REPORT

Final Remedial Design

Former CAE Electronics - Hillcrest Facility
Binghamton, New York

New York State Department of Environmental Conservation

Design Plans & Specifications

CAE LINK I.D.# 704015

☑ Approved ☐ Approved As Noted ☐ Resubmit With Revisions ☐ Disapproved

COMMISSIONER OF ENVIRONMENTAL CONSERVATION

Walter E. Demich PE

Designated Representative

Date 18 MAR 98

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O'BRIEN & GERE
ENGINEERS, INC.

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1. Introduction

1.1. Background

The "Hillcrest facility" is a 17-acre manufacturing facility located at 11 Beckwith Avenue in the Town of Fenton, Broome County, New York (Site). The Hillcrest facility was recently sold by CAE Electronics, Inc. (CAE Electronics) to B.W. Elliott Manufacturing Co., Inc. However, for most of its operational history the Hillcrest facility was owned by Singer Link.

The facility is located five miles northeast of the City of Binghamton in a mixed commercial/residential area. A railroad runs along the eastern edge of the property separating the Site from the Chenango Valley Cemetery. Although the surrounding land is mostly residential, there are several commercial/industrial facilities located nearby, including auto body shops, industrial platers, and gasoline stations.

The Chenango River is located approximately 2,500 feet west of the facility and flows south, draining a significant portion of central New York State into the Susquehanna River. Approximately 300 feet to the south of the Site is a small stream known as Phelps Creek which flows intermittently during wet periods from east to west into the Chenango River.

The Hillcrest facility is a two-story manufacturing/office building which has produced aviation related products (primarily flight simulators and related equipment) since 1940. The eastern portion of the building was used mainly for manufacturing while the western portion contains mostly offices.

Prior to July 1986, sanitary waste waters, cafeteria waste waters, non-contact cooling water and industrial process waste water were discharged to a subsurface leaching system regulated by a State Pollutant Discharge Elimination System (SPDES) Permit. The permitted outfall (004) consisted of twelve leaching pits, A, B, C, D, E, H, I, J, K, L, M, and N. The waste water discharge included chromium, cadmium, silver, zinc,

copper, nickel, rhodium, gold, and tin/lead alloy, trichloroethene, 1,1,1-trichloroethane, and methylene chloride.

Remediation of the Site began in October 1983 when leaching pits A, B, C, and D of outfall 004 were taken out of service, excavated, and removed. Moreover, in July 1986, all waste water discharges including those from all industrial process water, boiler blowdown, and sanitary and cafeteria waste waters were connected to the Binghamton / Johnson City Sewer District.

Investigations at the Site include "Hydrogeologic Evaluation and Risk Analysis Study" (March 1984, H2M), "Phase II Report, Contaminant Plume Identification at the Singer Link Company, Hillcrest Facility" (May 1986, H2M), and "Phase III Report, Ground water Investigation at the Singer Link Company, Hillcrest Facility" (September 1987, H2M).

In early 1988, samples were collected from private drinking water supplies along Brandywine Highway which is located immediately to the west of the Site. All the wells sampled contained volatile organic compounds (VOCs) similar to the Site's ground water constituents. Ground water investigations in this area were required as part of the Remedial Investigation/Feasibility Study (RI/FS). All commercial/industrial facilities and residences within the vicinity of the Site are now supplied with drinking water from the Town of Fenton Water District.

The NYSDEC and the Singer Link Flight Simulator Division, Hillcrest Facility entered into an Administrative Consent Order in February 1988 which required an RI/FS to be conducted to address the Site-related analytes and compounds of concern. The RI (1990, H2M) focused on identifying the physical nature and extent of the Site-related analytes and compounds of concern within the soil and ground water.

The RI analytical data confirmed the presence of the Site ground water plume consisting of VOC and inorganics (chromium and cadmium) and determined the configuration of the off-site VOC plume. VOCs were quantified above New York State guidance values or standards for drinking water. The majority of inorganic constituents appear to be limited in mobility and are found predominantly on Site in the near vicinity of Outfall 004.

According to the RI, the key release mechanism of the VOCs and inorganics at the Site is via percolation of rainfall through the leaching pits into ground water. The VOCs and inorganics from the leaching pits travel

via ground water pathways west-northwest toward the Chenango River. If any of the VOCs actually ever reach the river, their impact is expected to be insignificant because of the high volume and flow rate of the River relative to discharge from ground water.

On March 30, 1994, a Record of Decision (ROD) was issued to present the selected remedial action for the Site based on the Administrative Record of NYSDEC for the Site, and upon public input to the Proposed Remedial Action Plan presented by NYSDEC. The Order on Consent for the remedial design and implementation of the remedial design was entered on February 29, 1996 between NYSDEC and CAE Electronics, Inc.

Preliminary design investigations were performed in two phases in accordance with the Remedial Design (RD) Work Plan (January 1996) and the addendum to the RD Work Plan (September 3, 1996). The initial predesign investigations which were performed between April 11 and 16, 1996 evaluated the horizontal and vertical extent of the VOCs and inorganics in the soils around the leaching pits. These investigations consisted of advancing twelve soil borings to the water table in the vicinity of leaching pits "A" and "J."

