degradability	Readily biodegradable in the soil. Readily biodegradable in water.		
Biochemical oxygen demand (BOD)	0.6 - 1.12 g O □/g substance		
Chemical oxygen demand (COD)	1.42 g O □/g substance		
ThOD	1.5 g O □/g substance		

12.3. Bioaccumulative potential

Methanol (67-56-1)		
BCF fish 1	1 - 4.5 (72 h, Cyprinus carpio, Static system, Fresh water, Experimental value)	
Log Pow	-0.77 (Experimental value)	
Bioaccumulative potential	Low potential for bioaccumulation (BCF < 500).	

12.4. Mobility in soil

Methanol (67-56-1)	
Surface tension 0.023 N/m (20 °C)	
Log Koc 0.088 (log Koc, SRC PCKOCWIN v2.0, Calculated value)	
Ecology - soil	Highly mobile in soil.

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations

: Do not discharge into drains or the environment. Remove waste in accordance with local and/or national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Recycle by distillation. Incinerate under surveillance with energy recovery. Obtain the consent of pollution control authorities before discharging to wastewater treatment plants.

Additional information

Hazardous waste according to Directive 2008/98/EC, as amended by Regulation (EU) No 1357/2014 and Regulation (EU) No 2017/997.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1230 Methanol, 3, II

UN-No.(DOT) : 1230
DOT NA no. : UN1230
Proper Shipping Name (DOT) : Methanol

Transport hazard class(es) (DOT) : 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120

Hazard labels (DOT) : 3 - Flammable liquid



DOT Symbols : D - Proper shipping name for domestic use only, or to and from Canada

Packing group (DOT) : II - Medium Danger

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DOT Special Provisions (49 CFR 172.102)

: IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized. T7 - 4 178.274(d)(2) Normal...... 178.275(d)(3)

TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: tr is the maximum mean bulk temperature during transport, tf is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (tf) and the maximum mean bulk temperature during transportation (tr) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d15 and d50 are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively.

DOT Packaging Exceptions (49 CFR 173.xxx) : 150 DOT Packaging Non Bulk (49 CFR 173.xxx) : 202 DOT Packaging Bulk (49 CFR 173.xxx) : 242 DOT Quantity Limitations Passenger aircraft/rail : 1 L (49 CFR 173.27)

DOT Quantity Limitations Cargo aircraft only (49 : 60 L

CFR 175.75)

DOT Vessel Stowage Location

: B - (i) The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) "On deck only" on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.

DOT Vessel Stowage Other 40 - Stow "clear of living quarters"

Marine pollutant

Additional information

Other information : No supplementary information available.

ADR

Transport document description

Hazard identification number (Kemler No.) 336

Orange plates

336 230

Tunnel restriction code : D/E

Transport by sea

: 1230 UN-No. (IMDG) Proper Shipping Name (IMDG) : methanol

Class (IMDG) 3 - Flammable liquids

Packing group (IMDG) II - substances presenting medium danger

EmS-No. (1) : F-E MFAG-No : 19 EmS-No. (2) : S-D

Air transport

UN-No. (IATA) : 1230 Proper Shipping Name (IATA) : Methanol

Class (IATA) : 3 - Flammable Liquids Packing group (IATA) : II - Medium Danger

SECTION 15: Regulatory information

15.1. US Federal regulations

Methanol (67-56-1)

Listed on the United States TSCA (Toxic Substances Control Act) inventory Subject to reporting requirements of United States SARA Section 313

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Methanol (67-56-1)		
RQ (Reportable quantity, section 304 of EPA's List of Lists)	5000 lb	
SARA Section 311/312 Hazard Classes	Physical hazard - Flammable (gases, aerosols, liquids, or solids) Health hazard - Acute toxicity (any route of exposure) Health hazard - Specific target organ toxicity (single or repeated exposure)	

15.2. International regulations

CANADA

Methanol (67-56-1)		
Listed on the Canadian DSL (Domestic Substanc	es List)	
WHMIS Classification	Class B Division 2 - Flammable Liquid Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects	

EU-Regulations

No additional information available

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flam. Liq. 2 H225
Acute Tox. 3 (Inhalation) H331
Acute Tox. 3 (Dermal) H311
Acute Tox. 3 (Oral) H301
STOT SE 1 H370

Full text of H statements : see section 16

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

Not classified

15.2.2. National regulations

No additional information available

15.3. US State regulations

Methanol(67-56-1)	
U.S California - Proposition 65 - Carcinogens List	No
U.S California - Proposition 65 - Developmental Toxicity	Yes
U.S California - Proposition 65 - Reproductive Toxicity - Female	No
U.S California - Proposition 65 - Reproductive Toxicity - Male	No

SECTION 16: Other information

Full text of H-phrases: see section 16:

H225	Highly flammable liquid and vapour
H301	Toxic if swallowed
H311	Toxic in contact with skin
H331	Toxic if inhaled
H370	Causes damage to organs

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NFPA health hazard : 2 - Materials that, under emergency conditions, can cause

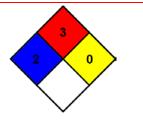
temporary incapacitation or residual injury.

NFPA fire hazard : 3 - Liquids and solids (including finely divided suspended solids) that can be ignited under almost all ambient

temperature conditions.

NFPA reactivity : 0 - Material that in themselves are normally stable, even

under fire conditions.



Hazard Rating

Health : 2 Moderate Hazard - Temporary or minor injury may occur

Flammability : 3 Serious Hazard
Physical : 0 Minimal Hazard

Personal protection : H

SDS US ValTech

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Version 1.1 SDS Number: 400000000475 Revision Date: 01/29/2018

SECTION 1. IDENTIFICATION

Product name : PURELL® VF481™ Hand Sanitizer Gel

Manufacturer or supplier's details

Company name of supplier : GOJO Industries, Inc.

Address : One GOJO Plaza, Suite 500

Akron, Ohio 44311

Telephone : 1 (330) 255-6000

Emergency telephone : CHEMTREC 1-800-424-9300

number CHEMTREC +1-703-527-3887: Outside USA & CANADA

Recommended use of the chemical and restrictions on use

Recommended use : Hand Sanitizer

Restrictions on use : This is a personal care or cosmetic product that is safe for

consumers and other users under normal and reasonably foreseeable use. Cosmetics and consumer products, specifically defined by regulations around the world, are exempt from the requirement of an SDS for the consumer. While this material is not considered hazardous, this SDS contains valuable information critical to the safe handling and proper use of the product for industrial workplace conditions as well as unusual and unintended exposures such as large spills. This SDS should be retained and available for

employees and other users of this product. For specific intended-use guidance, please refer to the information

provided on the package or instruction sheet.

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquids : Category 3

Eye irritation : Category 2A

GHS label elements

Hazard pictograms





Signal word : Warning



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Hazard statements : H226 Flammable liquid and vapour.

H319 Causes serious eye irritation.

Precautionary statements : Prevention:

P210 Keep away from heat/sparks/open flames/hot surfaces. -

No smoking.

P233 Keep container tightly closed.

P240 Ground/bond container and receiving equipment. P241 Use explosion-proof electrical/ ventilating/ lighting/

equipment.

P242 Use only non-sparking tools.

P243 Take precautionary measures against static discharge.

P280 Wear eye protection/ face protection.

Response:

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy

to do. Continue rinsing.

P337 + P313 If eye irritation persists: Get medical advice/

attention.

P370 + P378 In case of fire: Use dry sand, dry chemical or

alcohol-resistant foam to extinguish.

Storage:

P403 + P235 Store in a well-ventilated place. Keep cool.

Disposal:

P501 Dispose of contents/ container to an approved waste

disposal plant.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous components

Chemical name	CAS-No.	Concentration (%)
Ethyl Alcohol	64-17-5	>= 50 - < 70
Isopropyl Alcohol	67-63-0	>= 1 - < 5

SECTION 4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical

advice immediately.

When symptoms persist or in all cases of doubt seek medical

advice.

If inhaled : If inhaled, remove to fresh air.

If symptoms persist, call a physician.

In case of skin contact : Wash with water and soap as a precaution.

Get medical attention if irritation develops and persists.

In case of eye contact : In case of contact, immediately flush eyes with plenty of water

for at least 15 minutes.

If easy to do, remove contact lens, if worn.



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Seek medical advice.

If swallowed, DO NOT induce vomiting.

Rinse mouth with water. Obtain medical attention.

Most important symptoms and effects, both acute and

delayed

: Causes serious eye irritation.

Protection of first-aiders : First Aid responders should pay attention to self-protection

and use the recommended protective clothing

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Use water spray, alcohol-resistant foam, dry chemical or

carbon dioxide.

Unsuitable extinguishing

media

: High volume water jet

Specific hazards during

firefighting

: Do not use a solid water stream as it may scatter and spread

fire

Cool closed containers exposed to fire with water spray.

Flash back possible over considerable distance.

May form explosive mixtures in air.

Exposure to decomposition products may be a hazard to

health.

Carbon oxides

Hazardous combustion

products

Carbon oxides

Specific extinguishing

methods

: Use extinguishing measures that are appropriate to local

circumstances and the surrounding environment. Use water spray to cool unopened containers.

Further information : Collect contaminated fire extinguishing water separately. This

must not be discharged into drains.

Fire residues and contaminated fire extinguishing water must

be disposed of in accordance with local regulations.

Special protective equipment

for firefighters

In the event of fire, wear self-contained breathing apparatus.

Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Use personal protective equipment.

Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas.

Keep people away from and upwind of spill/leak.

Material can create slippery conditions.



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Environmental precautions : Discharge into the environment must be avoided.

Prevent further leakage or spillage if safe to do so. Retain and dispose of contaminated wash water.

Local authorities should be advised if significant spillages

cannot be contained.

Methods and materials for containment and cleaning up

: Non-sparking tools should be used. Soak up with inert absorbent material.

Suppress (knock down) gases/vapours/mists with a water

spray jet.

Keep in suitable, closed containers for disposal.

Clean contaminated floors and objects thoroughly while

observing environmental regulations.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling : For personal protection see section 8.

Keep away from heat and flame. Use with local exhaust ventilation.

Avoid contact with eyes.

Conditions for safe storage : Take measures to prevent the build up of electrostatic charge.

Keep in properly labelled containers.

Keep containers tightly closed in a dry, cool and well-

ventilated place.

Store in accordance with the particular national regulations.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Ethyl Alcohol	64-17-5	TWA	1,000 ppm 1,900 mg/m3	NIOSH REL
		TWA	1,000 ppm 1,900 mg/m3	OSHA Z-1
		STEL	1,000 ppm	ACGIH
Isopropyl Alcohol	67-63-0	TWA	200 ppm	ACGIH
		STEL	400 ppm	ACGIH
		TWA	400 ppm 980 mg/m3	NIOSH REL
		ST	500 ppm 1,225 mg/m3	NIOSH REL
		TWA	400 ppm 980 mg/m3	OSHA Z-1

Biological occupational exposure limits

Components	CAS-No.		Biological specimen	Samplin g time	Permissible concentratio	Basis
					n	
Isopropyl Alcohol	67-63-0	Acetone	Urine	End of	40 mg/l	ACGIH



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shift at end of workwee k

Personal protective equipment

Respiratory protection : No personal respiratory protective equipment normally

required.

Hand protection

Remarks : No special protective equipment required.

Eye protection : Wear face-shield and protective suit for abnormal processing

problems.

Skin and body protection : No special measures necessary provided product is used

correctly.

Protective measures : Choose body protection in relation to its type, to the

concentration and amount of dangerous substances, and to

the specific work-place.

Ensure that eye flushing systems and safety showers are

located close to the working place.

Hygiene measures : Handle in accordance with good industrial hygiene and safety

practice.

Avoid contact with eyes.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Colour : clear, greenish-blue

Odour : alcohol-like

Odour Threshold : No data available

pH : 3.8 - 5.2, (20 °C)

Melting point/freezing point : No data available

Initial boiling point and boiling

range

: 75.00 °C

Flash point : 26.50 °C

Evaporation rate : No data available

Flammability (solid, gas) : Not applicable

Flammability (liquids) :

Upper explosion limit : No data available



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Lower explosion limit : No data available

Vapour pressure : No data available

Relative vapour density : No data available

Density : 0.8742 g/cm3

Solubility(ies)

Water solubility : soluble

Partition coefficient: n-

octanol/water

: Not applicable

Auto-ignition temperature : No data available

Thermal decomposition : The substance or mixture is not classified self-reactive.

Viscosity

Viscosity, kinematic : 80 - 600 mm2/s (20 °C)

Explosive properties : Not explosive

Oxidizing properties : The substance or mixture is not classified as oxidizing.

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Not classified as a reactivity hazard.

Chemical stability : Stable under normal conditions.

Possibility of hazardous

reactions

: Vapours may form explosive mixture with air.

Conditions to avoid : Heat, flames and sparks.

Incompatible materials : Strong oxidizing agents

Hazardous decomposition

products

: No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation Eye contact

Skin contact

Acute toxicity

Not classified based on available information.

Components:

Ethyl Alcohol:



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Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity : LC50 (Rat): 124.7 mg/l

Exposure time: 4 h
Test atmosphere: vapour

Isopropyl Alcohol:

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity : LC50 (Rat): 72.6 mg/l

Exposure time: 4 h
Test atmosphere: vapour

Acute dermal toxicity : LD50 (Rat): > 5,000 mg/kg

Skin corrosion/irritation

Not classified based on available information.

Components:

Ethyl Alcohol:

Species: Rabbit

Method: OECD Test Guideline 404

Result: No skin irritation

Isopropyl Alcohol:

Species: Rabbit

Result: No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Components:

Ethyl Alcohol:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

Method: OECD Test Guideline 405

Isopropyl Alcohol:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

Respiratory or skin sensitisation

Skin sensitisation: Not classified based on available information.

Respiratory sensitisation: Not classified based on available information.

Components:

Ethyl Alcohol:

Test Type: Local lymph node assay (LLNA)

Exposure routes: Skin contact

Species: Mouse Result: negative

Isopropyl Alcohol:

Test Type: Buehler Test
Exposure routes: Skin contact



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Species: Guinea pig

Method: OECD Test Guideline 406

Result: negative

Germ cell mutagenicity

Not classified based on available information.

Components:

Ethyl Alcohol:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test

Result: negative

Genotoxicity in vivo : Test Type: Rodent dominant lethal test (germ cell) (in vivo)

Test species: Mouse

Application Route: Ingestion

Result: negative

Isopropyl Alcohol:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)

Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo

cytogenetic assay) Test species: Mouse

Application Route: Intraperitoneal injection

Result: negative

Carcinogenicity

Not classified based on available information.

Components:

Isopropyl Alcohol:

Species: Rat

Application Route: inhalation (vapour)

Exposure time: 104 weeks

Method: OECD Test Guideline 451

Result: negative

IARC No component of this product present at levels greater than or

equal to 0.1% is identified as probable, possible or confirmed

human carcinogen by IARC.

OSHA No component of this product present at levels greater than or

equal to 0.1% is identified as a carcinogen or potential

carcinogen by OSHA.

NTP No component of this product present at levels greater than or

equal to 0.1% is identified as a known or anticipated carcinogen

by NTP.

Reproductive toxicity

Not classified based on available information.

Components:



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Ethyl Alcohol:

Effects on fertility : Test Type: Two-generation reproduction toxicity study

Species: Mouse

Application Route: Ingestion Method: OECD Test Guideline 416

Result: negative

Isopropyl Alcohol:

Effects on fertility : Test Type: Two-generation reproduction toxicity study

Species: Rat

Application Route: Ingestion

Result: negative

Effects on foetal : Test Type: Embryo-foetal development

development Species: Rat

Application Route: Ingestion

Result: negative

STOT - single exposure

Not classified based on available information.

Components:

Isopropyl Alcohol:

Assessment: May cause drowsiness or dizziness.

STOT - repeated exposure

Not classified based on available information.

Repeated dose toxicity

Components:

Ethyl Alcohol:

Species: Rat

NOAEL: 2,400 mg/kg Application Route: Ingestion

Exposure time: 2 y

Isopropyl Alcohol:

Species: Rat NOAEL: 5000 ppm

Application Route: inhalation (vapour)

Exposure time: 104 w

Method: OECD Test Guideline 413

Aspiration toxicity

Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Ethyl Alcohol:

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): > 1,000 mg/l



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Exposure time: 96 h

Toxicity to daphnia and other

aquatic invertebrates

: EC50 (Daphnia magna (Water flea)): > 1,000 mg/l

Exposure time: 48 h

Toxicity to algae : EC50 (Chlorella vulgaris (Fresh water algae)): 275 mg/l

Exposure time: 72 h

Method: OECD Test Guideline 201

Toxicity to daphnia and other

aquatic invertebrates (Chronic toxicity)

: NOEC (Daphnia magna (Water flea)): 9.6 mg/l

Exposure time: 9 d

Toxicity to bacteria : EC50 (Photobacterium phosphoreum): 32.1 mg/l

Exposure time: 0.25 h

Isopropyl Alcohol:

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 10,000 mg/l

Exposure time: 96 h

Toxicity to daphnia and other

aquatic invertebrates

: EC50 (Daphnia magna (Water flea)): > 10,000 mg/l

Exposure time: 24 h

Toxicity to bacteria : EC50 (Pseudomonas putida): > 1,050 mg/l

Exposure time: 16 h

Persistence and degradability

Components:

Ethyl Alcohol:

Biodegradability : Result: Readily biodegradable.

Biodegradation: 84 % Exposure time: 20 d

Isopropyl Alcohol:

Biodegradability : Result: rapidly degradable

Bioaccumulative potential

Components:

Ethyl Alcohol:

Partition coefficient: n-

octanol/water

: log Pow: -0.35

Isopropyl Alcohol:

Partition coefficient: n-

octanol/water

: log Pow: 0.05

Mobility in soil

No data available

Other adverse effects

No data available

Product:



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Regulation 40 CFR Protection of Environment; Part 82 Protection of

Stratospheric Ozone - CAA Section 602 Class I Substances

Remarks This product neither contains, nor was manufactured with a

Class I or Class II ODS as defined by the U.S. Clean Air Act

Section 602 (40 CFR 82, Subpt. A, App.A + B).

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Dispose of in accordance with local regulations.

Contaminated packaging : Dispose of as unused product.

Empty containers should be taken to an approved waste

handling site for recycling or disposal.

SECTION 14. TRANSPORT INFORMATION

International Regulation

IATA-DGR

UN/ID No. : UN 1987
Proper shipping name : Alcohols, n.o.s.

(Ethanol, Propan-2-ol)

Class : 3
Packing group : III
Packing instruction (cargo : 366

aircraft)

Packing instruction : 355

(passenger aircraft)

IMDG-Code

UN number : UN 1987

Proper shipping name : ALCOHOLS, N.O.S.

(Ethanol, Propan-2-ol)

Class : 3
Packing group : III
Labels : 3
EmS Code : F-E, S-D
Marine pollutant : no

National Regulations

49 CFR

UN/ID/NA number : UN 1987
Proper shipping name : Alcohols, n.o.s.

Class : 3
Packing group : III
ERG Code : 127
Marine pollutant : no



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SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Fire Hazard

Acute Health Hazard

SARA 302 : No chemicals in this material are subject to the reporting

requirements of SARA Title III, Section 302.

SARA 313 : The following components are subject to reporting levels

established by SARA Title III, Section 313:

Isopropyl Alcohol 67-63-0 3.4086 %

Clean Air Act

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 12 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI

Intermediate or Final VOC's (40 CFR 60.489):

Ethyl Alcohol 64-17-5 65.2821 % Isopropyl Alcohol 67-63-0 3.4086 %

This product does not contain any VOC exemptions listed under the U.S. Clean Air Act Section 450.

Clean Water Act

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

US State Regulations

Massachusetts Right To Know

Ethyl Alcohol	64-17-5	50 - 70 %
Isopropyl Alcohol	67-63-0	1 - 5 %

Pennsylvania Right To Know

Ethyl Alcohol	64-17-5	50 - 70 %
Water (Aqua)	7732-18-5	30 - 50 %
Isopropyl Alcohol	67-63-0	1 - 5 %

New Jersey Right To Know

Ethyl Alcohol	64-17-5	50 - 70 %
Water (Aqua)	7732-18-5	30 - 50 %
Isopropyl Alcohol	67-63-0	1 - 5 %

California Prop 65 This product does not contain any chemicals known to State

of California to cause cancer, birth defects, or any other



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reproductive harm.

The components of this product are reported in the following inventories:

TSCA : On TSCA Inventory

AICS : On the inventory, or in compliance with the inventory

DSL : On the inventory, or in compliance with the inventory

ENCS : On the inventory, or in compliance with the inventory

ISHL : On the inventory, or in compliance with the inventory

KECI : On the inventory, or in compliance with the inventory

PICCS : On the inventory, or in compliance with the inventory

IECSC : On the inventory, or in compliance with the inventory

NZIoC : On the inventory, or in compliance with the inventory

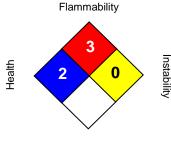
Inventories

AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)

SECTION 16. OTHER INFORMATION

Further information

NFPA:



Special hazard.

HMIS III:

HEALTH	2
FLAMMABILITY	3
PHYSICAL HAZARD	0

0 = not significant, 1 = Slight,

2 = Moderate, 3 = High

4 = Extreme, * = Chronic

Revision Date : 01/29/2018

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Health and Safety Plan Remedial Implementation Hornell, New York May 2020

Appendix C

Heat Stress and Cold Stress Guidelines

GEI Consultants, Inc. 2018 Template

Heat Stress Guidelines

Form	Signs & Symptoms	Care	Prevention ³
Heat Rash	Tiny red vesicles in affected skin area. If the area is extensive, sweating can be impaired.	Apply mild lotions and cleanse the affected area.	Cool resting and sleeping areas to permit skin to dry between heat exposures.
Heat Cramps	Spasm, muscular pain (cramps) in stomach area and extremities (arms and legs).	Provide replacement fluids with minerals (salt) such as Gatorade.	Adequate salt intake with meals ¹ . ACCLIMATIZATION ²
Heat Exhaustion	Profuse sweating, cool (clammy) moist skin, dizziness, confusion, pale skin color, faint, rapid shallow breathing, headache, weakness, and/or muscle cramps.	Remove from heat, sit or lie down, rest, replace lost water with electrolyte replacement fluids (water, Gatorade) take frequent sips of liquids in amounts greater than required to satisfy thirst.	ACCLIMATIZATION ² Adequate salt intake with meals ¹ , only during early part of heat season. Ample water intake, frequently during the day.
Heat Stroke	HOT <u>Dry</u> Skin. Sweating has stopped. Mental confusion, dizziness, nausea, chills, severe headache, collapse, delirium, and/or coma.	HEAT STROKE IS A MEDICAL EMERGENCY Remove from heat. COOL THE BODY AS RAPIDLY AS POSSIBLE by immersing in cold (or cool) water, or splash with water and fan. Call for Emergency Assistance. Observe for signs of shock.	ACCLIMATIZATION ² Initially moderate workload in heat (8 to 14 days). Monitor worker's activities.

Footnotes:

- 1.) American diets are normally high in salt, sufficient to aid acclimatization. However, during the early part of the heat season, (May, June), one extra shake of salt during one to two meals per day may help, so long as this is permitted by your physician. Check with your personal physician.
- ACCLIMATIZATION The process of adapting to heat is indicated by worker's ability to perform hot jobs less fluid loss, lower concentrations of salt loss in sweat, and a reduced core (body) temperature and heart rate.
- 3.) Method to Achieve Acclimatization Moderate work or exercise in hot temperatures during early part of heat season. Adequate salt (mineral) and water intake. Gradually increasing work time in hot temperatures. Avoid alcohol. Normally takes 8 to 14 days to achieve acclimatization. Lost rapidly, if removed from strenuous work (or exercise) in hot temperature for more than approximately 5 days.

Cold Stress Guidelines

Stress	Symptoms	What to do
Mild Hypothermia	 Body Temp 98 to 90°F Shivering Lack of coordination, stumbling, fumbling hands Slurred speech Memory loss Pale, cold skin 	Move to warm area Stay active Remove wet clothes and replace with dry clothes or blankets Cover the head Drink warm (not hot) sugary drink
Moderate Hypothermia	 Body temp 90 to 86°F Shivering stops Unable to walk or stand Confused and/or irrational 	All of the above, plus: Call 911 Cover all extremities completely Place very warm objects, such as hot packs on the victim's head, neck, chest, and groin
Severe Hypothermia	 Body temp 86 to 78°F Severe muscle stiffness Very sleepy or unconscious Ice cold skin Death 	Call 911Treat victim very gentlyDo not attempt to re-warm
Frostbite Trench Foot	 Cold, tingling, stinging, or aching feeling in the frostbitten area, followed by numbness Skin color turns red, then purple, then white or very pale skin Cold to the touch Blisters in severe cases Tingling, itching, or burning 	 Call 911 Do not rub the area Wrap in soft cloth If help is delayed, immerse in warm (not hot) water Soak feet in warm water, then
	sensation Blisters	wrap with dry cloth bandagesDrink a warm (not hot) sugary drink

Health and Safety Plan Remedial Implementation Hornell, New York May 2020

Appendix D

Forms



Please complete this form and send it to your Branch Manager, HR and CHSO **within 24 hours** of the incident.

Accident/Incident Report Form

SECTION A ACCIDENT/INCIDENT DETAILS				
EMPLOYEE INFORMATION:		OTHER INJURED (IF APPLICABLE):		
Name:		Name:		
Home Address: Street Address City State Zip Code		Home Address: Street Address City State Zip Code		
Contact Information: () () Primary Secondary		Contact Information: () () Primary Secondary		
Date of Birth:		Date of Birth:		
Date of Hire:		Date of Hire:		
Branch:		Branch:		
Supervisor:		Supervisor:		
Date and Time Accident/Incident Date and Time Reported	LOCATION OF I	NCIDENT/ACCIDENT		
///	Project Name:			
Month Day Year Month Day Year	Client and Location	· ————————————————————————————————————		
A.M P.M P.	м. О	or ————————————————————————————————————		
INCIDENT TYPE: WITNESS INFORM (Check All That Applies)		RMATION		
□ Personal Injury/Illness				
□ Vehicle Accident				
□ Property Damage Contact N				
□ Environmental Spill	Company:	Company:		
□ Other				
WHAT HAPPENED TO THE INJURED PAR	TY: First Aid Administe	red Refused Treatment/Transport Transported to Hospital		
Returned to Work	☐ Went Home ☐	Went to Physician Unknown		
Clinic/Hospital or Treating Physician:		Phone:		
Name Stree	t Address C	ity State Zip Code		
SECTION B PERSONAL INJURY				
Cause of Injury:				
Part of Body Injured: Multiple Injuries:YN				
Was PPE worn when injured?: \[\text{Y} \text{ \subset} N \text{ What PPE was worn?} \]				
WAS INJURY A RESULT OF THE USE A MOTOR VEHICLE: YES NO (If yes, complete Section C)				



Accident/Incident Report Form

Please complete this form and send it to your Branch Manager, HR and CHSO *within 24 hours* of the incident.

SECTION C AUTO AC	CIDENT ONLY		
DRIVER/VEHICLE INFORMATION			
Name of Insured:	Name of Other Driver: Driver's License Number: State: Description of Vehicle: License Plate Number: Make: Model: Year: Color: Insurance Carrier: Policy Number: Ph. Number:		
SECTION D PROPERTY DAMAGE OR	CHEMICAL RELEASE ONLY		
Type of Damage(s): Cause of Damage(s): Type of Chemical Released (if known): Quantity of Chemical Released: Spill Measures Employed: SECTION E NATURE OF ACCIDENT/INCIDENT AND EXTENT OF INJURIES/DAMAGES (Please give a detailed description of what happened. Attach a sketch or picture if applicable)			
I hereby certify that the above information is true and correct to my understanding of this accident/incident.			
Employee/Preparer's Name Date and	Time		



Near Miss Report Form

Please complete this form and send it to your Branch Manager, HR and the Safety Team *within 24 hours* of the near miss.

NEAR MISS DETAILS			
Employee Name:			
Phone Number:			
Branch:			
Supervisor:			
Date and Time Accident/Incident	Date and Time Reported	LOCATION OF NEAR MISS	
Month Day Year	Month Day Year	Project Name: Client and Location:	
A.MP.M.	A.MP.M.	or	
		Office Location:	
	(Please give a detaile	WHAT HAPPENED? d description of what happened. Attach photos or a sketch, if applicable.)	
☐ Photos were Taken			
		WHAT WAS DONE?	
	(Please give a detailed d	escription of what was done to prevent and incident from occurring.)	
☐ I have verbally contacted a member of the Safety Team and my Supervisor.			
Employee/Preparer's N	lame	Date and Time	



Project Safety Briefing Form

Project Number:	Project Name:	Project Name:	
Date:	Time:	Time:	
Briefing Conducted by:	Signature:		
This sign in log documents that a project specific briefing w	ras conducted in accordance with the site-specific HASP and GEI's H	2.5 policy GEL	
	I this project briefing. Applicable health and safety SOPs and any add		
	g. Prior to the start of the project or upon the start of a new on-site		
		project team	
member, this form must be completed. Please email this co	tyTeam@geiconsultants.com		
	tyream@geiconsuitants.com		
TOPICS COVERED (check all those covered):			
SOP HS-001 Biological Hazards	SOP HS-025 Manual Lifting		
SOP HS-002 Bloodborne Pathogens	SOP HS -26 Hazard Identification		
SOP HS-003 Container Management	SOP HS-27 Confined Space Entry for Sanitary Sewers		
SOP HS-004 Driver Safety	SOP HS-28 Safe Trailer Use		
SOP HS-005a Electrical Safety	SOP HS-29 Overtime and Fatigue Management		
SOP HS-005b Lockout/Tagout	Accident Reporting Procedures		
SOP HS-006 Excavation/Trenching	Changes to the HASP		
SOP HS-008a Hand Tools (Non-Powered)	Cold Stress		
SOP HS-008b Powered Hand Tools	Confined Space		
SOP HS-009 Hazardous Substances Management	Decon Procedures		
SOP HS-010 Inclement Weather	Exposure Guidelines		
SOP HS-011 Ladders	General PPE Usage		
SOP HS-012 Noise Exposure	Heat Stress		
SOP HS-013 Nuclear Density Gauge	Hearing Conservation		
SOP HS-014 Utility Markout	Lockout/Tagout		
SOP HS-015 Respirator Fit Test	Personal Hygiene		
SOP HS-016 Traffic Hazards	Respiratory Protection		
SOP HS-017 Water Safety	Review of Hazard Evaluation		
SOP HS-018 Working Around Heavy Equipment	Site Control		
SOP HS-019 Rail Safety	Site Emergency Procedures		
SOP HS-020 Aerial Lift	Slips, Trips, Falls		
SOP HS-021 Mobile Equipment	Other (Specify):		
SOP HS-022 Aquatic Ecological Survey/Electrofishing	Other (Specify):		
SOP HS-023 Scaffolding	Other (Specify):		
SOP HS-024 Wilderness Safety	Other (Specify):		
	Personnel Sign-in List		
Printed Name	Signature		
	•		

GEL	Daily Safety Brie	efing and Site Visitor Sign-In			
Project Number:		Project Name:			
		Time:			
¹ Date:		Signature:			
Briefing Conducted by:		Signature.			
required to attend each briefing and to	acknowledge receipt of each brid	with the site specific HASP. Personnel who performing, daily.	orm work o	perations on	site are
TOPICS COVERED (check all those cove Accident Reporting Procedures Cellular Phone Charged w/Serv Changes to the HASP Cold Stress Confined Space Decon Procedures Exposure Guidelines	General PPE Usage	Site Control Site Emergency Procedures Slips, Trips, Falls Traffic Safety Other: Other:		Other: Other: Other: Other: Other: Other: Other:	
Daily Safety Topic Description:					
Drinted Name		onnel Sign-in List		Time In	Time Out
Printed Name	Signature	Company Name		Time-In	Time-Out
1		1			•

Appendix E

GEI's Health and Safety SOPs

Applicable GEI H&S SOPs (check all that apply)				
⊠ Biological Hazards – 001	□ Ladders -011	☐ Mobile Equipment – 021		
⊠ Bloodborne Pathogens –	☑ Noise Exposure -012	☐ Aquatic Ecological Survey &		
002		Electrofishing -022		
⊠ Container Management –	☐ Nuclear Density Gauge	☐ Scaffolding - 023		
003	Operation -013			
⊠ Driver Safety -004	⊠ Utility Markout-014	☐ Wilderness Safety - 024		
☐ Electrical Safety Lock Out	⊠ Respirator Fit Test	☑ Manual Lifting – 025		
Tag Out -005	Procedure-015			
⊠ Excavation Trenching -	⊠ Traffic Hazards -016	⋈ Hazard Identification - 026		
006				
⊠ Non-Powered Hand Tools	□ Water Safety – 017	☐ Confined Space Entry for		
-008a		Sanitary Sewers – 027		
☐ Powered Hand Tools –		☐ Safe Trailer Use – 028		
008b	Equipment – 018			
	□ Rail Safety -019	☐ Overtime and Fatigue		
Management -009		Management - 029		
	☐ Aerial Lift – 020			

STANDARD OPERATING PROCEDURES

SOP No. HS-001 Biological Hazards

1.1 Objective

The objective of this Standard Operating Procedure (SOP) is to prevent or limit the potential for GEI personnel to encounter biological hazards during field activities.

1.2 General

This SOP is intended for use by employees engaged in work with the potential for contact with biological hazards such as animals, insects, plants, and sewage. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for encounters with biological hazards and the control methods to be implemented by GEI employees. These hazards must be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.3 Mammals

During some site operations, animals such as stray or domesticated dogs or cats, raccoons, snakes, bears, rats, bats, etc. may be encountered. Employees should use discretion and attempt to avoid contact with animals. If these animals present a problem, efforts will be made to remove these animals from the site by contacting a licensed animal control technician.

1.3.1 Rabies

The rabies virus is transmitted through the bite of an infected animal or contact with saliva or brain/nervous system tissue of an infected animal. The rabies virus infects the central nervous system, causing disease in the brain. The early symptoms of rabies in people are fever, headache, and general weakness or discomfort. As the disease progresses, more specific symptoms appear and may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hypersalivation (increase in saliva), difficulty swallowing, and hydrophobia (fear of water). Death usually occurs within days of the onset of these symptoms.

If you are bitten or think you may be exposed, wash any wounds immediately and thoroughly with soap and water. Then go to the hospital emergency room and notify the Project Manager and the People Safety Team. The doctor, possibly in consultation with the state or local health department, will decide if you need a rabies vaccination. Decisions to start series of vaccinations will be based on your type of exposure and the animal you were exposed to, as well as laboratory and surveillance information for the geographic area where the exposure occurred. If possible have someone document what type of animal it was, how it was behaving prior to the bite, what caused it to bite the

employee, and if it's not a domestic animal that would be easy to find again in the future, try to get animal control on site to capture it. An Incident Report Form must be completed and submitted, per GEI's Incident reporting procedures. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

1.4 Insects and Arachnids

Insects, including bees, wasps, hornets, mosquitoes, ticks, spiders, etc., may be present at a job site making the chance of a bite/sting possible. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life-threatening condition. Some insect bites can transmit diseases such as Lyme disease or a virus such as West Nile. The following is a list of preventive measures:

- Apply insect repellent prior to performing field work and as often as needed throughout the work shift.
- Wear proper personal protective equipment (PPE), including protective clothing (work boots, socks, and light colored clothing).
- Wear shoes, long pants with bottoms tucked into boots or socks, and a longsleeved shirt when outdoors for long periods of time, or when many insects are most active (between dawn and dusk).
- When walking in wooded areas, avoid contact with bushes, tall grass, or brush as much as possible.
- Field personnel who have or may have insect allergies must have insect allergy medication onsite and must inform the Site Safety Officer (SSO) and the People and Safety Team of their particular allergy prior to commencing work.
- Field personnel should perform a self-check at the end of the day for ticks.

1.4.1 Tick-borne Diseases

Lyme Disease

Lyme disease is caused by infection from a deer tick that carries a spirochete (a bacterium). During the painless tick bite, the spirochete may be transmitted into the bloodstream, often after feeding on the host for 12 to 24 hours. The ticks that cause the disease are often no bigger than a poppy seed or a comma in newsprint. The peak months for human infection are from May to September.

Symptoms appear in three stages. First symptoms usually appear from 2 days to a few weeks after a person is bitten by an infected tick. Symptoms usually consist of a ring-like red rash on the skin where the tick was attached. The rash is often bulls-eye like with red around the edges and clear in the center. The rash may be warm, itchy, tender, and/or "doughy." This rash appears in only 60 to 80 percent of infected persons. An infected

person also has flu-like symptoms of a stiff neck, chills, fever, sore throat, headache, fatigue, and joint pain. These symptoms often disappear after a few weeks.

The second stage symptoms, which occur weeks to months later include meningitis, severe headache, drooping of the muscles on the face, called Bell's Palsy, encephalitis, numbness, withdrawal, and lethargy. These symptoms may last for several weeks to several months. Third stage symptoms, which occur months or years later include arthritis, heart problems, and loss of memory. The third stage symptoms may mimic multiple sclerosis and Alzheimer's disease.

When in areas that could harbor deer ticks, employees should wear light color clothing, and visually check themselves and check and be checked by another employee when coming from wooded or vegetated areas. If a GEI employee has a tick bite, the People and Safety Team and Project Manager must be contacted immediately. The employee will be offered the option for medical treatment by a physician, which typically involves antibiotics. An Incident Report form must be completed in compliance with the Incident Reporting procedures. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

If personnel feel sick or have signs similar to those mentioned above, the SSO and the People and Safety Team must be notified immediately.



Figure 1: From left to right, the deer tick adult female, adult male, nymph, and larva on a centimeter scale.

How to Remove a Tick

A tick can be removed from the skin by pulling gently at the head with tweezers. If tweezers are not available, use tissue paper or cloth to grasp the tick. It is important to grasp the tick as close to the site of attachment and use a firm steady pull to remove it. Wash hands immediately after with soap and water. The affected area should also be washed with soap and water, then disinfected with an antiseptic wipe, if available. All mouth parts must be removed from the skin. If the tick was removed by breaking off the

mouth parts, an irritation or infection may occur because the organism that is causing the disease can still enter the body through the skin.

Treatment for Lyme Disease

Treatment with antibiotics is effective and recovery is usually complete. For first stage symptoms, antibiotics are usually given orally. However, treatment for second and third stage symptoms is prolonged and recovery may take longer. Antibiotic treatment is usually provided intravenously for second and third stage Lyme disease.

Babesiosis

The deer tick can also cause Babesiosis, an infection of the parasite Babesia Microti. Symptoms of Baesiosis may not be evident, but may also include fever, fatigue and hemolytic anemia lasting from several days to several months. Babesiosis is most commonly diagnosed in the elderly or in individuals whose immune systems are compromised. If there are no signs or symptoms of Babesiosis, usually no treatment it needed. If an employee believes they might have Babesiosis they'll see a physician to be tested. Treatment usually consists of taking prescription medications for 7 to 10 days.

Ehrlichiosis

Ehrlichiosis is a tick-borne disease which can be caused by either of two different organisms. Human monocytic ehrlichiosis (HME) is caused by *Ehrlichia chaffeensis*, which is transmitted by the lone star tick (*Amblyomma americanum*). Human granulocytic anaplasmosis (HGA), previously known as human granulocytic ehrlichiosis (HGE), is caused by *Anaplasma phagocytophilia*, which is transmitted by the deer tick (*Ixodes scapularis*).

Ehrlichiosis is transmitted by the bite of infected ticks, including the deer tick and the lone star tick. The symptoms of HME and HGE are the same and usually include fever, muscle aches, weakness and headache. Patients may also experience confusion, nausea, vomiting and joint pain. Unlike Lyme disease or Rocky Mountain spotted fever, a rash is not common. Infection usually produces mild to moderately severe illness, with high fever and headache, but may occasionally be life-threatening or even fatal. Symptoms appear 1 to 3 weeks after the bite of an infected tick. However, not every exposure results in infection. For those that become infected a drug called Doxcycline will be prescribed.