The second phase of investigations included soil sampling to correlate total, Toxicity Characteristic Leaching Procedure (TCLP), and Synthetic Precipitate Leaching Procedure (SPLP) data. These investigations consisted of advancing three soil borings to the ground water table around leaching pit "A" and collecting two samples from each boring. The locations for the soil borings were selected based upon the analytical data obtained in the April 1996 phase investigations. Detailed discussions regarding the results of the investigations are provided in Section 2.2 of the Preliminary Design Report (O'Brien & Gere, 1996).

The Preliminary Design was submitted to NYSDEC on December 12, 1996. NYSDEC's comments to the Preliminary Design were presented in a letter dated August 18, 1997.

On March 21, 1997, NYSDEC finalized an Explanation of Significant Difference to support modification of a component of the ROD-selected remedial alternative in accordance a with the recommendation of the Preliminary Design. The remedy of *in-situ* stabilization of the soils beneath the twelve leaching pits was replaced by the more permanent remedy of excavation and off-site disposal of the impacted soil.

1.2. Summary of preliminary design

The Preliminary Design report presented a summary of the pre-design investigations and results that supported the Remedial Design (RD), and a discussion of how the proposed remedial action (excavation and off-site disposal in lieu of *in-situ* stabilization) better addresses the objectives of the ROD. The Preliminary Design also included a detailed discussion of the: Health and Safety Plan (HASP); Construction Quality Assurance Plan (CQAP); Site Operations, Maintenance and Monitoring Plan; Citizen Participation Support Plan (CPSP); Contingency Plan; Preliminary Design Drawings; outline of Technical Specifications; and Ground Water and Surface Water Monitoring Plan in accordance with Section 3.2. of the approved RD Work Plan.

The revised remedial action components identified in the Preliminary Design (in accordance with the ROD) included:

- Excavation and proper off-site disposal of sludges from the eight existing subsurface leaching pits;
- Excavation and proper off-site disposal of the soils beneath the eight existing and former subsurface leaching pits to prevent future mobilization of the contaminants into the environment; and
- Ground water and surface water/sediment monitoring to allow for evaluation of the effectiveness of the remedial action.

Although the ROD also called for connection of one resident on West Arterial Road to the public water supply, according to the Town of Fenton, the resident on West Arterial Road had already been connected to the public water supply on or before December 7, 1995.

1.3. Purpose of the final design

The purpose of the Final Design is to incorporate NYSDEC's comments to the Preliminary Design (included in Appendix 1-1), and to present a complete design package for implementation of the remedial design in accordance with I.A. and B. of the Order on Consent.

1.4. Final design organization

The following table presents the components of the Final Design in accordance with the sequence presented in the Order on Consent, and shows where each of the components is addressed within this Final Design. In addition, the following table presents where each of NYSDEC's seven comments to the Preliminary Design are addressed in this Final Design.

Table 1-1. *Report organization.*

Requirement/Comment	Final Design Location
Order on Consent	
1. A detailed description of the remedial objectives and the means by which each element of the selected remedial alternatives will be implemented to achieve those objectives, including, but not limited to:	1. Section 1.5
a. the construction and operation of any structures;	a. N/A
b. the collection, destruction, treatment, and/or disposal of hazardous wastes and substances and their constituents and degradation products, and of any soil or other materials containing them;	b. Section 2
c. the collection, destruction, treatment, and/or disposal of impacted ground water, leachate, and air;	c. Section 3
d. physical security and posting of the Site;	d. Section 6
e. health and safety of persons living and/or working at or in the vicinity of the Site;	e. Section 4
f. quality control and quality assurance procedures and protocols to be applied during implementation of the Remedial Design;	f. Section 5
g. and monitoring which integrates needs which are present on-site and off-site during implementation of the remedial alternatives selected in the ROD.	g. Section 6, 8
2. "Biddable Quality" documents for the RD.	Section 3
3. A time schedule for implementation of the RD.	Section 9
4. The parameters, conditions procedures, and protocols to determine effectiveness of the Remedial Design, including a schedule for periodic sampling of ground water monitoring wells on-site and off-site.	Section 6

Table 1-1. *Report organization.*

Requirement/Comment	Final Design Location
5. A description of operation, maintenance, and monitoring activities to be undertaken after approval of construction of the Remedial Design.	Section 6
6. A contingency plan.	Section 8
7. A health and safety plan.	Section 4
8. A citizen participation plan.	Section 7
NYSDEC Comments to Preliminary Design (Appendix 1-1)	
1. Verification sampling	Section 2.2.3
2. Final design report signed/stamped by PE	Section 3
3. Post remediation report	Section 9
4. Community air monitoring	Section 4
5. Pipelines between leaching pits	Section 2.2.3
6. Radius and depth of soil excavations	Section 2 and 3
7. Walls of leaching pits	Section 2.1

Source: O'Brien & Gere Engineers, Inc.

1.5. Attainment of ROD requirements

The remedial objectives presented in the ROD were established through the remedy selection process stated in 6NYCRR 375-1.10. These objectives were established to meet all Standards, Criteria and Guidance (SCGs), and to protect human health and the environment. The objectives which were selected for the Site are:

- Reduce, control, or eliminate the contamination present within the former leaching pits and the related contaminated soils to the level approved by the department.

- Eliminate the potential for direct human or environmental contact with the contamination present within the 12 former leaching pits and the related contaminated soils.

- Mitigate the impacts of contaminated ground water on human health and the environment.

- Provide for the attainment of SCGs for ground water quality in the area impacted by site related contaminants.

Implementation of the Remedial Design as presented in the Preliminary Design and in this Final Design is consistent with these objectives. Soils and sludges from the leaching pits and the related surrounding area will be excavated and properly disposed off site. The potential for direct human or environmental contact with contaminated soils will be eliminated through excavation and off-site disposal. The effects on human health and the environment will be mitigated and removal of the source will promote the attainment of groundwater quality SCGs and monitoring the ground water quality as part of the long term monitoring program.

2. Major design components

2.1. General

The Remedial Design comprises excavation of the eight remaining leaching pits, excavation and proper off-site disposal of the sludge in those eight pits, excavation and proper off-site disposal of soil above and adjacent to the twelve leaching pits which exhibit concentrations above the clean-up objectives, and verification sampling. A summary of the clean-up objectives is presented in Table 2-1. Soil with concentrations exceeding the TAGM total VOC levels and HEAST metal levels (using cadmium as the indicator parameter) will be excavated and disposed off site.

2.2. Excavation and disposal of remaining leaching pits

Leaching pits A, B, C, and D were previously excavated in October 1983. Leaching pits E, H, I, J, K, L, M, and N require sludge removal, and removal of the cylindrical concrete block pits. In accordance with the Feasibility Study (June 1994, H2M Associates, Inc.), an estimated quantity of 40 cubic yards of sludge remains to be excavated from the eight pits and disposed off-site. Prior to acceptance at an off-site disposal facility (to be selected by the construction contractor), concrete and sludges will be characterized by the construction contractor as hazardous or nonhazardous per applicable law and through the analytical requirements of the specific disposal facilities.

2.3. Excavation and disposal of soil

2.3.1. Limits of excavation

Excavation of soil with levels above the clean-up objectives adjacent to the leaching pits will be performed down to the water table (approximately 18

feet below grade). Water encountered in the excavations will be handled as construction water in accordance with the technical specifications (Section 3). Initial limits of soil excavation were established based on the results of sampling performed during pre-design activities, as presented in the Preliminary Design. Soil will be initially excavated out to a radius of three feet surrounding the outer edge of all leaching pits except leaching pit "A", from which the soil will be initially excavated out to a radius of eight feet from the outer edge.

Soils excavated from around the leaching pits and designated for disposal will be stockpiled and sampled for total and TCLP cadmium and VOCs. Soils which exceed the toxicity characteristic levels for any of those compounds or the total soil concentration levels listed in Appendix I of NYSDEC Technical and Administrative Guidance Memorandum ("TAGM") No. 3028 will be managed as hazardous waste for disposal. Soils exhibiting concentrations below those levels will be considered by the Department to no longer contain hazardous waste, if they ever did, and managed for disposal as non-hazardous industrial solid waste.

Based upon reported information, pipelines between the leaching pits were removed when the sewer line was installed. However, if pipelines are encountered in the excavations, they will be capped and left in place unless verification sampling in the leaching pit excavations near the pipe (discussed below) shows levels of constituents above the clean-up levels in the vicinity of the pipes. If the initial verification shows that constituents are above the clean up levels, the piping plus one foot of soil beneath the piping will be excavated and properly disposed off site. Verification sampling beneath the pipe will not be performed.

2.3.2. Surface soils

Soils overlying the eight existing leaching pits (E, H, I, J, K, L, M, and N) are considered "surface soils." Surface soils (from surface to approximately four feet below grade) will be excavated to the areal limits described above and stockpiled separately. One sample from each pile will be analyzed for total cadmium utilizing EPA Method 6010 and VOCs (including all VOC parameters listed in the NYSDEC TAGM No. 4046) using EPA Method 8010/8020. If concentrations of total VOCs and cadmium are below the soil cleanup objectives set forth in Table 2-1, the soils from those piles will be set aside and used as backfill material. If the concentrations of total VOCs and cadmium are above, the soil from those

piles will be properly characterized by the construction contractor and disposed off site.

Soils overlying the excavation pits created during the past removal of the four leaching pits (A, B, C, and D) are considered "surface soils." Surface soils at these locations will be excavated to the areal limits discussed above, down to approximately 14 feet below grade (the depth equal to the bottom of the leaching pit prior to removal). The excavated surface soil from each of these former leaching pits will be stockpiled separately. One sample from each pile will be analyzed for total cadmium utilizing EPA Method 6010 and VOCs (including all VOC parameters listed in the NYSDEC Technical and Administrative Guidance Memorandum No. 4WR-92-4046) using EPA Method 8010/8020. If concentrations of total VOCs and cadmium are below the soil clean up objectives set forth in Table 2-1, the soil from those piles will be set aside and used as backfill material. If the concentrations of cadmium are above, the soil from those piles will be properly characterized by the construction contractor and disposed off site.