Rocky Mountain Spotted Fever

Rocky Mountain spotted fever is a tick-borne disease caused by a rickettsia (a microbe that differs somewhat from bacteria and virus). In the eastern United States, children are infected most frequently, while in the western United States, disease incidence is highest among adult males. Disease incidence is directly related to exposure to tick-infested habitats or to infested pets. Rocky Mountain spotted fever is characterized by a sudden onset of moderate to high fever (which can last for 2-3 weeks), severe headache, fatigue, deep muscle pain, chills and rash. The rash begins on the legs or arms, may include the



soles of the feet or palms of the hands and may spread rapidly to the trunk or rest of the body. Symptoms usually appear within 2 weeks of the bite of an infected tick. Like Ehrlichiosis the prescription drug Doxcycline is the first line treatment option.

1.4.2 Mosquito-Borne Disease

West Nile Virus

West Nile Virus is a mosquito-borne infection transmitted through the bite of an infected mosquito. The symptoms of West Nile Virus can be asymptomatic (no symptoms) or in more serious cases can lead to West Nile Fever. West Nile Fever can include fever, headache, tiredness, body ache, an occasional rash on the trunk of the body, and swollen lymph glands, In severe cases, people have developed West Nile Encephalitis or Meningitis which symptoms include fever, headache, neck stiffness, tremors, coma, and in some cases death. The incubation period for the disease is usually 2 to 15 days. The symptoms can range from a few days to several weeks. Most mosquitoes are not infected and the chance of infection from a mosquito bite of an on-site employee is very small.

1.5 Repellants

The following precautions will be used to help reduce the risk of mosquito bites:

Reduce mosquito-breeding areas by making sure wheelbarrows, buckets, and other containers are turned upside down when not used so that they do not collect standing water. According to the Environmental Protection Agency (EPA), many mosquitoes can breed in pooled water that's minimal enough to fill a bottle cap.

Wear shoes, long pants with bottoms tucked into boots or socks, and a long-sleeved shirt when outdoors for long periods of time, or when many mosquitoes are most active (between dawn and dusk).

Use mosquito repellant according to the manufacturer's directions when outdoors for long periods of time and when mosquitoes are most active.

Centers for Disease Control and Prevention (CDC) evaluation of information contained in peer-reviewed scientific literature and data available from the EPA has identified several EPA-registered products that provide repellent activity sufficient to help people avoid the bites of disease carrying mosquitoes. Products containing these active ingredients typically provide reasonably long-lasting protection:

- **DEET** (Chemical Name: N,N-diethyl-m-toluamide or N,N-diethly-3-methylbenzamide)
- **Picaridin** (KBR 3023, Chemical Name: 2-(2-hydroxyethyl)-1-piperidinecarboxylic acid 1-methylpropyl ester)



- Oil of Lemon Eucalyptus or PMD (Chemical Name: para-Menthane-3,8-diol) the synthesized version of oil of lemon eucalyptus
- **IR3535** (Chemical Name: 3-[N-Butyl-N-acetyl]-aminopropionic acid, ethyl ester)
- **Permethrin** (3-Phenoxybenzyl (1RS)-cis,trans-3-(2,2-dichlorovinyl) -2,2-dimethylcyclopropanecarboxylate) Permethrin kills ticks and can be used on clothing (but not skin)

The EPA characterizes the active ingredients DEET and Picaridin as "conventional repellents" and Oil of Lemon Eucalyptus, PMD, and IR3535 as "biopesticide repellents", which are derived from natural materials.

In general, higher concentrations of active ingredient provide longer duration of protection, regardless of the active ingredient, although concentrations above approximately 50 percent do not offer a marked increase in protection time. Products with less than 10 percent active ingredient may offer only limited protection, often from 1 to 2 hours. Products that offer sustained release or controlled release (microencapsulated) formulations, even with lower active ingredient concentrations, may provide longer protection times. Regardless of what product you use, if you start to get mosquito bites reapply the repellent according to the label instructions or remove yourself from the area with biting insects if possible.

Clothing and other products can be purchased pre-treated, or products can be treated using EPA-registered products. Permethrin is the only pesticide approved by the EPA for these uses. Permethrin binds tightly to the fabrics, resulting in little loss during washing and minimal transfer to the skin. Permethrin is poorly absorbed through the skin, although sunscreens and other products may increase the rate of skin absorption.

If you decide to use permethrin-treated clothing, consider these tips:

- Read the application instructions carefully and apply the product according to the label directions. Do not over-treat products.
- Permethrin treatments are only intended for use on fabrics; do not apply them directly to the skin or other items.
- Do not apply permethrin to clothing while it is being worn.
- Apply the product to clothing outdoors in well ventilated areas that are protected from wind.
- Hang treated fabrics outdoors and allow them to dry completely before wearing them.
- Wash permethrin treated clothing separately from other clothing items.



1.6 Poisonous Plants

The potential for contact with poisonous plants, such as poison ivy, oak, and sumac exists when performing fieldwork in wooded or boggy areas. Urushiol, an oily organic allergen found in plants, can cause an allergic reaction when in contact with the leaves or vines.

Poison ivy can be found as vines on tree trunks or as upright bushes. Poison ivy consists of three leaflets with notched edges. Two leaflets form a pair on opposite sides of the stalk, and the third leaflet stands by itself at the tip. Poison ivy is red in the early spring and turns shiny green later in the spring. Poison ivy grows throughout much of North America, including all states east of the Rocky Mountains. It is normally found in wooded areas, especially along edge areas where the tree line breaks and allows sunshine to filter through. It also grows in exposed rocky areas, open fields, and disturbed areas.

Poison oak can be present as a sparsely-branched shrub. Poison oak can grow anywhere in the United States with the exception of Hawaii, Alaska, and some southwest areas that have desert climates. Poison oak is similar to poison ivy in that it has the same leaflet configuration; however, the leaves have slightly deeper notches.

Poison sumac can be present in the form of a flat-topped shrub or tree. It has fern-like leaves, which are velvety dark green on top and pale underneath. The branches of immature trees have a velvety "down." Poison sumac has white, "hairy" berry clusters. Poison sumac grows exclusively in very wet or flooded soils, usually in swamps and peat bogs, in the eastern United States.







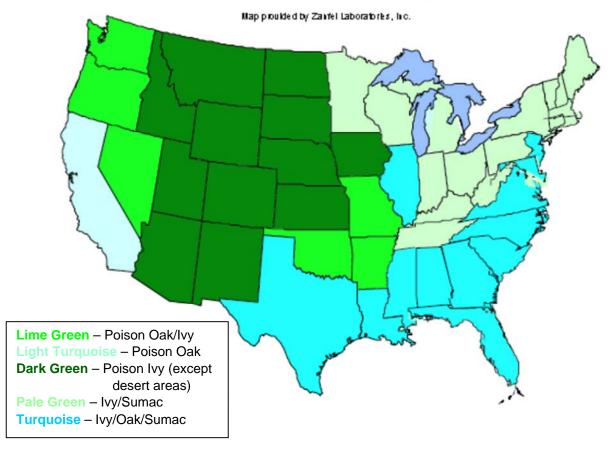
Poison Oak





Poison Sumac

U.S. Prevalence of Poison Ivy, Oak & Sumac



So unas: United States Department of Agriculture Plants Database, http://plants.usda.go.u/

To prevent exposure to these poisonous plants:

- Wear proper PPE, including long sleeves, long pants, boots, and gloves.
- Barrier skin creams, such as lotion containing bentoquatum (Tecnu®), may offer some protection prevent the occurrence of exposure symptoms.
- Contact with poison ivy, sumac, or oak may lead to a skin rash, characterized by reddened, itchy, blistering skin which needs first aid treatment. Employees with known allergies should identify themselves to the SSO or Project Manager prior to starting field work as a precautionary measure. If you believe you have contacted one of these plants:
 - o Immediately wash skin thoroughly with soap and water, taking care not to touch your face or other body parts.
 - o Contact the People and Safety Team and Project Manager immediately after caring for affected skin.



- o Wash exposed clothing separately in hot water with detergent.
- After use, clean tools, and soles of boots with rubbing alcohol or soap and lots of water. Urushiol can remain active on the surface of objects for up to 5 years.
- If a rash occurs, contact the People and Safety Team and complete and submit an Incident Report Form. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

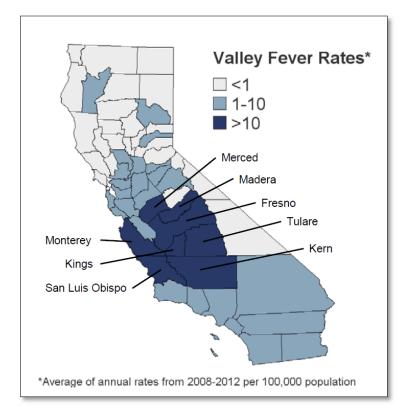
1.7 Sewage and Bacterial Impacted Sediments

Some project work may be conducted at sites that serve or have served as a combined sewer overflow and consequently may have received untreated sanitary sewage from numerous sources. Decomposed sewage can potentially be encountered within sites and their sediments. Sediments could contain soil and marine microorganisms, and bacterium associated with sewage. Many of these bacterium can cause illness through ingestion, direct contact, or the inhalation of a bio-aerosol possibly in the form of dust. Potential respiratory exposure to biological agents can also occur through the inhalation of aerosols produced during sediment handling activities. PPE as identified in the site-specific HASP will be worn to minimize potential exposures. Employees will follow the decontamination or disposal procedures identified in the HASP.

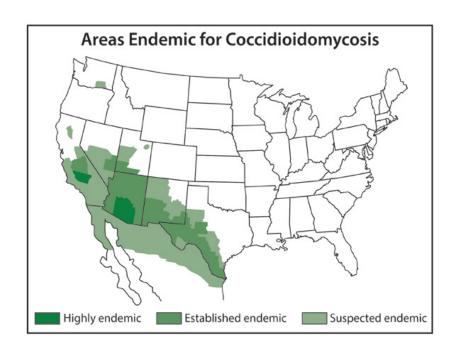
1.7.1 Fungal Spores in Soil – Valley Fever

Valley Fever is an illness that usually affects the lungs. It is caused by the fungus *Coccidioides immitis* that lives in the top 2 to 12 inches of soil in many parts of California. When fungal spores are present, any work activity that disturbs the soil, such as digging, grading, or other earth moving operations, or vehicle operation on dirt roads, can cause the spores to become airborne, therefore increasing the risk of Valley Fever. All employees on sites where the fungus is present, and who are exposed to dusty conditions and wind-blown dusts are at increased risk of becoming infected.

Valley Fever fungal spores are too small to be seen, and there is no reliable way to test the soil for spores before working in a particular place. Valley Fever can be found throughout the southwestern United States, parts of Mexico, and South America. Some California counties consistently have Valley Fever fungus present in the soil. In these regions Valley Fever is considered endemic. Health departments track the number of cases of Valley Fever illness that occur. This information is used to map illness rates as seen on the figures below from the Center of Disease Control Valley Fever Awareness website.



Rates of reported Valley Fever cases in California counties from 2008–2012. Darkest colored counties had the highest rates of Valley Fever.



When present, symptoms usually occur between 7 to 21 days after breathing in spores, and can include:

- Cough
- Fever
- Chest pain
- Headache

- Muscle aches
- Rash on upper trunk or extremities
- Joint pain in the knees or ankles
- Fatigue

Symptoms of Valley Fever can be mistaken for other diseases such as the flu (influenza) and TB (tuberculosis), so it is important for employees to obtain medical care for an accurate diagnosis and possible treatment.

While there is no vaccine to prevent Valley Fever, the following important steps must be taken in order to limit risk:

- Determine if the worksite is in an endemic area. Contact the local health department for more information about the risk in the county GEI is performing work that may disturb soils.
- Prepare work plans and work practices that reduce employee's exposure, which may include:
 - Provide air conditioned cabs with properly maintained dust filters for vehicles that generate heavy dust and make sure employees keep windows and vents closed.
 - o Suspend work during heavy winds.
- When exposure to dust is unavoidable, National Institute for Occupational Safety and Health (NIOSH)-approved respiratory protection with particulate filters rated as N95, N99, N100, P100, or High Efficiency Particulate Air (HEPA) must be provided. The Project Manager must work with the Safety Team to develop and implement a respiratory protection program in accordance with California's Occupational Safety and Health Administration (Cal/OSHA's) Respiratory Protection standard (8 CCR 5144) for the project.
- Take measures to reduce transporting spores offsite, such as:
 - o Clean tools, equipment, PPE, and vehicles before transporting offsite.
 - o If employee's clothing is likely to be heavily contaminated with dust, provide coveralls and change rooms, and showers where possible.

1.8 Injury Reporting

If a GEI employee suffers an injury, bite, or sting on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.9 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.10 References

http://www.cdc.gov/ncidod/dvbid/westnile/index.htm

http://www.cdc.gov/ncidod/dvbid/westnile/qa/insect_repellent.htm

http://www.epa.gov/pesticides/health/mosquitoes/insectrp.htm

http://www.cdc.gov/niosh/topics/lyme/

Protecting Yourself from Ticks and Mosquitoes, NIOSH Fast Facts, Publication No. 2010-119

http://npic.orst.edu/pest/mosquito/ptc.html

http://www.cdc.gov/features/valley-fever-10-things/

https://www.cdph.ca.gov/HealthInfo/discond/Documents/VFGeneral.pdf

https://blog.epa.gov/blog/tag/mosquitoes/

1.11 Attachments

None

1.12 Contact

Health&SafetyTeam@geiconsultants.com



1.13 Review History

- June 2016
- June 2014
- November 2013
- October 2010



STANDARD OPERATING PROCEDURES

SOP No. HS-002 Infectious Materials and Bloodborne Pathogens Exposure Control Plan

1.1 Objective

GEI personnel may come in contact with potentially infectious agents (materials) when performing first aid or cardiopulmonary resuscitation (CPR). Employees may also come into contact with these agents when working at certain contaminated sites (i.e., urban sites, discarded contaminated needles, or sewer outfall exposures). This standard operating procedure (SOP) has been developed to minimize the potential for exposure to employees who may contact, directly or indirectly, infectious agents.

1.2 General

This SOP is intended for use by employees engaged in work with the potential for contact with infectious materials and bloodborne pathogens. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for encounters with infectious materials or bloodborne pathogens and the control methods to be implemented by GEI employees. Exposure determinations are made by listing job functions impacted by potential exposure. The HASP will list job classifications or tasks in which occupational exposure could occur such as employees collecting samples or expected to provide First Aid. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Exposure determinations are made without regard to the use of personal protective equipment. When differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials. *Universal Precautions (i.e., treat all potentially infectious materials as if it were infected) will be used by GEI employees.*

1.3 Exposure Control Plan

1.3.1 Standard Procedures

A written Exposure Control Plan applicable to potential occupational exposure to blood or other potentially infectious materials will be developed as necessary based on project hazards. This plan will be accessible to each affected employee.

Sampling of materials containing potentially infectious materials will be performed in a manner that minimizes the potential for creating splashes, droplets, or aerosols. Mechanical pipetting devices will be used for manipulating sanitary sewer effluent. Mouth pipetting is prohibited.



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The use of glassware or equipment with sharp or pointed edges will be kept at a minimum to reduce the potential of injury that would create a direct route of entry into the body for infectious materials.

Minor cuts, scratches, or other breaks in the skin barrier will be covered prior to the handling of infectious materials. Employees experiencing exudative lesions or weeping dermatitis will refrain from direct contact with infectious materials.

Eating, drinking, smoking, or application of cosmetics is not permitted in areas where potentially infectious materials are handled or sampled.

Employees will wash and disinfect their hands, face, or other potentially contaminated skin surfaces upon completing the handling of infectious or potentially infectious agents or after rendering first aid. Hand washing facilities are readily available at all work locations. When provision of hand washing facilities is not feasible, either an appropriate antiseptic hand cleanser used in conjunction with clean cloth/paper towels or antiseptic towelettes will be provided.

All equipment and environmental and working surfaces will be cleaned and decontaminated after contact with blood or other potentially infectious materials. Specimens of blood or other potentially infectious materials (i.e. bandages) will be placed in a container which prevents leakage during collection, handling, processing, storage, transport, or shipping.

1.3.2 Personal Protective Equipment

When there is a potential for occupational exposure GEI will provide, at no cost to the employee, appropriate personal protective equipment (PPE). PPE will be worn to reduce the potential of exposures to splashes or aerosols. At a minimum, PPE will include safety glasses and appropriate gloves, but may also require the use of face, respiratory, foot, and full-body protection. Refer to the site-specific HASP for specific PPE requirements.

Disposable PPE used in the handling or sampling of infectious materials will be appropriately disposed of and not reused.

1.3.3 Medical Monitoring

Medical monitoring is required for an employee when a potential workplace exposure has occurred. GEI will make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-exposure evaluation and follow-up to all employees who have had an exposure incident. These are made available at no cost to the employee. The employee must follow the GEI Incident Reporting procedures regarding the potential exposure as soon as possible. For infectious agents in which a medically accepted vaccination has been developed (e.g., hepatitis B virus) (HBV) potentially exposed employees will be given the option to receive an inoculation at no cost. Employees who have been exposed will be given the option to receive a confidential medical evaluation also at no cost. Required records for exposed



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employees will be kept confidential. GEI will keep these medical records for at least the duration of employment plus 30 years and will be maintained for 3 years from the date on which the training occurred. All records required to be maintained shall be made available and GEI will comply with the requirements involving transfer of records set forth in 29 CFR 1910.1020(h).

1.3.4 Training

Training will be conducted at the time of initial assignment to tasks where exposure may take place and at least annually thereafter. All training for employees shall be provided within one year of their previous training. Employees with a reasonable risk for exposure must complete Bloodborne Pathogen training covering the following topics:

- An explanation of the Occupational Health and Safety Administration (OSHA) bloodborne pathogen standard.
- A general explanation of bloodborne diseases.
- An explanation of the modes of transmission of bloodborne diseases.
- Communications of hazards to employees.
- An explanation of the GEI's Bloodborne Pathogen SOP and exposure control plan.
- Appropriate methods for recognizing tasks that involve potential exposure.
- An explanation of the use and limitations of methods to prevent exposure.
- Proper types, use, handling, decontamination, and disposal of PPE.
- The availability of HBV vaccines and the procedures for obtaining a vaccination.
- Appropriate actions to take during an emergency involving bloodborne pathogens.
- Post-exposure procedures.
- An explanation of required signs and labels.

1.4 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health and Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People and Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the RHSO will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other



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appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.5 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.6 Attachment

None

1.7 Reference

OSHA 29 CFR 1910.1030 – Bloodborne Pathogens

1.8 Contact

SafetyTeam@geiconsultants.com

1.9 Review History

- October 2018
- June 2016
- June 2014
- November 2013
- January 2011
- November 2010



STANDARD OPERATING PROCEDURES

SOP NO. HS-003 Container Management

1.1 Objective

This Standard Operating Procedure (SOP) has been developed to minimize the potential for injuries to GEI employees performing container and drum handling and sampling, through proper use of engineering and administrative controls, personal protective equipment (PPE), and education.

1.2 General

This SOP is intended for use by employees engaged in work with the management of containers that may contain hazardous substances or contaminated media. The site-specific health and safety plan (HASP) should include a hazard assessment and control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

Hazardous substances and contaminated media will be handled, transported, labeled, and disposed of in accordance with this paragraph. Drums and containers will meet the appropriate United States Department of Transportation (DOT), Occupational Safety and Health Administration (OSHA), and Environmental Protection Agency (EPA) regulations for the wastes that they contain.

Site operations will be organized to minimize the amount of drum or container movement. Prior to movement of drums or containers, employees exposed to the transfer operation will be notified of the potential hazards associated with the contents of the drums or containers. Unlabeled drums and containers will be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled.

Fire extinguishing equipment meeting the requirements of 29 CFR Part 1910, Subpart L, shall be on hand and ready for use to control incipient fires.

DOT specified salvage drums or containers and suitable quantities of proper absorbent will be kept available and used in areas where spills, leaks, or ruptures may occur. Where spills may occur, a spill containment program, which may be part of the HASP, will be implemented to contain and isolate the entire volume of the hazardous substance being transferred.

1.3 Opening Drums and Containers

The following procedures will be followed in areas where drums or containers are being opened:

- Employees not actually involved in opening drums or containers will be kept a safe distance from the drums or containers being opened.
- If employees must work near or adjacent to drums or containers being opened, a suitable shield that does not interfere with the work operation will be placed between the employee and the drums or containers being opened to protect the employee in case of accidental release.
- GEI employees will not handle or attempt to open bulging containers. Employees will not stand upon or work from drums or containers. GEI will contract with a hazardous waste company to handle, manage, and dispose of a bulging drum.

1.4 Material Handling Equipment

Several types of equipment can be used to move drums: (1) a drum grappler attached to a hydraulic excavator; (2) a small front-end loader, which can be either loaded manually or equipped with a bucket sling; (3) a rough terrain forklift; (4) a roller conveyor equipped with solid rollers; and (5) drum carts designed specifically for drum handling. GEI employees will not operate heavy equipment to move drums. This will be handled by an authorized subcontractor.

The following procedures can be used to maximize worker safety during drum handling and movement:

- Train personnel in proper lifting and moving techniques to prevent back injuries.
- Make sure the vehicle selected has sufficient rated load capacity to handle the anticipated loads, and make sure the vehicle can operate smoothly on the available road surface.
- Air condition the cabs of vehicles to increase operator efficiency; protect the operator with heavy splash shields.
- Supply operators with appropriate respiratory PPE when needed. Normally either
 a combination SCBA/SAR with the air tank fastened to the vehicle, or an airline
 respirator, and an escape SCBA are used because of the high potential hazards of
 drum handling. This improves operator efficiency and provides protection in case
 the operator must abandon the equipment.
- Have overpacks ready before any attempt is made to move drums.
- Before moving anything, determine the most appropriate sequence in which the various drums and other containers should be moved. For example, small



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containers may have to be removed first to permit heavy equipment to enter and move the drums.

- Exercise extreme caution in handling drums that are not intact and tightly sealed.
- Ensure that operators have a clear view of the roadway when carrying drums. Where necessary, have ground workers available to guide the operator's motion.

1.5 Leaking, Open, and Deteriorated Drums

If a drum containing a liquid cannot be moved without rupture, immediately transfer its contents to a sound drum using a pump designed for transferring that liquid. Contract an approved vendor to immediately use an over pack container if the:

- Leaking drum contains sludge or semi-solids;
- Open drum contains liquid or solid waste;
- Deteriorated drum can be moved without rupture.

1.6 Radioactive Wastes

GEI does not routinely handle or manage radioactive waste. If required to do so for a project, procedures will be approved by the Corporate Health and Safety Officer (CHSO) and Regional Health and Safety Officer (RHSO).

1.7 Shock-Sensitive Wastes

GEI employees will not handle shock-sensitive waste. Shock-sensitive waste or chemicals may explode with friction, movement or heat. Some chemicals are shock-sensitive by nature-, others become shock-sensitive through drying, decomposition, or slow reactions with oxygen, nitrogen, or the container. Some chemicals that are, or can, become shock-sensitive will have that hazard noted in the safety data sheet (SDS).

• Drums and containers containing packaged laboratory wastes will be considered to contain shock-sensitive or explosive materials until they have been characterized. Caution: Shipping of shock-sensitive wastes may be prohibited under U.S. Department of Transportation regulations. Shippers will refer to 49 CFR 173.21 and 173.50.

1.8 Laboratory Waste Packs

It is unlikely that GEI employees work in an environment where laboratory waste packs are used. However if one is found, do not handle or open it. Complete the incident reporting form to identify finding the pack and then work with the Project Manager to find the appropriate means of disposal.

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1.9 Sampling of Drum and Container Contents

Sampling of containers and drums will be done in accordance with a site-specific sampling plan that will be developed in conjunction with a site-specific HASP.

1.10 Staging Areas

Drums and containers will be identified and classified prior to packaging for shipment. Drum or container staging areas will be kept to a minimum number as approved by the client to safely identify and classify materials and prepare them for transport. Staging areas will be provided with adequate access and egress routes. Bulking of hazardous wastes will be permitted only after a thorough characterization of the materials has been completed and approved by the Client. GEI employees will not sign manifests unless a written authorization agreement is in place with the Client.

1.11 Shipment and Training

Shipment of materials to off-site treatment, storage, or disposal facilities involves the entry of waste hauling vehicles into the site. U.S. Department of Transportation (DOT) regulations (49 CFR Parts 171-178) and EPA regulations (40 CFR Part 263) for shipment of wastes must be complied with. Employees managing hazardous waste on behalf of a client must complete annual RCRA training and triannual DOT hazardous materials training. Training must be current and a manifest agreement with the client must be in place before employees can sign hazardous waste manifests on behalf of a client.

1.12 Tank and Vault Procedures

GEI employees do not routinely sample vaults and tanks. Entry procedures will be coordinated and approved by the CHSO and RHSO.

1.13 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the RHSO will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the

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potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.14 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection and appropriate training must be current

1.15 References

OSHA 1910.120 Hazardous Waste Operations and Emergency Response (j) Handling of Drums and Containers

1.16 Attachment

None.

1.17 Contact

Health&SafetyTeam@geiconsultants.com

1.18 Review History

- June 2016
- May 2014
- November 2013
- October 2011
- Initial Version Date Unknown

STANDARD OPERATING PROCEDURE

HS-004 Driver Safety

1.1 Objective

GEI has implemented a Safe Driving Program to encourage safe driving habits and promote the ongoing safety of our staff and the communities where we work. For more information, refer to the Operation of Vehicles section of GEI's Employee Handbook.

This Standard Operating Procedure (SOP) provides requirements and recommendations to minimize the potential risks while operating or riding in a motor vehicle.

1.2 General

GEI employees will adhere to the following requirements when operating a vehicle while conducting business on behalf of GEI. These requirements apply to GEI-owned, rental, and personal vehicles used to conduct GEI business:

- Employees must maintain a valid and current driver's license.
- Employees using a personal vehicle for work-related travel must have proper insurance coverage that meets the requirements in the state in which they reside.
- Employees must wear their safety belt while in a moving vehicle.
- Vehicle incidents will be reported in accordance with GEI's Incident Reporting procedures (*refer to* GEI's Safety App for smart phones or the Safety page on the GEI intranet.).
- Vehicles will be properly maintained and safely operated (*refer to* GEI's Fleet Maintenance Program).
- Employees will follow safe driving behaviors, which include limiting distractions such as manipulating radios or other equipment that may cause a distraction.
 Employees should not exceed the posted speed limit and should maintain a safe distance between other vehicles.
- When parking a vehicle at a job site, the employee should position the vehicle in a manner which reduces or eliminates the need to operate the vehicle in reverse. It is recommended, a safety cone should be placed at the rear of the vehicle after parking the vehicle and be removed prior to moving the vehicle. This precautionary measure makes the employee aware of other vehicles, equipment, and structures within the backup radius of the vehicle.

When driving an unfamiliar vehicle (rental or GEI-owned), it is the driver's responsibility to orient themselves to the vehicle by:



- Walking around the vehicle to observe the condition of the vehicle and hazards that could be within the travel path.
- Becoming familiar with the size of the vehicle.
- Note if the vehicle has anti-lock braking system (ABS¹).
- Adjusting mirrors (rear and side).
- Adjust seats to be situated as far back as safely practical, away from the air bag, located in the steering wheel.
- Becoming familiar with dashboard, center console, and steering controls.
- Locating the turn signals, windshield wipers, lights, emergency flashers, and the heating, air conditioning, and defrost controls.

1.3 Driving Defensively

Driving defensively means not only taking responsibility for oneself and actions but also keeping an eye on "the other guy." Good defensive drivers may be able to anticipate what the other driver will do next. GEI recommends the following guidelines to help reduce risks while driving:

- Do not start the vehicle until each passenger and any belongings are secured in the vehicle.
- Remember that driving above or below the speed limit can increase the likelihood of a collision.
- Be aware of impaired drivers; if a car is straddling the center line, weaving, making wide turns, stopping abruptly, or responding slowly to traffic signals, the driver may be impaired or using a cellular telephone. Avoid an impaired driver by turning right at the nearest corner or exiting at the nearest exit.
 - o If it appears that an oncoming car is crossing into your lane, pull over to the roadside, sound the horn, and flash the headlights.
 - o If an unsafe or suspicious driver is observed, notify the police.
- Follow the rules of the road. Do not contest the "right of way" or try to race another car during a merge. Always be respectful of other motorists.

¹ ABS is a mechanism that allows the wheels on a vehicle to maintain contact with the surface of the road, based on inputs from the driver (braking), to prevent the wheels from locking up (ceasing rotation) and to avoid an uncontrolled skid.



- Allow large vehicles, including tractor trailers, extra breaking distance, turning radius, and avoid traveling in the other driver's blind spots.
- Do not follow too closely. GEI employees should use a minimum of "3-second following distance."
- While driving, be cautious, aware, and responsible.
- Use extra caution, observe road signs, and reduce speed in construction areas and school zones.
- Always be aware of pedestrians, bicyclists, and motorcyclists.

1.4 Cellular Phone Use and Other Distractions

Refer to the *Portable Communication Device Use While Driving* section of the GEI Employee Handbook for GEI's policy on the use of cellular telephones while operating a vehicle.

1.5 Drugs and Alcohol

The use of illegal drugs or alcohol is prohibited when driving a vehicle on GEI business. Be aware of the side effects of prescription and over-the-counter medications which can impair an employee's ability to drive.

1.6 Adverse Driving Conditions

When operating a vehicle, its possible adverse driving conditions may be encountered. Below is a list of possible conditions and how they can be mitigated.

1.6.1 Driving at Night

Vision maybe limited at night due to impairment of the driver's depth perception, color recognition, and peripheral vision. Another factor adding danger to night or early morning driving is fatigue. Drowsiness makes driving more difficult by dulling concentration and slowing reaction time. Effective measures to minimize these hazards by preparing the car and following guidelines:

- Check the headlights to ensure they are properly aimed. If you notice the
 headlights are not properly aimed, report it to the Branch Manager, or if
 applicable the rental car agent. Misaimed headlights blind other drivers and
 reduce the driver's ability to see the road.
- In addition to the known hazards of consuming alcohol prior to driving, night driving can potentially be affected because the recovery rate of glare from headlights is prolonged. Thus reducing your ability to see.



- Smoking in GEI vehicles and rentals is not permitted. When driving a personal vehicle for business, avoid smoking while driving. Nicotine and carbon monoxide may hamper night vision.
- Observe driving safety as soon as the sun goes down. Twilight is one of the most difficult times to drive, because the eyes' pupils are constantly changing to adapt to the growing darkness Always use headlights at dusk and at dawn; lights will not help the driver see better in early twilight, but they will make it easier for other drivers to see your car. Drive at a speed that allows you to see the road that is within the headlights span. Driving in a manner that prevents you from seeing hazards as they are illuminated is known as overdriving the headlights; it may be necessary for the driver to reduce speed to be prepared to brake within the illuminated area of the headlights.
- If an oncoming vehicle does not lower beams from high to low, avoid glare by watching the right edge of the road and using it as a steering guide.
- The driver should make frequent stops for light snacks and exercise. If the driver is too tired to drive, stop in a safe area and get some rest.

1.6.2 Snow/Freezing Conditions

When snow and ice are present, be prepared by following these winter driving safety tips.

1.6.2.1 Prepare the Vehicle Before a Snowstorm

- Check under the hood and take a look at the vehicles cooling system. Make sure the vehicle contains adequate antifreeze and the hoses are in good condition.
- Test heaters and defrosters ahead of time to make sure they are in good working condition.
- Test the windshield wipers and check the condition of the wiper blades. If wipers leave streaks on the windshields, replace the blades at the next possible opportunity. Keep the receipt to expense the cost with GEI or with the car rental company.
- It is recommended that a windshield washer/antifreeze solution is used during winter conditions.
- Check the lights on the vehicle and periodically clear them of snow and dirt.
- Vehicle batteries need extra power in cold conditions. Make sure the battery's terminals are clean and cables are secure.
- Determine if the vehicle has a anti-lock brake (ABS) system.
- Keep the gas tank at least half-full in the winter to help avoid gas line freeze up.



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1.6.2.2 Driving During and After a Snowstorm

- Wear sunglasses to aid in limiting reflection from snow.
- Be aware of blind spots created by snow banks.
- Be extra cautious of pedestrians and other vehicles in intersections.
- Allow extra time for braking and increase the distance between your car and the car immediately in front of the car.
- Reduce speed and do not exceed the posted limit.
- If the tires starts to lose traction, remove the foot off the gas and gradually reduce speed. Accelerate slowly once traction is regained.
- If the vehicle starts to skid, and does not have anti-lock brakes, steer into the skid. This will bring the back end of the car in line with the front. Avoid using the brakes. If the vehicle does have anti-lock brakes, firmly brake as you steer into the skid.

1.6.3 Driving In the Rain

To prevent losing control of the car on wet pavement, take these preventive measures.

- Prevent skids by driving slowly and carefully, especially on curves.
- Steer and brake with a light touch.
- When necessary to stop or slow, do not brake hard or lock the wheels.
- Maintain mild pressure on the brake pedal.

Skidding

If the car begins to skid, ease the foot off the gas, and carefully steer the car in the direction you want the front of the car to go. For cars without anti-lock brakes, avoid using the brakes. This procedure, known as "steering into the skid," will bring the back end of the car in line with the front. If the car has anti-lock brake systems (ABS), brake firmly as you steer into the skid.

Hvdroplaning

Hydroplaning happens when the water in front of the tires builds up faster than the car's weight can push it out of the way. The water pressure causes the car to lose contact with the road surface and slide on a thin layer of water between the tires and the road. At this point, the car can be completely out of contact with the road, making it possible for the driver to skid or drift out of the lane, or even off the road.



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To avoid hydroplaning, keep the tires properly inflated and maintain good tread on the tires. If tires need to be replaced on a company vehicle, notify the branch manager or their designee. Slow down when roads are wet, and stay away from puddles. Try to drive in the tire tracks left by the cars in front of the vehicle. If the car begins to hydroplane, do not brake or turn suddenly. This could throw the car into a skid. Ease the foot off the gas until the car slows; accelerate slowly once traction is regained. If braking is needed, do so gently with light pumping actions. If the car has ABS, brake normally; the car's computer will mimic a pumping action, as necessary.

If weather conditions worsen to the point where the driver is not comfortable driving, pull the vehicle over to a safe location until conditions improve. Do not drive during severe weather conditions. Do not attempt to drive on roads with standing water or that have been flooded. Find an alternate route if these conditions exist.

1.6.4 Off Road

If operation of a vehicle is required off public or private roads or in situations where four-wheel-drive vehicles are required, the appropriate vehicle for the situation will be used.

Be sure any gear or equipment is secured inside the vehicle so it doesn't bounce around while the vehicle is off-road.

- Know the underside of the vehicle. Look under the vehicle and learn where the lowest-hanging parts are located so they are not damaged.
- Scout tricky terrain on foot. Don't hesitate to get out of the vehicle to examine, up close, the terrain and soil conditions. And be sure to scout out what's on the other side of a hill ahead of time so there are no surprises.
- Drive cautiously. Drive, "as slow as possible, as fast as necessary." Remember to use the gears to efficiently manage engine power, braking, and torque.
- Create a mental picture. Look ahead and visualize the paths to the vehicle will travel. Follow those paths.
- Drive straight up and down hills. Avoid diagonal lines that put the vehicle in a situation where it might roll.

1.7 Driver Training

GEI employees are required to complete driver safety training every 3 years. This training is managed by the People Team and will be assigned through GEI's e-learning provider.



Revised Date: December 2017

1.8 Injury Reporting

GEI employees will report incidents involving GEI personnel or subcontractor personnel, such as: lost time injuries, injuries requiring medical attention, near miss incidents, fires, fatalities, accidents involving the public, chemical spills, vehicle accidents, and property damage. The following steps must be followed when an incident occurs:

- 1. In life-threatening situations, immediately call 9-1-1.
- **2.** Stop work activity to address any injury, illness, property damage, spill or other emergency.
- **3. Immediately** report any incidents to your Supervisor/Project Manager and Regional Health & Safety Officer.
- **4.** If your injury or illness is not life-threatening, call Medcor Triage at 1-800-775-5866 to speak with a medical professional.
- **5.** Complete an Incident Report Form **immediately** after addressing the incident. Report forms are available on GEI's Safety App (for smart phones) and on the Safety page on the GEI intranet.

For vehicle accidents involving another vehicle or damage to property, the employee will take pictures of each vehicle or property involved in the incident and obtain a police report. In some municipalities police will not be dispatched to a non-injury accident, but every effort needs to be made to try and obtain the report.

1.8.1 Injury Triage Service

If a GEI employee experiences a work-related injury that is not life-threatening, the employee will initiate a call to Medcor Triage at 1-800-775-5866. The injured employee will detail any medical symptoms or complaints which will be evaluated by a Registered Nurse (RN) specially trained to perform telephonic triage. The RN will recommend first aid self-treatment or refer the injured employee for an off-site medical evaluation by a health professional at a clinic within GEI's workers compensation provider network. GEI employees are still required to follow our Accident Reporting procedures as listed above.

1.9 Limitations

Follow safety procedures as defined in the site-specific HASP.

1.10 References

National Safety Council Oklahoma Safety Council GEI Consultants, Inc. Employee Handbook

1.11 Attachments



SOP No. HS-004 Revision No. 5

Revised Date: December 2017

None

1.12 Contact

SafetyTeam@geiconsultants.com

1.13 Review History

- December 2017
- November 2016
- May 2014
- November 2013
- January 2011



STANDARD OPERATING PROCEDURES

SOP No. HS-006 Excavations and Trenches

1.1 Objective

The objective of this Standard Operating Procedure (SOP) is to highlight the hazards and safety procedures when work activities include excavations and/or trenches. The following guidelines will be followed when excavations or trenches are present on GEI projects.

1.2 General

This SOP is intended for use by employees engaged in work on project sites that include trenching and/or excavation operations. The site-specific health and safety plan (HASP) must include a hazard assessment for the project that identifies the potential for trenching and excavation hazards and the control methods to be implemented by GEI employees. These hazards must be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

An "excavation" is any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal.

A "trench" (trench excavation) is a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet.

Do not enter a trench or excavation without consulting with the Project Manager, Corporate Health and Safety Officer (CHSO), or Regional Health and Safety Officer (RHSO).

1.2.1 Personal Protective Equipment

Employees will be provided with the personal protective equipment (PPE) necessary to help protect them from the hazards of work activities related to excavations and/or trenches. All employees will wear a hard hat, steel too or composite too boots, and safety glasses at a minimum. In addition, face shields, gloves, fall protection and hearing protection may be required. PPE must be maintained in good condition, kept clean and properly stored when not in use. More information regarding PPE is located in Section 6 of GEI's Corporate Health and Safety Program.



1.3 Hazards

Hazards associated with excavations and trenches can include collapse, falls, falling objects, hazardous atmospheres, and incidents involving mobile equipment. One cubic yard of soil can weigh as much as a car.

1.4 Entry

GEI employees will not enter trenches or excavations that do not comply with OSHA 29 CFR 1926.650. If a project requires GEI employees to enter a trench or excavation, the trench or excavation must meet the following requirements described in the following sections.

Do not enter a trench or excavation without consulting with the Project Manager, Corporate Health and Safety Officer (CHSO), or Regional Health and Safety Officer (RHSO).

1.4.1 Competent Person

The excavation must be inspected prior to the start of each shift by a competent person who most likely will work for the contactor performing the work. The competent person is an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary, or dangerous to workers, soil types and protective systems required, and who is authorized to take prompt corrective measures to eliminate these hazards and conditions. GEI generally does not act as the competent person.

1.4.2 Soil Type

The competent person for the project will determine what the soil type is and what type of protective system will be implemented. The type of soil where the excavation or trench is being dug has significant influence on what type of protective system will need to be in place. There are four types of soil: stable rock, type A, type B, and type C. As you progress from stable rock to type C, the cohesive properties of the soil change the soil becomes less stable.

1.4.3 Protective System

A protective system is required for trenches or excavations greater than 5 feet in depth unless the excavation is made entirely in stable rock. In special situations the competent person may require a protection system for an excavation that is less than 5 feet deep. The competent person is responsible for assessing the soil type and the protective systems required for a specific trench when an excavation is less than 20 feet deep. If the excavation is greater than 20 feet in depth, the protection system requires a design by a registered professional engineer or based on tabulated data prepared and/or approved by a registered professional engineer.