Prior to acceptance at an off-site disposal facility, surface soils designated for disposal will be sampled and analyzed for TCLP metals and VOCs, as well as characterized through the analytical requirements of the specific disposal facilities.

2.3.3. Subsurface soils

Subsurface soils include the soils adjacent to the eight existing leaching pits, from the top of the leaching pits (approximately four feet below grade) to the ground water table (approximately 18 feet below grade). Subsurface soils also include the soils adjacent to the four previously excavated leaching pits, from 14 feet below grade to the ground water table (approximately 18 feet). The subsurface soils at each leaching pit location will be excavated to the areal limits presented above, and stockpiled separately. One sample will be obtained from each pile and analyzed for total and TCLP metals and VOCs by the construction contractor. Soils which exceed the toxicity characteristic levels or which exceed the total soil concentration levels of Appendix I of TAGM No. 3028 will be managed as hazardous waste for disposal. Soils which do not will be managed as non-hazardous industrial solid waste for disposal.

Prior to acceptance at an off-site disposal facility, subsurface soils will be characterized as hazardous or nonhazardous through the analytical requirements of the specific disposal facilities.

2.4. Verification sampling

Following excavations at each leaching pit location, verification samples at a frequency of one sample per 12 feet of circumference will be collected by the construction contractor from the wall of each of the twelve excavated leaching pits by the contractor. The samples will be submitted to a New York State Department of Health Environmental Laboratory Approval Program-, and Contract Laboratory Protocol-certified laboratory using chain-of-custody protocol, and analyzed for the indicator metal cadmium, utilizing EPA Method 6010. The laboratory will provide level 1 quality control. Validation of the analytical results will not be performed. Twenty-four hour turnaround time will be specified for analytical results to minimize the duration of open excavations. Sample locations will include the base of incoming and outgoing pipelines (if encountered), and visually impacted soil. The sample locations will be selected by the on-site engineer with the concurrence, as appropriate, of a NYSDEC representative.

If the analytical results of a sample indicate cadmium above 80 ppm, at a minimum, an additional one-foot of soil (from the outer edge of the excavation) will be excavated from the ground surface to the ground water table in the area which exceeds the limits (i.e., the area between two sample locations which show concentrations less than or equal to 80 ppm.). Samples will be collected from the re-excavated area at the same frequency described above. The surface and subsurface soils will be stockpiled separately as described above. This process will continue until the next verification samples of the soils remaining in place indicate that clean-up levels for the indicator parameter, cadmium, have been attained.

2.5. Physical constraints

Physical constraints on site include the New York Susquehanna and Western (NYS&W) Railway upgradient to the east of the leaching pits, and the former Singer Link facility building downgradient to the west of the leaching pits. The NYS&W Railway requires the construction contractor's obtainment of a "Permit to Enter Upon Property of the NYS&W Railway

Corporation". The construction contractor is required to perform work in accordance with the "Information Required for Work on NYS&W's Right-of-Way", and any other NYS&W Railway requirements. Disturbance of soil may require the construction contractor to provide sheeting. Construction plans, and the potential need for sheeting, are being reviewed by the railroad.

Excavation along the eastern side of the building will be performed in a manner to protect the integrity of the building. The construction contractor is required to provide sheeting and shoring, if necessary.

Soil with constituent concentrations above the clean-up levels will be excavated in the eastern direction only to the limits allowed by the railroad. In addition, soil with constituent concentrations above the clean-up levels will be excavated in the western direction only to the limits of the building. Downward migration of constituents that may be in the soil under the building would not occur since the building protects it from the driving elements (i.e., precipitation).

3. Technical specifications and contract drawings

Technical specifications in accordance with Construction Specification Institute (CSI) format have been prepared to provide the necessary information to perform the remedial action. Included below is a list of the technical specifications which are included in Appendix 3-1. Special provisions which provide additional information for the contractor, are also included in Appendix 3-1. The list of Technical Specifications and Special Provisions are provided below.

Technical Specifications

02003 Field Office Trailer
02006 Health and Safety
02009 Project Photographs
02110 Clearing and Grubbing
02141 Construction Water Management
02143 Spill and Discharge Control
02221 Earthwork
02223 Embankment
02229 Rock Removal
02231 Selected Fill
02232 Soil, Leaching Pit, Sludge, and Piping Removal and Disposal
02270 Erosion and Sediment Control
02503 Restoration of Surfaces
02981 Topsoil and Seeding

Special Provisions

SP-1 Definitions
SP-2 Lines, Grades and Elevations
SP-3 Pre-Construction Meeting
SP-4 Progress and Coordination Meetings
SP-5 Emergency Calls
SP-6 Staging Plan
SP-7 Dust Control Program
SP-8 Contractor's Construction Quality Control Plan
SP-9 NYSDEC Review

Special Provisions (Cont'd)

SP-10 Non-Disclosure
SP-11 Night, Weekend, and Holiday Work
SP-12 Contractor's Office
SP-13 Noise Control
SP-14 Existing Utilities
SP-15 Existing Monitoring Wells
SP-16 Borrow Materials
SP-17 New York, Susquehanna & Western Railway
SP-18 Site Access
SP-19 Traffic Control and Pre-Construction Survey
SP-20 Existing Adjacent Structures
SP-21 Special Construction Requirements
SP-22 Notices
SP-23 Permits
SP-24 Decommissioning/Decontamination
SP-25 Items to be Submitted with the Bid

The Contract Drawings are separately bound. They include a title sheet and an index to drawings, an existing site plan, leaching pit partial removal plans, and miscellaneous details. Upon approval of the Final Design by NYSDEC, the Contract Drawings will be signed and stamped by New York State professional engineer.

4. Health and safety plan

4.1. General

Prior to the commencement of remedial activities at the Site, the construction contractor will be required to prepare and implement a site-specific health and safety plan (HASP) for persons working at or living in the vicinity of the Site in accordance with the Federal Regulations found under 29 CFR 1910.120 for Hazardous Waste Operations and Emergency Response, 29 CFR 1926 "Safety and Health Regulations for Construction," and the citations adopted by reference.

The HASP will be developed by a certified health and safety professional. The site-specific HASP will, at a minimum, address the following elements:

- Program organization and responsibilities
- Health and safety risk or hazard analysis for each Site task and operation
- Employee training
- Required personal protective equipment (PPE) for each site task and operation
- Medical surveillance requirements
- Frequency and types of air monitoring (including community air monitoring), personnel monitoring, and environmental sampling techniques and instrumentation to be used
- Site control measures
- Decontamination measures

- Emergency response plan
- Confined space entry procedures (when applicable)
- Spill containment program (when applicable)
- Exclusion zone security and entry procedures
- Occupational Safety and Health Administration (OSHA) Requirements in 29 CFR 1920.120, and citations adopted in reference.
- Monitoring locations and frequency
- Action levels, and description of actions to be taken if action levels are exceeded
- Testing protocols

4.2. Program organization and responsibilities

The construction contractor will be required to identify the lines of authority, responsibility, and communication in the HASP. The contractor will also be required to provide an organization chart and resumes of the contractor's key personnel involved in all phases of the construction activities. In addition, the contractor will be required to identify and assign a Site Health and Safety Officer (SO) for the project. The SO will be required to be responsible to the Contractor and have the authority and knowledge necessary to implement the site-specific HASP and verify compliance with applicable safety and health requirements.

4.3. Health and safety risk analysis

To identify and evaluate specific site hazards for determining the appropriate safety and health control procedures, existing site data will be

available for the contractor's review prior to and during his development of the site-specific HASP.

The contractor, as a minimum, is required by the referenced regulations to obtain the following information to the extent available prior to allowing employees on-site:

- Location and size of the Site
- Description of the Site operations and tasks to be performed
- Approximate duration of each operation and task
- An evaluation including the chemical and physical properties of the known or suspected hazardous substances and health hazards
- An evaluation of known or potential safety hazards associated with each task
- Known or suspected pathways of hazardous substance dispersion pertinent to each operation and task
- Site topography and accessibility
- Status and capabilities of emergency response teams.

4.4. Employee training

Employees performing on-site activities and the supervisors and management responsible for the Site will be trained to the level required by their job function as specified by OSHA 29 CFR 1910.120(e) prior to the start of work at the Site. Each employee, manager and supervisor will also receive eight hours of refresher training annually. Written certification of the successful completion of the necessary training is required by the regulations.

Employees who have been designated as responsible for responding to on-site emergencies are also required to receive additional training meeting the requirements of 29 CFR 1910.120(q) in how to respond to such emergencies prior to the start of Site work.

4.5. Personnel protection

Engineering controls, work practices, the use of PPE, or a combination of these will be implemented by the contractor during Site operations to protect employees from exposure to hazardous substances, and safety and health hazards as required by 29 CFR 1910.120(g).

A written PPE program including, but not limited to, the following elements will be required to be incorporated into the contractor's site-specific HASP:

- PPE selection based on site hazards
- Duration of Site operations
- PPE use and limitations
- PPE maintenance and storage
- PPE decontamination and disposal
- PPE training and proper fit
- Procedures for donning and doffing PPE
- PPE inspection prior to, during, and after use
- Evaluation of the effectiveness of the PPE program
- Heat stress and cold injury prevention while using PPE.

4.6. Medical surveillance

The construction contractor will establish and implement a Medical Surveillance Program (MSP) for employees engaged in on-site operations, consistent with 29 CFR 1910.120(f). The MSP will include physical

examinations performed by or under the supervision of a licensed physician. The written opinion of the attending physician on the employee's ability to perform the required work will be obtained by the contractor and provided to the employee.

The construction contractor will retain an accurate record of the required medical surveillance information for the appropriate period as specified in 29 CFR 1910.20.

4.7. Monitoring

In the site-specific HASP, the construction contractor will establish a monitoring program in accordance with 29 CFR 1910.120(h) in order to select and maintain proper administrative and engineering controls, work practices and PPE. The monitoring program will include administrative and engineering controls to reduce potential harm from hazardous substances and activities for persons living in the vicinity of the Site. Air monitoring will be performed to identify and quantify airborne levels of hazardous substances.