The protective system will be designed based on soil type, depth of excavation, water level, loads adjacent to the excavation, changes in weather conditions, or other operations in the area. Protective systems can include sloping or benching of the sidewalls, shoring the sidewalls using an approved support system, or shielding workers with a trench box or other similar type of support.

The different types of protective systems include:

Benching is a method of protecting workers from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels of steps, usually with vertical or near vertical surfaces between levels. Benching cannot be done with Type C soil.

Sloping involves cutting back the trench wall at an angle inclined away from the excavation.

Shoring requires installing aluminum hydraulic or other types of support structures to prevent soil movement and cave-ins.

Shielding protects workers by using trench boxes or other types of supports to prevent soil cave-ins.

Designing a protective system can be complex because many factors must be considered: soil classification, depth of cut, water content of soil, changes caused by weather or climate, surcharge loads (e.g., spoil, other materials to be used in the trench) and other operations in the vicinity.

1.4.4 Access and Egress

Excavations and trenches greater than 4 feet in depth require a safe access and egress including ladders, steps, or ramps. These points of access and egress are to be no greater than 25 feet of lateral travel in any direction.

1.4.5 Atmospheric Hazards

Where oxygen deficiency (atmospheres containing less than 20.7% oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation will be tested before employees enter excavation.

1.5 Subcontractor Oversight

When GEI is overseeing excavation activities performed by a subcontractor, the following safety hazards should be monitored:



- Care must be taken not to create new hazards like narrow walkways along edges of an excavation.
- Heavy equipment must not be parked or working at the edge of the excavation.
- Spoils should not be stockpiled within 2 feet of the trench edges.
- Confirm with subcontractor that underground utilities have been located before any excavation or trenching activities begin (*refer to* SOP HS-014 Utility Markout).
- Confirm with the subcontractor that the excavation or trench has been tested for hazardous atmospheres before entering.
- Confirm with the subcontractor that the excavation or trench has been inspected by a competent person before each work shift and after any type of precipitation. If hazards are identified during this inspection, verify that the hazards are controlled prior to entering the trench or excavation.
- GEI employees will not work under raised or suspended loads.
- Excavations/trenches must be protected at the end of a work shift if they are to be left open. These trenches/excavations must be covered and a sign that reads "Hole" must be placed in a location that will notify anyone of the hazard. Or a secure barricade will need to be installed.

In circumstances where GEI employees are working on sites where a contractual agreement with the excavation contractor does not exist and we cannot confirm the above stated conditions, entry into trenches or excavations will not be conducted. Any safety concerns that arise should be communicated to the Project Manager and, if necessary, the client.

1.6 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened.



The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.7 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

Some states, including Massachusetts, require a trench permit prior to trenching or excavation activities. Verification of local requirements will be evaluated in the planning stage.

1.8 References

OSHA 29 CFR 1926.650 – Subpart P; Excavations

OSHA Construction eTool – http://www.osha.gov/SLTC/etools/construction/index.html

OSHA FactSheet Trenching and Excavation Safety – viewed on 9/13/2016

https://www.osha.gov/OshDoc/data_Hurricane_Facts/trench_excavation_fs.pdf

1.9 Attachments

None

1.10 Contact

Health&SafetyTeam@geiconsultants.com

1.11 Review History

- September 2016
- May 2014
- November 2013
- January 2011
- Initial Version Date Unknown



STANDARD OPERATING PROCEDURES

SOP No. HS-008a Non-Powered Hand Tools

1.1 Objective

This Standard Operating Procedure (SOP) is intended for use by employees working with non-powered hand tools. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the hazards associated with the non-powered hand tools that will be used. These hazards should be reviewed during the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General

Misuse of hand tools accounts for the majority of accidents and injuries involving hand tools. Only use a tool for the task which it was designed for. If the right tool isn't available contact the Project Manager and discuss what is needed. Improper maintenance is another leading cause of injuries. Employees using hand tools may be exposed to a number of other potentially serious hazards: falling objects (i.e., objects can fall as a result of contact with tools or objects which are abrasive or splash), harmful dust, fumes mists, vapors, and gases, as well as contact with electrical power sources.

1.2.1 Condition of Tools

All hand tools, whether furnished by GEI or the employee, will be maintained in safe working condition. All hand tools must be inspected before use. Never use a tool if its handle has splinters, burrs, cracks, splits or if the head of the tool is loose. Never use impact tools such as hammers, chisels, punches or steel stakes having mushroomed (flattened) heads. Tag worn, damaged or defective tools "Out of Service" and do not use them; notify your Branch Manager or Project Manager so that the tool can be replaced or repaired. If the tools cannot be repaired they will be disposed of properly. GEI does not issue or permit the use of unsafe hand tools.

1.2.2 Personal Protective Equipment

Employees using hand tools will be provided with the personal protective equipment (PPE) necessary to protect them from the hazard of the tool as well as the associated hazards with using the tool. (i.e., projectile debris, dust, etc.). All employees will wear work gloves, steel toe or composite toe boots, and safety glasses at a minimum. In addition, face shields and hearing protection may be required. Most hand injures can be avoided with the proper use of PPE. PPE must be maintained in good condition, kept clean and properly stored when not in use. More information regarding PPE is located in Section 6 of GEI's Corporate Health and Safety Program.



1.2.3 General Safe Practices

Never wear sandals, open-toed or canvas shoes when working with tools. Always tie back long hair. Avoid loose-fitting clothes which might become entangled in a tool. Always remove rings and other jewelry. Make sure your grip and footing are secure when using large tools. Never carry tools up ladders; use a tool belt, hoist, or a rope. Use extra caution when using tools at heights — a falling tool could kill a co-worker. Always pass a tool to another person by the handle — never toss it to them. Never use a tool with hands are wet, oily, or greasy. Select ergonomically-designed tools for work tasks when movements are repetitive and forceful. Always make sure observers are at a safe distance. Always secure work with a vice, clamp, or other support.

1.3 Non-Power Hand Tools

Non-powered hand tools include anything from axes to wrenches. Even though the tool is powered by human inertia, injuries from improper use of non-powered hand tools often involve severe disabilities.

1.3.1 **Knives**

Only use a knife with a sharpened blade. Pull the knife through the object and away from your body; pulling motions are easier to manage. Never use a knife if its handle has splinters, burrs, cracks, splits or if the blade is loose. Knives should never be used as screwdrivers, pry bars, or can openers. Never pick up knives by their blades. Always carry knives with their tips/points toward the floor. Never carry knives, scissors, or other sharp tools in pockets. Never attempt to catch a falling knife. When not in use, knives should be stored in sheaths. Box cutters will be self-retracting.

1.3.2 Wrenches

Never use wrenches that are bent, cracked, badly chipped, or having loose or broken handles. Discard any wrench with spread or battered jaws; if the handle is bent; or if a wrench has broken or battered points and notify your Branch Manager so that a replacement can be made. Never slip a pipe over a single head wrench handle to increase leverage. Never use a shim to make a wrench fit. Pull on a wrench using a slow, steady motion. Do not use push force on a wrench; you could lose your balance if the wrench slips.

1.3.3 Screwdrivers

Always match the size and type of screwdriver blade to fit the head of the screw. Do not hold the work piece against your body while using a screwdriver. Never put your fingers near the tip of a screwdriver when tightening a screw. Never use a screwdriver to make a starting hole for screws. Never use a screwdriver as a chisel, pry bar, or nail puller. When performing electrical work, always use an insulated screwdriver. Never use a screwdriver to test the charge of a battery.



1.3.4 Hammers

Never use a hammer if your hands are oily, greasy or wet. Always check behind you before swinging a hammer. Use a claw hammer for pulling nails. Never strike nails or other objects with the "cheek" of the hammer. Do not strike a hardened steel surface, such as a cold chisel, with a claw hammer. Never strike one hammer against another hammer. Never use a hammer as a wedge or a pry bar.

1.3.5 Pliers

Never use pliers which are cracked, broken, or sprung. Never use pliers as a wrench or a hammer. Do not attempt to force pliers by using a hammer on them. Never slip a pipe over the handles of pliers to increase leverage. When performing electrical work, always use insulated pliers. When using diagonal cutting pliers, shield loose pieces of cut material from flying into the air by using a cloth or your gloved hand.

1.3.6 **Snips**

Never use snips as a hammer, screwdriver, or pry bar. Always wear safety glasses or safety goggles when using snips to cut materials. Always wear work gloves when cutting materials with snips. Keep the blade aligned by tightening the nut and bolt of the snips. Never use straight cut snips to cut curves. Always use the locking clip on the snips when you have finished using them. Never leave or store snips in the open position.

1.3.7 Hand Saws

Always keep handsaws sharp and free of rust to prevent them from binding or jumping. Never carry a saw by the blade. Always hold the work piece firmly against a work table. Keep control of saws by releasing downward pressure at the end of the stroke. Never use an adjustable blade saw such as a hacksaw, coping saw, keyhole saw, or bow saw, if the blade is not taut. Oil saw blades after each use. Never force the saw through the cut as this may cause the saw to buckle or fly out of the groove and cause injury.

1.3.8 Chisels

Only use sharpened chisels. Never use chisels having mushroomed (flattened) striking heads. Whenever possible, hold a chisel by using a tool holder. Clamp small work pieces in a vise and chip towards the stationary jaw of the vise. Chip or cut away from yourself and keep both hands in back of the cutting edge. Always wear safety glasses or a face shield.

1.3.9 Vise and Clamps

Never use a vise having worn or broken jaw inserts, or having cracks or fractures in the body of the vise. Position the work piece in the vise so the entire face of the jaw supports the work piece. When clamping a long work piece in a vise, support the far end of the work piece by using an adjustable pipe stand or saw horse. Never slip a pipe over the handle of a vise to increase leverage. Never use a C-clamp for hoisting materials. Never use a C-clamp as a permanent fastening device.



1.3.10 Jacks

A manufacture's rated capacity must be clearly marked on all jacks and all jacks must have a stop indicator. When using a jack, never exceed the capacity of the stop indicator. Jacks should be lubricated and inspected regularly. When setting up a jack, ensure the base is centered on a firm, level surface. The jack head should also be placed against a level surface. Lift force should be applied evenly. Put a block under the base of the jack when the foundation is not firm. If it seems likely the cap could slip, place a block between the jack cap and load. Immediately block the load after it is lifted.

1.4 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or supervisor/project manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.5 Limitations

Follow safety procedures as defined in the site-specific HASP or in the manufacturer's specifications. Appropriate PPE must be worn correctly to provide the intended level of protection. If a hand tool is being used that is not identified in this SOP consult the manufacturer's literature and contact the Safety Team so we can include the information in a future version of this SOP.

1.6 References

OSHA Standards for the Construction Industry, Subpart I Risk Analytics, LLC Hand Tools Training, 2006

1.7 Attachments

None



1.8 Contact

Health&SafetyTeam@geiconsultants.com

1.9 Review History

- July 2016
- May 2014
- August 2011
- October 2010
- One revision date unable to be found



STANDARD OPERATING PROCEDURES

SOP NO. HS-009 Hazardous Substances Exposure Management

1.1 Objective

This Standard Operating Procedure (SOP) is intended to outline the steps GEI employees will take to identify potential hazards associated with exposure to hazardous substances, the risks associated with these hazards, and the proper controls to use to minimize exposure. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential of encountering a hazardous substance and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General

A hazardous substance is any substance that has one or more of the following intrinsic properties:

- Explosiveness
- Flammability
- Ability to oxidize
- Human toxicity (acute or chronic)
- Corrosiveness (to human tissue or metal)
- Ecotoxicity (with or without bioaccumulation)
- Capacity, on contact with air or water, to develop one or more of the above properties

1.3 Hazard Identification

An initial identification of hazards should be done based on a review of available documents including lists of chemicals used on site, analytical data from soil, surface water, groundwater, air, spill history, site history, equipment on site, maps, photos, and a preliminary survey.

Once hazardous substances are identified the regulated exposure limits need to be identified. Each substance may have a state/federal exposure value for each of the following (if applicable):

Action Level – An airborne level, typically one-half of the permissible exposure limit (PEL) designated in Occupational Safety and Health Administration's (OSHA's) substance-specific standards, 29 CFR 1910, Subpart Z, calculated as an

8-hour time weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.

Ceiling Limit – The exposure limit a worker's exposure may never exceed.

Sampling and Analytical Error – A statistical estimate of the uncertainty associated with a given exposure measurement.

Short-Term Exposure Limit (STEL) – The average exposure to a contaminant to which a worker may be exposed during a short time period (typically 15-30 minutes).

Time Weighted Average (TWA) – The average exposure to a contaminant over a given period of time, typically 8 hours.

1.4 Risk Identification

Once the presence and concentrations of specific hazardous substances and health hazards have been established, the risks associated with these substances will be identified. GEI employees and GEI subcontractors who will be working on the site will be informed of risks that have been identified.

Risks to consider include, but are not limited to:

- Potential exposures exceeding the permissible exposure limits and published exposure levels
- Potential Immediately Dangerous to Life and Health (IDLH) concentrations
- Potential skin absorption and irritation sources
- Potential eye irritation sources
- Potential hazardous atmospheres, including oxygen deficiency and fire and explosion hazards

1.5 Engineering Controls, Work Practices, and Personal Protective Equipment for Employee Protection

Engineering controls, work practices, and personnel protective equipment (PPE) for substances regulated in OSHA Subpart G (Occupational Health and Environmental Control) and Subpart Z (Toxic and Hazardous Substances) will be implemented in to protect employees from exposure to hazardous substances and safety and health hazards.

1.5.1 Elimination/Substitution

The first control method should be to try and eliminate or substitute the hazards with a safer alternative. This is the most effective solution as shown is Figure 1 below. If you can remove the hazard than you no longer need to find a way to protect the employee



from it. Or you can substitute a different piece of equipment or chemical to use that doesn't pose the same hazard and doesn't create a new one.

1.5.2 Engineering Controls

Engineering controls implement physical change to the workplace, which eliminates/reduces the hazard on the job/task. Examples include:

- Change the process to minimize contact with hazardous chemicals
- Isolate or enclose the process
- Use of wet methods to reduce generation of dusts or other particulates
- General dilution ventilation
- Use of fume hoods

1.5.3 Administrative Controls (Work Practices)

Administrative controls establish efficient processes or procedures to help protect the employee. Examples of these are:

- Rotate job assignments
- Adjust work schedules so that workers are not overexposed to a hazardous chemical

1.5.4 Personal Protective Equipment

The use of PPE to reduce exposure to risk factors is the last line of defense. All other options should be exhausted before use of PPE. Examples of PPE are:

- Chemical protective clothing
- Respiratory protection
- Gloves
- Eye or hearing protection
- Steel toe boots

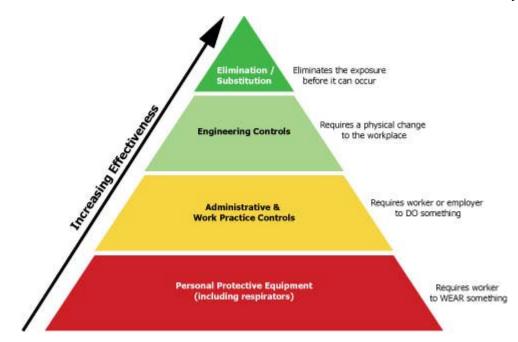


Figure 1: Hazard Mitigation Effectiveness Pyramid

1.5.5 Engineering Controls, Work Practices, and PPE for Substances Regulated in Subparts G and Subpart Z

Engineering controls and work practices will be instituted to reduce and maintain employee exposure at or below the PELs for substances regulated by 29 CFR Part 1910.

Engineering controls that may be feasible include the use of pressurized cabs or control booths on equipment, and/or the use of remotely operated material handling equipment. Work practices may include removing non-essential employees from potential exposure during opening of drums, wetting down dusty operations, and positioning employees upwind of potential hazards.

If engineering controls and work practices are not feasible, or not required, a reasonable combination of engineering controls, work practices, and PPE will be used to reduce and maintain at or below the PELs or dose limits for substances regulated by 29 CFR Part 1910, Subpart Z.

GEI will not implement a schedule of employee rotation as a means of compliance with PELs or dose limits except when there is no other feasible way of complying with the airborne or dermal dose limits for ionizing radiation.

The provisions of 29 CFR, subpart G, will be followed.

Revised Date: July 2016

1.5.6 Engineering Controls, Work Practices, and Personal Protective Equipment for Substances <u>Not</u> Regulated in Subparts G and Subparts Z

An appropriate combination of engineering controls, work practices, and PPE will be used to reduce and maintain employee exposure to or below published exposure levels for hazardous substances and health hazards not regulated by 29 CFR Part 1910, Subparts G and Subparts Z. GEI will use published literature and Safety Data Sheets (SDS) as a guide in making the determination of what level of protection is appropriate for hazardous substances and health hazards for which there is no permissible exposure limit or published exposure limit.

1.5.7 Decontamination Procedures

Decontamination procedures will be developed, communicated to employees, and implemented before employees or equipment enter areas on site where potential for exposure to hazardous substances exists. Procedures will be developed to minimize employee contact with hazardous substances or with equipment that has contacted hazardous substances.

GEI employees leaving a contaminated area will be properly decontaminated; contaminated clothing and equipment leaving a contaminated area will be properly disposed of or decontaminated.

Decontamination procedures will be monitored by the site safety officer (SSO) to determine their effectiveness. When such procedures are found to be ineffective, the site safety officer will contact the Corporate Health and Safety Officer and appropriate steps will be taken to correct deficiencies.

Location

Decontamination will be performed in areas that will minimize the exposure to employees, equipment, and the environment.

Equipment and Solvents

Equipment and solvents used for decontamination will be decontaminated or disposed of properly.

Personal Protective Clothing and Equipment

Protective clothing and equipment will be decontaminated, cleaned, laundered, maintained, or replaced as needed to maintain their effectiveness.

Employees whose clothing comes in contact with hazardous substances will immediately remove that clothing and follow the directions on packaging or SDS sheet for how to properly clean the exposed area. The clothing will be disposed of or decontaminated before it is removed from the work zone.



Commercial Laundries or Cleaning Establishments

Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment will be informed of the potentially harmful effects of exposures to hazardous substances.

Showers and Changing Rooms

Where the decontamination procedure indicates a need for regular showers and change rooms outside of a contaminated area, these will be provided and meet the requirements of 29 CFR 1910.141 (Sanitation). If temperature conditions prevent the effective use of water, then other effective means for cleansing will be provided and used.

1.6 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health and Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.7 Limitations

None

1.8 References

OSHA 1910.120 Hazardous Waste Operations and Emergency Response

OSHA 1910 Subpart G Occupational Health and Environment Control

OSHA 1910 Subpart Z Toxic and Hazardous Substances

OSHA 1910.141 General Environmental Controls – Sanitation

 $\underline{http://www.business.govt.nz/worksafe/information-guidance/legal-framework/hsno-act-properties and the properties of the properties of$

1996/defining-hazardous-substances/ (Viewed 7/8/2016)

https://www.osha.gov/SLTC/hazardoustoxicsubstances/ (Viewed 7/8/2016)

https://www.osha.gov/SLTC/hazardoustoxicsubstances/control.html (Viewed 7/11/2016)



1.9 Attachments

None

1.10 Contact

Health&SafetyTeam@geiconsultants.com

1.11 Review History

- July 2016
- May 2014
- November 2013
- August 2011 known as Hazard Identification and Management
- February 2011 known as HS-008 Contaminant Properties

Revised Date: June 2016

STANDARD OPERATING PROCEDURES

SOP No. HS-010 Inclement Weather

1.1 Objective

This Standard Operating Procedure (SOP) is intended for use by employees engaged in work with the potential to be affected by inclement weather. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for working in inclement weather and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General

Employees should be aware of local weather conditions and monitor advisories issued by the National Weather Service and other local reporting services. Depending on location and season, storms are capable of producing heavy rain, floods, extreme temperatures, high wind conditions, lighting, tornados, and/or snowfall.

1.2.1 Heavy Rain

If working or driving in a rain storm, use extreme caution. When driving, turn your low beam lights on when the rainfall becomes heavy. Employees should be aware of the following:

- Heavy rain decreases visibility, especially when driving.
- Surfaces and tools become slippery.
- If you are working in the rain and your clothes become wet there is a risk of hypothermia when exposed to winds, even in warm temperatures.
- If the storms are going to produce thunder and/or lightning, leave the work area immediately and move to a safe area.
- Use your best judgment to determine if the rainfall becomes too heavy to continue working safely.

1.2.2 Lightning

Lightning can strike as far as 10 miles from the area where it is raining. That's approximately the distance you can hear thunder. **If you can hear thunder, you are within striking distance. Seek safe shelter immediately.** This can be within a building or vehicle. Wait 30 minutes after the last clap of thunder or flash of lightning before going outside again.



Revised Date: June 2016

1.2.3 Flooding

Flooding may occur as a result of heavy rain in a short period of time. Flooding can be particularly acute in canyon areas where dry creek beds can turn into raging rivers from rainfall in distant or higher elevation areas. Be aware of this and your surroundings and move to a safe place if you begin to see signs that flooding may occur. Signs of potential flooding include sudden appearance of water in dry creek beds, increased water flow in rivers or streams, or quick rise in water levels.

Do not attempt to drive through areas or streets that are flooded. Seek alternate routes. Be particularly cautious at night when flooded areas are difficult to see. Urban flooding can stop traffic; increase the potential for traffic accidents; and can trap people in vehicles.

1.2.4 Extreme Temperatures

Work activities may take place in extreme heat or cold. Be prepared if these conditions are anticipated. Have the appropriate personal protective equipment (PPE) available; exercise proper fluid intake; and take breaks to prevent heat and cold stress. For more information about these conditions see the heat stress and cold stress programs found in GEI's Health and Safety Program.

1.2.5 High Winds, Tropical Storms, and Tornados

High Winds can be extremely dangerous. Appropriate measures will be taken to secure equipment and loose items when working in windy conditions. The project manager should be contacted about the weather conditions and, if necessary, work should be postponed.

Tropical storms are described as storms with sustained winds ranging from 39 to 73 miles per hour (mph) and hurricanes produce sustained winds that exceed 74 mph. When winds approach 40 mph (gale force winds) twigs begin to break off of trees and vehicles will veer off of the road. When winds approach 40 mph or the GEI employee feels unsafe based on the activities being performed, stop work and seek shelter as soon as possible. Blowing or falling debris and overhanging limbs/signs can be a significant hazard. If possible, avoid driving in these conditions; 70 percent of injuries during hurricanes are a result of vehicle accidents. Note that tall or elevated equipment will have manufacturer's safe operating wind speeds defined that could be less than 40 mph. The operator's manual should be consulted prior to operation of the equipment.

A tornado is a violent, dangerous, rotating column of air that is in contact with both the surface of the earth and a cumulonimbus cloud or, in rare cases, the base of a cumulus cloud. The Fujita Scale is used to rate the intensity of a tornado by examining the damage caused by the tornado after it has passed over a man-made structure. Based on the Fujita Scale, or F-Scale, numbers begin at F0: 40-72 mph and go to F6: 319-379 mph (F6 is



generally theoretical). Nearly three-fourths of tornados are on the weak F0-F1 scale with just over two-thirds of deaths resulting from the violent F4-F5 tornados.

If a tornado is seen, stop work and seek shelter immediately. If a tornado siren is sounded move immediately to safety indoors and then move to a windowless interior space, basement, stairwell, or designated fall-out shelter. Windows should not be opened before an oncoming tornado. If there is no shelter available, seat belt yourself into your stationary vehicle or seek a depression or low spot on the land surface.

1.2.6 Snowfall and Ice Conditions

Working in the winter months may result in activities taking place during periods of snowfall or icy conditions. If you are working during or after snow has fallen, dress appropriately for the conditions. Snow and ice can cause working surfaces to become slippery. Clear snow and ice from work areas to prevent slip hazards. Use caution when performing snow or ice removal activities to prevent injuries. Driving in snowy and icy conditions is also hazardous. Reduce speed and use caution if you must drive in these conditions.

If the weather conditions deteriorate and you do not feel safe working in these conditions, stop work, move to a safe indoor location, and contact your project manager to let them know the weather, work conditions, and your location.

1.3 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.



Revised Date: June 2016

1.4 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection. Protection in extreme weather conditions can best be accomplished if the conditions are anticipated and actions are taken. Monitor local weather conditions prior to starting work.

1.5 References

Center for Disease Control and Prevention – Natural Disasters and Severe Weather http://www.bt.cdc.gov/disasters/

National Lightning Safety Institute

NOAA, National Weather Service

Office of Climate, Water, and Weather Services

1.6 Attachment

None

1.7 Contact

Safety Team

Health&SafetyTeam@geiconsultants.com

1.8 Review History

- Previous revision dates were not documented
- May 2014
- July 2016

Revised Date: June 2016

STANDARD OPERATING PROCEDURES

SOP No. HS-012 Noise Exposures

1.1 Objective

This Standard Operating Procedure (SOP) is intended for use by employees engaged in work with elevation noise levels. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for work in loud environments and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2 General

Working in loud environments can cause hearing damage and loss if the proper protection is not in place. The following procedures describe methods to mitigate unhealthy noise levels and protect hearing.

1.3 Hazard Identification

If projects involve noise levels above OSHA regulations, employees should take steps to remove the noise exposure. Common sources of elevated noise levels are heavy equipment, power tools, pumps, and generators. GEI has an established Hearing Conservation Program located in the GEI Health and Safety Program.

1.4 Risk Identification

Hearing protection is required if noise levels in a work area are known to be above 85 decibels (dB), which can be measured with a noise meter. When decibel levels are not known, hearing protection is required if you need to raise your voice to talk to someone standing within a normal speaking distance from you.

1.5 Mitigation

There are three options that can be used to help mitigate a noise hazard:

- 1.) Remove the hazard by taking away the source of the noise.
- 2.) Remove the employee from the source of the noise.
- 3.) Provide the employee with appropriate personal protective equipment (PPE).

The first option for employee protection is to remove the hazard by taking away the source of the noise or using engineering controls to reduce the level.



If this cannot be accomplished, the next control measure is to remove the employee from the source. This can be done by moving the work area to a quieter location or distancing the employee from the noise source. For example, GEI employees do not need to be standing next to an operating drill rig or other heavy equipment. By distancing themselves from heavy equipment or other noise sources the need for hearing protection can be eliminated/reduced.

The final option, if the above two options aren't feasible, disposable ear plugs that are made available to GEI employees are to be used. Additional means of hearing protection will be provided, such as ear muffs, if the disposable ear plugs are not adequate.

When using hearing protection, employees will need to make a greater effort to be aware of the surroundings which may include moving equipment, traffic, and other site hazards.

1.6 Proper Use of Hearing Protection

DISPOSABLE EAR PLUG FITTING INSTRUCTIONS

Before fitting any ear plugs, make sure your hands are clean. Foam ear plugs are disposable and not intended for reuse.

Hold the ear plug between your thumb and forefinger. Roll and compress the entire ear plug to a small, crease-free cylinder. While still rolling, use your other hand to reach over your head and pull up and back on your outer ear. This straightens the ear canal, making way for a snug fit.



Insert the ear plug and hold for 20 to 30 seconds. This allows the ear plug to expand and fill your ear canal.



Test the fit. In a noisy environment, and with earplugs inserted, cup both hands over your ears and release. You should not notice a significant difference in the noise level. If the noise seems to lessen when your hands are cupped over your ears, your ear plugs are not fitted properly. Carefully remove the earplugs (see instructions below) and refit following instructions, above.





you could damage your ear drum.

SOP No. HS-012 Revision No. 5 Revised Date: June 2016

Always remove ear plugs slowly, twisting them to break the seal. If you remove them too quickly,



REUSABLE EAR PLUG FITTING INSTRUCTIONS

Before fitting any ear plugs, make sure your hands are clean.

Reusable ear plugs should be inspected and cleaned often in soapy water. If they become hard, torn, or deformed they should be discarded and replaced.

Reach around your head and pull up and back on your outer ear. This straightens out the ear canal, making way for a snug fit. Hold the stem end of the ear plug and insert it well inside your ear canal until you feel it sealing and the fit is comfortable.



Test the fit. In a noisy environment, and with ear plugs inserted, cup both hands over your ears and release. You should not notice a significant difference in the noise level. If the noise seems to lessen when your hands are cupped over your ears, your ear plugs are not fitted properly. Carefully remove the ear plugs (see instructions below) and refit following instructions, above.



Always remove ear plugs slowly, twisting them to break the seal. If you remove them too quickly, you could damage your ear drum.



1.7 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety



Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, People Team, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.8 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.

1.9 References

OHSA 29 CFR 1910.95 – Occupational Noise Exposure

OHSA 29 CFR 1926.101 – Hearing Protection

Texas American Safety Company (TASCO)

1.10 Attachments

None

1.11 Contact

Health&SafetyTeam@geiconsultants.com

1.12 Review History

- June 2016
- May 2014
- November 2013
- February 2011
- November 2010

STANDARD OPERATING PROCEDURE

SOP HS-014 Utility Mark-out

1.1 Objective

This Standard Operating Procedure (SOP) provides guidance for utility mark-out procedures related to drilling, excavation, or other sub-surface or intrusive activities to avoid injury to GEI employees or property damage. This SOP is applicable when GEI is responsible for its operation or our subcontractor's operation for utility mark-out. A utility mark out is when paint, flags or other markers are put in place to identify the location of an underground utility.

Clients or local agencies may have additional requirements or procedures to mark out of utilities. If local utility mark-out procedures differ from those described within this SOP, applicable state or municipal regulations should be followed.

1.2 General

This SOP is intended for use by employees engaged in work with sub-surface or intrusive activities. The site-specific health and safety plan (HASP) should include a hazard assessment for the project that identifies the potential for subsurface hazards and the control methods to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.2.1 Contractor/GEI Responsibilities

- The contractor or GEI employee will pinpoint each exploration area with white paint, flags, or stakes. personal protection equipment (PPE), including eye protection when using spray paint will be worn.
- Exploration locations should be marked-out with sample identification number(s) and type of sample (e.g., boring, test-pit, or monitoring well).
- The contractor compiles information about the work areas on a request form specified by the state utility mark-out program and submits it. Work area location maps can be sent to the utility mark-out program to clarify locations.
- The mark-out program customer service representative will provide a mark-out ticket number and a list of utilities notified upon receipt of the request information. This information will be recorded on the GEI documentation form in Appendix B and/or in other project documents.
- If known, the contractor or GEI employee will also notify non-member utility operators (e.g., apartment complexes, commercial complexes, railroads with communication cables, etc.).



1.2.2 Utility Mark Outs

• Utility companies or their sub-contractors will only mark-out, or clear, utilities under their responsibility. Generally, this means that they will only mark-out utilities within the public right-of-way up to private property boundaries. Information needed to determine the location of utilities on private properties will be requested from the property owner. This may include available property drawings or as-built figures. If this information is not available, additional non-intrusive surveys of the property may be required by a private utility locator to find underground utilities by using techniques such as ground penetrating radar (GPR).

- American Public Works Association (APWA) Uniform Color Code For Marking Underground Utility Lines are:
 - 1. White Proposed Excavation
 - 2. **Pink** Temporary Survey Markings
 - 3. **Red** Electric Power Lines, Cables, Conduit and Lighting Cables
 - 4. **Yellow** Gas, Oil, Steam, Petroleum, and Gaseous Material
 - 5. **Orange** Communications, Alarm, Signal Lines, Cables or Conduit
 - 6. **Blue** Water
 - 7. **Purple** Radioactive Materials
 - 8. **Green** Sanitary and Storm Sewers and Drain Lines

1.2.3 Utility Mark Out Review

- Before the intrusive work activities begin, the contractor or GEI employee will
 verify that each utility company has completed a utility location for the work
 area or the location has been cleared by a private locator and record this on the
 mark-out request information sheet.
- A visual survey of the project area will be done prior to the start of intrusive activities. This visual inspection will be done to identify signs, manholes, utility boxes, or other evidence of an underground utility is present and has been considered.
- The contractor or GEI employee can begin work on the scheduled work date and time if the utility operators have responded, taking care to find and preserve markings that have been made.
- Completed clearance documentation will be located on the excavation site during excavation activities and kept in project files.



1.2.4 Excavations

- When excavating near a buried utility, observe the approximate location around that utility.
- If exposing a utility, proper support and protection must be provided so that the utility will not be damaged.
- If the excavation work requires significant spans of the utility to be exposed, it is the contractor's responsibility to support the infrastructure (to prevent sagging or collapse) as needed. Contact the utility operator for support, guidance, or assistance.
- When the excavation is complete, provide proper backfill for utilities that have been exposed.
- Take care not to damage the conduit or protective coating of a utility. If the damage occurs, leave the damaged utility exposed and immediately call the utility owner.
- If a gas line is encountered, everyone will be evacuated according to the site evacuation procedures and the contractor must notify police, fire, and emergency personnel. No attempt should be made to tamper with or correct the damaged utility. All site personnel are to evacuate to the site's predetermined meeting point or a location a minimum of 300 feet away from the incident location.
- If the contractor needs to dig within the approximate location of a combustible, hazardous fluid, or gas line (natural gas, propane or gasoline), soft digging is required (hand digging, vacuum extraction) to a maximum depth of 5 feet. The approximate location is defined as 24 inches on either side of the designated center line of the utility if the diameter is not provided or 24 inches from each outside edge if the diameter is provided.

1.3 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.



Revised Date: June 2016

Upon notification and/or the receipt of the Incident Report Form, RHSO will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.4 Limitations

- Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.
- Mark-out notification time usually does not include holidays. Make sure
 holidays are considered and mark-out time is scheduled accordingly. Under no
 circumstances are intrusive activities allowed to be performed prior to the
 required mark-out.
- Do not use white paint if precipitation is eminent. Consider using stakes if snow is predicted.

1.5 References

Reference the website for the "Call Before You Dig – 811" for the utility mark-out agency for the state you working in prior to site work. If you have issues locating the appropriate agency, contact the Safety Team for assistance.

1.6 Attachments

Attachment A – Standard Utility Color Codes

Attachment B – GEI Utility Clearance Documentation Form

1.7 Contact

Health&SafetyTeam@geiconsultants.com

1.8 Review History

- June 2016
- May 2014
- November 2013
- February 2011
- November 2010

ATTACHMENT A

COLOR CODE FOR UTILITY MARKING

(BASED ON 'THE AMERICAN PUBLIC WORKS ASSOCIATION' RECOMMENDATIONS AND THE ANSI STANDARD Z-53.1 FOR SAFETY COLORS)

UTILITY	COLOR
PROPOSED EXCAVATION	WHITE
ELECTRIC POWER LINES, CABLES, CONDUIT AND LIGHTING CABLES	RED
POTABLE WATER	BLUE
STEAM, CONDENSATE, GAS OR OIL COMPRESSED AIR	YELLOW
TELECOMMUNICATIONS, ALARM OR SIGNAL LINES, CABLES OR CONDUIT	ORANGE
TEMPORARY SURVEY MARKINGS	PINK
SEWER AND STORM DRAINS	GREEN
CHILLED WATER, RECLAIMED WATER, IRRIGATION AND SLURRY LINES	PURPLE
OTHER	LIGHT BLUE

SOP No. HS-014 Revision No. 5

Revised Date: June 2016

ATTACHMENT B



Utility Clearance Documentation

Please print clearly.		For more room, use back of page.		
Client:				
GEI Project Name & Number:				
Site:				
Excavation/Drilling Location ID:				
F . /D !!!				
GEI Field Team Leader:				
Utility Drawings Pavious				
Provided By:		Reviewed By:		
Utility Clearance Call Date:	Name of Utility:			
Utility Clearance Call Date:	Name of Utility:			
Utility Clearance Received from (utility & r	ep name):			Date:
Utility Clearance Received from (utility & r	ep name):			Date:
Company that completed clearance:			_	ate:
GEI Staff Responsible for Oversight:				
	Drilling Location			
Contractor Name:		Company Name:		
<u>.</u>			Date:	
GEI Staff Responsible for Oversight:				
Private Location Clearance Required (yes/r	no):	Date:		
Contractor Name:	Company Name:			
Contractor Signature:			Date:	
Methods used for utility location (i.e. GPR,	electronic pipe location	<u> </u>		
GEI Staff Responsible for Oversight:				
Hand clearing Performed (yes/no):	Methods:			Date:
Contractor Name:		Company Name:		
Contractor Signature:			Date:	
GEI Staff Responsible for Oversight:				
GEI Consultants, Inc. Representative (name	e & title):			
GEI Consultants, Inc. Representative Signa Based upon the best available information, application ordered site specific deviations from exist	ropriate utility clearance pr			-
Client Representative (name & title):				
Client Representative Signature:				Date:



GEI CONSULTANTS, INC.

SOP No. HS-014 Revision No. 5 Revised Date: June 2016

Notes:	



STANDARD OPERATING PROCEDURES

SOP No. HS-015 Respirator Fit Test Procedure

1.1 Objective

The objective of this Standard Operating Procedure (SOP) is to standardize the respirator fit testing procedures performed by the GEI Safety Team members or their designees. Respirator fit testing will be performed in accordance to OSHA 29 CFR 1910.134(f)(1) - (8) and OSHA 29 CFR 1910.134 Appendix A. This SOP is not intended to fit test employees that will be using GEI supplied air respirators.

1.2 General

Based on an employee's role at GEI there might be times when the use of a full or half-faced air purifying respirator is required. These types of respirators have filters, cartridges, or canisters that remove contaminants from the air by passing the ambient air through the air-purifying element before it reaches the user. Information about respiratory protection at can be found in GEI's Respiratory Protection Program, which can be found on the Safety page of the intranet.

Prior to GEI employees being required to use a respirator with a negative or positive pressure tight-fitting face piece, the employee must be medically cleared by a GEI-contracted occupational health physician. When an employee is cleared, the physician will provide a copy of the clearance form to the Corporate Health and Safety Officer (CHSO) who in turn will provided it to the employee. The employee must also be fit tested to determine the make, model, style, and size respirator that will be issued for use. GEI employees performing respirator fit testing procedures must be trained and approved by the CHSO and/or a Regional Health and Safety Officer (RHSO).

1.3 Required Equipment

The following equipment will be needed to perform respirator fit testing:

- A copy of this written GEI fit testing procedure.
- A fit testing kit consisting of a test hood, an accepted testing agent (i.e., saccharin, bitrex, isoamyl acetate [banana oil], and irritant smoke), nebulizers (device for producing a fine spray of liquid) to administer the test agent, and a copy of the Rainbow Passage or other reading material.
- A sufficient number of respirators and sizes. High Efficiency Particulate Air (HEPA) filters will be used for tests using saccharin, bitrex, or irritant smoke. A combination of organic vapor and HEPA filter will be used for tests using isoamyl acetate.
- A Respirator Fit Test Form (Attachment A).



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1.4 Execution

1.4.1 Pre-Test Screening

Before an employee can be fit tested the following questions will be asked to make sure that the employee is able to wear a respirator:

- Certificate for Respirator Use. After an employee's annual physical they will be presented with a certificate for respirator use if they are deemed to have the necessary fitness level to don a respirator by the exam physician. Once an employee has this certificate they can be fit tested.
- Does the employee have medical conditions that may be aggravated by taking part in this fit test? Conditions may include allergies to the test agent(s) being used; neck or shoulder injuries; respiratory allergies; or a cold symptoms.
- Is the employee taking medications that are inhibiting their sensitivity to taste or smell?
- Has the employee had anything to eat, drink, or smoke within 30 minutes of the fit test? If so, delay the testing for 30 minutes.
- Can the employee demonstrate proper donning and doffing of the respirator and perform the user seal check? If not, the fit test examiner will demonstrate and review these actions.

After the user seal check has been completed, have the employee continue to wear the respirator for a 5-minute comfort assessment period.

If the employee passes the pre-test screening, proceed to the fit test.

1.4.2 Fit Testing

- With the respirator removed, check to see if the employee has sensitivity to the test agent being used. This is done by choosing one sensitivity test agent (saccharin, bitrex, or isoamyl acetate), and spraying (with a nebulizer) a mist onto the employee's tongue. If the agent can be detected, proceed with the fit test. If the employee cannot detect the test agent, a different agent may be needed. If the employee has an existing condition that does not allow them to detect a type of agent, a quantitative test may be required.
- Have the employee don the respirator and perform the user seal check.
- Place the test hood on the employee being tested.
- Using the nebulizer with the test solution, maintain an adequate concentration of aerosol inside the test hood by injecting 10-15 squeezes every 30 seconds.
- Instruct the employee to indicate if they can detect the testing agent at a point during the testing process.