The site-specific HASP will establish action levels for monitored parameters and describe the actions which will be implemented if an established action level is exceeded.

4.8. Site control

The construction contractor will establish a Site control program as part of the site-specific HASP to reduce the possibility of contact with contaminants present, before work begins, and modify this program as new information becomes available. The following information, as a minimum, will be included in the Site control program, unless covered elsewhere in the HASP:

- A Site map
- Site work zones

- Use of a "buddy system"
- Site communications including altering means for emergencies
- Standard operating procedures
- Identification of the nearest medical assistance.

4.9. Decontamination

The construction contractor will develop and implement decontamination procedures as required by 29 CFR 1910.120(k) which will minimize employee contact with hazardous substances or equipment that has contacted hazardous substances.

4.10. Emergency response plan

The construction contractor will develop and implement an emergency response plan as a section of the site-specific HASP, meeting the requirements of 29 CFR 1910.120(l). The emergency response plan will address, as a minimum, the following elements:

- Pre-planning of Site operations to prevent emergencies
- Personnel roles, lines of authority, and communication
- Emergency recognition and prevention
- Evacuation routes and procedures
- Safe distances and places of refuge
- Site security control measures

- Decontamination procedures which are not covered elsewhere in the HASP
- Emergency medical treatment and first aid
- Emergency alerting and response procedures
- Measures to review on Site response and follow-up
- Emergency and personal equipment kept at the Site for emergencies.

4.11. Confined space entry

The construction contractor will include confined space entry procedures in the site-specific HASP as required by 29 CFR 1910.120(b).

4.12. Spill containment program

The construction contractor will include a spill or other inadvertent release containment program in the site-specific HASP meeting the requirements of 29 CFR 1910.120(j), which will be implemented to contain and isolate a hazardous substance, in the event that a spill or other inadvertent release may occur during handling or transfer.

4.13. Exclusion zone security and entry

The construction contractor will delineate exclusion work zones (i.e. work within the limits of the areas to be capped) in which specific operations or tasks will occur and shall institute specific Site entry and decontamination procedures at designated control points in accordance with the provisions set forth in 29 CFR 1910.120. As a minimum, three work zones will be established to perform this work: an exclusion/contamination zone, a contamination reduction zone, and a support/clean zone. A map or diagram

showing the work zones and a description of the associated security control plan shall be included in the site-specific HASP.

5. Construction quality assurance plan

The purpose of the Construction Quality Assurance Plan (CQAP) is to cover elements necessary to document that the completed remedial activities meet the requirements of the remedial design.

Prior to the commencement of remedial activities at the Site, the construction contractor will be required to prepare and implement a CQAP. The CQAP will include, at a minimum, the following:

- Description of the CQA organization, including chart showing lines of authority and acknowledgment that the CQA staff shall be in addition to the job supervisory staff.

- Names, qualifications, duties, responsibilities and authorities of each person assigned a CQA function.

  The CQA staff will include CQA Manager who will be required to be on-site during the construction period. The CQA Manager must demonstrate experience with excavation and earthwork projects of similar magnitude. The CQA staff will also include CQA inspectors with experience in performing soils testing. The inspector will also have a working knowledge of proposed sampling equipment.

- A copy of a letter to the CQA Manager signed by an authorized official of the construction contractor's firm which describes the responsibilities and authorities of the CQA Manager.

- Description of proposed field observations, tests, equipment, and calibration procedures for field testing equipment including:

  - Sampling strategies;
  - Sampling protocols
  - Sample size;
  - Sampling locations;
  - Frequency of sampling; and
  - Laboratory procedures.

- Procedures for scheduling and managing submittals.
- Proposed analytical testing laboratory.
- Documentation and reporting procedures including proposed reporting formats.

The construction contractor's analytical laboratory will be an independent laboratory not owned by the contractor and/or subcontractors or owned by a subsidiary of the contractor and/or his subcontractors. The laboratory will be New York State-certified, and will have an internal quality control (QC) plan to confirm that laboratory procedures conform to applicable standards. The laboratory will follow the internal QC procedures. The laboratory's qualifications will be submitted at least 30 days prior to their use for NYSDEC approval.

6. Site operation, maintenance, and monitoring plan

The Site Operation, Maintenance, and Monitoring Plan is presented in Appendix 6-1. The Plan discusses routine post construction operation and maintenance of Site facilities, including physical Site security, and Site access. This Plan also includes the Ground Water, Surface Water, and Sediment Monitoring Plan to be implemented to evaluate the effectiveness of the remedial design, as specified in the ROD.

Ground water, surface water, and sediment monitoring will be used to assess the effectiveness of the source control remedy by evaluating reductions in ground water and surface water/sediment (from the Chenango River) concentrations over time. The Plan identifies the monitoring wells and surface water/sediment locations to be sampled, the frequency, and the analytical parameters. The Plan also recognizes that over the short term there may be an initial degradation of ground water quality as a result of contaminants being mobilized during the (intrusive) remedial excavation. The long term trend in ground water quality; however, should be toward attainment of the SCGs.

7. Citizen participation support plan

This Citizen Participation Support Plan (CPSP) was prepared to conform to the requirements of New York State Superfund Regulations §375-1.5-Public Participation and be consistent with the Department's Citizen Participation in New York Hazardous Waste Site Remediation Program: A Guidebook.

7.1. General

This CPSP describes the activities that will be performed by the NYSDEC and the activities to be performed by representatives of CAE Electronics to provide support to the NYSDEC. Implementation of public participation activities for the Site will be coordinated by NYSDEC. Community relations activities will be initiated upon NYSDEC's development of a final Citizen Participation Program (CPP).

7.2. Activities in support of CPP

Representatives of CAE Electronics will support NYSDEC during the CPP as described below:

- Attendance and technical support at public meetings.

  Representatives of CAE Electronics will be available to attend public meetings to be organized by NYSDEC. At the direction of NYSDEC, technical presentations will be made regarding the nature of the activities at the Site. As necessary, visual aids such as charts, slides, or handouts fashioned from available maps or figures will be provided to support these technical presentations.

- Preparation of fact sheets or updates.

At the direction of the NYSDEC, representatives of CAE Electronics will assist in the preparation and updates of text and graphics to be incorporated into periodic fact sheets to be issued by NYSDEC.

- Preparation of a responsiveness summary.

  If requested by NYSDEC, representatives of CAE Electronics will prepare a draft of the comments received from citizens during the public meeting and public comment period, and responses given by NYSDEC to those comments. Preparation and distribution of the final Responsiveness Summary will be performed by the NYSDEC.

- Assistance in NYSDEC public notices.

  If requested by NYSDEC, representatives of CAE Electronics will assist in placing public notices in the appropriate publications.

8. Contingency plan

A Contingency Plan is included in Appendix 8-1. The Contingency Plan describes the procedures for providing the necessary notifications in the event of an unforeseen, changed, or emergency condition. The Plan identifies potential health and safety hazards and summarizes general actions to be taken to remedy an emergency, design failure, or unexpected event.

9. Remedial action project schedule

The soil remediation schedule is included as Figure 9-1. The schedule illustrates the anticipated time schedule for implementation of the components of the remedial design. The schedule assumes thirty days for review and approval of the Final Design by NYSDEC, and 60 days for review by the railroad. The schedule is subject to change based upon delays associated with reviews and approvals, and adverse weather conditions. If necessary or requested, the schedule will be updated and submitted to NYSDEC as required.

As shown on the schedule, a Post Remedial O&M Plan, as-built drawings, a final engineering report, and certification will be submitted to NYSDEC in accordance with the Order on Consent.

Soil clean-up objectives

Table 2-1
CAE Electronics, Inc.
Binghamton, New York

Soil Clean-up Objectives

Parameter	TAGM/HEAST Standards (1)
Antimony	30
Barium	4,000
Beryllium	0.16
Cadmium	80
Chromium	80,000
Hexavalent Chromium	400
Cyanide	2,000
Lead	250
Manganese	20,000
Mercury	20
Nickel	2,000
Silver	200
Zinc	20,000
Total VOCs	10

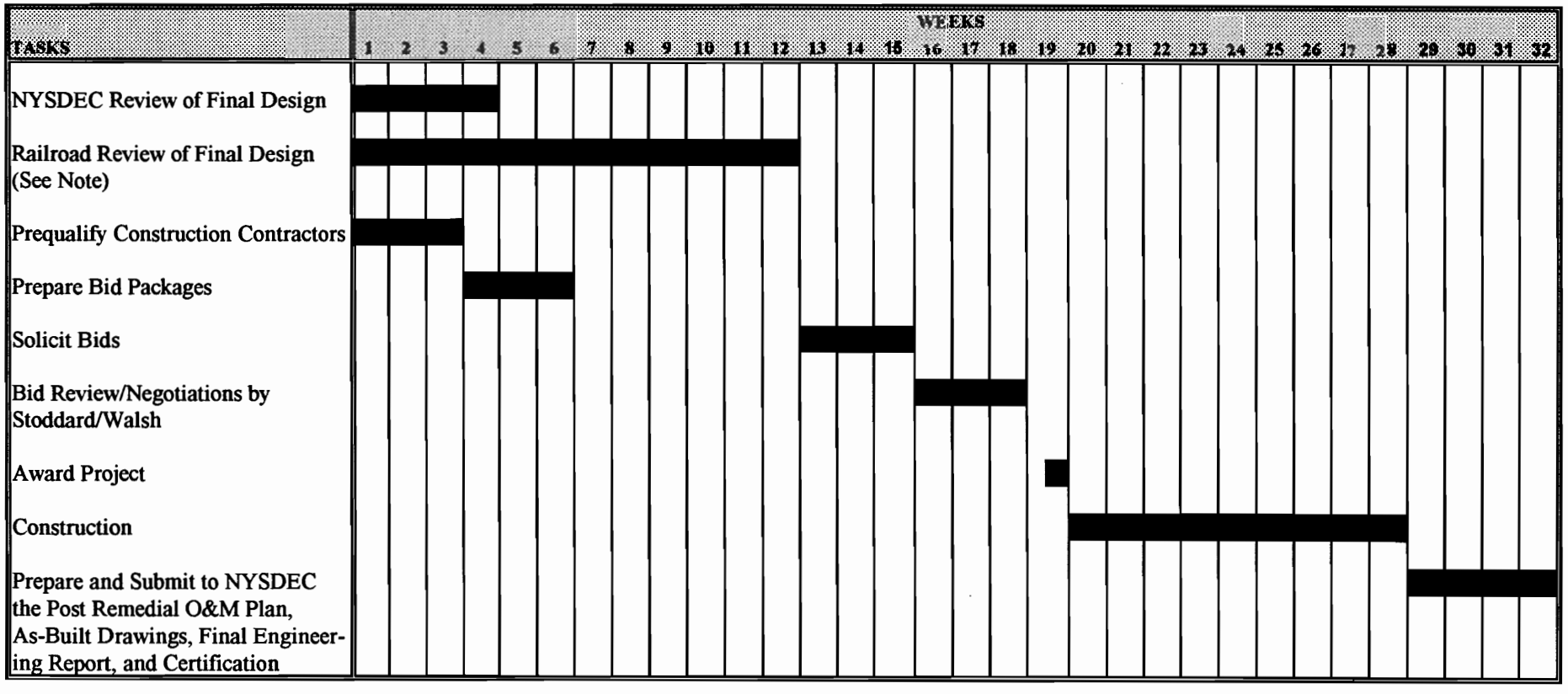
(1) Standard levels in mg/kg.
(2) HEAST Standards are the cleanup objective for metals.
TAGM level for total VOCs is cleanup level for VOCs.