- After the initial aerosol is injected into the test hood, instruct the employee to perform the following exercises for 60 seconds each.
 - o Normal Breathing.
 - o Deep Breathing; breathe slowly and deeply.
 - o Turning Head from Side to Side; inhale at extreme positions at each side.
 - o Moving Head Up and Down; inhale at the "up" position.
 - o Jog in Place.
 - o Normal Breathing.
 - o Talking Recite the Rainbow Passage, count backward from 100, or recite a memorized poem or song.
- Finally, remove the test hood from the employee and use irritant smoke to verify that the respirator seal is a good one. Introduce a small amount of irritant smoke around the seal of the face piece while the employee breathes normally to verify that the employee does not react to the smoke.
- If all of the above exercises were completed without the employee detecting the test agent, the test is successful. If the employee indicates that they detected the test agent, a different respirator must be tried and the entire procedure repeated.

1.5 Documentation

The attached fit test form will be used to document the fit testing; a copy will be given to the employee and a copy sent to Health&SafetyTeam@geiconsultants.com

1.6 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential



for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.7 Limitations

Only trained employees designated by the CHSO or RHSO may conduct respirator fit testing.

1.8 References

Occupational Safety and Health Administration Training Institute Education Center Respiratory Protection Course Manual, May 2003

Occupational Safety and Health Administration Respiratory Protection Standard (29 CFR1910.134 (f)(1) –(8) and Appendix A

Allegro Industries Qualitative Fit Test Kit Instructions, Part No. 2040

1.9 Attachments

Respiratory Fit Test Form

The Rainbow Passage

1.10 Contact

Health&SafetyTeam@geiconsultants.com

1.11 Review History

- June 2016
- May 2014
- November 2013
- August 2011
- June 2009 at this time it was HS-024



Respiratory Fit Test Form

Name:

Respirator Manufacturer & Type:

Respirator Size:

Date:

Name of Tester:

Respirator Fit Testing

This fit testing has been conducted in compliance with OSHA 29 CFR 1910.134(f)(1)-(8) and OSHA 29 CFR 1910.134. Respirators are an effective method of protection against designated hazards when properly selected and worn. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the employee. Sometimes, employees may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. You should do the following:

- 1. Read and heed instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
- 2. Choose cartridges certified for use to protect against the contaminant of concern. The National Institute for Occupational Safety and Health (NIOSH) or Mine Safety and Health Administration (MSHA) label or statement of certification should appear on the respirator or respirator packaging. Contact the RSHO or CHSO for new cartridges.
- 3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against or in atmospheres with less than 20.5% oxygen. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
- 4. Keep your respirator in the storage bag supplied to you from the RHSO and put your name on the bag so that you do not mistakenly use someone else's respirator. Inspect your respirator daily when in use.



Revised Date: June 2016

The Rainbow Passage

When the sunlight strikes raindrops in the air, they act as a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(Source: *The Rainbow Passage*, a public-domain text, can be found on page 127 of the 2nd edition of Grant Fairbanks' *Voice and Articulation Drillbook*. New York: Harper & Row.)



STANDARD OPERATING PROCEDURES

SOP No. HS-016 Traffic Hazard Management

1.1 Objective

The objective of this Standard Operating Procedure (SOP) is to prevent or limit the potential for GEI personnel to encounter traffic hazards during field activities.

1.2 General

This SOP is intended for use by employees engaged in work with the potential for traffic hazards. The site-specific health and safety plan (HASP) will include a hazard assessment for the project that identifies the potential for exposure to traffic hazards and the control methods to be implemented by GEI employees, including review or attainment of necessary permits, traffic control plans, and flagger/police detail requirements for the local jurisdiction. Routine checks of the work zone will be made to ensure there are adequate levels of protection. These hazards will be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.3 Traffic Hazard Management

Traffic Hazard Management is the process of identifying and managing the potential risks associated with the movement of traffic through, around, or past a work area. This Traffic Hazard Management SOP is designed to assist employees in identifying and managing these hazards. Work areas should be as safe as possible. It is the responsibility of GEI employees to follow the Traffic Hazard Management SOP and adhere to these safety standards. Safety is not negotiable.

Under no circumstances are GEI employees permitted to commence work in a situation that the employee believes or knows their health and safety, or the health and safety of others, is at risk.

Major risk factors for work site Traffic Hazard Management include:

- The speed of traffic moving through a work site.
- The distance and clearance between moving traffic, workers, vehicles and equipment, and over-head power lines.
- Traffic volume and vehicle composition.
- Nature and conditions at the work site and approaches to the work site.



• Other factors such as the time of day, sight distance, weather, presence of pedestrians, or cyclists, and the type of work being carried out.

• Other hazards in proximity to the work site (e.g., power lines, open excavations) that may have conflicting safety management measures that need to be considered when developing the HASP.

1.4 Site Preparation

The following management measures will be considered whenever working in traffic areas. In addition, remain aware of the amount of traffic around the working area. The work space should be large enough for the job to be completed safely. Check permit, traffic control plans, and flagger/police detail requirements for the local jurisdiction. Perform routine checks of the work zone to make sure there are adequate levels of protection.

1.4.1 Traffic Barriers and Warning Signs

GEI employees will comply with the U.S. Department of Transportation's (DOT) Manual on Uniformed Traffic Control Devices (MUTCD) and/or state regulations for temporary traffic barriers (cones, barriers) and sign placement when required for working in traffic areas. Clearly define the work site by placing traffic barriers around the work space to indicate the space that is needed to safely perform the work. The traffic barrier will help make the work site more visible to other workers, pedestrians, cyclists, and moving vehicles. Place traffic barriers in such a way as to give yourself and equipment adequate space to work within the barriers. OSHA suggests placing the first warning sign at a distance calculated to be 4 to 8 times (in feet) the speed limit (in MPH).

1.4.2 Adequate Light

Requirements for night conditions and work areas with poor visibility are similar to day requirements. However there are a number of additional things to consider, such as visibility of the work site to advancing traffic and sufficient lighting. OSHA requires lighting for workers on foot and equipment operators to be at least 5-foot-candles or greater.

Visibility of the work area can be increased by employing the following measures:

- Using parked vehicles hazard and flashing lights.
- Wearing reflective personal protective equipment (PPE), such as a safety vest, in good condition.
- Providing adequate lighting to illuminate the work area with lights positioned so that there is no glare to approaching drivers.
- Placing reflective advance warning signs and traffic barriers so that they are visible to road users.



1.4.3 Distance from the Nearest Traffic Lane

Work areas located along roadsides will have a minimum clearance as defined by DOT's MUTCD and/or state or local DOT regulations for traffic barrier and sign placement.

1.4.4 PPE

The proper PPE, as outlined in the project HASP, will be worn when appropriate. The color/type of safety vest will comply with site regulations.

1.5 Equipment Operation

Vehicles and heavy equipment operators should use a spotter when possible if it is necessary to drive in reverse to reduce risk of collision with oncoming traffic. If it is necessary to drive against the flow of traffic make sure this area is within the work zone and properly blocked off from oncoming traffic.

1.6 Pedestrian Safety

When working near pedestrian traffic, a safe alternate pedestrian route will be established. Refer to local regulations when establishing pedestrian walkways.

1.7 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the RHSO will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.8 Limitations

Follow safety procedures as defined in the site-specific HASP, federal DOT, and local jurisdictions. Appropriate PPE must be worn correctly to provide the intended level of protection.



SOP No. HS-016 Revision No. 5

Revised Date: November 2016

1.9 References

DOT's Manual on Uniformed Traffic Control Devices (2009 Edition)

Hazard Exposure and Risk Assessment Matrix for Hurricane Response and Recovery Work: https://www.osha.gov/SLTC/etools/hurricane/work-zone.html

1.10 Attachments

None

1.11 Contact

Health&SafetyTeam@geiconsultants.com

1.12 Review History

- November 2016
- May 2014
- November 2013
- August 2011
- October 2010 Initially HS-027 Traffic Hazards



Revision Date: October 2016

STANDARD OPERATING PROCEDURES

SOP No. HS-018 Working Around Heavy Equipment

1.1 Objective

The objective of this Standard Operating Procedure (SOP) is to prevent or limit the physical hazards when working around heavy equipment.

1.2 General

This SOP is intended for use by employees engaged in work with the potential for working near heavy equipment. The project site-specific health and safety plan (HASP) should include a hazard assessment for working near heavy equipment to be implemented by GEI employees. These hazards should be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.3 Heavy Equipment Precautions

Heavy equipment (e.g., excavators, backhoes, drill rigs, etc.), can present many physical hazards that can result in serious injury or death if the proper safety precautions are not followed. The following is a list of precautions to be aware of when working around heavy equipment:

- Wear appropriate personal protective equipment (PPE), including at a minimum reflective, high-visibility safety vest, hard hat, safety glasses, and steel/composite toe boots.
- Always keep your distance from moving equipment.
- Do not assume the operator knows where you are or where you are going.
- Make sure to make eye contact and receive acknowledgement of your presence with the operator.
- Avoid working near heavy equipment, but if unavoidable, communicate your location with the operators. If using hand signals, discuss the signals with the equipment operator prior to starting work.
- Watch for moving equipment. Construction sites can have a lot of activity and equipment may be moving in an unpredictable manner.
- Do not rely on back-up or other alarms. They may not be working or you may not hear them with the noise of other activities taking place in the area.
- Stay out of the swing radius of cranes, excavators, or other equipment that swings or rotates.
- Do not walk beside a moving vehicle, the vehicle may turn, slip, or the load may shift causing the vehicle to go off course.
- Do not ride on the outside of a moving equipment.



Revision Date: October 2016

- Never walk under or stand too close to a load suspended by cranes or hoists.
- Do not walk behind a piece of equipment that is backing up without acknowledgment from the operator it is safe to proceed. If working next to heavy equipment is unavoidable, be aware of the hazards including pinch points and moving parts. Use a spotter to watch the work area for moving equipment.
- If necessary, ask the operator to stop equipment operation to perform your work tasks.
- Verify the location and operation of emergency shut-off devices on the equipment.
- Be aware of the fuels and chemicals associated with the equipment. Have a spill prevention and response plan in place that includes the appropriate containment materials (i.e., spill kit).
- Do not wear loose fitting clothing when working around moving equipment (i.e., drill rig augers).
- Do not operate heavy equipment.
- Do not use cellular telephones near operating equipment.

1.4 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.5 Limitations

Follow safety procedures as defined in the site-specific HASP. Appropriate PPE must be worn correctly to provide the intended level of protection.



SOP No. HS-018 Revision No. 5

Revision Date: October 2016

1.6 References

OSHA 29 CFR 1926.600 – Subpart O; Motor Vehicles, Mechanized Equipment, and Marine Operations.

<u>www.toolboxtopics.com/Construction/</u> (Viewed 10/16) Caterpillar Safety – http://safety.cat.com/ (Viewed 10/16)

1.7 Attachments

None

1.8 Contact

Health&SafetyTeam@geiconsultants.com

1.9 Review History

- October 2016
- May 2014
- November 2013
- August 2011
- October 2010



STANDARD OPERATING PROCEDURES

SOP No. HS-025 Manual Lifting

1.1 Objective

The purpose of this Standard Operating Procedure (SOP) is to identify and reduce potential work-related musculoskeletal disorder (WMSD) hazards. The SOP is intended to comply with state regulations and safe work practices developed by the Occupational Safety and Health Administration (OSHA). Modifications to meet these requirements will be made to this program as changing laws or regulations dictate.

1.2 General

Lifting heavy items is one of the leading causes of injury in the workplace. Overexertion and cumulative trauma when lifting are significant factors for injuries. When employees use smart lifting practices and work in their "power zone", they are less likely to suffer from back sprains, muscle pulls, wrist/elbow/spinal and other injuries caused by lifting heavy objects. Common things to consider prior to lifting an object are: weight of the object, awkward postures, high-frequency and long duration lifting, inadequate handholds, and physical/environmental factors.

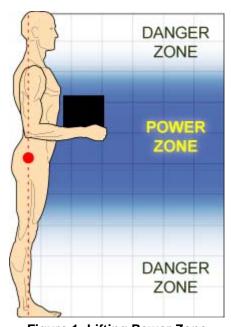


Figure 1: Lifting Power Zone



1.3 Safe Lifting Guidelines

The following safe lifting guidelines will be followed by employees involved in manual lifting activities:

- Before manual lifting is performed, a hazard assessment must be completed. The
 assessment must consider size, bulk, and weight of the object(s), if mechanical
 lifting equipment is required, if two-man lift is required, whether vision is
 obscured while carrying and the walking surface and path where the object is to
 be carried.
- Get a co-worker to help if equipment or other item is too heavy to lift.
- If possible, use powered equipment instead of manually lifting heavy materials. Lifting equipment such as dollies, hand trucks, lift-assist devices, jacks, or carts can be provided for employees.
- Reduce lifts from shoulder height and from floor height by repositioning the shelf or bin to closer to the power zone.
- Make sure walkways are clear of tripping hazards before moving materials.
- Use your legs and keep your back in a natural position while lifting. Keep the load close to your torso.



- Test the load to be lifted to estimate its weight, size, and bulk and to determine the proper lifting method.
- Do not twist while carrying a load. Instead, shift your feet and take small steps in the direction you want to turn.
- Make sure there are appropriately marked and sufficiently safe clearances for aisles and at loading docks or passageways where mechanical-handling equipment is used.
- Properly stack loose or unboxed materials which might fall from a pile by blocking, interlocking, or limiting the height of the pile to prevent falling hazards.
- Bags, containers, bundles, etc. should be stored in tiers that are stacked, blocked, interlocked, and limited in height so that they are stable and secure to prevent sliding or collapse.



- Storage areas should be kept free from accumulation of materials that could lead to tripping, fire, or explosion.
- Work methods and stations should be designed to minimize the distance between the person and the object being handled.

Supervisors should periodically evaluate work areas and employees' work techniques to assess the potential for and prevention of injuries. New operations should be evaluated to engineer out hazards before work processes are implemented.

1.4 Regulations

OSHA does not have a standard which sets limits on how much a person may lift or carry. They do however state that lifting loads heavier than about 50 pounds will increase the risk of injury.

The National Institute for Occupational Safety and Health (NIOSH) has developed a mathematical model that helps predict the risk of injury based on the weight being lifted and other criteria. The NIOSH model is based on previous medical research into the compressive forces needed to cause damage to bones and ligaments of the back. The mathematical model is incorporated in the *Applications Manual for the Revised NIOSH Lifting Equation*, which can be found on the NIOSH website (http://www.cdc.gov/niosh/docs/94-110/). It should be noted, however, that this NIOSH document provides only voluntary guidelines.

If there is a situation that arises where an employee is required to perform manual lifting on a reoccurring basis, the NIOSH Lifting Equation will be used to determine the appropriate weight that employee can safely lift. The lifting equation establishes a maximum load of 50 pounds for employees that are less likely to have to lift something, and don't have to do any long distance travel or maneuvering of the item. This 50 pounds is then adjusted to account for:

- how often the employee is lifting
- twisting the back during lifting
- the vertical distance the load is lifted
- the distance of the load from the body
- the distance the employee must move while lifting the load
- how easy it is to hold onto the load

GEI uses 50 pounds as a standard. However each individual should not attempt to carry loads heavier than they can safely manage.



1.5 Training

Training will include general principles of ergonomics, correct manual lifting techniques to avoid musculoskeletal injuries, recognition of hazards and injuries, procedures for reporting hazardous conditions, and methods and procedures for early reporting of injuries.

1.6 Lifting Assistance

If employees are assigned a task that involves repetitive lifting and carrying of equipment the Safety Team and Project Manager should be contacted to conduct an ergonomic evaluation. The task should be discussed to determine if there is an alternative method that can be used. The alternative method should institute an engineering or administrative control to reduce/limit the amount of lifting that is required of the employee. Some examples include providing smaller containers to reduce the weight of what needs to be lifted; providing a device that helps carry awkwardly-shaped objects easier; or using a winch, fork lift, or other device to lift the item(s) for the employee.

1.7 Injury Reporting

Injuries experienced during manual lifting activities should receive prompt medical attention. If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health and Safety Officer.

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the Regional Health & Safety Officer (RHSO) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health & Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future musculoskeletal injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.



SOP No. HS-025 Revision No. 2 Revised Date: July 2016

1.8 Limitations

Follow safety procedures for manual lifting.

1.9 References

OSHA Technical Manual (OTM), Section VII: Chapter 1 - Back Disorders and Injuries https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATI ONS&p_id=29936 (Viewed 7/12/2016)

https://www.osha.gov/SLTC/etools/electricalcontractors/materials/heavy.html (Viewed 7/12/2016)

1.10 Attachments

None

1.11 Contact

Health&SafetyTeam@geiconsultants.com

1.12 Review History

- July 2016
- August 2014



STANDARD OPERATING PROCEDURES

SOP NO. HS-026 Hazard Identification and Management

1.1 Objective

This Standard Operating Procedure (SOP) is intended to outline the steps GEI employees will take to identify potential hazards on site, the risks associated with these hazards, and the proper engineering controls, work practices, and personal protective equipment (PPE) to use to minimize the associated risks.

1.2 Hazard Identification

Establishing proper work procedures by conducting a job hazard analysis will should be performed for all projects involving field work. An initial identification of hazards will be completed based on past and current property usage of the site, what tasks are required to perform the job, what equipment is needed to complete the assigned tasks, what hazards are in the working area etc.

The site-specific health and safety plan (HASP) will include a hazard assessment for the project that identifies the potential hazards and how to alleviate the hazard. These hazards will be reviewed in the project safety briefing and documented on the Project Safety Briefing form, found on the Safety page of the GEI intranet.

1.3 Risk Assessment

A risk assessment will be performed for all aspects of field work. This analysis is to determine the quantitative or qualitative value of risk related to a tangible situation and a recognized hazard. Identification, studies, and monitoring of any hazard to determine its potential, origin, characteristics, and behavior are examples of what could be included and performed during a risk assessment. The assessment will increase awareness of workplace hazards and provide an opportunity to identify and control workplace hazards.

1.3.1 Assessment Guidelines

It is necessary to consider certain general guidelines for assessing the foot, head, eye and face, and hand hazard situations that exist in an occupational operation or process, and to match the protective devices to the particular hazard.

Assessments should be conducted:

- Prior to starting any work at the site
- As conditions change
- Workplace layout changes
- Environmental changes
- Process changes



• Yearly or other pre-determined interval

1.3.2 Hazard Sources

Some examples of hazard sources include but are not limited to:

- Items, materials, or machinery in motion
- Extreme temperatures
- Chemical exposures
- Harmful dust
- Light radiation
- Falling objects or potential from dropping objects
- Sharp objects
- Rolling or pinching objects
- Layout of workplace and location of co-workers
- Electrical hazards
- Noise exposures
- Confined spaces
- Working near or on water
- Fall hazards
- Traffic or other activities taking place on the site
- Air quality issues

1.4 Prevention – Control Methods

Control methods should be considered in the following hierarchy:

- Elimination
- Substitution
- Engineering Controls
- Administrative Controls
- Personal Protective Equipment

1.4.1 Elimination and Substitution

Elimination and substitution, while most effective at reducing hazards, also tend to be the most difficult to implement in an existing process. If the process is still at the design or development stage, elimination and substitution of hazards may be inexpensive and



SOP No. HS-026 Revision No. 1

Revised Date: November 2016

simple to implement. For an existing process, major changes in equipment and procedures may be required to eliminate or substitute for a hazard. Employees should work with the Safety Team to find solutions.

1.4.2 Engineering Controls

Engineering controls are used to remove a hazard or place a barrier between the work and the hazard. It's implemented to control the hazard at the source. Examples may include machine guards, sound deading/dampening panels, traffic barriers, guardrails, and shields.

1.4.3 Administrative Controls

Administrative controls change the work procedures such as programs, schedules, and supervision to reduce employee exposure to hazards. The controls are frequently used with existing processes where hazards are not particularly well controlled. Examples of administrative controls are requiring frequent breaks or implementing a specific method to perform a task.

1.4.4 Personal Protective Equipment Selection

To select the proper PPE, the potential hazards must be known. The protective equipment selected must ensure a level of protection *greater than* the minimum required in order to help protect employees. The user must be supplied with a properly fitting protective device and given instructions on care and use. Users must be aware of all warning labels for and limitation of the PPE. Employees must be aware that the PPE does not eliminate the hazard.

1.4.5 Hazard Re-Assessment

As necessary, the workplace should be re-assessed for hazards by identifying and evaluating new equipment and processes, reviewing accident records, and re-evaluating the suitability of previously selected PPE. Re-assessment should occur at a defined regular schedule interval.

1.5 Job Safety Analysis

A job safety analysis (JSA) sometimes referred to as a job hazard analysis (JHA) or an activity hazard analysis (AHA) is the breaking down of any method or procedure into its component parts to determine the hazards connected with each key step and the requirements for performing it safely.

When a JSA is being created, make sure it isn't too general where the resulting information is not enough to assess the hazard and select proper controls, and be careful not to add unnecessary steps.



1.6 Injury Reporting

If a GEI employee suffers an injury on the job that is not life threating, call Medcor Triage at 1-800-775-5866 to speak with a medical professional. Then, immediately report the injury to the Supervisor/Project Manager and Regional Health & Safety Officer (RHSO).

After verbal notification has been made, an Incident Report Form is to be completed by the employee and/or Supervisor/Project Manager and submitted to the People & Safety Team immediately following care of the incident. This form is available on the Safety App (smart phones) and on the Safety page on the GEI intranet.

Upon notification from a Branch or Office Manager, Human Resources, and/or the receipt of the Incident Report Form, the RHS) will conduct an investigation and evaluation on what happened and how and why it happened. The Corporate Health and Safety Officer (CHSO) will then recommend (as necessary) engineering controls, personal protection equipment, training or other appropriate measures to minimize the potential for future injuries. The CHSO/RHSO may develop educational information based on lessons learned for distribution to GEI employees.

1.7 Limitations

Limitations may arise on a project specific basis and will be addressed as they arise.

1.8 Attachments

None.

1.9 References

Risk Analytics, LLC Hazard Assessment Training Program, January 2011

1.10 Contact

Health&SafetyTeam@geiconsultants.com

1.11 Review History

- November 2016
- June 2015

Health and Safety Plan Remedial Implementation Hornell, New York May 2020

Appendix F

Utility Clearance Documentation

GEI Consultants, Inc. 2018 Template

Utility Clearance Documentation	
GEI	
Consultants	
Project:	
Site:	
Drilling Location ID:	
Driller:	
GEI PM:	
GEI Field Team Leader:	
Utility Drawings Reviewed:	
Provided By:	
Reviewed By:	
One Call Utility Clearance Call Date:	
Utility Clearance Received back from (list utilities):	
Completed By (Company):	Date:
GEI Staff Responsible for Oversight:	
Metal Detector Survey (yes/no):	
Drilling Location Cleared by:	
Contractor:	Date:
GEI Staff Responsible for Oversight:	
Physical Test Pit Clearance Required (yes/no):	
Contractor:	Date:
GEI Staff Responsible for Oversight:	
Handclearing Performed:	Date:
Contractor:	
GEI Staff Responsible for Oversight:	
Notes:	
Based upon the best available information, appropriate utility clear invasive work specified. If client ordered/site specific deviations they are approved by the client signature below.	
Client Signature (Optional):	Date:
GEI, Inc. Representative:	Date:

Health and Safety Plan Remedial Implementation Hornell, New York May 2020

Appendix G

COVID-19 Field Guidance

GEI Consultants, Inc. 2018 Template



Coronavirus COVID-19 Preparedness for Field Work & Project Sites TO ACCOMPANY PROJECT HASPs and DISCUSS WITH PROJECT TEAMS

As we navigate through the COVID-19 outbreak and take precautions to remain healthy while carrying out field work and related activities on project sites, the guidelines below provides important information to prevent potential exposures.

Field work will continue to be performed so long as project sites are accessible, and the work can be performed safely. If you have a question on project or site accessibility, communicate with the project manager and/or client contact to whether there are any access restrictions in place. Should your project be suspended, please contact your project manager and branch manager to discuss other assignments.

While working in an outdoor environment is better than enclosed areas, the primary precautions we need to continue to take are distancing and good hygiene.

1.0 Distancing

COVID-19 spreads from person-to-person primarily through droplets that are emitted from the initial person to a distance of 3 to 6 feet.

- Whenever possible maintain a distance of *6 feet* from others. This includes during site meetings and breaks and while performing work tasks.
- If tasks need to be performed close to others, limit the time spent in close proximity.
- Minimize time in office spaces to performing essential duties such as picking up and dropping off equipment and samples. If you need to spend more significant time in a project office (e.g., a construction trailer), it's important that the workspace allows for proper social distancing.
- When traveling to project sites, travel in separate vehicles. Do not travel in the same vehicle.

2.0 Hygiene Practices

The hygiene practices we have been instructed to perform more routinely apply to performing field work as well, such as:

- Frequent hand washing with soap and warm water for 20 seconds. If soap and water are not readily available, use hand sanitizer (containing 60% alcohol) until soap and water can be used. If sanitizer is not available, bringing gallon containers of water and soap may be a good substitute.
- If you are filling water bottles (for drinking or hand washing) keep the bottle away from the spigot to avoid transfer of germs or contaminants.
- Wipe down surfaces with disinfectant on a routine basis (at least once per day). This includes
 field equipment and other items that may have previously been used by others. This is especially
 important while working in construction trailers. When using company and personal vehicles,
 wipe surfaces including the steering wheel, gear shifter, controls, and door handles before and
 after use.
- Wear nitrile gloves as frequently as possible. Hand washing is necessary after removing gloves.
- When greeting others avoid handshaking, hugging, or other personal contact. A greeting from a distance such as a wave is suggested.
- Avoid sharing field equipment and other materials with others. Before using field equipment or
 putting it away, wipe it down with disinfectant or wash it with soap and water. Note, use extra
 caution using disinfectants while collecting environmental samples to ensure that the samples are
 not compromised.

Coronavirus COVID-19 Preparedness for Fieldwork & Project Sites

More detail on ways to protect yourself through distancing and hygiene can be found at MIT Medical's website: https://medical.mit.edu/three-ways-to-protect

3.0 Use of Public Places

- If your project requires you to stay in a hotel, practice the disinfecting precautions described above.
- If you will be eating food/drinks, order take-out or use delivery services at restaurants. Wash your hands before eating.
- Minimize the use of public transportation to travel to and from project sites. Use your personal vehicle (preferred), GEI vehicle, or a ride service such as Lyft.
- If you have concerns, discuss them with the project manager, your supervisor, branch manager, and/or with your Regional Safety Manager (RSM) or with Steve Hawkins, Safety Director.

4.0 COVID-19 and Symptoms

The health and safety of every member of our GEI family is most important. Continue to follow the guidance that is frequently communicated to all employees including:

- If you experience a fever or symptoms associated with COVID-19, please stay at home and contact your licensed healthcare provider. Notify your branch manager and Julie Jennings before returning to the workplace.
- If you, a household member, or someone you have come into first-hand contact and has a confirmed COVID-19 diagnosis, please do not come into the workplace. Alert your branch manager and Julie Jennings without delay for specific instructions, including the requirements for returning to work.

5.0 Resources

Additional information can be found through the resources below:

- Centers for Disease Control and Prevention (CDC) https://www.cdc.gov/coronavirus/2019-ncov/index.html
- World Health Organization https://www.who.int/emergencies/diseases/novel-coronavirus-2019
- State and Local Agency Resources

6.0 Communication and Reporting

The precautions included in this guidance and in other GEI's employee communications should be practiced at all project site locations and offices. While COVID-19 related information is not expected to be reported through GEI's incident reporting process, the expectation is that all employees will communicate any inconsistencies or concerns with practices at project sites to their project manager, supervisor, branch manager, and RSM. This will allow us to make corrections/updates and provide proper protective measures.

Information about preventing COVID-19 exposure is changing regularly. The information included in this guide are general steps we can take while performing field assignments and should be included in HASPs and safety briefings. If you have specific situations, questions, or concerns please discuss them with the Project Manager, your RSM, or Steve Hawkins.

Stay safe and healthy.

Holden, Jeffrey

From: King, Matthew A (DEC) < Matthew.King@dec.ny.gov>

Sent: Wednesday, July 8, 2020 10:02 AM

To: Kopcow, Dan

Cc: Holden, Jeffrey; Brad Walker (walkerb@natfuel.com); Tanya B. Alexander (alexandert@natfuel.com);

Eaton, Daniel J (DEC)

Subject: [EXT] RE: National Fuel Gas Hornell Soil Reuse Evaluation

Hi Dan,

The Department accepts this Soil Reuse Evaluation document.

Thanks,

Matt

Matthew King

Geologist Trainee, Remedial Bureau C Division of Environmental Remediation

New York State Department of Environmental Conservation

625 Broadway, Albany, NY 12233

P: 518-402-7383 | F: 518-402-9679 | Matthew.King@dec.ny.gov |

From: Kopcow, Dan <dkopcow@geiconsultants.com>

Sent: Tuesday, July 07, 2020 5:17 PM

To: King, Matthew A (DEC) < Matthew.King@dec.ny.gov>

Cc: Holden, Jeffrey <JHolden@geiconsultants.com>; Brad Walker (walkerb@natfuel.com) <walkerb@natfuel.com>;

Tanya B. Alexander (alexandert@natfuel.com) <alexandert@natfuel.com>; Eaton, Daniel J (DEC)

<daniel.eaton@dec.ny.gov>

Subject: RE: National Fuel Gas Hornell Soil Reuse Evaluation

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Hi Matt, thanks for providing comments regarding the Hornell Soil Reuse Evaluation. The comments provided in your letter of July 6 are reiterated below and our response follows each.

1. Department staff observed BTEX/petroleum impacts in test pit 12 during the Supplemental Pre-Design Investigation at this site during August of 2019. While it is understood that the maximum depth of re-used soils will be 8 foot and that the test pit logs show the BTEX/petroleum impacts, there is no mention of this in the narrative.

Response: The Department correctly notes that petroleum-related impacts in Test Pit TP12 were located below the depth of the proposed soil reuse zone. The reuse proposal has been modified to more clearly state that impacted soils exist adjacent to and below the targeted reuse soils.

2. Figure 1, Soil Reuse Evaluation: It is not obvious on this figure where the commercial zoned property ends on the residentially zoned properties begin on the southwest corner of the map. Soils only meeting commercial standards would not be appropriate for re-use on a residential property. Drawing S-017, sheet 17 of 18, in the 95% Design Drawings document show on-site reuse material being considered for the 4-foot excavation area. Any backfill on residential properties should be clean, approved, imported fill.

Response: The intent is only to reuse soils within the commercially zoned areas. The illustration of soil reuse within the 4-foot excavation zone on Design Drawing 17 was only intended to apply to 4-foot excavations on the commercial property, not the residential parcels. This will be clarified in the 100% Design submittal. Meanwhile, the soil reuse document was revised to indicate where soil reuse may occur, including a new Figure 2 showing the limits of the excavation and ISS boundaries within which onsite soils could be reused as backfill.

Pending your review and approval, we'll maintain the potential for onsite soil reuse in the 100% Remedial Design Document.

Thanks.

GEI50

DANIEL KOPCOW, P.E., PMP Vice President/Branch Manager 607.216.8976 cell: 607.206.9075 1301 Trumansburg Road, Suite N, Ithaca, NY 14850



From: King, Matthew A (DEC) < Matthew.King@dec.ny.gov>

Sent: Monday, July 6, 2020 11:27 AM

To: Kopcow, Dan < dkopcow@geiconsultants.com>

Cc: Holden, Jeffrey <JHolden@geiconsultants.com>; Brad Walker (walkerb@natfuel.com) <walkerb@natfuel.com>;

Tanya B. Alexander (alexandert@natfuel.com) <alexandert@natfuel.com>; Eaton, Daniel J (DEC)

<daniel.eaton@dec.ny.gov>

Subject: [EXT] RE: National Fuel Gas Hornell Soil Reuse Evaluation

Hi Dan,

Attached please find Department comments on the Soil Re-use Work Plan for the Hornell Former MGP site, 851032. No hard copy of this letter is to follow. Please submit a revised document for Department consideration at your earliest convenience.

Thanks,

Matt

Matthew King

Geologist Trainee, Remedial Bureau C Division of Environmental Remediation

New York State Department of Environmental Conservation

625 Broadway, Albany, NY 12233

P: 518-402-7383 | F: 518-402-9679 | Matthew.King@dec.ny.gov |

From: Kopcow, Dan <<u>dkopcow@geiconsultants.com</u>>

Sent: Thursday, May 21, 2020 12:23 PM

To: King, Matthew A (DEC) < Matthew.King@dec.ny.gov>

Cc: Holden, Jeffrey < JHolden@geiconsultants.com >; Brad Walker (walkerb@natfuel.com) < walkerb@natfuel.com >;

Tanya B. Alexander (<u>alexandert@natfuel.com</u>) < <u>alexandert@natfuel.com</u>>

Subject: National Fuel Gas Hornell Soil Reuse Evaluation

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Hi Matt, please review the attached soil reuse evaluation for the National Fuel Gas MGP Hornell site. I'd like to see if we can discuss on our call on Tuesday. Thanks.

GEI50

DANIEL KOPCOW, P.E., PMP Vice President/Branch Manager 607.216.8976 cell: 607.206.9075 1301 Trumansburg Road, Suite N, Ithaca, NY 14850



National Fuel Gas Distribution Corporation Hornell Former Manufactured Gas Plant Site Hornell, New York

Soil Reuse Evaluation Summary

On behalf of National Fuel Gas Distribution Corporation (NFG), GEI Consultants, Inc., P.C. (GEI) has reviewed existing soil data (including analytical data and field observations) within the limits of the in-situ soil solidification (ISS) area of the Hornell Former Manufactured Gas Plant (MGP) Site. The purpose of this evaluation was to determine whether any of the soil generated as part of the pre-ISS excavation can be reused at the site as backfill per the provisions of the March 2018 ROD. Specifically, soils within the ISS treatment area will be excavated to a planned minimum depth of 8 feet below ground surface (bgs) to accommodate swell of the underlying soils subject to ISS. To the extent that the excavated soils are impacted by MGP constituents, the soils will be transported for off-site disposal. However, the ROD allows for soils exceeding NYSDEC's commercial site cleanup objectives (SCOs) to be reused as backfill at the site as long as they contain total polycyclic aromatic hydrocarbon (tPAH) concentrations less than 500 parts per million (milligrams per kilogram [mg/kg]). When reused as fill, the soils could only be placed within excavation and/or ISS areas within the boundaries of the commercial property and at least one foot below the restored ground surface.

Figure 1 summarizes the analytical and field observations at each historical soil investigation location within and adjacent to the area where ISS is to be performed. Based on the data review, GEI identified an area within and immediately adjacent to the eastern portion of the sheet pile wall (delineating the excavation and ISS area) where data indicate soil within the 0 to 8-foot depth range may be suitable for reuse as fill on site. This area is outlined in orange on Figure 1. Soil observations indicating no visible MGP impacts are colored green, while observations of a coal tar-like odor, sheening and/or staining are colored yellow. Locations are colored pink where evidence of potentially significant coal tar impacts were observed (including hardened tar, stringers, blebs, coating, saturation, etc.) and/or analytical data for tPAHs are 500 mg/kg or greater. Green outlines indicate locations where analytical data are available and have tPAH concentrations below 500 mg/kg.

Table 1 provides details regarding the soil observations and tPAH concentrations for each sample point within the target area. Geologic logs for the soil investigation locations within this area are included in Appendix 1. As shown in Figure 1 and Table 1, there was a single instance where visual evidence of potential coal tar impacts was observed (hardened tar in the shallow fill of TP12). A sample was collected from the most visually impacted soil within the test pit and analyzed for PAHs; the tPAH concentration in that sample was 2.83 mg/kg; well below the 500 mg/kg limit for on site reuse of soil.

Please note that Figure 1 only illustrates data representative of the 0- to 8-foot depth interval within the targeted soil reuse area. We recognize that soils outside this area, and deeper than the targeted 8 feet of reuse soil, contain impacts that make them unsuitable for reuse as fill material

-

¹ For the 17 priority pollutant PAHs

National Fuel Gas Distribution Corporation Hornell Former Manufactured Gas Plant Site Hornell, New York

Soil Reuse Evaluation Summary

on site. This includes, but is not limited to, petroleum impacted soils at depths of 12 feet or greater in Supplemental Pre-Design Investigation Test Pit #12, as noted in NYSDEC's comments dated July 6, 2020. This is, in part, the reason that excavation and/or ISS activities will proceed deeper than the targeted soil reuse depth of 8 feet.

Approximately 1,600 cubic yards (cy) of soil is available for potential reuse from the 0- to 8-ft bgs interval within the target area. A total of 20 visual observations were made on samples collected from within this volume, resulting in an observation sample density of one sample per 80 cy of soil. Only one of these locations showed evidence of potentially significant coal tar impacts (i.e., hardened tar in TP12 as noted above). Analytical results are available from 14 of the samples collected from this soil volume, resulting in a sample density of one sample per 114 cy of soil, which is more sampling than recommended by NYSDEC for soil imported to or exported from a site (i.e., 1 sample per 500 cubic yards). All of the data are below the 500 mg/kg total PAH standard, including the sample representative of the area where tar was observed in shallow fill of TP12. Therefore, based on the existing analytical data and visual characterizations described above, the soil is adequately characterized and suitable for reuse atop the ISS mass (and covered by 1 foot of imported material) without further pre-characterization or sampling of excavated stockpiles during implementation.

Consistent with the ROD requirement, on-site soil reuse would only occur within the limits of the commercially zoned hotel property. More specifically, it would only be reused at depths greater than one foot below final grade within the support of excavation (SOE) boundary area excluding the limited area in the southwest corner where the SOE extend onto the adjacent residential property. The target area where soil reuse could be implemented is illustrated on Figure 2.

To facilitate planning for the future 100% Remedial Design submittal and implementation schedule, GEI requests NYSDEC concurrence that the soil volume within the identified area is adequately characterized such that soils within the targeted area and depth (up to 1,600 cubic yards) may be reused on site as fill material above the ISS-treated soil mass without further stockpiling or assessment/characterization. Note, however, that any decision to use some or all of this volume will be at the collective discretion of the Contractor, GEI, and NFG based on the progress of the work, space availability, and the relative cost of material handling in comparison to off-site disposal and replacement with clean fill from an off-site source. If a decision is made to reuse soil on site, any hardened tar, asphalt, or similar non-soil materials identified in the target soils would not be deemed acceptable; such materials would be removed from the soil and disposed off site. Determinations of material unsuitability would be made by GEI in consultation with NFG and the NYSDEC's on-site observer (when present).

Soil Reuse Evaluation Summary Hornell Former Manufactured Gas Plant Site Hornell, New York May 2020, revised July 2020

Figures

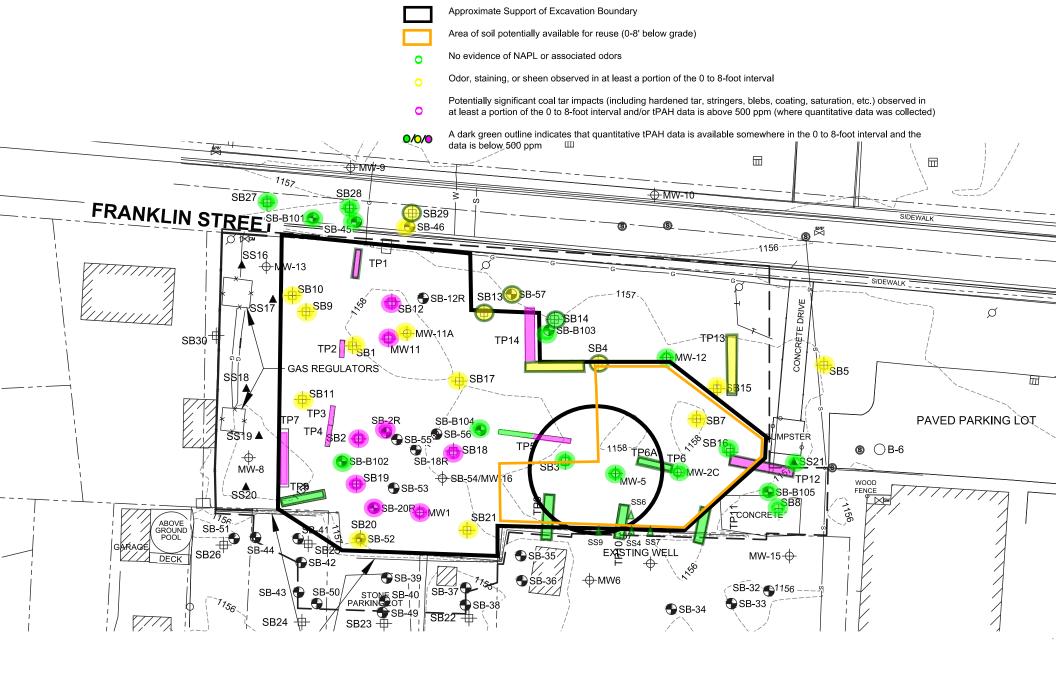
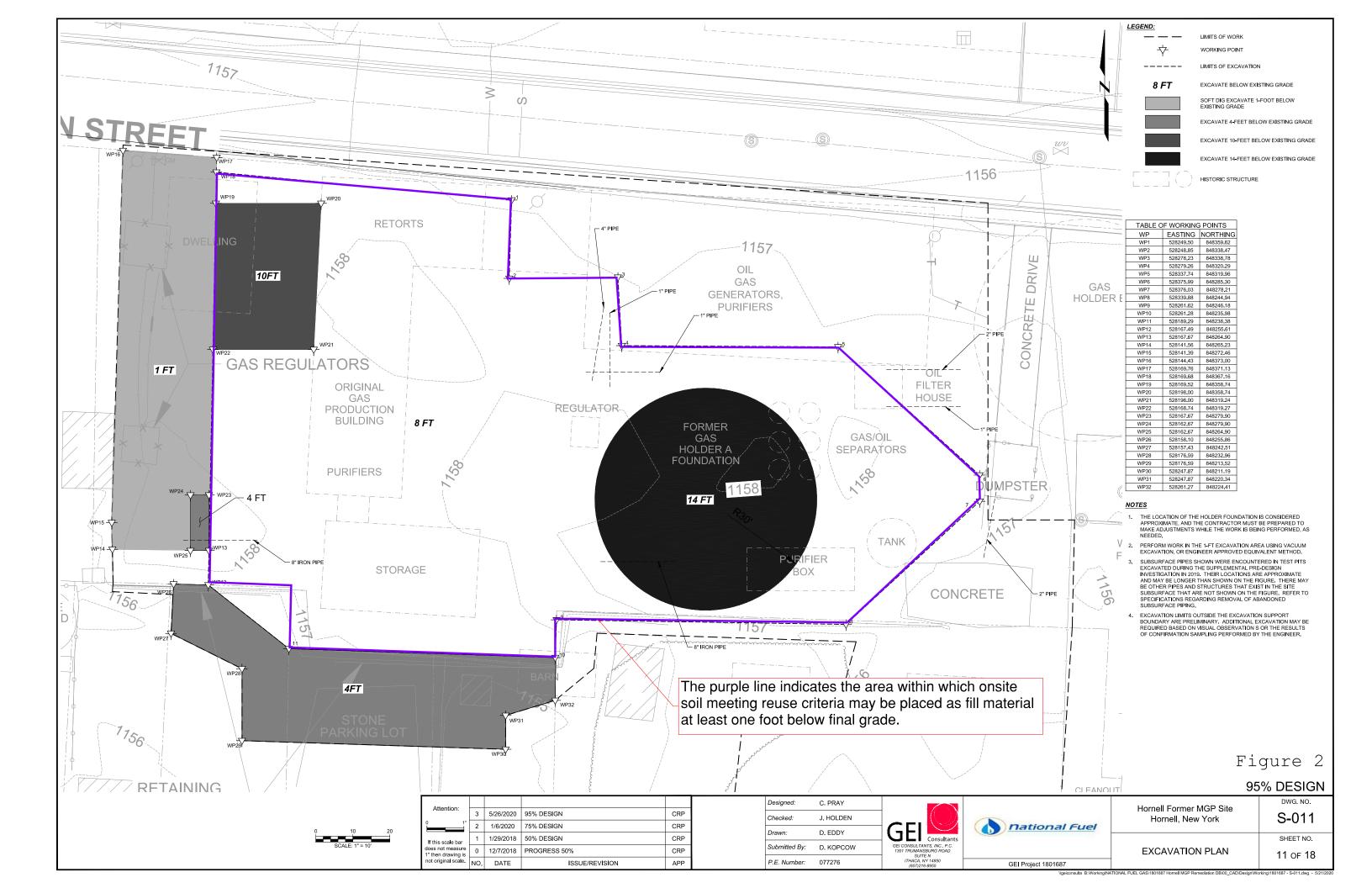


Figure 1. Soil Reuse Evaluation



Soil Reuse Evaluation Summary Hornell Former Manufactured Gas Plant Site Hornell, New York May 2020, revised July 2020

Table

Table 1. Summary of Data 0-8' bgs within Eastern Portion of ISS Area (Proposed Reuse Soil Area) Hornell Former Manufactured Gas Plant Site National Fuel Gas Distribution Corporation

Location	Date	Observation Depth Range (ft bgs)	Impact Remarks	Sample ID	Sample Depth Interval (ft bgs)	Total PAH Concentration (ppm)
MW2C	2/1/2011	0-30	No observed impacts in the 0 - 8 ft bgs interval	NS	NS	NS
MW5	9/29/2011	0-22	No observed impacts in the 0 - 8 ft bgs interval	NS	NS	NS
MW12	9/27/2011	0-30	Fill containing brick and coal fragments (2-4'); no other observed impacts in the 0 - 8 ft bgs interval	MW12 (8-9)	8-9	3.618
SB3	1/27/2011	0-30	No observed impacts in the 0 - 8 ft bgs interval	NS	NS	NS
SB4	1/28/2011	0-30	Slight tar-like odor (6-8); no other observed impacts in the 0 - 8 ft bgs interval	SB4 (6-8)	6-8	0.723
SB7	1/31/2011	0-30	Moderate tar-like odor (6-8); no other observed impacts in the 0 - 8 ft bgs interval	NS	NS	NS
SB15	9/23/2011	0-30	Slight tar-like odor (6-8); no other observed impacts in the 0 - 8 ft bgs interval	NS	NS	NS
SB16	9/27/2011	0-24	No observed impacts in the 0 - 8 ft bgs interval	NS	NS	NS
SS4	10/4/2011	0-0.5	No observed impacts	SS-4	0-0.5	12.191
SS6	8/28/2012		Unknown - soil observations not available	SS-6	0-0.17	10.55
SS7	8/28/2012		Unknown - soil observations not available	SS-7	0-0.17	41.23
SS9	8/28/2012		Unknown - soil observations not available	SS-9	0-0.17	19.559
TP6	12/21/2010	0-4.5	No observed impacts	TP6(3.5)	3.5	1.987
TP6A	12/21/2010	0-4.5	No observed impacts	TP6A(3.5-4)	3.5-4	40.8
TP9	8/5/2019	0-14	No observed impacts	TP9-6	6	0.231
TP10	8/5/2019	0-14.5	No observed impacts	TP10-6	6	6.745
TP11	8/6/2019	0-14	No observed impacts	TP11-6	6	ND [0.02]
TP12	8/6/2019	0-15	Fill containing black staining and hardened tar and coal fragments (1-4); no other observed impacts in the 0 - 8 ft bgs interval. Analytical sample TP12-4.5 was collected as the worst case visual sample and contained the black staining and hardened tar and coal fragments.	TP12-4.5	4.5	2.83
TP13	8/7/2019	0-14	Fill containing black staining and coal fragments (0-3); no other observed impacts in the 0 - 8 ft bgs interval. Analytical sample TP13-3Bound was collected from fill at remedial boundary and contained the black staining and coal fragments.	TP13-3Bound	3	61.51
TP14	8/7/2019	0-8.5	Fill containing brick and coal fragments (0-3); strong to moderate hydrocarbon-like odor (5-6.5); no other observed impacts in the 0 - 8 ft bgs interval. Analytical sample TP14-6 was collected as the worst case visual sample and contained gray to black-stained clay and odor.	TP14-6	6.5	5.761

Notes:

[0.02] = Duplicate sample result

ft bgs = feet below ground surface

ND = Not detected

NS = No sample collected within the 0- to 8-foot interval

PAH = polycyclic aromatic hydrocarbons (total of detected PAHs)

ppm = parts per million (milligrams per kilogram)

^{1.} This table summarizes visual observations and total PAH analytical data for soil samples 0-8' deep within the area of soils in the eastern portion of the ISS zone proposed for reuse as backfill on site.

Soil Reuse Evaluation Summary Hornell Former Manufactured Gas Plant Site Hornell, New York May 2020, revised July 2020

Appendix 1

Geologic Logs

CLIENT: National Fuel Gas PROJECT: **NFG Hornell** PAGE CITY/STATE: Hornell, NY 1 of 2 **GEI PROJECT NUMBER:** 102260

MW2C

BORING LOG

GROUND SURFACE ELEVATION (FT): 1157.92 LOCATION: Hornell, NY NORTHING (FT): 848271 EASTING (FT): 528337 TOTAL DEPTH (FT): 30.0 DATUM VERT. / HORZ.: NAVD 88 / NAD 83 DRILLED BY: Parratt-Wolff LOGGED BY: Matthew Sweet DATE START / END: 2/1/2011 - 2/1/2011

DRILLING DETAILS: Direct Push then Hollow Stem Auger

WATER LEVEL DEPTHS (FT): 7 7 48

**	IN LL	VEL D	EPTHS (FT). <u>+ 1</u>	+0				
Ë	Ë		SAMPLE IN	IFO	⋖	12 12	~		
ELEV.	DEPTH	TYPE and NO.	PEN/REC IN./IN.	FIELD TEST DATA	STRATA	VISUAL IMPACTS	ODOR	REMARKS	SOIL / BEDROCK DESCRIPTION
	— o	S1	24/14	PID= 0.6 ppm	7/ 1/v				(0'- 0.7') TOPSOIL.
.	-								(0.7'- 2') SILTY GRAVEL WITH SAND (GM); ~60% gravel, ~25% sand, fine to coarse, ~15% fines; dry, orange brown.
1 155 _	-	S2	24/6	PID= 0.0 ppm	Ta				(2'- 4') POORLY GRADED SAND WITH GRAVEL (SP); ~50% sand, medium, ~45% gravel, fine to coarse, ~5% fines; dry, orange brown.
· -	- 5	S 3	24/0	PID= 0.0 ppm					(4'- 6') Drill through to 6' bgs.
- - Y	-	S4	24/15	PID= 0.0 ppm					(6'- 8') SILT WITH SAND (ML); ~85% fines, low plasticity, ~15% sand, fine; moist, brown, medium stiff.
-1 150 _	_	S5	24/15	PID= 0.1 ppm					(8'- 10') SILTY SAND (SM); ~85% sand, fine to medium, ~15% fines; dry, brown, medium dense, slight tar odor.
-	— 10 -	S6	24/14	PID= 0.8 ppm					(10'- 12') SILTY GRAVEL WITH SAND (GM); ~50% gravel, ~35% sand, fine to coarse, ~15% fines; slight tar-like odor, wet, brown.
-1 145 _	-	S 7	24/10	PID= 0.0 ppm	10 (1)				(12'- 14') SILTY SAND (SM); ~70% sand, fine, ~30% fines; moist to wet, brown, medium dense.
-	_ 15	S8	24/6	PID= 0.0 ppm					(14'- 16') SILTY GRAVEL WITH SAND (GM); ~60% gravel, fine to coarse, ~25% sand, fine to coarse, ~15% fines; moist to wet, brown, dense, slight tar odor.
-	-	S9	24/14	PID= 0.0 ppm	d			Sample ID= MW-2c (16-18)	(16'- 18') WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM); ~50% sand, fine to coarse, ~40% gravel, fine to coarse, ~10% fines; moist to wet, brown, medium dense.
-1 140 _ -	-	S10	24/17	PID= 0.0 ppm					(18'- 20.3') SILTY SAND (SM); ~80% sand, fine to medium, ~20% fines; wet, dark brown, dense.
	- 20				Ш				

NOTES:

PEN = PENETRATION LENGTH OF SAMPLER OR CORE BARREL

REC = RECOVERY LENGTH OF SAMPLE PID = PHOTOIONIZATION DETECTOR READING (JAR HEADSPACE)

IN. = INCHES FT. = FEET

PLO = PETROLEUM LIKE ODOR TLO = TAR LIKE ODOR CLO = CHEMICAL LIKE ODOR

ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR OLO = ORGANIC LIKE ODOR SLO = SULFUR LIKE ODOR MLO = MUSTY LIKE ODOR

NA = NOT AVAILABLE

				onsultants,			CLIEN	IT: National I	Fuel Gas		BORING LOG
			1301 T Suite I	Trumansbui N	rg Rd		PROJ	ECT:	NFG Hornell	PAGE	
6	ΕI		Ithaca	, NY 14850				STATE:	Hornell, NY	2 of 2	MW2C
U	<u>LI</u>	Consult	ants (607) 2	216-8955			GEI P	ROJECT NUM	BER: 102260	_ 、 _	
F.	Ë	5	SAMPLE IN	1FO	_	. თ					
		TYPE		FIELD	STRATA	VISUAL IMPACTS	ODOR	REMARKS	SOIL	. / BEDF	ROCK
ELEV.	DEPTH	and	PEN/REC IN./IN.	TEST	Į,	ISI IPA	0	REWARNS	DE	SCRIPT	ION
ᆸ	8	NO.	IIN./IIN.	DATA	ြ	/≥					
	- 20	S11	24/14	PID= 0.5	2145						
		011	2-7/1-7	ppm					(20.3'- 22') SILTY GRAVEL	WITH	SAND (GM); ~55% gravel,
_	-								fine to coarse, ~30% sand, dark brown black, dense, o		
_					φ					. 9	
	_ [S12	24/20	PID= 0.0 ppm					(22'- 23.2') POORLY GRAD	DED SA	ND (SP); ~100% sand,
1 135	_			ppiii					medium; wet, dark brown, i	nedium	dense.
					PT.				(23.2'- 24') SILTY GRAVEL	WITH	SAND (GM); ~55% gravel,
-	-	S13	24/10	PID= NA	194		-		fine to coarse, ~30% sand, brown tan, dense.	fine to	coarse, ~15% fines; wet,
		313	24/10	ppm					(24'- 26') ŚILTY SAND (SM	l); ~75%	sand, fine, ~25% fines;
_	25								wet, brown, medium dense	-	
_											
	_ [S14	24/24	PID= NA ppm				Sample ID= MW-2c (26-28)	(26'- 30') SILTY SAND WIT	H GRA	VEL (SM); ~60% sand, fine,
-	_			-					~25% fines, ~15% gravel, f	ine to co	parse; wet, prown.
-1 130	-	S15	24/12	PID= 0.0	-						
		0.0	- " -	ppm							
_	-										
_ [— 30 [[]										
	30								Bottom of borehole at 30.0	feet.	
-	_										
-	_										
ŀ	-										
	_										
	— 35										
-	_										
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NOTE	<u>:S:</u>										
			LENGTH OF S		R COR	E BARF		pm = PARTS PER N. = INCHES	MILLION NLO = NAPHTHALENE LII PLO = PETROLEUM LIKE		CrLO= CREOSOTE LIKE ODOR OLO = ORGANIC LIKE ODOR
PID =	PHOTO	IONIZATI	ION DETECTO		G (JAR			T. = FEET	TLO = TAR LIKE ODOR		SLO = SULFUR LIKE ODOR
	HEADS	PACE)							CLO = CHEMICAL LIKE O ALO = ASPHALT LIKE OD		MLO = MUSTY LIKE ODOR
		/AILABLE									

ENVIRONMENTAL BORING LOG NFG HORNELL BORELOGS.GPJ GASTOWNBORINGLOGS_2010.GPJ 6/27/14

BORING LOG CLIENT: National Fuel Gas PROJECT: **NFG Hornell** PAGE MW5 CITY/STATE: Hornell, NY 1 of 1 **GEI PROJECT NUMBER:** 102260

GROUND SURFACE ELEVATION (FT): 1157.65 LOCATION: Hornell, NY NORTHING (FT): 848271 EASTING (FT): 528311 TOTAL DEPTH (FT): 22.0 DATUM VERT. / HORZ.: NAVD 88 / NAD 83 DRILLED BY: Parratt-Wolff LOGGED BY: Garrett Schmidt DATE START / END: 9/29/2011 - 9/29/2011

DRILLING DETAILS: Hollow Stem Auger

FT.	Ë	,	SAMPLE IN	NFORMAT	ION	⋖	75		
ELEV.	рертн	TYPE and NO.	PEN/REC IN./IN.	BLOWS (/6 in.)	FIELD TEST DATA	STRATA	VISUAL IMPACTS	REMARKS	SOIL / BEDROCK DESCRIPTION
	— 0	S1	24/12	3-3-3-4	PID= 0.0 ppm				(0'- 0.5') TOPSOIL; ~70% sand, ~20% fines, ~5% gravel, subangular; 5% root fragments, moist, brown, no odor. (0.5'- 2') SILTY SAND (SM); ~75% sand, ~20% fines, ~5% gravel, subangular; moist, brown, no odor.
-1 155 -	_	S2	24/0	2-3-3-3	PID= NA ppm				(2'- 4') no recovery.
-	_ 5	S3	24/16	3-3-2-2	PID= 0.0 ppm				(4'- 10') SILTY SAND (SM); ~55% sand, ~25% fines, ~10% gravel, subangular; 5% coal fragments, 5% brick fragments, moist, brown, no odor.
- -1 150	_	S4	24/14	3-6-4-4	PID= 0.0 ppm				
-	_	S5	24/4	5-5-2-2	PID= 1.6 ppm				
-	— 10 –	S6	24/6	3-4-5-3	PID= 44.4 ppm				(10'- 14') SILTY SAND (SM); ~50% sand, ~25% fines, ~15% gravel, subangular; 5% brick and coal fragments, 5% wood fragments, wet, brown, moderate hydrocarbon-like odor; sheen; occasional blebs of
-1 145 -	_	S7	24/21	1-31-27- 8	PID= 156 ppm			Sample ID= MW5 (13-14)	black-brown tar, soil saturated with tar.
_	 15	S8	24/13	15-14- 15-17	PID= 25.2 ppm				(14'- 16') SILTY SAND (SM); ~65% sand, ~20% fines, ~15% gravel, subangular; wet, brown, slight hydrocarbon-like odor, soil grains coated with tar, sheen.
- -1 140	_	S9	24/15	8-8-9-9	PID= 25.0 ppm				(16'- 18') SILTY SAND (SM); ~75% sand, ~15% gravel, subangular, ~10% fines; dark grayish brown, occasional blebs of blackish-brown tar, sheen, slight hydrocarbon-like odor.
-	_	S10	24/19	9-7-7-14	PID= 18.3 ppm				(18'- 20') SILTY SAND (SM); ~70% sand, ~20% fines, ~10% gravel, subangular; wet, grayish brown.
-	— 20 –	S11	24/20	15-17- 15-15	PID= 5.0 ppm			Sample ID= MW5 (21-22)	(20'- 22') WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM); ~70% sand, ~20% gravel, subangular, ~10% fines; wet, grayish brown, no odor.
	_					<u>1. 17h</u>			Bottom of borehole at 22.0 feet.

NOTES:

REC = RECOVERY LENGTH OF SAMPLE PID = PHOTOIONIZATION DETECTOR READING (JAR HEADSPACE)

IN. = INCHES FT. = FEET

PLO = PETROLEUM LIKE ODOR TLO = TAR LIKE ODOR CLO = CHEMICAL LIKE ODOR ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR OLO = ORGANIC LIKE ODOR SLO = SULFUR LIKE ODOR MLO = MUSTY LIKE ODOR

NA = NOT AVAILABLE

CLIENT: National Fuel Gas PROJECT: **NFG Hornell** PAGE CITY/STATE: Hornell, NY 1 of 2 **GEI PROJECT NUMBER:** 102260

MW12

BORING LOG

GROUND SURFACE ELEVATION (FT): 1157.25 LOCATION: Hornell, NY TOTAL DEPTH (FT): 30.0 NORTHING (FT): 848320 EASTING (FT): 528333 DATUM VERT. / HORZ.: NAVD 88 / NAD 83 DRILLED BY: Parratt-Wolff LOGGED BY: Garrett Schmidt DATE START / END: 9/27/2011 - 9/27/2011

DRILLING DETAILS: Hollow Stem Auger

Ë	FI.		SAMPLE IN	NFORMAT	ION	4	_					
ELEV. F	DEPTH F	TYPE and NO.	PEN/REC IN./IN.	BLOWS (/6 in.)	FIELD TEST DATA	STRATA	VISUAL	REMARKS	SOIL / BEDROCK DESCRIPTION			
- - - 1155	— 0	S1 S2	24/17	2-3-5-5 9-6-4-5	PID= 0.0 ppm	3/4			(0'- 0.3') TOPSOIL; ~65% sand, ~20% fines, ~10% gravel subangular; 5% root fragments, brown, no odor. (0.3'- 2') SILTY SAND WITH GRAVEL (SM); ~60% sand, ~20% fines, ~15% gravel, subangular; 5% brick and coal fragments, moist, brown, no odor. (2'- 4') no recovery.			
-	_	S3	24/7	1-1-3-3	PID= 0.9				(4'- 6') SILTY SAND (SM); ~70% sand, ~25% fines; 5% brick fragments, moist, brown, no odor.			
-	— 5 —	S 4	24/19	2-4-5-5	PID= 0.1 ppm				(6'- 8') SILT WITH SAND (ML); ~75% fines, low plasticity, ~20% sand, fine; 5% brick fragments, moist, light brown,			
-1 150 -	_	S5	24/24	5-6-6-10	PID= 0.1 ppm	-		Sample ID= MW12 (8-9)	no odor. (8'- 10.5') SILT WITH SAND (ML); ~80% fines, low plasticity, ~20% sand, fine; moist, light brown, no odor.			
-	— 10 –	S6	24/12	2-2-5-5	PID= 0.0 ppm				(10.5'- 12') SILTY SAND (SM); ~70% sand, ~20% fines, ~10% gravel, subangular; moist, light brown, no odor.			
-1 145	_	S7	24/4	7-5-7-7	PID= NA ppm				(12'- 14') SILTY SAND WITH GRAVEL (SM); ~60% sand ~20% gravel, subangular, ~20% fines; moist, light brown, no odor.			
-	15 	S8	24/11	4-6-6-6	PID= 14.2 ppm				(14'- 16') SILTY SAND WITH GRAVEL (SM); ~55% sand ~25% fines, ~20% gravel, subangular; wet, grayish brown slight hydrocarbon-like odor.			
1 140	_	S9	24/7	12-11-8-	PID= 0.8 ppm				(16'- 18') SILTY SAND WITH GRAVEL (SM); ~55% sand ~25% gravel, subangular, ~20% fines; wet, grayish brown slight hydrocarbon-like odor.			
-	_ 20	S10	24/17	9-6-4-5	ppm ppm				(18'- 20') POORLY GRADED SAND WITH SILT (SP-SM ~85% sand, ~10% fines, ~5% gravel, subangular; wet, grayish brown, very slight hydrocarbon-like odor.			
REC =	PENETI RECOV PHOTO HEADS	ERY LEN IONIZAT PACE)	LENGTH OF S NGTH OF SAM TON DETECTO	IPLE		REL		PARTS PER MILL INCHES FEET	ION NLO = NAPHTHALENE LIKE ODOR PLO = PETROLEUM LIKE ODOR TLO = TAR LIKE ODOR CLO = CHEMICAL LIKE ODOR ALO = ASPHALT LIKE ODOR			

NOTES:

			GEI C	onsultants,	Inc.	CLII	ENT:	National Fuel	Gas		BORING LOG
- 5			1301 Suite	Trumansbur N	g Rd.		JECT		NFG Hornell	PAGE	
G	FΙ		Ithaca	, NY 14850			Y/STA		Hornell, NY	2 of 2	MW12
U	<u> </u>	Consult	ants	216-8955		GEI	PROJ	ECT NUMBER	102260		
Ë	Ë		SAMPLE IN	NFORMAT	ION	<	_ S				
ELEV.	DEPTH	TYPE and NO.	PEN/REC IN./IN.	BLOWS (/6 in.)	FIELD TEST DATA	STRATA	VISUAL IMPACTS	REMARKS		IL / BEI ESCRIF	DROCK PTION
-	— 20 _	S11	24/22	3-8-25- 12	PID= 0.5 ppm	* • • • • • • • • • • • • • • • • • • •			(20'- 22') WELL GRADE GRAVEL (SW-SM); ~70 subangular, ~10% fines	0% san	d, ~20% gravel,
-1 135 -	_	S12	24/16	7-7-9-12	PID= 0.8 ppm				(22'- 30') WELL GRADE GRAVEL (SW-SM); ~70 subangular, ~10% fines	0% san	d, ~20% gravel,
-	25 	S13	24/11	8-8-8-8	PID= 0.3 ppm	· • • • • • • • • • • • • • • • • • • •					
- - 1 130	_	S14	24/16	14-13- 19-17	PID= 0.5 ppm	**************************************					
-	_ 30	S15	24/18	8-11-11- 20	PID= 0.4 ppm			Sample ID= MW12 (29-30)	Bottom of borehole at 3		
REC = PID = NA =	PENETI RECOV PHOTO HEADS NOT AV	ERY LEN		1PLE		REL		PARTS PER MILLI INCHES FEET	ON NLO = NAPHTHALENE LIK PLO = PETROLEUM LIKE TLO = TAR LIKE ODOR CLO = CHEMICAL LIKE OD ALO = ASPHALT LIKE OD	ODOR OOR	CrLO= CREOSOTE LIKE ODOR OLO = ORGANIC LIKE ODOR SLO = SULFUR LIKE ODOR MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG NFG HORNELL BORELOGS.GPJ GASTOWNBORINGLOGS_2010.GPJ 5/27/14

CLIENT: National Fuel Gas PROJECT: **NFG Hornell** PAGE CITY/STATE: Hornell, NY 1 of 2 **GEI PROJECT NUMBER:** 102260

LOCATION: Hornell, NY

SB3

BORING LOG

GROUND SURFACE ELEVATION (FT): 1157.91 NORTHING (FT): 848276 EASTING (FT): 528290 DRILLED BY: Parratt-Wolff LOGGED BY: Matthew Sweet

TOTAL DEPTH (FT): 30.0 DATUM VERT. / HORZ.: NAVD 88 / NAD 83 DATE START / END: 1/27/2011 - 1/27/2011

DRILLING DETAILS: Direct Push then Hollow Stem Auger

WATER LEVEL DEPTHS (FT):

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ELEV. F	DEPTH F	TYPE and NO.	PEN/REC IN./IN.	FIELD TEST DATA	STRATA	VISUAL IMPACTS	REMARKS	SOIL / BEDROCK DESCRIPTION
	— O	S1	24/0	PID= 0.0 ppm	<u>11/1/</u>			(0'- 1') TOPSOIL; dark brown.
-	_				A 4 4			(1'- 2') CONCRETE; auger through.
1 155	_	S2	24/12	PID= 0.0 ppm				(2'- 4') SILTY SAND WITH GRAVEL (SM); ~60% sand, fine to coarse, ~20% gravel, fine to coarse, ~20% fines; trace brick and concrete fragments, moist to wet, blackish brown red, trace glass, brick fragments. Fill
	_ 5	S3	24/6	PID= 0.0 ppm				(4'- 8.7') SILTY SAND WITH GRAVEL (SM); \sim 60% sand, fine to coarse, \sim 20% gravel, fine to coarse, \sim 20% fines; brick fragments, glass, moist.
	_	S4	24/2	PID= 0.0 ppm				
1 150	_	S5	24/18	PID= 0.0				
-	_			ppm				(8.7'- 10') CLAYEY SAND (SC); ~60% sand, fine, ~40% fines, medium plasticity; moist, gray black.
-	— 10 –	S6	24/3	PID= 0.0 ppm	<i>K.J</i> ./			(10'- 12') wood, black, tar coated timber.
1 145	_	S7	24/8	PID= 51.3 ppm				(12'- 14') SILTY GRAVEL (GM); ~60% gravel; wood, black, tar coated, moderate tar odor.
	_ — 15	S8	24/13	PID= 7.0 ppm				(14'- 18') WELL GRADED GRAVEL WITH SAND (GW); ~60% gravel, fine to coarse, ~35% sand, fine to coarse, ~5% fines; moist to wet, black, tar stained, sheen, moderate tar odor, medium dense
	_	S9	24/12	PID= 115 ppm			Sample ID= SB-3 (16-18)	
1 140	_ _ 20	S10	24/18	PID= 4.6 ppm				(18'- 20') SILTY SAND (SM); ~75% sand, fine, ~15% fines, ~10% gravel, fine to coarse; moist to wet, blackish olive, tar staining, sheen, moderate tar-like odor.

NOTES:

REC = RECOVERY LENGTH OF SAMPLE PID = PHOTOIONIZATION DETECTOR READING (JAR

HEADSPACE)

IN. = INCHES FT. = FEET

PLO = PETROLEUM LIKE ODOR TLO = TAR LIKE ODOR CLO = CHEMICAL LIKE ODOR

CrLO= CREOSOTE LIKE ODOR OLO = ORGANIC LIKE ODOR SLO = SULFUR LIKE ODOR MLO = MUSTY LIKE ODOR ALO = ASPHALT LIKE ODOR

NA = NOT AVAILABLE

			GEI C	onsultants,	Inc.		CLIENT: Nati	onal Fuel Gas		BORING LOG
		$((\bigcirc$	1301 7	Γrumansbúr		. [PROJECT:	NFG Hornell		
(C	Suite I	N NY 14850			CITY/STATE:	Hornell, NY	PAGE 2 of 2	SB3
U		Consult	ants (607) 2	216-8955			GEI PROJECT	NUMBER: 102260	2 01 2	
FT.	Ħ.	5	SAMPLE IN	IFO		. ທ				
	노	TVDE		FIEL D	STRATA	VISUAL IMPACTS		SOIL / E	BEDRO	CK
ELEV.	DEPTH	TYPE and	PEN/REC	FIELD TEST	濐	ISI PA	REMARKS		RIPTIO	
ᆸ	8	NO.	IN./IN.	DATA	S	>≧				
	- 20	S11	24/18	PID= 24.3	2.111			(20'- 22') POORLY GRADED SA	ND WIT	'H SII T (SP₋SM)· ~90%
		011	2-7/10	ppm				sand, fine, ~10% fines; waterbea	ring, bla	ck olive, sheen, tar
_	-							staining, slight tar-like odor.		
_	_									
		S12	24/24	PID= 30.9 ppm				(22'- 24') WELL GRADED SAND	WITH	SILT AND GRAVEL
-1 135	_							(SW-SM); ~75% sand, fine to coafines; wet, black, slight tar-like od	arse, ∼ i lor. blac	5% graver, rine, ∼10% k staining. loose.
								, , , ,	•	0 ,
-	-	S13	24/11	PID= 2.5				(24'- 26') SILTY SAND WITH GR	AVFI (SM): ~70% sand fine to
		0.0		ppm				coarse, ~15% gravel, fine, ~15%	fines; w	et, orange brown, medium
	 25							dense.		
-	_									
		S14	24/12	PID= 3.1 ppm				(26'- 28') WELL GRADED SAND (SW-SM); ~75% sand, fine to coa		
-	-							~10% fines; wet, dark brown to o	range b	rown, slight tar odor.
4400										
-1 130	-	S15	24/16	PID= 3.0	╬╬		Sample ID= SB-3	(28'- 30') WELL GRADED SAND	WITH S	SILT AND GRAVEL
_				ppm			(28-30)	(SW-SM); ~70% sand, fine to coa	arse, ~2	0% gravel, fine to coarse,
								~10% fines; wet, slight tar odor, r	nealum	derise.
-	— 30 [[]							D. II		
								Bottom of borehole at 30.0 feet.		
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NOTE	<u>S:</u>									
			ENGTH OF S		R COR	E BARF		ΓS PER MILLION NLO = NAPHTHALENE LII		CrLO= CREOSOTE LIKE ODOR
			IGTH OF SAM ON DETECTO		(JAR		IN. = INCH FT. = FEET		ODOR	OLO = ORGANIC LIKE ODOR SLO = SULFUR LIKE ODOR
	HEADS				,			CLO = CHEMICAL LIKE O		MLO = MUSTY LIKE ODOR
		/AILABLE						ALO = ASPHALT LIKE OD	-UK	

ENVIRONMENTAL BORING LOG NFG HORNELL BORELOGS.GPJ GASTOWNBORINGLOGS_2010.GPJ 5/27/14

BORING LOG CLIENT: National Fuel Gas PROJECT: **NFG Hornell** PAGE CITY/STATE: Hornell, NY 1 of 2 **GEI PROJECT NUMBER:** 102260

SB4

GROUND SURFACE ELEVATION (FT): 1157.62 LOCATION: Hornell, NY NORTHING (FT): 848317 EASTING (FT): 528304 TOTAL DEPTH (FT): 30.0 DATUM VERT. / HORZ.: NAVD 88 / NAD 83 DRILLED BY: Parratt-Wolff LOGGED BY: Matthew Sweet DATE START / END: 1/28/2011 - 1/28/2011 DRILLING DETAILS: Direct Push then Hollow Stem Auger

WATER LEVEL DEPTHS (FT):

F.	Ë	;	SAMPLE IN	NFO	_	. თ		
ELEV. F	DEPTH	TYPE and NO.	PEN/REC IN./IN.	FIELD TEST DATA	STRATA	VISUAL IMPACTS	REMARKS	SOIL / BEDROCK DESCRIPTION
-	— 0 –	S1	24/14	PID= 0.0 ppm	N 1/2			(0'- 0.3') TOPSOIL. (0.3'- 2') SILTY SAND WITH GRAVEL (SM); ~70% sand, fine to coarse, ~15% gravel, fine to coarse, ~15% fines; trace brick fragments, moist, brown.
-1 155	_	S2	24/8	PID= 0.0 ppm	0 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4			(2'- 6') concrete fragments, FILL.
- - -	_ 5	S3	24/4	PID= 1.0 ppm	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
- - 1 150	_	S4	24/20	PID= 136 ppm			Sample ID= SB-4 (6-8)	(6'- 8') LEAN CLAY (CL); ~90% fines, low plasticity, ~10% sand, fine; moist, gray orange green, slight tar-like odor, mottled color.
- -	_	S5	24/16	PID= 1.0 ppm				(8'- 10.8') SILT WITH SAND (ML); fine to coarse, ~90% fines, low plasticity, ~10% sand, fine; moist to wet, gray orange green, slight tar-like odor.
-	— 10 - -	S6	24/16	PID= 0.0 ppm				(10.8'- 12') SILTY GRAVEL WITH SAND (GM); ~50% gravel, fine to coarse, ~25% sand, fine, ~25% fines, low plasticity; moist to wet, gray orange green, slight tar-like odor.
-1 145 -	_	S7	24/10	PID= 0.5 ppm				(12 ⁱ - 14 ⁱ) SILTY GRAVEL (GM); ~60% gravel, fine to coarse, ~40% fines; moist to wet, gray orange green.
- - -	_ 15	S8	24/0	PID= NA ppm	911			(14'- 16') NO RECOVERY.
- - 1 140	_	S9	24/20	PID= 38.0 ppm			Sample ID= SB-4 (16-18)	(16'- 18') WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM); ~50% sand, fine to coarse, subangular, ~40% gravel, fine to coarse, ~10% fines; moist to wet, gray, strong tar-like odor, tar staining, gravel up to 1" diameter, loose.
- - -	_ _ 20	S10	24/21	PID= 0.4 ppm	* * *			(18'- 20') SILTY SAND WITH GRAVEL (SM); ~60% sand, fine to medium, ~25% fines, ~15% gravel, fine to coarse; moist to wet, brown, slight tar-like odor, gravel up to 1" diameter, medium dense.

NOTES:

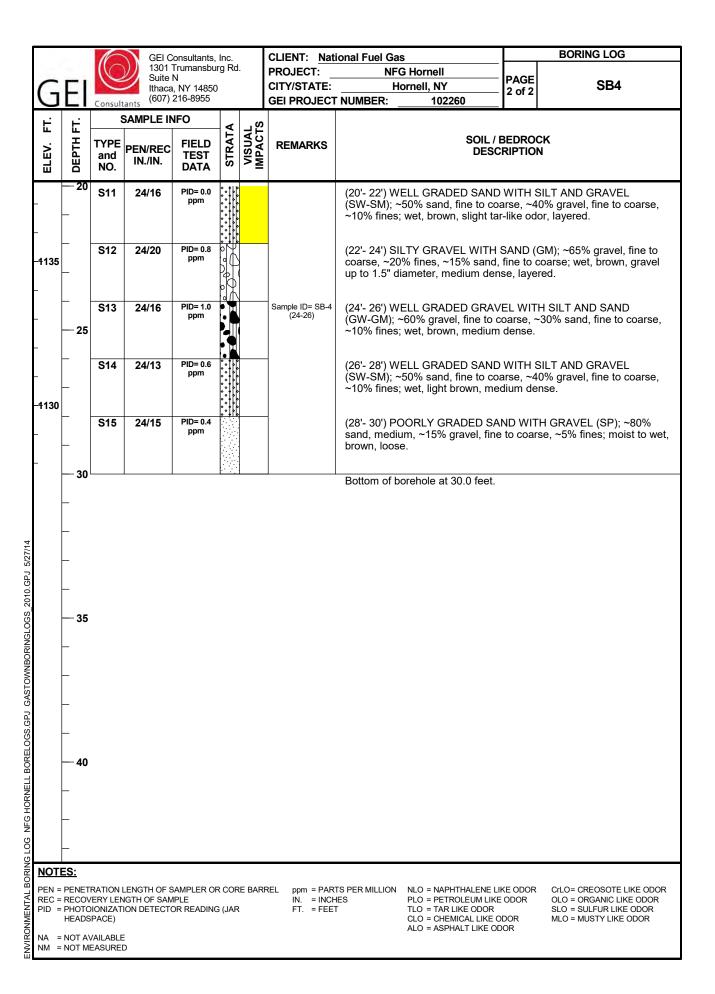
REC = RECOVERY LENGTH OF SAMPLE PID = PHOTOIONIZATION DETECTOR READING (JAR HEADSPACE)

IN. = INCHES FT. = FEET

PLO = PETROLEUM LIKE ODOR TLO = TAR LIKE ODOR CLO = CHEMICAL LIKE ODOR ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR OLO = ORGANIC LIKE ODOR SLO = SULFUR LIKE ODOR MLO = MUSTY LIKE ODOR

NA = NOT AVAILABLE



CLIENT: National Fuel Gas PROJECT: **NFG Hornell** PAGE CITY/STATE: Hornell, NY 1 of 2 **GEI PROJECT NUMBER:**

SB7 102260

BORING LOG

GROUND SURFACE ELEVATION (FT): 1158.16 LOCATION: Hornell, NY NORTHING (FT): 848294 EASTING (FT): 528346 TOTAL DEPTH (FT): 30.0 DATUM VERT. / HORZ.: NAVD 88 / NAD 83 DRILLED BY: Parratt-Wolff LOGGED BY: Matthew Sweet DATE START / END: 1/31/2011 - 1/31/2011

DRILLING DETAILS: Direct Push then Hollow Stem Auger

			EPTHS (FT	·				
Ħ.	FT.		SAMPLE IN	NFO	⋖	٦ <u>۲</u>		
ELEV.	нтаэа	TYPE and NO.	PEN/REC IN./IN.	FIELD TEST DATA	STRATA	VISUAL IMPACTS	REMARKS	SOIL / BEDROCK DESCRIPTION
-	— 0	S1	24/6	PID= NA ppm	\(\frac{1}{2}\), \(\frac{1}\), \(\frac{1}\), \(\frac{1}2\), \(\frac{1}2\), \(\frac{1}2\), \(\frac{1}2\), \(\			(0'- 2') TOPSOIL.
- - 1 155	_	S2	24/6	PID= 0.0 ppm				(2'- 6') FILL material: ~50% concrete, ~50% wood.
-	— 5 —	S3	24/8	PID= 79.2 ppm				
-	1	S4	24/18	PID= 68.8 ppm				(6'- 8') LEAN CLAY WITH GRAVEL (CL); ~80% fines, low plasticity, ~15% gravel, fine to coarse, ~5% sand, fine; moist, gray orange, moderate tar-like odor.
-1 150	_ 10	S5	24/18	PID= 116 ppm				(8'- 10') SILTY SAND WITH GRAVEL (SM); ~40% sand, fine to coarse, ~30% gravel, fine to coarse, ~30% fines; moist to wet, gray green, moderate tar-like odor, dense.
-	_	S6	24/0	PID= NA ppm				(10'- 12') No recovery.
- -1145		S7	24/18	PID= 75.3 ppm				(12'- 14') SILTY SAND WITH GRAVEL (SM); ~50% sand, fine to coarse, ~25% gravel, fine to coarse, ~25% fines; wet, gray orange green, tar stained sand lenses, moderate tar-like odor, dense.
-	_ 15	S8	24/2	PID= 76.8 ppm				(14'- 16') SILTY SAND WITH GRAVEL (SM); ~60% sand, fine to coarse, ~25% gravel, fine to coarse, ~15% fines; wet, dark brown, tar staining, strong tar-like odor.
-	_	S9	24/15	PID= 161 ppm			Sample ID= SB-7 (16-18)	(16'- 18.3') SILTY GRAVEL WITH SAND (GM); ~50% gravel, fine to coarse, ~35% sand, fine to coarse, ~15% fines; wet, gray brown, tar staining and lenses to tar saturated at 18' bgs, strong tar-like odor, dense.
-1 140	_ _ 20	S10	24/12	PID= 27.2 ppm				(18.3'- 20.3') SILTY SAND (SM); fine to coarse, ~75% sand, fine, ~25% fines; wet, gray brown, blebs and globs, strong tar-like odor, medium dense.

NOTES:

REC = RECOVERY LENGTH OF SAMPLE PID = PHOTOIONIZATION DETECTOR READING (JAR HEADSPACE)

IN. = INCHES FT. = FEET

PLO = PETROLEUM LIKE ODOR TLO = TAR LIKE ODOR CLO = CHEMICAL LIKE ODOR

OLO = ORGANIC LIKE ODOR SLO = SULFUR LIKE ODOR MLO = MUSTY LIKE ODOR ALO = ASPHALT LIKE ODOR

			GEI C	onsultants,	Inc.		CLIENT: Nat	ional Fuel Gas		BORING LOG
i.e.			1301	Trumansbur		.	PROJECT:	NFG Hornell		
-	Γ I	~	Suite I	N , NY 14850			CITY/STATE:	Hornell, NY	PAGE 2 of 2	SB7
U		Consult	(607)	216-8955			GEI PROJECT		2 01 2	
	<u> </u>		SAMPLE IN	IFO						
Ë	ᇤ		DAIVIF LE IIV	11-0	⋖	VISUAL IMPACTS				
		TYPE	DENUDEO	FIELD	STRATA	Ϋ́	REMARKS	SOIL / E	BEDRO	CK
ELEV.	DEPTH	and	PEN/REC IN./IN.	TEST	Ä	S€		DESC	RIPTIO	N
ᆸ	5	NO.	III./III.	DATA	ဟ	-≥				
	20	244	04/40	DID- 44.5	HH					
		S11	24/12	PID= 41.5 ppm	<u> </u>			(20.3'- 22') SILTY GRAVEL WITH	SAND	(GM): ~55% gravel, fine to
	_				UC			coarse, ~30% sand, fine to coars		
					倒			layered.		
	_				þΥ					
_		S12	24/21	PID= 14.1 ppm				(22'- 22.8') SILTY SAND (SM); fir	ne to co	arse, ~75% sand, fine to
4405				••	H		-	coarse, ~25% fines; wet, brown, s (22.8'- 24') SILTY GRAVEL WITH	Siigni ia I SAND	r-like odor.) (GM): ∼50% graveL fine to
-1 135					[d(C			coarse, ~25% sand, fine to coars	e, ~25%	6 fines; wet, orange brown,
					<u> </u>			slight tar-like odor.		_
_		S13	24/20	PID= 16.7 ppm				(24'- 26') SILTY SAND (SM); ~75	% sand	I, fine, ~25% fines; wet,
	25							orange brown, loose.		
_	25									
_		S14	24/8	PID= NA ppm				(26'- 28') SILTY SAND (SM); ~75	% sand	I, fine, ~25% fines; wet,
								brown, slough.		
 										
	L I				Ш					
-1 130		S15	24/19	PID= 10.1 ppm			Sample ID= SB-7 (28-30)	(28'- 30') WELL GRADED SAND		
				ppiii			(20 00)	(SW-SM); ~75% sand, fine to coa ~10% fines; wet, brown, slight tar	arse, ∼1	5% gravel, fine to coarse,
-								10 % lilles, wet, blown, slight tal	-like ou	or, mediam dense.
	30									
	30							Bottom of borehole at 30.0 feet.		
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ENVIRONMENTAL BORING LOG NFG HORNELL BORELOGS.GPJ GASTOWNBOR! S										
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PEN =			LENGTH OF S		COF	E BARF		TS PER MILLION NLO = NAPHTHALENE LIK		
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A L	HEADS				(5) (1)	-		CLO = CHEMICAL LIKE O		MLO = MUSTY LIKE ODOR
Ñ NA =	NOT A	/AILABLE	<u>.</u>					ALO = ASPHALT LIKE OD	OR	
₹ NM =		EASURE								
ш										

CLIENT: National Fuel Gas PROJECT: **NFG Hornell** PAGE CITY/STATE: Hornell, NY 1 of 2 **GEI PROJECT NUMBER:** 102260

SB15

BORING LOG

GROUND SURFACE ELEVATION (FT): 1157.65 LOCATION: Hornell, NY TOTAL DEPTH (FT): 30.0 NORTHING (FT): 848307 EASTING (FT): 528355 DATUM VERT. / HORZ.: NAVD 88 / NAD 83 DRILLED BY: Parratt-Wolff LOGGED BY: Garrett Schmidt DATE START / END: 9/23/2011 - 9/23/2011 DRILLING DETAILS: Hollow Stem Auger

WATER LEVEL DEPTHS (FT):

Ë.	Ë	;	SAMPLE II	NFORMAT	ION	_	. თ		
ELEV. F	DEPTH F	TYPE and NO.	PEN/REC IN./IN.	BLOWS (/6 in.)	FIELD TEST DATA	STRATA	VISUAL	REMARKS	SOIL / BEDROCK DESCRIPTION
-	— 0 –	S1	24/11	7-6-7-6	PID= 0.0 ppm	<u> </u>			(0'- 0.5') TOPSOIL; ~75% sand, ~20% fines; 5% root fragments, moist, brown, no odor. (0.5'- 2') SILTY SAND WITH GRAVEL (SM); ~50% sand ~25% gravel, subangular, ~20% fines; 5% brick and concrete fragments, dry, brown, no odor.
-1 155 -	_	S2	24/5	7-7-14- 12	PID= 0.1 ppm				(2'- 6') SILTY SAND WITH GRAVEL (SM); ~55% sand, ~20% gravel, subangular, ~20% fines; 5% brick and concrete fragments, dry, brown, no odor.
-	_ 5	S3	24/6	9-18-50- 52	PID= 1.2 ppm				
- - 1 150	_	S4	24/16	3-1-4-6	PID= 6.6 ppm				(6'- 8') SILT WITH SAND (ML); ~80% fines, ~20% sand, fine; moist, light grayish brown, slight hydrocarbon-like odor.
-	_	S5	24/4	4-4-3-4	PID= 9.6 ppm				(8'- 10') SILT WITH SAND (ML); ~80% fines, ~20% sand fine; wet, dark grayish brown, slight hydrocarbon-like odd hydrocarbon-like sheen.
-	— 10 –	S6	24/15	1-2-3-3	PID= 2.8 ppm				(10'- 12') SILT WITH SAND (ML); ~80% fines, ~20% san fine; wet, light grayish brown, slight hydrocarbon-like odo
-1 145 -	_	S7	24/16	6-3-2-2	PID= 13.1 ppm				(12'- 14') SILTY SAND (SM); ~70% sand, ~20% fines, ~10% gravel, subangular; wet, grayish brown, slight hydrocarbon-like odor.
-	_ 15	S8	24/20	6-6-9-7	PID= 67.5 ppm				(14'- 15') SILT WITH SAND (ML); ~80% fines, ~20% san fine; wet, light grayish brown, slight hydrocarbon-like odo (15'- 16') SILTY SAND (SM); ~75% sand, ~20% fines,
- - -1 140	_	S9	24/18	20-14- 10-10	PID= 167 ppm			Sample ID= SB15 (17-18)	~5% gravel, subangular, wet, dark grayish brown, slight hydrocarbon-like odor. (16'- 18') SILTY SAND WITH GRAVEL (SM); ~55% sanc ~25% gravel, subangular, ~20% fines; wet, dark grayish brown, slight hydrocarbon-like odor, hydrocarbon-like sheen, occasional blebs of brownish-black tar.
_	_ _ 20	S10	24/21	11-7-6-7	PID= 64.5 ppm				(18'- 22') SILTY SAND WITH GRAVEL (SM); ~60% sand ~20% gravel, subangular, ~20% fines; wet, dark grayish brown, slight hydrocarbon-like odor.

NOTES:

REC = RECOVERY LENGTH OF SAMPLE PID = PHOTOIONIZATION DETECTOR READING (JAR HEADSPACE)

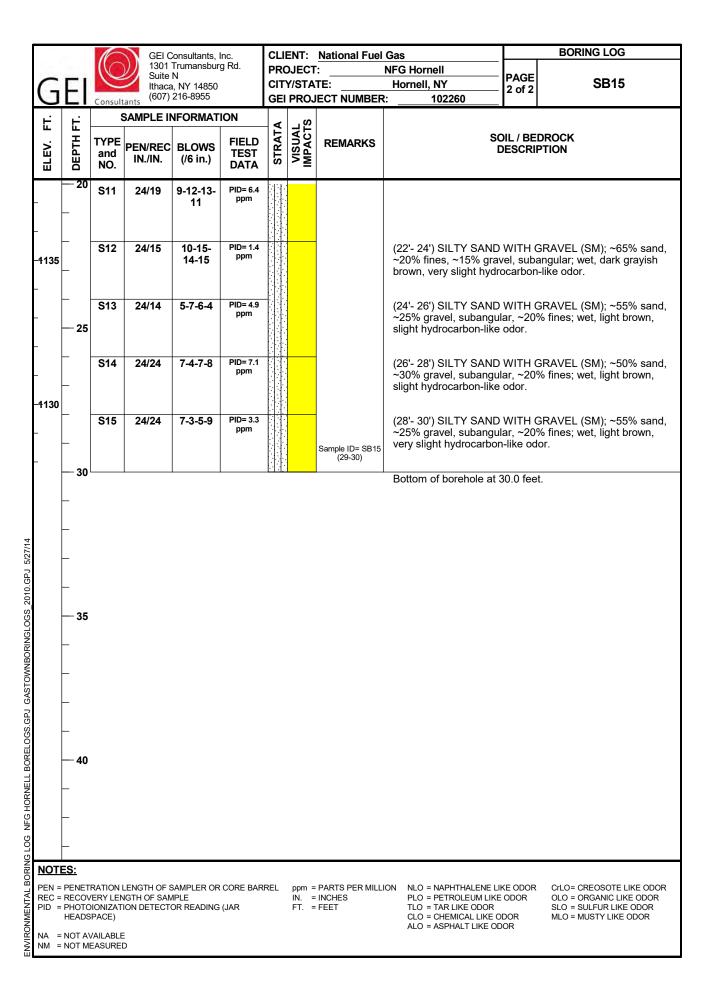
IN. = INCHES FT. = FEET

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ALO = ASPHALT LIKE ODOR

CrLO= CREOSOTE LIKE ODOR OLO = ORGANIC LIKE ODOR SLO = SULFUR LIKE ODOR MLO = MUSTY LIKE ODOR

NA = NOT AVAILABLE





BORING LOG CLIENT: National Fuel Gas PROJECT: **NFG Hornell** PAGE **SB16** CITY/STATE: Hornell, NY 1 of 2 **GEI PROJECT NUMBER:** 102260

GROUND SURFACE ELEVATION (FT): 1157.45 LOCATION: Hornell, NY NORTHING (FT): 848280 EASTING (FT): 528360 TOTAL DEPTH (FT): 24.0 DATUM VERT. / HORZ.: NAVD 88 / NAD 83 DRILLED BY: Parratt-Wolff LOGGED BY: Garrett Schmidt DATE START / END: 9/27/2011 - 9/27/2011 DRILLING DETAILS: Hollow Stem Auger WATER LEVEL DEPTHS (FT):

FT.	Ë		SAMPLE IN	NFORMAT	ION	4	_ က		
ELEV. F	DEPTH F	TYPE and NO.	PEN/REC IN./IN.	BLOWS (/6 in.)	FIELD TEST DATA	STRATA	VISUAL	REMARKS	SOIL / BEDROCK DESCRIPTION
-	— 0 –	S1	24/10	8-13-8-6	PID= 0.0 ppm	24			(0'- 0.4') TOPSOIL; ~65% sand, ~20% fines, ~10% gravel, subangular; 5% root fragments, moist, brown, no odor. (0.4'- 2') SILTY SAND WITH GRAVEL (SM); ~65% sand, ~20% fines, ~15% gravel, subangular; moist, brown, no odor.
-1 155	_	S2	24/13	3-3-5-3	PID= 0.0 ppm				(2'- 4') SILTY SAND (SM); ~75% sand, ~25% fines; moist, brown, no odor.
-	_ 5	S 3	24/12	3-3-2-5	PID= 0.0 ppm				(4'- 8') SILTY SAND WITH GRAVEL (SM); ~65% sand, ~20% fines, ~15% gravel, subangular; trace brick fragments, moist, brown.
- 1 150	_	S4	24/9	2-3-3-3	PID= 0.0 ppm				
-	_	S5	24/17	3-4-7-5	PID= 0.3 ppm				(8'- 10') SILTY SAND WITH GRAVEL (SM); ~60% sand, ~25% fines, ~15% gravel, subangular; moist, light brown, no odor.
-	— 10 –	S6	24/12	2-3-5-4	PID= 0.8 ppm				(10'- 12.4') SILTY SAND (SM); ~65% sand, ~25% fines, ~10% gravel, subangular; moist, brown, no odor.
-1 145 -	_	S 7	24/15	2-3-5-6	PID= 10.8 ppm				(12.4'- 12.8') SILT WITH SAND (ML); ~80% fines, low plasticity, ~20% sand, fine; moist to wet, grayish brown, slight hydrocarbon-like odor. (12.8'- 14') SANDY SILT WITH GRAVEL (ML); ~60% fines low plasticity, ~20% grayed, subapquilar, ~20% sand
	- 15	S8	24/16	2-5-17- 20	PID= 49.8 ppm				fines, low plasticity, ~20% gravel, subangular, ~20% sand, fine; wet, grayish brown, slight hydrocarbon-like odor. (14'- 16') SILTY SAND WITH GRAVEL (SM); ~65% sand, ~25% fines, ~15% gravel, subangular; wet, grayish brown,

NOTES:

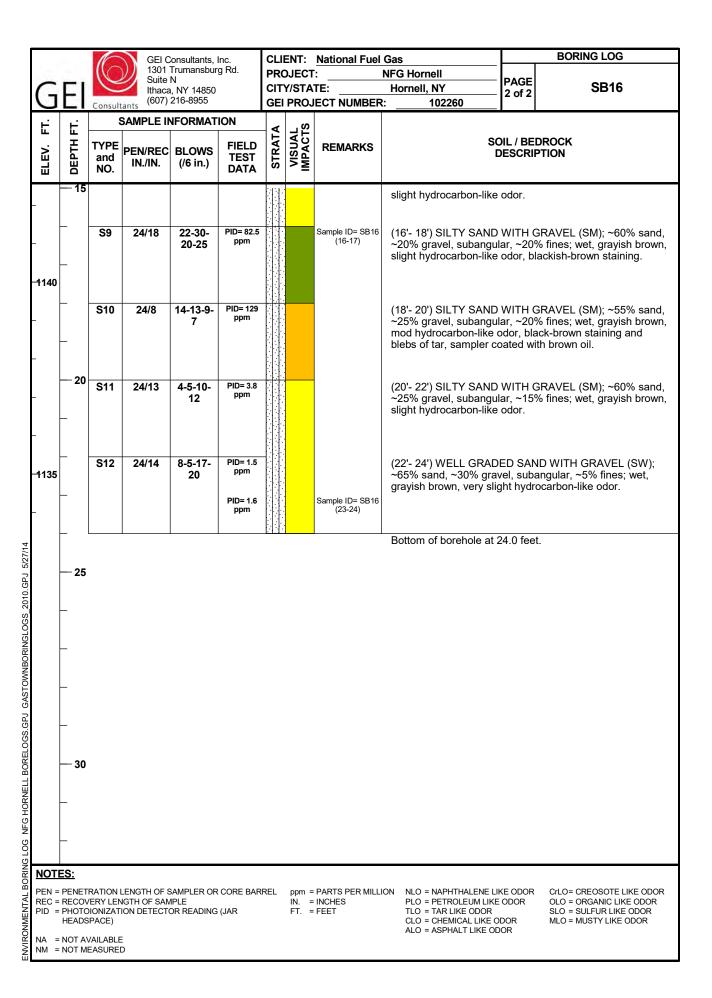
REC = RECOVERY LENGTH OF SAMPLE PID = PHOTOIONIZATION DETECTOR READING (JAR HEADSPACE)

IN. = INCHES FT. = FEET

PLO = PETROLEUM LIKE ODOR TLO = TAR LIKE ODOR CLO = CHEMICAL LIKE ODOR ALO = ASPHALT LIKE ODOR

OLO = ORGANIC LIKE ODOR SLO = SULFUR LIKE ODOR MLO = MUSTY LIKE ODOR

NA = NOT AVAILABLE



			CELC	onsultants,	Inc	CLIENT	Notion	ol Eugl Coo			BORING LOG	
		$\mathbb{I}(\mathbb{C})$	1301	Γrumansbu	rg Rd.	Inc. CLIENT: National Fuel Gas 9 Rd. PROJECT: NFG Hornell			Hornell	-		
-			Suite I	N , NY 14850				PAGE	SS4			
	ΕI	Consult	(607)	216-8955			JECT NU		102260	_ 1 of 1	•••	
GRO	IND S		CE ELEVAT	ION (FT):		1157			l: Hornell, NY			
			848251				8319		PTH (FT): 0.5			
			arratt-Wolf		,	(· · /·			RT. / HORZ.: N	NAVD 88 / N	AD 83	
LOG	GED B	Y: G	arrett Schi	midt					RT / END: 10/4			
			.S: Hand									
WAT	ER LE	VEL DI	EPTHS (FT):								
Ŀ	Ŀ	,	SAMPLE IN	IFO								
FT.	Ë				STRATA				SOIL / E	SEDBOCK		
ELEV.	ᇤ	TYPE and	PEN/REC	FIELD TEST	2	REMARKS	SOIL / BEDROCK DESCRIPTION					
ELI	DEPTH	NO.	IN./IN.	DATA	ပ							
	- 0		2002									
		S1	6/NM	PID= 0.0 ppm	<u>11/4</u>	Sample ID= SS4 (0-6")	(0'- 0.5') TOPSOIL; [,]	∼70% sand, ∼20% ırk brown, no odor.	fines, ~5%	gravel, subangular; 5% root	
					//· : \		iraginei	ito, moist, ua	iik biowii, no odoi.	•		
					: <u>\'\'</u> .							
	l				12. 3		Bottom	of borehole a	at 0.5 feet			
							20110	o. 20.0	0.0 .00			
	_											
	_											
	<u> </u>											
NOTE	<u>:S:</u>											
PEN =	PENET	RATION I	LENGTH OF S	AMPLER OF	R CORE	BARREL ppm	= PARTS F	ER MILLION	NLO = NAPHTHALENI	E LIKE ODOR	CrLO= CREOSOTE LIKE ODOR	

PEN = PENCE TRAILON LENGTH OF SAMPLER OR CORE
REC = RECOVERY LENGTH OF SAMPLE
PID = PHOTOIONIZATION DETECTOR READING (JAR
HEADSPACE)

IN. = INCHES FT. = FEET

NLO = NAPHTHALENE LIKE ODO PLO = PETROLEUM LIKE ODOR TLO = TAR LIKE ODOR CLO = CHEMICAL LIKE ODOR ALO = ASPHALT LIKE ODOR

OLO = ORGANIC LIKE ODOR SLO = SULFUR LIKE ODOR MLO = MUSTY LIKE ODOR

ENVIRONMENTAL BORING LOG NFG HORNELL BORELOGS.GPJ GASTOWNBORINGLOGS_2010.GPJ 5/31/12

	1591	PII LOG	IP6					
PROJECT LOCATION CLIENT CONTRATE CONTRATE CONTRATE COLIPM WEATHINGEL REF	National Fue ACTOR Trec Environ Steve Warne IENT Rubber Tire ER Clear, 20's	l Gas mental er Backhoe	PG. 1 OF 1 LOCATION East side of Gas Holder A, outside of the wall of the holder foundation GROUND EL. 1157.83 DATUM NAVD88 PROJECT NO. 102260 TIME STARTED 10:10 TIME COMPLETED 13:00					
DEPTH (FT)	LABORATORY SAMPLE		SOIL DESCRIPTION					
1.0		(0-0.5) TOPSOIL (0.5-4.5) dark brown sand and grave odor	FILL, occasional brick, stone, glass, metal pipe debris. No					
2.0								
3.0	TP6(3.5)	(2.5' - east end of test pit) tan silt and	clay with some mottling					
4.0		(4.5' - west end of test pit, adjacent to	o former gas holder wall) tan silt and clay with some mottling,					
5.0		End of test pit at 4.5'						
- -								
_								
	the depth of fill shallows	from west to east, moving away	PIT DIMENSIONS (FT): LENGTH 13 WIDTH 3 DEPTH 4.5					
		rated by a fully weathered stone wall, nal construction observed at TP5	GEL					

	TEST	PIT LOG	TP6A						
PROJECT LOCATION CLIENT CONTRATOPERATEQUIPM WEATHINGER	ON Hornell, NY National Fue Trec Environ TOR Steve Warne IENT Rubber Tire ER Clear, 20's	l Gas mental er Backhoe	PG. 1 OF 1 LOCATION East side of Gas Holder A, inside of the wall of the holder foundation GROUND EL. 1157.83 DATUM NAVD88 PROJECT NO. 102260 TIME STARTED 10:10 TIME COMPLETED 13:00						
DEPTH (FT)	LABORATORY SAMPLE		SOIL DESCRIPTION						
1.0 2.0 3.0 4.0 5.0	TP6A(3.5-4.0)	(0-0.5) TOPSOIL (0.5-4.5) dark brown sand and gravel cinders, metal pipe debris, no odor (4.5) tan silt and clay with some mote End of test pit at 4.5'	, broken and intact glass bottles, occasional brick, stone,						
		rated by a fully weathered stone wall, all construction observed at TP5	PIT DIMENSIONS (FT): LENGTH 10 WIDTH 3 DEPTH 4.5						
			GEL						

	GEI 6) IntE		Test Pit Log	TP-9
GEI PROJE	CT NO: 1801687		I	TEST PIT DESIGNATION: TP-9	SURFACE ELEVATION NORTH NAVD88: 1157.4
	ational Fuel Gas			SITE LOCATION OR AREA: South Central - Near Fence	SURFACE ELEVATION SOUTH NAVD88: 1156.2
	E: Hornell MGP SPI			EQUIPMENT USED: Bobcat E85 Excavator	NORTHING NAD83 (NORTH): 848261.896
	T: Mackenzie Fann TER ENCOUNTER			EARTHWORK SUBCONTRACTOR: Nothnagle Drilling OPERATOR: Kevin	EASTING NAD83 (NORTH): 528283.561 NORTHING NAD83 (SOUTH): 848242.656
	TE: 8/5/2019	ED. IVA		START TIME: 3:40 p.m.	EASTING NAD83 (SOUTH): 528282.096
FINISH DA	TE: 8/5/2019			FINISH TIME: 6:00 p.m.	7
DEPTH (FEET)	PID HEADSPACE (PPM)	LABORATORY SAMPLE (FEET)	SOIL LITHOLOGY USCS	SOIL DESCRIPTION AND VISUAL OBSERVATIONS	STRUCTURES ENCOUNTERED OR COMMENTS
1			Topsoil	Topsoil: 0.0-1.5 feet bgs, SAND brown/dark brown fine to medium	
3			Fill	Fill: 1.5-4.0 feet bgs, WELL GRADED SAND AND GRAVEL (SW-SM), with brick and concrete	
5 		TP9-6 0.231 ppm tPAH	SM	4.0-8.0 SAND WITH SILT (SM) with ~60% fine sand, ~40% low plasticity fines (silt), light brown, compact	Evidence of the former holder foundation wall (neatly stacked, flat rocks) observed approximately 9.5 feet north of the fence line
9 10 11 11 12			SP	8.0-14.0 SAND (SP), fine to medium, brown, moist	
	TEST PIT LENGTH TEST PIT WIDTH: TEST PIT BACKFI	4.5' LL: Yes		Bottom of Test Pit @ 14.0' bgs	GEI Consultants, Inc., P.C. 1301 Trumansburg Road Suite N
L	LABORATORY AN	NAL I SES: PAH			Ithaca, New York 14850

	GEI	tants		Test Pit Log	TP-10
	ECT NO: 180168	7	•	TEST PIT DESIGNATION: TP-10	SURFACE ELEVATION NORTH NAVD88: 1157.6
	National Fuel Gas	CDDI		SITE LOCATION OR AREA: South-central along fence EQUIPMENT USED: Bobcat E85	SURFACE ELEVATION SOUTH NAVD88: 1156.3 NORTHING NAD83 (NORTH): 848257.538
	E: Hornell MGP ST: Mackenzie Fa			EARTHWORK SUBCONTRACTOR: Nothnagle Drilling	EASTING NAD83 (NORTH): 528315.032
	ATER ENCOUNT			OPERATOR: Kevin	NORTHING NAD83 (SOUTH): 848243.125
	TE: 8/5/2019			START TIME: 9:15 a.m.	EASTING NAD83 (SOUTH): 528312.728
	TE: 8/5/2019	* + non + mon**	2011	FINISH TIME: 10:45 a.m.	
DEPTH (FEET)	PID HEADSPACE	LABORATORY SAMPLE	SOIL LITHOLOGY	SOIL DESCRIPTION AND	STRUCTURES ENCOUNTERED
` ′	(PPM)	(FEET)	USCS	VISUAL OBSERVATIONS	OR COMMENTS
1 2			Topsoil	0.0-2.0 feet bgs, Topsoil: brown fine SAND (topsoil),with bricks, trace concrete	
3 3 4 		TP10-6 6.745 ppm tPAH	Fill	2.0-8.5 Fill: light brown fine to medium sand with gravel (~70% sand, 30% gravel), no visual impacts observed	Evidence (neatly stacked flat rocks) observed 9.5 feet north of the fence line sample along east sidewall 2 feet from southern end
9 10			SC-SM	8.5-10.0 brown, silty to clayey sand, with trace gravel. No visual impacts observed	
11			CL-ML	10.0-14.5 light brown to light gray silty clay, fine, with mottling, dry, cohesive, no visual impacts observed	
	<u> </u>			Bottom of Test Pit @ 14.5' bgs	
Comments:	TEST PIT LENG TEST PIT WIDT		n		GEI Consultants, Inc., P.C. 1301 Trumansburg Road
	TEST PIT BACE	CFILL: Yes	r		Suite N
		ANALYSES: PAH			Ithaca, New York 14850

ND 0.0 ppm (PAH in blind duplicate) 8	(GEI Consultant			Test Pit Log	TP-11			
MIT MANEE Rough MOFF PAPE SUPPRINT I SIDE Based PAFE searches SORTHING AND CORTES SABES 251	GEI PROJEC	CT NO: 1801687	1	!	TEST PIT DESIGNATION: TP-11	SURFACE ELEVATION NORTH NAVD88: 1157.3			
### APTIVE MARKANG PARTIES SAME AND STREET SAME NAME SAME NAME NAME NAME SAME NAME NAME NAME NAME NAME SAME NAME NAME NAME NAME NAME NAME NAME N									
MATHER PRODUCTION 1997 1									
SARTING ANDRESCHIE SARTING									
Print Print AMORGAN STRUCTING SATE SALE			EKEDI IWI						
Marked Mark	FINISH DAT	E: 8/6/2019			FINISH TIME: 1:00 p.m.				
Commence						STRUCTURES ENCOUNTERED			
Fill File 0.0.2.5 feet bgs, day, brown POORLY (GRAPED SAND WITH GRAVEL (SV), fine to medium, glass bottles Fill File 2.5-2.8 feet bgs, concerte slab Fill Fill File 2.5-2.8 feet bgs, concerte slab Fill File 2.5-2.8 feet bgs, concerte slab	(ILLI)								
Fill Fill Fill Fill Fill Fill Fill 2.8-4.0 feet bgs, dry, brown WELL GRADED SAND WITH GRAVEL (SW), fine to medium, cohesive Sw-SM OO 2 ppm 1PAH in blind duplicate 4.0-8.5 brown, WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), cohesive, moist Sample was collected from the southwest corner of GRAVEL (SW-SM), cohesive, moist Sw-SM Sw-SM GRAVEL (SW-SM), cohesive, moist Sw-SM Sw-SM GRAVEL (SW-SM), cohesive, moist Sw-SM GRAVEL (SW-SM), cohesive, moist Sample was collected from the southwest corner of GRAVEL (SW-SM), cohesive, moist Sw-SM GRAVEL (SW-SM), cohesive, moist GRAVEL (SW-SM), cohesive, moist GRAVEL (SW-SM), cohesive, moist Sw-SM GRAVEL (SW-SM), cohesive, moist GRAVEL (SW-SM), coh				Fill					
Fill Fill Fill Fill Fill Fill Fill 2.8-4.0 feet bgs, dry, brown WELL GRADED SAND WITH GRAVEL (SW), fine to medium, cohesive Sw-SM OO 2 ppm 1PAH in blind duplicate 4.0-8.5 brown, WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), cohesive, moist Sample was collected from the southwest corner of GRAVEL (SW-SM), cohesive, moist Sw-SM Sw-SM GRAVEL (SW-SM), cohesive, moist Sw-SM Sw-SM GRAVEL (SW-SM), cohesive, moist Sw-SM GRAVEL (SW-SM), cohesive, moist Sample was collected from the southwest corner of GRAVEL (SW-SM), cohesive, moist Sw-SM GRAVEL (SW-SM), cohesive, moist GRAVEL (SW-SM), cohesive, moist GRAVEL (SW-SM), cohesive, moist Sw-SM GRAVEL (SW-SM), cohesive, moist GRAVEL (SW-SM), coh									
Fill Fill: 2.8-4.0 feet bgs. dry, brown WELL GRADED SAND WITH GRAVEL (SW), fine to medium, cohesive TP11-6				Fill	Fill: 2.5-2.8 feet bgs, concrete slab				
TP11-6 ND 0.02 ppm (PAH in blind duplicate) 8 SW-SM 4.0-8.5 brown, WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), cohesive, moist 10 Sample was collected from the southwest corner of GRAVEL (SW-SM), cohesive, moist 8 SW-SM 4.0-8.5 brown, WELL GRADED SAND WITH GRAVEL (SW), fine to medium, less cohesive than soils above — undercutting observed along sidewalls, moist 12 SW 8.5-14.0 brown, WELL GRADED SAND WITH GRAVEL (SW), fine to medium, less cohesive than soils above — undercutting observed along sidewalls, moist 13 Bottom of Test Pit @ 14.0 bgs 14 GER Consolinate, Inc., P.C. 1301 Transandury Road SILV SW				Fill					
8.5-14.0 brown, WELL GRADED SAND WITH GRAVEL (SW), fine to medium, less cohesive than soils above undercutting observed along sidewalls, moist 13			ND 0.02 ppm tPAH in blind	SW-SM		Sample was collected from the southwest corner of			
Comments: TEST PIT LENGTH: 15' GEI Consultants, Inc., P.C. TEST PIT WIDTH: 3.5' ~14.0' deep 1301 Trumansburg Road TEST PIT BACKFILL: Yes Suite N	10 			SW	fine to medium, less cohesive than soils above undercutting observed along sidewalls, moist				
TEST PIT WIDTH: 3.5' ~14.0' deep TEST PIT BACKFILL: Yes 1301 Trumansburg Road Suite N		TEST DIT I EN	CTH: 15'	ļ	Bottom of Test Pit @ 14.0' bgs	CEI Consultante Inc. D.C.			
TEST PIT BACKFILL: Yes Suite N				0' deep					
LABORATORY ANALYSES: PAH Ithaca, New York 14850		TEST PIT BAC	KFILL: Yes	•					

	GEI Consultants			Test Pit 1	Log	TP-12			
	CCT NO: 1801687			TEST PIT DESIGNATION: TP-12		SURFACE ELEVATION WEST NAVD88: 1157.3			
	National Fuel Gas E: Hornell MGP S	PDI		SITE LOCATION OR AREA: at eas EQUIPMENT USED: Bobcat E85 Ex		SURFACE ELEVATION EAST NAVD88: 1156.9 NORTHING NAD83 (WEST): 848276.404			
	T: Mackenzie Far			EARTHWORK SUBCONTRACTOR		EASTING NAD83 (WEST): 528359.966			
	TER ENCOUNT	ERED: N/A		OPERATOR: Kevin		NORTHING NAD83 (EAST): 848271.254			
	TE: 8/6/2019 TE: 8/6/2019			START TIME: 1:10 p.m. FINISH TIME: 6:00 p.m.		EASTING NAD83 (EAST): 528387.006			
DEPTH	PID	LABORATORY	SOIL	SOIL DE	SCRIPTION				
(FEET)	HEADSPACE (PPM)	SAMPLE (FEET)	LITHOLOGY USCS		AND SERVATIONS	STRUCTURES ENCOUNTERED OR COMMENTS			
	(====)	(=)							
			Fill		WELL GRADED SAND WITH (SW), bricks	Pipe is 7' east of western endpoint and is 1' bgs			
						Hardened tar observed @ ~3.0' bgs and is ~ 5" thick at thickest point, PID = 133 ppm			
			Fill	Fill: 1.0-4.0 feet bgs [western endpoint to 15 feet east) black and brown WELL GRADED SAND WITH GRAVEL (SW), fine to medium, bricks, coal and	Fill: 1.0-4.0 feet bgs [15 feet from western endpoint to the eastern endpoint] g WELL GRADED SAND WITH GRAVEL				
3				hardened tar with hydrocarbon-like odor	(SW) fill with bricks, some coal fragments				
4		TP12-4.5				Sample collected from easternmost observed fill			
5		2.83 ppm tPAH							
3 		TP12-6 ND	SM-CL		Y SAND WITH CLAY (SM-CL), al impacts observed	sample collected of clean soils beneath impacted fill from eastern sidewall 19.5 feet east of western endpoint			
7									
9			SW	GRAVEL (SW). Gray discolor	WELL GRADED SAND WITH ration/staining begins at 8' east of nd point.				
10									
10						1			
11 12									
11									
<u> </u>									
12			G.P.	10.0-14.0 dry to moist, grav	stained/discoloration POORLY				
			SP		AVEL (SP), petroleum-like odors				
13									
13									
13									
<u> </u>									
14]			
		TP12-15 11.52 ppm	GW		tion WELL GRADED GRAVEL , petroleum-like odors	PID = 53.7 ppm bottom sample collected from gray, petroleum-like			
15		tPAH		Bottom of Tes	t Pit @ 15.0' bgs	impacted soils			
Comments:	TEST PIT LENG TEST PIT WIDT		еер			GEI Consultants, Inc., P.C. 1301 Trumansburg Road			
	TEST PIT BACK					Suite N Ithaca, New York 14850			
L	LADURATURY	val i sesi fAl	•			11114C4, 17CW 101K 14000			

	GEI Cansultants			Test Pit Log	TP-13
	CT NO: 1801687		I	TEST PIT DESIGNATION: TP-13	SURFACE ELEVATION NORTH NAVD88: 1157.4
	ational Fuel Gas			SITE LOCATION OR AREA: north bound line at east-central portion of Site	SURFACE ELEVATION NORTH NAVD88: 1157.4 SURFACE ELEVATION SOUTH NAVD88: 1156.7
	E: Hornell MGP SPI	DI .		EQUIPMENT USED: Bobcat E85 Excavator	NORTHING NAD83 (NORTH): 848328.74
	T: Mackenzie Fann			EARTHWORK SUBCONTRACTOR: Nothnagle Drilling	EASTING NAD83 (NORTH): 528360.866
	TER ENCOUNTER			OPERATOR: Kevin	NORTHING NAD83 (SOUTH): 848303.788
	ГЕ: 8/7/2019			START TIME: 8:35 a.m.	EASTING NAD83 (SOUTH): 528360.837
	ГЕ: 8/7/2019			FINISH TIME: 5:30 p.m.	, ,
DEPTH	PID	LABORATORY	SOIL	SOIL DESCRIPTION	
(FEET)	HEADSPACE	SAMPLE	LITHOLOGY	AND	STRUCTURES ENCOUNTERED
	(PPM)	(FEET)	USCS	VISUAL OBSERVATIONS	OR COMMENTS
			Fill		
					2 inch diameter pipe found 1 foot bgs near proposed
1					remedial boundary
				ETH OO 2 O C . 1 1 1 CH WELL OR A DED CAND	,
				Fill: 0.0-3.0 feet bgs, dry, brown fill WELL GRADED SAND	
2				WITH GRAVEL (SW) with bricks, wire, and concrete and coal	
				fragments	
_					
3					
		TP13-3Bound			1 11 4 10 000
3		61.14 ppm tPAH			sample collected from fill at proposed remedial bound
		TD12 2N1 4	CL		sample collected from fill at northern sidewall of test
		TP13-3North 131.64 ppm tPAH			pit
4		151.0+ ppin tPAH			
4					
5					
_					
<u> </u>					
-					
-					
6					
				3.0-9.3 feet bgs, light brown CLAY with trace sand/silt. No visible	
6				impacts	
7					
7					
8					
8					
-					
9					
					PID = 37.9 and 31.0 ppm
					· · · · · · · · · · · · · · · · · · ·
10					
<u></u>					
<u> </u>					
11					
11					
├					
<u> </u>			_	9.3-14.0 gray stained, POORLY GRADED SAND WITH GRAVEL	
├			SP	(SP) with strong weathered petroleum-like odor	
12				, , , , , , , , , , , , , , , , , , , ,	
13					
<u></u>					
<u> </u>					
<u> </u>					
14		TD12 14			comple collected from
14		TP13-14			sample collected from gray soil with petroleum-like
-		22 22 ppm +DAII			odor
├		23.22 ppm tPAH			
├					
15				Bottom of Test Pit @ 14.0' bgs	
	TEST PIT LENGTI	H: 25.8'	1		GEI Consultants, Inc., P.C.
	TEST PIT WIDTH:	3' ~14.0' deep			1301 Trumansburg Road
	TEST PIT BACKFI LABORATORY AN				Suite N Ithaca, New York 14850
	OWI A				Tennen, Ten Tulk 17000

	GEI Consult	ants		Test Pit Log	TP-14				
GEI PROJE	ECT NO: 18016	87		TEST PIT DESIGNATION: TP-14	SURFACE ELEVATION NORTH/CORNER/EAST NAVD88: 1157.0/1157.5/1157.6				
	National Fuel Ga			SITE LOCATION OR AREA:	NORTHING NAD83 (NORTH): 848339.088				
SITE NAM	E: Hornell MGI	P SPDI		EQUIPMENT USED:	EASTING NAD83 (NORTH): 528270.613				
GEOLOGIS	ST: Mackenzie l	Fannon		EARTHWORK SUBCONTRACTOR: Nothnagle Drilling	NORTHING NAD83 (CORNER): 848319.628				
DEPTH WA	ATER ENCOUN	NTERED:		OPERATOR: Kevin	EASTING NAD83 (CORNER): 528269.017				
START DA	TE: 8/7/2019			START TIME: 9:30 a.m.	NORTHING NAD83 (EAST): 848318.315				
	TE: 8/7/2019			FINISH TIME: 11:45 a.m.	EASTING NAD83 (EAST): 528293.972				
DEPTH (FEET)	PID HEADSPACE	LABORATORY SAMPLE	SOIL LITHOLOGY	SOIL DESCRIPTION AND	STRUCTURES ENCOUNTERED				
(FEEI)	(PPM)	(FEET)	USCS	VISUAL OBSERVATIONS	OR COMMENTS				
	,	,	Fill	Fill: 0.0-3.0 feet bgs, brown, dry SAND, fine to					
				medium, bricks present in northern jog of the TP.					
				Fill: 0-1 ft brown, dry, SAND, fine to medium					
_				with brick and coal fragments present in eastern					
1				jog of TP					
				Jog of 11					
2									
-									
-									
3		TP14-3		1.0-4.0 light brown CLAY observed in the corner	Foundation present between 1 and 5 ft bgs and was observed 9 feet east				
		3393 ppm	CL	between the northern and eastern jogs of the TP	of the western corner of the TP				
_		tPAH		between the northern and eastern jogs of the 11	of the western corner of the 11				
2 		ıгАП							
_									
4									
_									
_									
5									
_									
3									
_									
_									
			CI	5.0-6.5 gray CLAY with strong to moderate					
_			CL	hydrocarbon-like odor					
6									
⊢		TD14.6							
⊢		TP14-6							
⊢		5.641 ppm							
<u> </u>		tPAH							
7									
⊢			CL	6.5-8.0 light brown CLAY					
-									
8									
8									
				Б. и Ст. 1711 С 2 211					
_				Bottom of Test Pit @ 8.5' bgs					
G :	mnom per v ==	COTTO 10 TO TO	NV 4 44 01 31	4.5.4	OPI C. N. I. P.C.				
Comments:		NGTH: 19.5' East- DTH: 3' East-Wes			GEI Consultants, Inc., P.C. 1301 Trumansburg Road				
	TEST PIT BAC		., 5.5 1101 tii-30	uu	Suite N				
		Y ANALYSES: PA	AH		Ithaca, New York 14850				

National Fuel Gas Distribution Corporation Hornell Former Manufactured Gas Plant Site Hornell, New York

Confirmation Sampling Plan



Introduction

This appendix to the Final Design package for the Hornell Former Manufactured Gas Plant (MGP) Site, summarizes the plan for conducting confirmation sampling following shallow excavation as part of the selected remedy at the site. Previous site investigations have characterized the soil that will remain following remedial excavation throughout the majority of the planned shallow excavation areas outside the support of excavation boundary, including the residential area to the south and the commercial area to the north and east. Accordingly, no post-excavation confirmation sampling is specifically planned for those areas. Nonetheless, in the event that gross visible impacts are observed in those areas following the targeted soil removal, additional soil removal may be performed and/or confirmation samples may be collected for analysis to assess whether site-related constituents may be present at concentrations exceeding remedial goals for that area. Decisions for additional removal and/or sampling in such areas would be made on a case-by-case basis in consultation with the New York State Department of Environmental Conservation (NYSDEC).

Specific to the Gas Regulator parcel in the western portion of the planned remediation area, Page 2 of the 2018 Record of Decision (ROD) states that the "upper one foot of soil exceeding 500 ppm total PAHs on the off-site Gas Regulator parcel will be excavated and transported off-site for disposal." Page 3 of the ROD further states that a "site cover will be required to allow for commercial use of the site and on the off-site Gas Regulator parcel in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs)." Based on these requirements and existing site characterization data, the remedial design includes removal of the uppermost foot of soil throughout most of the Gas Regulator parcel inside the perimeter fence and extends further to a depth of 4 feet adjacent to a Supplemental Pre-Design Investigation test pit sidewall sample that exceeded 500 ppm total PAHs.

In an email to the NYSDEC dated July 27, 2020, GEI Consultants, Inc., P.C. (GEI) noted an apparent discrepancy among the ROD's commercial-based remediation goal for the Gas Regulator parcel, its actual use (non-residential and contains natural gas supply lines and regulators), and its apparent residential zoning on the City tax maps. As a result, and in consideration of limited soil data for this parcel below the uppermost foot, the July 27 email proposed that soil excavation would be performed to achieve the ROD-specified goals as specified in the design, and that post-excavation confirmation sampling would be performed within the Gas Regulator parcel. Specifically, after removing the soils to the target depths within this area (plus additional soils based on visual inspection following removal to target limits, if necessary), GEI would collect confirmation samples. To the extent that those concentrations exceed residential SCOs, the presence of remaining impacted soils would be documented in the Site Management Plan. This approach was approved by the NYSDEC in a return email dated August 4, 2020. A copy of the associated email chain is provided as an attachment hereto.

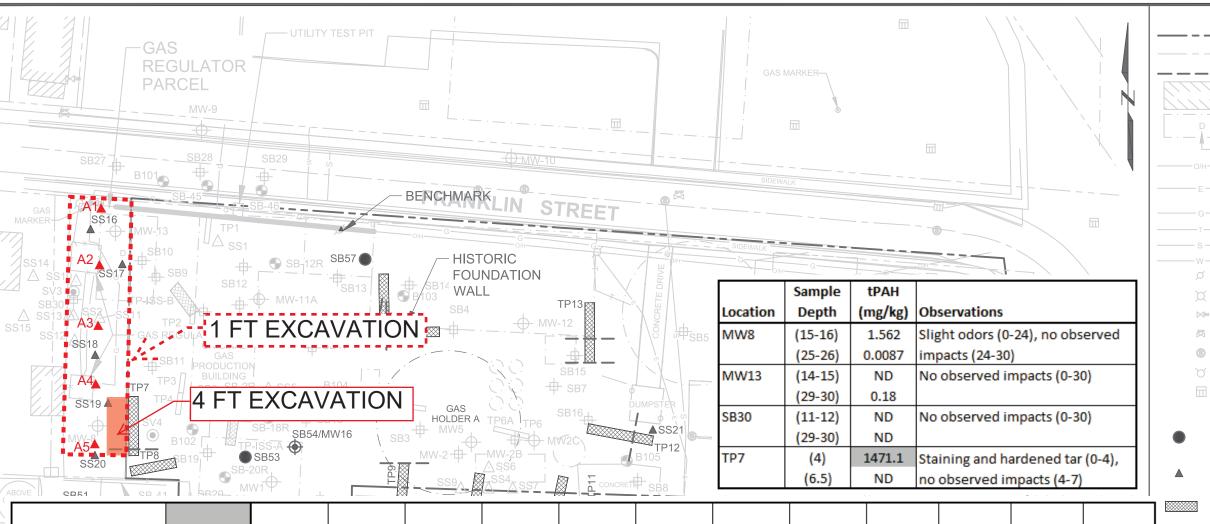
The proposed confirmation sampling plan for the Gas Regulator parcel includes collection of post-excavation samples at locations A1 through A5, as shown on Figure 1. These samples would be collected from a depth of 0- to 1-foot below the base of the excavation and analyzed for PAHs and

National Fuel Gas Hornell MGP Site Confirmation Sampling Plan

metals to document concentrations of potential site-related constituents at the bottom of the excavation. The confirmation samples will be submitted for laboratory analysis on a quick-turn basis. Should data from any of these confirmation samples exceed the subsurface cleanup objective for PAHs as identified in the ROD (i.e., 500 milligrams per kilogram total PAHs), an additional foot of soil (or deeper, should visual impacts also be observed) will be excavated from the surrounding area if it is determined to be safe to do so given the presence of subsurface gas lines in the area. In general, and to the extent it is safe and feasible, the additional excavation will target a 25- by 25-foot excavation area represented by confirmation sample(s) that exceeded the cleanup objective. Additional sampling and excavation will be repeated as needed until sample data at all five locations are below cleanup objectives, or additional removal is deemed unsafe or infeasible. Confirmation sampling data generated during the remedial implementation will be shared with the NYSDEC as received and subsequently included in the remedial documentation report.

As indicated above, should any of the final confirmation samples exceed Residential-based SCOs, their residual presence will be documented in the Site Management Plan so that appropriate measures can be undertaken if and when the parcel is ever developed for residential use.

Figure



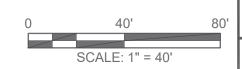
	Commercial SCOs	SS-2 (0-2") 10/4/2011	SS-10 (0-2") 8/28/2012	SS-11 (0-2") 8/28/2012	SS-11 (0-2") 8/28/2012	SS-12 (0-2") 8/28/2012	SS-13 (0-2") 8/28/2012	SS-14 (0-2") 5/8/2013	SS-15 (0-2") 5/8/2013	SS16 (0'-1') 8/7/2019	SS17 (0'-1') 8/7/2019	SS18 (0'-1') 8/7/2019	SS19 (0'-1') 8/7/2019
PAH (mg/kg)													
Benzo[a]anthracene	5.6	97	4.5	13	16	8.8	2	0.8	0.58	4.6	9.3	24	2
Benzo[a]pyrene	1	73	5	14	16	11	2.8	0.87	0.62	4.5	7.9	24	2.1
Benzo[b]fluoranthene	5.6	93	6.3	18	20	13	2.3	0.82	0.68	6.1	9.9	29	2.4
Chrysene	56	72	4	12	13	9.1	1.8	0.83	0.57	4	8	24	1.8 J
Dibenz(a,h)anthracene	0.56	12	1.4	2.5	3.3	3.1	0.76	0.15 J	0.15 J	ND	ND	ND	ND
Indeno[1,2,3-cd]pyrene	5.6	36	3.2	8.1	9.4	6.7	1.8	0.54	0.41	3	4.6	12	1.1 J
Metals (mg/kg)													
Arsenic	16	55	120 J	42 J	45 J	25 J	55 J	13	21	15.3	19.6	18.7	26.1
Lead	1000	230	470 J	260 J	250 J	290 J	220 J	400	7200	92.7	230	261	128

SOURCES:

- Survey prepared for GEI Consultants, Inc. by William J Tucker, II PLS #50369, Clear Creek Land Surveying, L.L.C., Springville, N.Y. dated February 11, 2011.
- City of Hornell, Steuben County, NY Tax Map No. 166.06 dated Oct. 18, 2008.
 Modification to Order on Consent and Administrative Settlement, Attachment 1 between New York State Department of Environmental Conservation, Office of

General Counsel, and National Fuel Gas dated Oct. 21, 2010.

- 4. Sanborn Fire Insurance Maps from 1888 to 1961.
- Survey prepared for GEI Consultants, Inc. by William J Tucker, II PLS #50369, Clear Creek Land Surveying, L.L.C., 7449 Mill Street, Caneadea, N.Y., dated November 26, 2018.
- Survey prepared for GEI Consultants, Inc. by William J Tucker, II PLS #50369, Clear Creek Land Surveying, L.L.C., 7449 Mill Street, Caneadea, N.Y. dated August 27, 2019.



Supplemental Pre-Design Investigation Hornell Former MGP Site Hornell, New York

National Fuel Gas Distribution Company



SV-1

SB36

LEGEND

STRUCTURES
INDICATES DWELLING
ELECTRIC OVERHEAD WIRE
UNDERGROUND ELECTRIC LINE

APPROXIMATE SITE BOUNDARY (FROM NYSDEC)
APPROXIMATE PROPERTY BOUNDARIES

SUBSURFACE PIPE (APPROXIMATE)

APPROXIMATE LOCATION OF HISTORICAL

EXISTING STRUCTURE

UNDERGROUND GAS LINE

TELEPHONE LINE SANITARY SEWER LINE

WATER LINE

UTILITY POLE

LIGHT POLE

GAS METER

MANHOLE

WATER VALVE

FIRE HYDRANT

SAMPLE LOCATIONS

PRE-DESIGN INVESTIGATION)

(SUPPLEMENTAL PRE-DESIGN INVESTIGATION)

(SUPPLEMENTAL PRE-DESIGN INVESTIGATION)

(SUPPLEMENTAL PRE-DESIGN INVESTIGATION)

TEST PIT (PRE-DESIGN INVESTIGATION)

BORING (PRE-DESIGN INVESTIGATION)

SURFACE SOIL SAMPLE (SUPPLEMENTAL

DROP INLET

SOIL BORING

MONITORING WELL

MONITORING WELL SOIL BORING TEST PIT

INDOOR AIR SAMPLE
AMBIENT AIR SAMPLE
SOIL VAPOR SAMPLE

FORMER MONITORING WELL FORMER SOIL BORING SURFACE SOIL SAMPLE

CONFIRMATION SAMPLING PLAN LOCATIONS

Project 1801687

Fig. 1

Attachment 1

Email correspondence from NYSDEC to GEI dated August 4, 2020

Moore, Wendy

To: Kopcow, Dan

Subject: RE: [EXT] RE: National Fuel Gas Hornell - Final Remedial Design - DEC Comments

From: "King, Matthew A (DEC)" < <u>Matthew.King@dec.ny.gov</u>>

Date: August 4, 2020 at 1:10:43 PM EDT

To: "Kopcow, Dan" < dkopcow@geiconsultants.com>

Cc: "Brad Walker (walkerb@natfuel.com)" <walkerb@natfuel.com>, "Tanya B. Alexander

(alexandert@natfuel.com)" <alexandert@natfuel.com>, "Holden, Jeffrey" <JHolden@geiconsultants.com>,

"Eaton, Daniel J (DEC)" < <u>daniel.eaton@dec.ny.gov</u>>

Subject: [EXT] RE: National Fuel Gas Hornell - Final Remedial Design - DEC Comments

Hi Dan,

I understand that the commercial SCO for benzo(a)pyrene has been proposed at 3.7ppm. However, the Department has not yet promulgated this standard. As such, we need to use the commercial SCO's as they are in law now. Any plans for excavation at this site should be made according to current SCO's.

The Department concurs with your plan for the gas regulator area as outlined below. Soils will be excavated to the extent practicable in the vicinity of the gas regulator and any impacted soils that remain will be documented in a SMP.

The design for the sign as outlined in the 95% design document is acceptable to the Department. However, please use the provided email address in place of a phone number.

Thanks,

Matt

Matthew King

Geologist Trainee, Remedial Bureau C Division of Environmental Remediation

New York State Department of Environmental Conservation

625 Broadway, Albany, NY 12233

P: 518-402-7383 | F: 518-402-9679 | Matthew.King@dec.ny.gov |

From: Kopcow, Dan < dkopcow@geiconsultants.com>

Sent: Tuesday, August 04, 2020 10:44 AM

To: King, Matthew A (DEC) < Matthew.King@dec.ny.gov">Matthew.King@dec.ny.gov; Eaton, Daniel J (DEC)

<daniel.eaton@dec.ny.gov>

Cc: Brad Walker (walkerb@natfuel.com) < walkerb@natfuel.com>; Tanya B. Alexander

(alexandert@natfuel.com) <alexandert@natfuel.com>; Holden, Jeffrey <JHolden@geiconsultants.com>

Subject: RE: National Fuel Gas Hornell - Final Remedial Design - DEC Comments

Importance: High

Hi Matt, can you please provide us the status to your response to the Hornell email below as well as to my Hornell B(a)P in Shallow Soil email to you on July 31? Thanks.



DANIEL KOPCOW, P.E., PMP Vice President/Branch Manager 607.216.8976 cell: 607.206.9075 1301 Trumansburg Road, Suite N, Ithaca, NY 14850



From: Kopcow, Dan

Sent: Monday, July 27, 2020 8:20 AM

To: King, Matthew A (DEC) < Matthew.King@dec.ny.gov">Matthew.King@dec.ny.gov; Eaton, Daniel J (DEC)

<daniel.eaton@dec.ny.gov>

Cc: Brad Walker (<u>walkerb@natfuel.com</u>) < <u>walkerb@natfuel.com</u>>; Tanya B. Alexander

(alexandert@natfuel.com) <alexandert@natfuel.com>; Jeff Holden <iholden@geiconsultants.com>

Subject: FW: National Fuel Gas Hornell - Final Remedial Design - DEC Comments

Hi Matt,

Thanks again for providing the comments on the Hornell 95% Design package. We're working on preparing the Final Design to reflect the Department's comments, as well as other considerations (e.g., the findings of the shallow soil investigation). Overall, your comments were straightforward and we anticipate no issues in addressing them. However, there are two comments where we'd like to provide additional information or request clarification so that we can ensure these issues are addressed to your satisfaction in the Final Design submittal. These are further discussed below, each referencing the corresponding numbered comment from your July 14, 2020 comment letter. Please respond at your earliest convenience, or let us know if you'd like to set up a call to discuss further.

Regarding NYSDEC's Comment 1, we agree that soils excavated from the site and reused as backfill (per our July 7 "soil reuse" proposal and your subsequent July 8 approval thereof) cannot be used as fill in residential excavation areas. As indicated in our July 7 transmittal, the Final Design Drawings will be revised to more clearly indicate this. Related to this comment, we further note that Page 2 of the ROD states that the "upper one-foot of soil exceeding 500 ppm total PAHs on the off-site Gas Regulator parcel will be excavated and transported off-site for disposal." The design to date has reflected that goal and, based on shallow soil sampling performed during the Pre-Design Investigation, includes removal of the uppermost foot of soil throughout most of that parcel inside the perimeter fence. In fact, the target removal limit further extends to a depth of 4 feet in a portion of that parcel that is adjacent to a test pit sidewall sample from the Supplemental Pre-Design Investigation that exceeded 500 ppm total PAHs.

In considering this NYSDEC comment, we also sought to confirm the zoning that applies to the Gas Regulator parcel. Hornell tax maps (available online at

https://scnygis.maps.arcgis.com/apps/webappviewer/index.html?id=52e7258379e24f27a634111d2493 d386) indicate that the Gas regulator parcel is zoned for residential use. This seems inconsistent with the current use of this parcel as a location for gas service lines and gas regulators, as well as the ROD-specified cleanup goal for the parcel. Considering this apparent inconsistency, we propose to remediate the parcel per the ROD requirements, including any soils below 1 foot deep that are found to be grossly contaminated or exceeding 500 ppm total PAHs. After removing the target soils (plus any additional

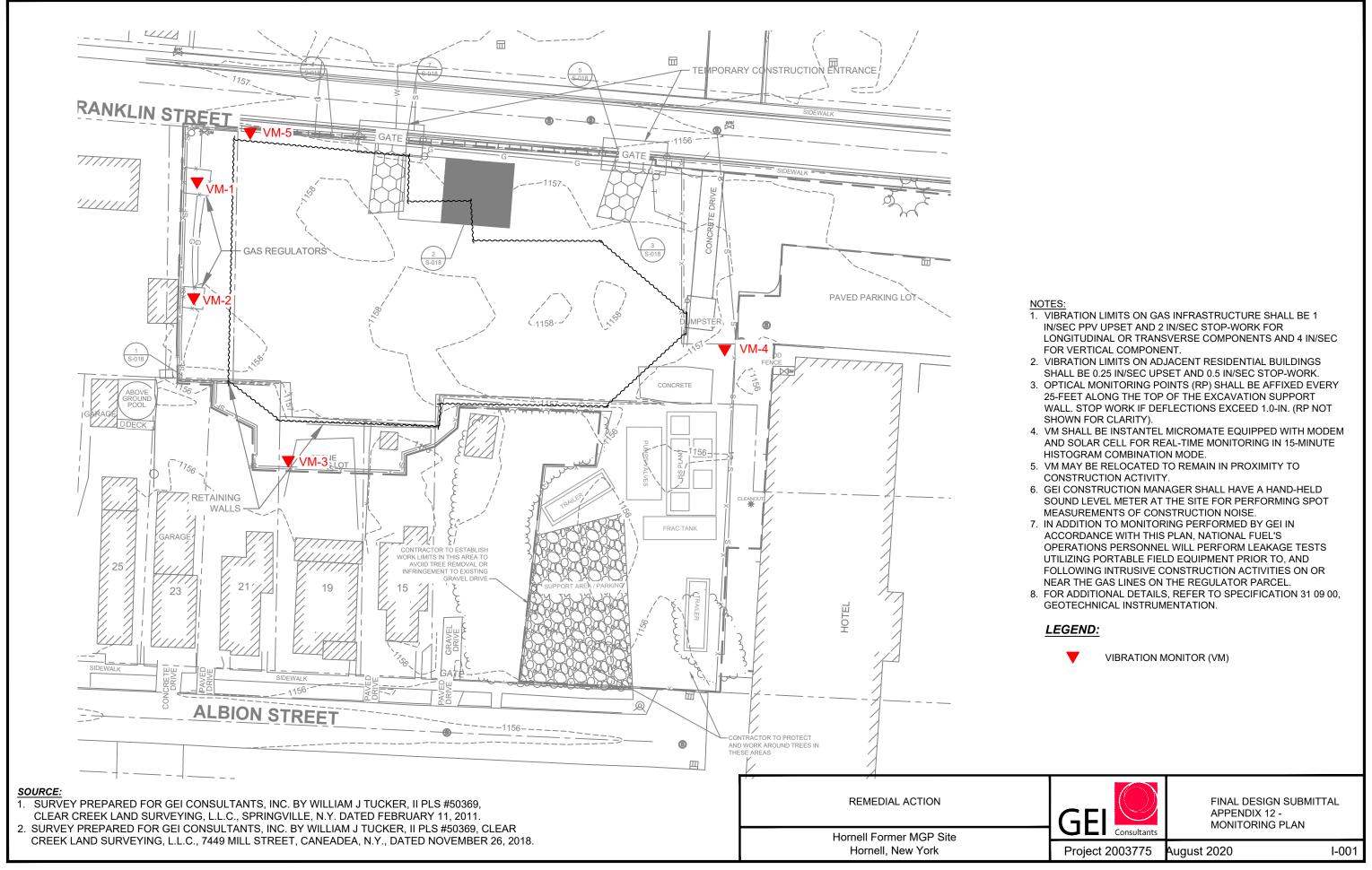
soils as warranted based on visual inspection), we would then collect samples of the remaining underlying soils to document concentrations of potential site-related constituents. To the extent that those concentrations exceed Residential SCOs, we would document the presence of remaining impacted soils in the Site Management Plan. In the unlikely future condition where the gas regulators may be removed and the parcel converted to residential use, any further remediation to meet residential use criteria could be more easily completed at that time when the gas lines and regulators are no longer present to complicate the work. We believe this approach will allow us to meet the ROD-specified remedy and document the need for further remediation, if needed, when residential use is actually foreseeable for the property. Is that approach acceptable?

NYSDEC's Comment 3 indicates that the phone number listed on our sign detail should be replaced with an email address. An updated guidance for signage was attached to the DEC's comment letter. The updated guidance has a completely different layout than our proposed sign and, based on the information provided in the guidance, is not specifically applicable for this site. Can you please clarify whether your intent is only that we replace the phone number on our sign to reflect the email address indicated in the new sign guidance, <u>or</u> that we completely replace our proposed sign with one meeting the specifications of the new guidance?

Thanks.

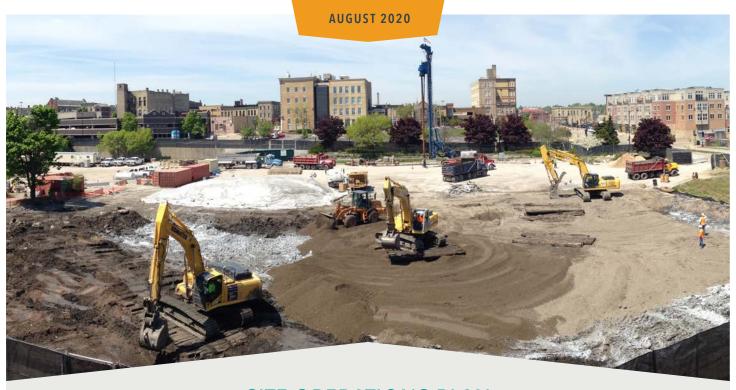








ENVIRONMENTAL REMEDIATION



SITE OPERATIONS PLAN

NATIONAL FUEL GAS

FORMER HORNELL MANUFACTURED GAS PLANT SITE

STEUBEN COUNTY, HORNELL, NEW YORK







PREPARED FOR









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Site Operations Plan **SECTION 1**

ATTACHMENTS

- Project Schedule
 Figure 1 ISS Column Layout
 Daily Report Template

SECTION 1 Site Operations Plan



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1.0 INTRODUCTION

ENTACT has prepared this Site Operations Plan (SOP) to describe our sequence, means and methods for remedial activities at the Former Hornell Manufactured Gas Plant (MGP) Site located near the intersection of Franklin Street and Canisteo Street in Hornell, New York. The eastern portion of the site is currently developed as part of a hotel property and the central and western portion is a grassy vacant lot. Remedial activities to be conducted on the MGP site and adjacent residential areas will include excavation, in-situ solidification (ISS) and off-site disposal of MGP impacted material.

Site remediation is being implemented in accordance with the New York State Department of Environmental Conservation (NYSDEC) March 2018 Record of Decision (ROD). ENTACT's SOP has been prepared in accordance with the ROD and the Request for Proposal (RFP) prepared by GEI Consultants, Inc. P.C. (GEI) (Engineer) on behalf of National Fuel Gas Distribution Corporation (National Fuel) (Owner) including the Final Remedial Design Specifications and Drawings, Appendices and Addenda. Also factored into our proposal and this SOP is NYSDEC Title 6 (6 NYCRR) Part 375 and other applicable Federal, State, County, City, and local laws, regulations and requirements.

1.1 SCOPE OF WORK

Major scope of work items to be performed include the following described in detail in the remainder of this SOP:

- Project preparation and coordination including submittal preparation, permit acquisition as needed, final subcontractor and vendor selection and contracting
- Mobilization of ENTACT personnel, equipment, and materials to the MGP site
- Preparation activities including general site setup, establish work zones, installation of temporary infrastructure, implementation of temporary environmental controls, initial site surveying, utility survey, clearing and grubbing, fence installation and security,
- Demolition of existing above grade structures including a two-foot retaining wall and concrete pad and demolition and removal subsurface structures encountered during excavation and in-situ stabilization (ISS)
- Excavation and loadout of impacted soils from shallow soil excavation areas to a depth of 1 foot (near gas regulator) and 4-feet (portion of gas regulator parcel and residential properties) and backfill with imported clean fill to within 6-inches of final grade
- Installation of steel sheet pile around the MGP site perimeter as shown on the Drawings to an approximate depth of 26-feet for excavation support and ISS
- Excavation and loadout of impacted soil from the MGP site to depths ranging from 8-feet to 14-feet below existing grade
- On site management and off-site transportation and disposal of excavated material
- ISS of delineated areas on the MGP site to depths ranging from 21-feet to 34 feet below existing grade.
- Perform core sampling and quality control procedures during ISS activities
- Excavate and dispose of shallow soils as required by additional delineation to a depth of 1-foot.
- Backfill excavated/ISS areas with on-site re-use material (on commercial property, at least one foot below grade) and approved imported clean fill to within 6-inches of final grade
- Cut and/or remove steel sheet pile to 4-feet below final grade and restore disturbed areas by seeding and planting

1.2 SEQUENCING AND SCHEDULE

A Project Schedule showing our planned sequence and duration of the scope of work items is included in this SOP and will be updated once Final Design is complete and periodically throughout project duration. The Project Schedule has been sequenced to use time efficiently, align necessary precursor items and accommodate the disposal facility requirements. ENTACT will staff the project with the appropriately sized project management team, field crew and subcontractors as needed to maintain the schedule.

2.0 PROJECT PREPARATION

2.1 PROJECT SUBMITTALS

The ENTACT Project Management Team, Corporate Quality Control Group and Health and Safety Department will prepare and submit project submittals in accordance with specifications and the Submittal Summary. Pre-mobilization submittals will be prepared during the premobilization and design phase. Remaining submittals including quality control data, survey data, product data, daily reporting, health and safety documentation, material safety data sheets, waste disposal documentation, closeout documents and other specified documents will be prepared and submitted in accordance with specified submittal procedures.



2.1.1 DAILY CONSTRUCTION REPORT

ENTACT will prepare a Daily Construction Report each day on Site. The report will be submitted to GEI and others included on the distribution list by 10:00 the morning of next scheduled workday. A Daily Construction Report template is included at the end of this SOP. At a minimum, the Daily Construction Report will include the following:

- List of personnel and equipment on site
- Description of work performed that day and scheduled for the following day
- Production and material quantity report
- Major deliveries to the site
- Summary of waste material transported off-site for disposal
- Field changes as applicable
- Other items that may impact remediation and restoration activities or the Project Schedule
- Attachments including health and safety documentation, daily tailgate meeting attendance, material deliver documentation, etc.

2.2 PERMITS AND NOTIFICATIONS

ENTACT will conduct a thorough review to determine applicable permits required to perform work and submit a Schedule of Permits with approximate lead times. Permits that are the responsibility of ENTACT will be obtained in a timely manner to allow permit related work to proceed without delay. In addition, ENTACT will review and comply with permits obtained by others that will impact our scope. Based on an initial review the following permits and notifications may be required and will be obtained by ENTACT (or our subcontractors) as applicable.

PERMIT/NOTIFICATION	PERMITTING ENTITY
Utility locate and mark out	Dig Safely New York (811)
Hydrant Permit	City of Hornell

3.0 PROJECT MANAGEMENT AND COORDINATION

3.1 ENTACT PERSONNEL

The ENTACT Project Management Team and field crew assigned to this project have been selected based on previous experience with projects having similar scope of work including sheet pile installation, ISS and working on/near residential properties. All team members have undergone 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training, 8-hour refresher training, medical surveillance, respirator fit testing and project specific training and documentation. The proposed ENTACT Project Management Team and field crew will consist of the following:

- (1) Project Coordinator (off-site support)
 (1) Field Project Manager (FPM)
 (1) Field Engineer/Quality Control Officer (FE/QCO)
 (1) Site Health and Safety Officer (Site HSO)

 Brady Bonsted 630-669-0216

 Frank LeRoy
 A09-720-7940
 Nate Bennett
 607-743-2666
 Artis Camon
 706-536-0233
- (2-4) Equipment Operator
- (2-4) Field Technician/Laborer

The ENTACT project team will include a project management team and the field crew (operators and field technicians). The following sections describe specific functions of project management team members as it pertains to QC and personnel assigned to each role.

3.1.1 PROJECT COORDINATOR

The Project Coordinator (PC), Brady Bonsted, will support the project team from the home office and visit the site periodically while work is in progress. The PC will monitor work progress with the project management team and ensure appropriate and sufficient resources are available to achieve QC requirements. The PC will receive Daily Construction Reports and Weekly Reports from the field updating the status of planned, ongoing, and completed work, including QC performance. The PC will participate in scheduled update calls with GEI and participating parties. The PC will be immediately notified of any potential problems in the field and recommendations for solutions and/or corrective actions. The PC will work with the ENTACT Field Project Manager, Field Engineer/QC Officer, and subcontractors and vendors to rectify QC deficiencies reported from the field team.



3.1.2 FIELD PROJECT MANAGER

The Field Project Manager (FPM), Frank LeRoy, will be on site daily and will direct work performed by the ENTACT field crew, subcontractors and vendors. The FPM will work directly with the QC Manager and Field Engineer/QC Officer to ensure compliance with Construction Documents and this SOP. The FPM will report QC deficiencies observed in the field directly to the PC and the QC Manager.

3.1.3 PROJECT MANAGER/FIELD ENGINEER/QC OFFICER

The Field Engineer/QC Officer (FE/QCO), Nate Bennett, will be on site daily and will ensure remediation and restoration activities performed by the field crew, subcontractors, vendors, and independent laboratories are in accordance with the Construction Documents and this SOP. Specifically, the FE/QCO will perform the following QC activities:

- Ensure required QC field and laboratory testing is performed in accordance with the specified frequency and methods, interact with the independent laboratories to arrange for field and laboratory analytical service, track status of laboratory analyses, and review analytical results for conformance with Construction Documents
- Ensure submittals are prepared and submitted in accordance with the Construction Documents. Subcontractors and vendors will provide submittal documents related to their scope of work to the FE/QCO who will be responsible for reviewing and organizing the data for formal submission.
- Perform surveying activities to locate and mark site features; guide the field crew during excavation, backfilling, and stockpile
 management; and maintain project logs and record drawings. Surveying performed by the FE/QCO will be checked and certified by the
 New York licensed Professional Land Surveyor as needed
- Report QC deficiencies or non-conformance to the PC and FPM as appropriate

3.1.4 SITE HEALTH AND SAFETY OFFICER

The Site Health and Safety Officer (Site HSO), Artis Camon, will be on site daily and will ensure that all ENTACT site personnel, subcontractors and vendors comply with the ENTACT Site-specific Health and Safety Plan(HASP) and other project health and safety requirements. The Site HSO will perform health and safety orientation, conduct daily health and safety meetings, maintain training documentation, oversee work activities from a health and safety perspective, fulfill health and safety record-keeping requirements, and conduct air monitoring.

3.2 SUBCONTRACTORS

Subcontractors will be finalized during the mobilization phase and updated as needed. Selected subcontractors performing work on site will be in full compliance with specified qualifications, site-specific health and safety requirements, and will review and sign the ENTACT HASP. Specified qualifications, health and safety documentation, and training will be submitted prior to subcontractors performing work on site. The table below summarizes proposed major subcontractors and corresponding scope of work:

SUBCONTRACTOR	CONTACT INFORMATION	SCOPE OF WORK
Armstrong Drilling Inc.	4827 Treesdale Ct. Murrysville, PA 15668 (724) 733-7124	ISS Coring
B&R Surveying LLC	175 N. Main Street Suite #107 Wellsville, NY 14895 (716) 498-4031	Surveying
Johnston Landscaping	261 W. William Street Corning, NY 14830 (607) 661-5467	Landscaping and Maintenance
Maybee Trucking	5044 State Rte. 244 Belmont, NY 14813 (585) 268-5384	Trucking to Disposal Facility
GPRS Inc	Rochester, NY (484) 685-4753	Utility Locate



3.3 CONSTRUCTION EQUIPMENT

The table below summarizes major equipment proposed for use. Equipment will be mobilized and demobilized as needed to complete the proposed tasks as scheduled. This list and quantities of equipment are subject to change based on actual field conditions and tasks being performed. Additional equipment may be mobilized by our subcontractors as needed to perform their scope of work.

EQUIPMENT	QUANTITY	PROPOSED USE
80,000-lb excavator	1-2	Sheet pile installation; excavation
Vibratory hammer	1	Sheet pile installation
80,000-lb excavator w/8,000 lb hammer	1	Selective demolition
10,000-lb mini excavator	1	Shallow excavation (1-foot)
4 cubic yard wheel loader w/forks	1	Off-load/handle sheet pile; excavation
Delmag Mixer	1	ISS
Grout batch plant	1	Grout mixing for ISS
120 HP low ground pressure (LGP) dozer	1	Place and grade backfill materials
84-inch smooth drum roller	1	Backfill compaction
3,000-lb tracked skid steer	1	General site maintenance
2,000-gallon water truck	1	Dust suppression and street cleaning
Sweeper	1	Street cleaning
Rusmar PFU400/25 Foam Machine	1	Dust suppression and odor control
Pressure washer	1	Equipment decontamination
Walk behind trencher	1	Silt fence installation
Chipper	1	Site clearing
Scaffolding station	1	Line transport vehicles
250 kW diesel generator	1	Temporary power source for grout batch plant
21,000-gallon Frac Tank	1-2	Wastewater storage prior to off-site disposal
Dual bag filter skid	1	Wastewater management
4-inch diesel pumps with hoses	2-3	Wastewater management

Certain pieces of equipment (excavators, dozers) will be equipped with Real Time Kinematic – Global Positioning Systems (RTK-GPS) to guide operators during excavation, backfill and other activities as needed to ensure targeted excavation depths and design grades are achieved. All equipment will be inspected upon mobilization and daily while in use and thoroughly decontaminated and inspected prior to demobilization.

4.0 SITE PREPARATION 4.1 UTILITY PROTECTION

As shown on the Drawings, active subsurface utilities (gas, sanitary, telephone) are present on or adjacent to the MGP site. During the preparation phase Dig Safely New York 811 and applicable private utility companies will be contacted to locate and mark existing subsurface utilities entering the site. ENTACT will engage the services of a private utility locator to perform subsurface surveys using ground penetrating radar to locate and mark subsurface utilities within the limits of work. Identified subsurface utilities to remain in place will be clearly marked and protected during excavation, sheet pile installation and ISS activities. If utilities are identified in areas to be disturbed, work will be coordinated with the utility companies prior to breaking ground.

Utility poles and overhead transmission lines were present on the north side of the site along Franklin Street. ENTACT has coordinated with the electrical utility provider to relocate, the overhead electrical lines during the duration of the work. Lines will be re-installed once the work is complete. A Verizon communication line currently remains on the poles. ENTACT has been in contact with Verizon, who will either temporarily move or protect the communication lines during sheeting installation.



Excavation and backfill of the 1-foot excavation area on the west side of the site near the gas regulator and gas utility infrastructure will be done prior to sheet pile installation. National Fuel will be notified a minimum of 72-hours prior to working in the area and/or removal of regulator station fencing. Work will not proceed until a National Fuel representative is on-site to oversee work. The area will be carefully excavated with a 10,000-lb mini-excavator. The ENTACT FE/QCO (or spotter) will closely observe excavation activities and guide the equipment operator. Offsets, as determined by National Fuel, will be marked prior to beginning excavation. Excavation within the offset may be performed manually to protect the gas regulators and infrastructure. Any hand tools used will be made of non-sparking material. As specified, the Engineer will monitor vibration near gas utility infrastructure via seismographs. ENTACT will protect monitoring instrumentation and alter construction methods if directed by the Engineer based on seismograph recordings. Monitoring wells that are intended to remain will be protected. Wells will be demarcated with orange fencing as a perimeter that will serve as a warning equipment in the area. Spotters will be used when equipment is in the area of monitoring well.

4.2 SITE SURVEYING

ENTACT will engage the services of a New York State licensed PLS to perform an initial site survey and on-going surveys as specified. The initial site survey will be performed during the preparation phase to document the existing topography and existing structures. On-going surveys will be performed as needed to document horizontal and vertical extents of excavation, post excavation compliance sample locations, upper surfaces of the ISS mass, ISS elevations and depths, backfill placement and final elevations in backfilled and restored areas. Additional surveys will be conducted as needed to control and document work.

The ENTACT Field Engineer/QCO will be capable of performing field surveys as needed to guide equipment operators during excavation, sheet pile installation and ISS activities. An ENTACT owned GPS base station and rover system will be setup on site and select pieces of equipment (dozer and excavator) will be equipped with RTK-GPS receivers to enable full-time survey capabilities. Official record surveys for reporting purposes and preparation of as-built drawings will be performed by or under the supervision of the PLS. ISS depths will be monitored and verified based on the onboard computer in the drill, as discussed further in Section 10.3.

4.3 CLEARING AND GRUBBING

Clearing and grubbing of trees, vegetation and debris will be done within limits of work during the preparation phase and as work proceeds. Areas to be cleared will be delineated and reviewed with the Engineer to identify and flag any vegetation or structures to remain. Above ground vegetation will be chipped and stockpiled on site in an approved location. Root balls and other below grade material will be managed with impacted soil. Sections of chain link fence will be removed as needed to allow work to proceed. Chain link fence other miscellaneous debris will be segregated by type, sized as applicable and disposed of off-site. Any fencing that is in good condition will be salvaged and set aside for reuse in the restoration of the site.

5.0 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS 5.1 WORK ZONES

Work zones will be established during the project preparation and clearly identified. The support zone will be established in an approved location to house office trailers for ENTACT personnel and separate office trailers for NYSDEC representatives, the Engineer and air monitoring personnel. Temporary utility services (electrical, water, telephone, and internet) will be established. Portable sanitation and hand wash stations will be placed in the support zone proximate to the office trailers. The Support Zone will be located in the adjacent property to the work area accessed by Albion Street.

Exclusion zones (EZs) and contamination reduction zones (CRZs) will be established and identified with safety fence and signage. EZs will encompass open excavations, areas associated with MGP impacted material, heavy equipment use and traffic, and other physical hazards. EZs and CRZs will be moved several times throughout the the project as the work progresses. No one will enter EZs without safety training and appropriate personal protective equipment (PPE). CRZs will transition from EZs and will house personnel decontamination stations where workers can don and doff PPE. CRZs will be equipped with hand wash stations, boot wash stations, first aid kits, clean PPE, and containers for spent PPE. A decontamination pad will be constructed with the CRZ to clean trucks and equipment in contact with impacted material by mechanical means and with pressure washers as needed. The pad will be placed on an impermeable barrier constructed of a geosynthetic liner system and crushed stone. The pad will be bermed and graded to a collection sump where rinse water will be captured and routed to the wastewater storage tanks. Residual waste generated during decontamination will be collected and managed with excavated impacted soils.



5.2 SITE SECURITY / TRAFFIC & PEDESTRIAN CONTROL

A security program will be established to control persons and vehicles accessing the site. Temporary 6-foot high security fence will be installed around the site perimeter. Additionally, temporary fencing will be added adjacent to the hotel to prevent pedestrian traffic from passing through between the work area and the hotel building. Security fence placed along Franklin Street will be supported by jersey barriers (water filled) and equipped with a lockable equipment gate. Barriers will allow for traffic to travel as usual on public roads. Flaggers will be used when needed to escort trucks or equipment when traffic may be impacted. Various construction road signs may be installed as an additional effort to warn traffic and pedestrians of work areas. These may include signs such as "Trucks Entering", "Sidewalk Closed" or other signals as needed to protect and notify the public. Privacy screen, project identification signs, danger signs, and security signs will be installed on the temporary fence and gates as specified.

ENTACT personnel will be responsible for site security during work hours and the site will be secured and locked at the end of each workday. Only authorized personnel and vehicles will be allowed entry during work hours. Visitors will be required to sign in/out in a visitor log to be kept in the ENTACT office trailer and maintained by ENTACT personnel.

5.3 STOCKPILE AREA

Stockpile areas will be constructed on unexcavated portions of the remedial area for the temporary stockpiling of impacted excavated soil and demolition debris. The stockpile areas will be placed in a location convenient to loading for off-site disposal and large enough for segregating soil and demolition debris stockpiles. A separate stockpile area will be prepared to stockpile material designated for potential re-use as determined by the Engineer.

The stockpile areas will be surrounded by berms and silt fence and graded to a collection sump where decant and stormwater run-off will be captured and routed to the wastewater storage tanks. Stockpiled impacted soil will be covered with polyethylene sheeting secured in place with sandbags when not being actively managed.

5.4 ENVIRONMENTAL CONTROLS

5.4.1 EROSION AND SEDIMENT CONTROL

Erosion and sediment controls will be implemented in accordance with New York State Standards and Specifications for Erosion and Sediment Control (2016 Blue Book), applicable specifications and Drawings. At a minimum, the following controls will be installed prior to beginning land disturbing activities, supplemented as needed, relocated as work progresses, and remain functional until the site is fully restored.

- Silt fence installed around the work limits, stockpile areas and other areas of disturbance as needed. Hay bales may be used in conjunction with silt fence for added control
- Anti-tracking pad constructed at the site ingress/egress on Franklin Street to clean tires of trucks exiting the Site. The anti-tracking pad will be constructed of a minimum 4-inch layer of stone underlain with woven geotextile. The pad will be redressed as needed throughout project duration;
- Storm drain inlet protection installed in storm drains, catch basins, and curb inlets identified on site

In addition, ENTACT will implement best management practices (BMPs) throughout project duration to reduce the potential for soil and sediment becoming entrained in storm water discharges from the site including good housekeeping practices to maintain the site in a neat and orderly condition, prompt cleanup of any spills of impacted materials and prompt clean-up of any materials tracked by construction vehicles.

ENTACT personnel will be responsible for inspecting controls weekly and after rain events (>0.25 inches) to ensure they are properly maintained in effective operating condition. Inspection results will be summarized on a Weekly Inspection Report. Deficiencies observed during inspections will be noted on the Weekly Inspection Report and corrected as soon as possible.

5.4.2 ODOR, VAPOR AND DUST CONTROL

Odor, vapor and dust control measures will be implemented in accordance with the specifications and the site-specific Community Air Monitoring Plan (CAMP) to prevent fugitive emission of MGP related odors and respirable dust during remedial activities. At a minimum, the following control measures will be implemented:

 Water truck with sprinkler attachments to wet down soil stockpiles, dust generating activities, heavily trafficked on-site areas, and adjacent roadways as needed



- Rusmar PFU 400/25 foam applicator and AC 645 Long Duration Foam applied to exposed soil and excavation faces
- Covering impacted soil stockpiles when not being actively managed with polyethylene sheeting secured in place with sandbags or other anchoring devices
- Haul impacted soil and clean fill material in properly covered vehicles and restrict vehicle speeds for on-site and off-site haul routes

Perimeter air monitoring for total volatile organic compounds (TVOCs) and particulates will be performed by the Engineer to verify CAMP compliance. The ENTACT Site HSO will perform personal and work zone monitoring for total dust levels in accordance with the ENTACT HASP. Real time aerosol monitors (RAMs) or personal DataRams (PDRs) will be placed on personnel, in equipment or within EZs to monitor respirable dust and ensure appropriate PPE levels are in use.

Dust and odor generation will be closely monitored during excavation, backfill, ISS and impacted soil handling activities. If visible dust is generated or air monitoring results exceed applicable Action Levels for TVOCs or particulates defined in the CAMP, ENTACT HASP or as determined by the Engineer or Site HSO, corrective action measures will be implemented. Corrective action measures may include increased water or foam application, slowing or ceasing select activities during dry periods or periods of high winds, decreasing truck travel speeds and/or utilizing different sizes or types of equipment that may cause less dust generation. In the event odor emissions exceed allowable intensity or if directed by the Engineer or the Site HSO, applicable odor controls will be implemented including increased use of foam.

5.4.3 NOISE CONTROL

Measures will be taken to minimize noise during activities requiring the use of heavy construction equipment, trucks, generators and pumps. To minimize disruption to neighboring properties, vehicles will not be operated outside the normal workdays (9:00 AM to 6:00 PM) Monday through Friday with no "high noise level" work performed before 10:00 AM. If the property owners approve earlier work hours, site hours will be lengthened as feasible according to restriction and daylight.

6.0 DEMOLITION

Demolition of existing structures will be conducted as specified and shown on the Drawings. Existing above grade and below grade structures to be demolished include at a minimum a 2-foot retaining wall and fencing on the south side of the site, a concrete storage pad on the southeast portion of the site, remnant building foundations, piping and other below grade structures encountered during excavation that may inhibit ISS activities. Demolition of above grade structures will be done during the project preparation phase. Below grade structures will be removed as encountered during excavation, sheet pile pre-trenching and ISS activities. ENTACT will notify the Engineer in the event structures not identified on the Drawings are encountered.

Concrete structures will be demolished with an 80,000-lb excavator equipped with an 8,000-lb hammer attachment. Remnant concrete foundations will be broken off at excavation limits and care taken not to pull remaining portions of foundations that extend outside excavation limits. The hammer will size concrete as needed to meet off-site disposal facility acceptance criteria. Concrete may be direct loaded into off site transport trucks or placed in the demolition debris stockpile area while awaiting loadout or waste characterization sampling and analysis as needed. Concrete debris generated during demolition activities will not be commingled with impacted soils.

As shown on the Drawings, various types and sizes of piping associated with MGP operations are present within remediation limits. Piping will be removed as it is encountered and cut and plugged (sealant of pipe cap) at or just beyond the excavation limits. Any flowable fluid found in pipes will be captured and containerized for waste characterization prior to off-site disposal. Containerized pipe residue may be pumped into the wastewater storage tanks and managed with wastewater for off-site disposal.

7.0 SHEET PILE INSTALLATION

Approximately 600 linear feet of sheet pile will be installed around the MGP site perimeter to a minimum depth of 26 feet below existing grade to support MGP site excavation, ISS and backfill activities. ENTACT will supply sheet pile consisting of AZ 36 to be delivered in pairs. ENTACT will self-perform sheet pile installation using an 80,000-lb excavator with vibratory hammer attachment and a loader to assist with sheet pile handling.

7.1 PREPARATION FOR SHEET PILE INSTALLATION

All required submittals pertaining to the sheet pile and installation layout and methods will be submitted prior to installation. Upon delivery, sheets will be off-loaded with the loader and placed on cribbing in prepared lay down areas located in approved areas convenient to the



sheet pile alignment. The ENTACT FE/QCO or FPM will direct off-loading to ensure sheets are properly segregated by type and visually inspect the sheets for damage as they are being off-loaded. Non-conforming or damaged sheets will be rejected and replaced. Sheets will be lifted, handled and stored in manner that will not cause damage.

Preparation activities will be performed to allow uninterrupted installation of sheet pile along the sheet pile alignment. Preparation activities will include surveying and clearly marking the alignment, clearing/grubbing and removal of surficial objects along the alignment, pretrenching, and preparing a stable working platform as needed to support installation equipment.

The sheet pile alignment will be pre-trenched to a maximum depth of 5-feet below existing grade ahead of sheet pile installation to remove obstructions. Once oversized material is removed the remaining spoils will be placed back in the trench. To minimize the amount of open trench, the alignment may be pre-trenched in increments as sheet pile installation progresses along the alignment.

7.2 SHEET PILE INSTALLATION

Once preparation and pre-trench activities are complete, the loader will transport sheets from the staging area to the working portion of the sheet pile alignment. The ENTACT FE/QCO will direct the operation to ensure the correct type of sheet pile is being transported based on the station of the alignment. Sheets will be attached to the vibratory hammer, lifted with the excavator and guided into place along the alignment. Once in place, the interlock of the sheet will be threaded into the previously driven sheet and driven with the vibratory hammer to the targeted depth of 26 feet below existing grade. The ENTACT FE/QCO will guide the operator to ensure sheets are set plumb and driven to the targeted depth. If refusal is met prior to achieving design depth, ENTACT will consult the Engineer to determine appropriate corrective measure.

During installation of sheet piles, vibration monitoring will be performed by GEI. ENTACT's means and methods have been selected to operate below any vibration thresholds. However, in the unlikely occurrence vibration levels are reached, GEI will notify ENTACT and driving will stop immediately. The issue will be discussed and addressed before driving can continue.

The pile driving team and ENTACT FE/QCO will continuously monitor sheet pile during installation for verticality and final elevations. The FE/QCO will maintain a sheet pile driving log to record installation date and time, total drive time, driving location (station), tip elevation, ground elevation and any unusual pile driving problems or deviations. The driving log will be submitted to the Engineer at the completion of sheet pile installation or upon request.

8.0 EXCAVATION AND BACKFILL

8.1 EXCAVATION

Approximately 6,950 cubic yards of MGP impacted soil will be excavated from residential (off-site) areas to depths of 1-foot and 4-feet below existing grade and from MGP site excavation areas to depths of 8-feet, 10-feet and 14 feet below existing grade. Excavation will be coordinated with sheet pile installation and sequenced as shown on the Schedule. As shown on the schedule, areas outside the sheet pile area, including the 1-foot excavation near the gas regulator, the 4-feet excavation area on the southwest residential portion of the site, and the reuse areas, will be excavated and backfilled prior to sheet pile installation. MGP site excavations will proceed after sheet pile installation is complete.

With the exception of the 1-foot excavation near the gas regulator and gas utility infrastructure (discussed in Section 4.1), ENTACT will use 80,000-lb excavators to excavate impacted material from delineated excavation areas to the targeted depths. As impacted material is excavated it will be direct loaded into transport trucks for off-site transportation and disposal or transported via loader to the appropriate stockpile area if direct loading is not feasible.

Excavation will proceed until the target excavation depths are achieved or as directed by the Engineer. Once targeted excavation depths are reached, ENTACT will assist the Engineer in collection of post excavation confirmation or documentation samples from the excavation bottom and/or sidewalls, where needed. The sample locations will be surveyed by the licensed PLS. Based on analytical results, the Engineer will authorize backfill placement or direct excavation of additional material. ENTACT assumes a seven-day turnaround time for sample laboratory results.

Wet soils encountered during excavation will be allowed to gravity drain back into the open excavation. Drier soils may be used to mix with the wet soil until it is adequately dried for loading into transport vehicles. A drying agent (calciment or approved equal) acceptable to the disposal facilities will be available on site for bucket mixing into wet soil in the event further drying is required.



Dewatering may be required within the excavations to remove stormwater that enters excavation areas and to remove and maintain groundwater to 2-feet below excavation bottoms. ENTACT will dewater the excavation areas as work progresses using localized sumps consisting of perforated pipe wrapped in geotextile and embedded in stone placed in the low points within active excavation areas. Submersible 4-inch pumps will be placed inside in the sumps to transfer water via hoses from the sumps to the wastewater storage tanks. Sumps will be constructed and relocated within the active excavation area as needed as excavations proceed. The water will be filtered through a duplex multi-bag filter housing skid prior to being pumped into the 21,000-gallon storage tanks for storage prior to off-site disposal. The dual bag skid and storage tanks will be placed in secondary containment.

QC activities related to targeted excavation of impacted soil include the following:

- Conduct survey activities including marking the horizontal limits of the targeted excavation area, and bottom of the excavation survey once targeted excavation depth is achieved
- Monitor excavated material for moisture and allow wet material to decant back into the excavation or stabilize by mixing with a drying agent prior to loading and transporting to the disposal facility

8.2 BACKFILL PLACEMENT

Backfill will be placed in shallow residential excavation areas, MGP site excavation areas that do not require ISS (north side of the site), and remaining MGP site areas post ISS. The residential areas and MGP site excavation areas that do not require ISS will be backfilled as soon as possible once authorization is received from the Engineer and final excavation limits have been surveyed. Backfill of the ISS areas will proceed once ISS is complete.

Backfill will consist of imported clean fill and soil approved for re-use as determined by the Engineer. Re-use soil will only be placed within the limits of the commercial (hotel) parcel and covered with at least 1-foot of imported clean fill. Prior to importation, imported clean fill will be tested for geotechnical and chemical analysis as specified and summarized below to ensure compliance with the specifications and NYSDEC Technical Guidance for Site Investigation and Remediation (DER-10):

MATERIAL	SAMPLE	PARAMETERS								
WAIERIAL	FREQUENCY	GEOTECHNICAL	CHEMICAL							
Imported Clean Fill	One/source	Modified Proctor, Grain size	RCRA Metals, PCBs, VOCs, SVOCs, NYSDEC per and polyfluoroalkyl substances (PFAS substances) and 1,4 dioxane							
Topsoil	One/source	Grain size	Imported clean fill parameters and pH, organic content							

Imported clean fill used to backfill MGP site excavations must meet Commercial Soil Cleanup Objectives and imported clean fill used to backfill residential excavations must meet Residential Soil Cleanup Objectives as listed in Appendix 5 of NYSDEC DER-10 as well as Special Testing Requirements for Import or Reuse of Soil provided in the NYSDEC Sampling for 1,4-Dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under DEC's Part 375 Remedial Programs (June 2019). The targeted re-use soil has been shown to contain total polycyclic aromatic hydrocarbons concentrations less than 500 mg/kg, as discussed in the Soil Reused Evaluation Summary submitted by GEI to NYSDEC. The reuse soils will also be visibly observed during handling to confirm they are free of gross contamination or hardened tar.

Imported clean fill will be delivered to the site and may be off-loaded directly into an excavation area or placed in a designated clean fill stockpile area for future transport to the active backfill area via loader. Soil designated for re-use will be transported from the stockpile area, or if pre-approved, directly to the active backfill area. A 120-HP dozer will spread, and grade backfill into 12-inch lifts. Each lift will be compacted with the 84-inch smooth drum vibratory roller to achieve specified compaction of 92% in lifts greater than 2-feet below final grade and 95% in lifts less than 2-feet below final grade. In-place density testing will be performed by a licensed third-party testing firm at the specified frequency of one test per lift per 50-feet by 50-feet area. Imported clean fill placed in the shallow 1-foot excavation area will be placed and spread with a tracked skid steer. The final 6-inch lift will be topsoil placed and compacted by tracking over with equipment or bucket tamping.

Prior to placing backfill, a non-woven geotextile demarcation layer will be placed at the base of the excavations to segregate clean fill from underlying soil.



QC activities related to backfill of excavated areas include the following:

- Conduct survey activities including final elevation survey once excavation backfill and compaction is complete
- Backfill excavation with documented clean imported fill and reuse soils where possible. Submit clean fill chemical and geotechnical
 data to GEI for review and approval prior to importation. Place and spread backfill into 12-inch lifts with a dozer and compact lifts to
 achieve specified compaction of 90% of modified proctor maximum dry density. Perform in-place density testing if requested to ensure
 compaction is achieved

9.0 CONTAMINATED MATERIAL MANAGEMENT

Contaminated material generated during remedial activities will include excavated impacted soils, demolition debris, wastewater from dewatering and decontamination activities, spent PPE and miscellaneous refuse. Only National Fuel approved treatment/disposal facilities and transporters will be utilized. ENTACT has received conditional approval for disposal of soils to the Steuben County Landfill with trucking by Maybee Trucking.

9.1 WASTE CHARACTERIZATION

Waste streams will be properly characterized by ENTACT in accordance with the disposal facility sample requirements. A sampling plan has been discussed with the Steuben County Landfill that includes the frequency of analytical samples that is required. ENTACT will submit an initial waste classification sample for the material once we are onsite. Furthermore, additional samples will be submitted for every 500 tons of material as delineated on a grid system. Samples will be approved by the landfill prior to the soil being shipped.

Following mobilization, ENTACT plans to collect impacted waste characterization samples in situ to generate adequate data for facility approvals ahead of excavation. This will allow uninterrupted loading and transport of impacted material and avoid delays associated with treatment/disposal facility approvals. A sampling grid will be established over the excavation area to guide in situ sample collection at the required sampling frequencies. The grid sizes will be based on the estimated excavation depth in the area. Samples will be taken via an excavator bucket, which will test pit to depths desired. Remaining waste streams (demolition debris, wastewater, miscellaneous debris) will be sampled for waste characterization in stockpiles or storage tanks and analyzed for the parameters required by the disposal facility. Once samples are obtained, they will be sent to TestAmerica labs for analytical testing. The following QC activities will be implemented as part of waste characterization:

- Collect waste characterization samples of each waste stream destined for off-site disposal and submit to the laboratory for analysis of facility required parameters at the dictated frequencies
- Maintain a waste characterization sample tracking log to track the stockpiles/waste streams sampled, sample analysis, sample status, submission of analysis to the disposal facility, and status of disposal facility approval

9.2 WASTE TRANSPORTATION AND DISPOSAL COORDINATION

ENTACT will coordinate with the transporters and treatment/disposal facilities to schedule the appropriate amount of transport vehicles and acceptance slots with the facilities. Careful coordination with the transporters and treatment/disposal facilities will be critical to accommodate efficient direct loading of impacted soil and waste material as much as possible.

Transport trucks arriving on site will be directed to a scaffolding station where solid sealable covers (liners) will be installed in the truck bed. Trucks transporting demolition waste will not require truck bed liners. Lined transport vehicle will be directed to the active excavation area for direct loading or to the appropriate stockpile for loading from stockpiles. Once the transport trucks are loaded, they will be securely tarped. In an effort to avoid impacts to public traffic, ENTACT will stagger trucks/stage offsite.

A manifest or bill of lading will accompany each load and will be signed by an approved agent for the Owner and by the truck driver before leaving the site. A copy of the signed manifest or bill of lading will be filed in the ENTACT office trailer. Once received at the treatment/disposal the manifest or bill of lading will be signed by a representative of the facility and a copy returned to ENTACT. The returned manifests or bill of ladings will be cross checked and matched with the original document on file. ENTACT will develop and maintain a Waste Tracking Log to track each shipment of waste transported off site and receipt of completed and signed disposal documents. The log will identify waste type, date and time the material left the site, treatment/disposal facility, truck identification number, manifest or bill of lading number accompanying the load, and weight or estimated weight of each loaded truck.



10.0 IN -SITU SOLIDIFICATION

ISS of approximately 8,100 in place cubic yards (excluding overlap) of MGP impacted soil will begin once sheet pile installation and pre-ISS excavation activities are complete. MGP impacted soils will be solidified to depths ranging from 21-feet to 34-feet below existing grade (15 feet to 30-feet below excavation grade). ENTACT will perform ISS as described in the following sections and in accordance with the specifications and Drawings. ENTACT's planned approach to ISS is detailed on attached Figure 1 - Proposed ISS Layout. ENTACT's proposed approach to ISS mix design is based on the treatability study conducted by ENTACT during the 95% design process.

10.1 PREPARATION ACTIVITIES

The following preparation activities will be conducted prior to full-scale ISS and/or just ahead of ISS activities within an area:

- Delivery of grout reagents will be scheduled, and the grout batch plant (described below) and Delmag mixing rig will be mobilized and assembled
- ISS areas (by depth) will be surveyed and marked by the licensed PLS
- ISS columns will be laid out and column centers marked
- The ISS surface elevation will be surveyed pre-ISS
- Stable working platforms will be established adjacent to the active ISS areas to support the Delmag mixing rig and relocated as work progresses to support installation equipment

10.2 GROUT BATCH PLANT

The grout used for ISS will be a mix of Portland cement, ground granulated blast furnace slag (GGBFS), and a calculated volume of water. The grout will be produced in ENTACT's customized grout batch plant to be assembled outside the limits of sheet pile. The grout batch plant will include a silo-fed mixing tank erected over a concrete pad to provide lateral support to the silo while distributing the silo loading over existing ground surface. The mixing tank is a skid-mounted unit with 1,500-gallon capacity, equipped with high speed jet mixers and grout pumps. Four 350 bbl Belgrade silos (or similar) with internal bag houses (for dust control during reagent conveyance) will be utilized to store and discharge dry reagent to the mixing tank via auger feed. The silos (two for Portland cement, two for GGBFS) will be erected over calibrated load cells to accurately meter the amount of reagent discharged into the mixing tank. Dry reagent control from each silo to the mixing tank will be accomplished using each silo's auger feed system to provide the required reagent ratio and combined reagents to water ratio by weight per the final grout mix. Water for grout preparation will be supplied from a 21,000-gallon frac tank (or similar) for feeding the grout mixing tank. The amount of water pumped to the mixing tank will be controlled using a flow meter. Batches of mixed grout will be visually observed to confirm a homogeneous mixture is achieved.

10.3 IN-SITU SOLIDIFICATION

ISS will be completed utilizing a Delmag mixing rig (or equal) equipped with a 10-feet or 5-feet diameter augers capable of reaching the maximum ISS depth. The mixing auger bit is equipped with pressure nozzles to deliver grout into the mixing zone. Slurry pumps will transfer the grout mix from the batch plant to the auger. Grout will be pumped to the hollow stem auger through flexible grout hose, routed through the hollow stem auger and into the mixing bit for injection at variable pressures, adjusted according to the workability of the soil being treated. The dosage of grout will be calculated based on the bulk unit weights of the soils being treated and delivered in sequence.

The soil mixing process is completed by mixing the soil in a vertical column to the required depth. The proposed ISS layout and overlapping columns is depicted on attached Figure 1 – Proposed ISS Layout. The center of each column will be field surveyed and marked prior to mixing to guide the Delmag operator into position. Once in position, the operator will initiate drilling and radio the batch plant operator to begin pumping reagent. The operator will continue to auger while grout is being injected into the soil. Mixing will continue to the targeted ISS depth each column (not to extend more than 0.5 feet beyond targeted depth) and the auger will be brought back up to the surface while the injection continues. Based on the workability of the soil, the flow rate and injection pressures may be adjusted. The operator will continue to mix, raising and lowering the bit from the bottom of the column to the top a minimum of 3x to achieve a homogeneous mix within each column. Depth of the ISS column will be verified from data provided by the Delmag's on-board computer system.

ISS activities within the "reduced ISS production zone" as shown on the Drawings, will be sequenced such that no more than 10 linear feet along the sheet pile wall is fluidized and below ISS target design strength at any given time. The 5-feet diameter auger will be used during ISS activities within the "reduced ISS production zone". A minimum cure time before treating the adjacent segment will be determined once ISS results are determined but will be set at 2 days of curing to start.



In the event obstructions are encountered during ISS activities that reduces the drilling rate to refusal, the Engineer will be notified, and the specified procedures will be implemented as directed by the Engineer.

As ISS within a column or area is complete, swell material generated during ISS activities will be removed as needed to achieve the top of ISS elevations shown on the Drawings. Swell material may be used as post ISS backfill within Gas Holder A. swell material will be placed in lifts, graded and compacted in accordance with backfill specifications. Excess swell material will be disposal of off-site.

10.4 ISS QUALITY CONTROL AND PERFORMANCE STANDARDS

A quality assurance/quality control program will be established as specified and in accordance with the NYSDEC In-Situ Solidification QA/QC memo. The Engineer will be responsible for oversight of a QA program and the ENTACT FE/QCO and ISS crew will implement the specified QC program during ISS activities to ensure specified performance criteria are achieved. QC samples will be collected at the specified frequencies for field observation and laboratory analysis to ensure the following performance standards are achieved:

- Unconfined Compressive Strength (UCS) as determined by ASTM D 1633 to be greater than or equal to 50 psi
- Permeability as determined by ASTM D 5084 to be less than 1 x 10-6 cm/sec with no single sample greater than 1 x 10-5 cm/sec
- Non-aqueous phase liquids (NAPL) should not be present along the break point during UCS testing of the solidified material based on visual inspection by the Engineer

The ENTACT FE/QCO will collect samples of reagent for density testing in accordance with API Method RP 13-B1 at a frequency of every 3rd batch mixed or as directed by the Engineer.

ENTACT will engage the services of a licensed driller to collect ISS core samples in accordance with the NYSDEC In-Situ Solidification QA/QC memo at a frequency of one sample for every 5,000 square feet of ISS treatment area but no less than 2 boreholes per treatment area, for UCS and hydraulic conductivity testing. To provide early coring information to be used to adjust ISS operations, the first core sample will be collected when ISS activities are no more than 25% complete. Location of boreholes will be selected as in accordance with the NYSDEC memo and will be surveyed and documented.

The ENTACT FE/QC Officer will maintain and submit on-going QC records prepared to document ISS activities in formats acceptable to the Engineer. Daily soil mixing records summarizing work activities and QC testing will be submitted daily and will include at a minimum a description of work completed the previous day; column identification numbers; date and time of beginning and completion of each column; grout batch mix records; daily and running totals for volume of soil mixed and grout components used; summary of QC testing; soil mix issues identified and resolutions.

11.0 SITE RESTORATION

The MGP site and residential areas will be restored to final design grades shown on the Drawings. The areas will be seeded in accordance with local practices and City of Hornell regulations. Topsoil will be prepared for seeding with the application of fertilizer and lime as needed based on topsoil evaluations.

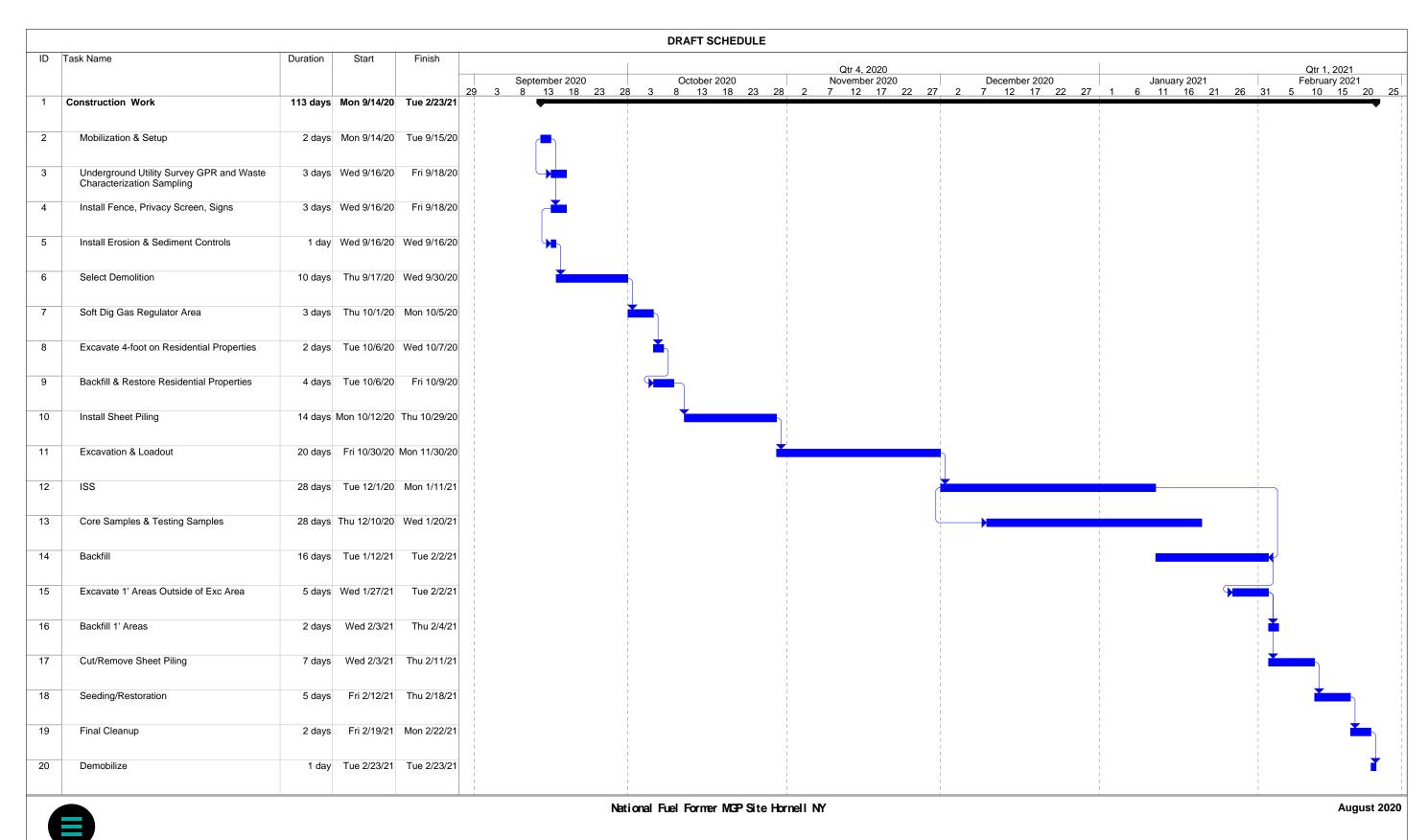
In addition to seeding, the following activities will be completed during the restoration phase:

- Trees and plants along the western fence line will be replaced as specified
- A gravel driveway consisting of a 6-inch layer of ¾-inch stone underlain with non-woven geotextile will be reconstructed on a portion of the south residential area where a gravel surface currently exists
- New chain link fence will be installed to replace existing removed during remedial activities. Salvaged chain link will be used when feasible.
- The retaining wall on the south side of the MGP site will be replaced
- The Hotel's dumpster will be moved to its original position and the temporary access road will be removed
- Sheet pile will be removed on the residential properties, and cut and/or removed inside the site

Upon completion of restoration activities, the site will be restored to acceptable conditions prior to demobilization of the ENTACT crew. Equipment will be decontaminated and inspected prior to demobilization. The grout plant and wastewater storage area will be disassembled. All temporary construction facilities (decontamination pad, stockpiles, stabilized entrance/exit); temporary erosion, sediment and stormwater controls; support zone and trailers; stockpiles of excess material; and other signs of construction activity will be removed. All required deliverables including asbuilt drawings and final record documents will be completed and submitted in accordance with the Submittal Register and as specified.

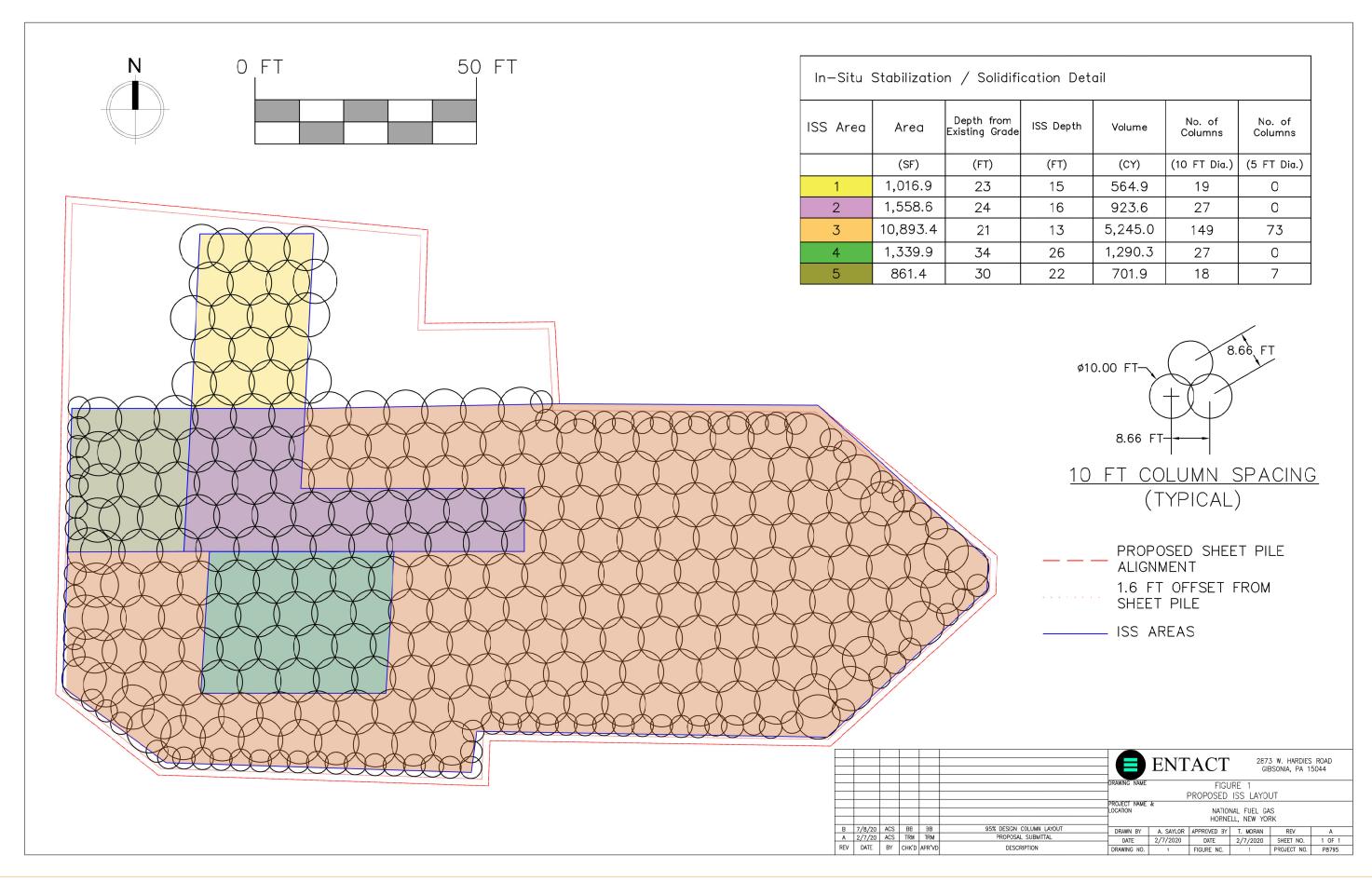
ATTACHMENTS





ENTACT.











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DAILY ACTIVITY REPORT

ENTACT, LLC.

● EN7	FACT	National Ho	rnell, N			Ballston Spa, NY 12020
ENTACT Project #	E8795	Date:			Report #	
Weather Conditions:		<u>.</u>			•	
Activities Completed:						
Daily Notes:						
None						
Subcontractors:						
None						
Current Material Stockpiled: None				CAMP Exceedances & Re	esolution:	
	Onsite Personnel	Hours		Equipment	Onsite	Task
		Total Crew Hours Monthly Total PROJECT TOTAL	0 0 0	Item	Import Tracking: Units Daily Material Loadout:	Project Total
Delivery Vendors:			-	Item	Units Daily	Project Total
Site Visitors:						
				Item	Water Loadout: Units Daily	Project Total
Call Landaut Natas						
Soil Loadout Notes:						
ENTACT	Representative					



ENTACT Health and Safety DepartmentCompany Owned or Leased Construction Equipment Daily Inspection

Project Name & No.:		Project Locat	tion:			Week	Beginning:	
Year, Make, Model:		Equipment II	O No.:		Assigned Oper	ator:		
Mileage/Hours:		Field Project	Manager:					
Status: Owned Leased	?	Rental Comp	any:					
For each item below ENTER: " OK ", '	"Bad". or "r	n/a" If "Bad."	indicate repairs	or acti	ion needed in "Re	emarks"	below and not	ifv FPM.
Enter Date:	, , , , , , , , , , , , , , , , , , , ,	, , , ,						
Check the ground under and around the equipment for signs of fluid leaks								
Tracks, Wheels, Tires (PSI)								
Wheel Chocks in Place								
Oil, Hydraulic & Steering Fluid								
Brake Fluid & Clutch								
Emergency Brake – Set and Test								
Signals, Lights, Warning Lights								
Grease Fittings								
Ground Engaging Tools, Teeth, etc.								
Glass, Wipers, Mirrors								
Body, Frame, ROPS								
Demo Guard (Screen or Bar)								
Dump Mechanism								
Steering, Horn, Controls, Levers								
Doors, Latches, Hinges, Handles								
A/C, Heater, & Vent Covers								
Seat Belts, Buckle, Mounting								
Motor (Wiring)								
Radiator and Coolant								
Belts and Hoses								
Batteries, Cables, Terminals								
Fuel Tank, Lines, Exhaust								
Hydraulic Cylinders, Lines, Hoses								
Linkages, Obvious Wear/Damage								
Boom, Hoist, Hooks								
Transmission/Swing Case Oil								
Grab Bars, Steps, Landings								
Backup Alarm								
Guards for Moving Parts								
Bonding/Grounding Systems (rust,								
fraying, clamp tension, insulation,								
build-up of material (oil, grease, etc.)								
Secure all loose items; identify all								
missing/damaged parts								
Fixed objects as hazards are recognized (in/outside cab)								
Wiring changes (new, repaired,								
replaced)								
All haz materials declared and SDS								
available onsite or in the vehicle			-					
Operators Manual and Spill Kit Fire Extinguisher Inspection Date								
THE EXHIGUISHER HISPECTION Date			1	[<u> </u>
Domontos								

12/17/15





DAILY IN-SITU VERTICAL AUGER QUALITY CONTROL AND PRODUCTION REPORT

	COLUMN DESCRIPTION								MIX DESCRIPTION			DESIGN ISS PRODUCTION VALUES				ACTUAL ISS PRODUCTION VALUES								
Column ID	Date	Column Northing	l .	Column Diameter	Number of Overlaps	Top Elevation of Column (ft)	Bottom Elevation of Column	Design Column Length (ft)	Mixing Passes	Water To Reagent Ratio	% Cement	% Bentonite	Cement Addition (lbs)	Bentonite Addition (lbs)	Water Addition (gallons)	Total Target Grout Addition (gallons)	Grout Density (pcf)	Column Length (ft)	Volume Treated (CY)		Bentonite Used (lbs)		Reagent Percent	Grout Densit
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	Total Columns Mixed Today:	lotal Cement Used Today (Tons):	
	Total Columns Mixed To Date:	Total Cement Used To Date (Tons):	
	Total Sediment Mixed Today (CY):	Total Slag Used Today (Tons):	
	Total Sediment Mixed To Date (CY):	Total Slag Used To Date (Tons):	
		<u> </u>	
Comments:			



IN-SITU SOIL SOLIDIFICATION/STABILIZATION (ISS) PROJECT



Hornell Former Manufacted Gas Plant Site Hornell, NY

		Sample		Per	netrometer					Unconfi S	ined Comp trength (ps	oressive si) 28 days	Permeability (cm/sec) 7 days 14 days 28 days					
Cell No.	Sample No.	Depth (ft)	Date molded	1	3	5	14	21	28	7 days	14 days	28 days	7 days	14 days	28 days	Comments		



Batch Plant Log						
Date	Batch	Column	Time Completed	Water (gal)	Portland (lbs)	Density (lbs/ft ³)