Figure 9-1

Remedial action project schedule

FIGURE 9-1

FORMER CAE ELECTRONICS FACILITY
BINGHAMTON, NEW YORK
SOIL REMEDIATION PROJECT SCHEDULE



sc:71\6250001\5\sched.wb2
10/23/97

Note: Railroad may require three to six months for review of Final Design. The schedule will be revised, as required.

Appendix 3-1

Technical specifications

Technical Specifications

Soil Remediation Project Former CAE Electronics-Hillcrest Facility Binghamton, New York

Contract No. 1

CAE Electronics
Binghamton, New York

1998

O'BRIEN & GERE
ENGINEERS, INC.

6250.001

TECHNICAL SPECIFICATIONS

SOIL REMEDIATION PROJECT
FORMER CAE ELECTRONICS - HILLCREST FACILITY
BINGHAMTON, NEW YORK

CONTRACT NO. 1

CAE ELECTRONICS
BINGHAMTON, NEW YORK

JAMES R. HECKATHORNE
VICE PRESIDENT

1998

O'BRIEN & GERE ENGINEERS, INC.
5000 BRITTONFIELD PARKWAY
PO BOX 4873
SYRACUSE, NEW YORK 13221

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DIVISION 2 - SITE WORK (Continued)

SPECIAL PROVISIONS

SP-1 DEFINITIONS

A. Construction Water shall be defined as follows:

1. Water or other liquids which have come into contact with potentially contaminated surface soils, subsurface soils, fill, sludge, or debris.

2. Ground water entering excavations.

3. Liquids generated during decontamination activities.

4. Surface water resulting from precipitation or run-on during construction which has come into contact with potentially contaminated sources.

5. Water or other liquids generated during handling, staging, and dewatering activities.

6. Water or other liquids from the Leaching Pits.

B. Debris shall be defined as any non-native materials located on the site including, but not limited to, household waste, industrial waste, construction demolition debris, concrete, asphalt, wood, tires, piping, imported soil, previously excavated and stockpiled materials, foundations, wires, and cables.

C. Engineer shall mean the Consulting Engineer or Engineers engaged by the Owner for the project and shall include any properly authorized assistants acting for the Consulting Engineer within the scope of the particular duties assigned to them.

D. Leaching Pits shall be defined as the 004 outfall consisting of pits "A", "B", "C", "D", "E", "H", "I", "J", "K", "L", "M", and "N" requiring material removal.

E. New York State Department of Environmental Conservation (NYSDEC) shall mean the agency providing regulatory oversight for this project.

F. Owner shall be defined as CAE Electronics, Inc., or any duly authorized agents.

G. Project shall mean activities associated with implementation of the final remedial design.

H. Railroad shall mean the New York State Susquehanna and Western Railway Corporation.

I. Site shall be defined as the property formerly owned by CAE Electronics, Inc., at 11 Beckwith Avenue in the Town of Fenton, Broome County, New York, encompassing approximately 17 acres plus the portion of the New York, Susquehanna & Western Railway Corporation property containing leaching pits and soil to be excavated as part of the implementation of the remedial design.

J. Spoil shall be defined as surplus excavated materials not required nor suitable for backfills or embankments.

K. Subsurface soil shall be defined as any materials located at the Site from the top of the existing leaching pits ("E", "H", "I", "J", "K", "L", "M", and "N"), extending laterally outward, to the ground water table; and from the bottom of the former leaching pits ("A", "B", "C", and "D"), extending laterally outward, to the ground water table, as shown on the Contract Drawings, specified, or directed.

L. Surface soil shall be defined as any native materials located at the Site from existing grade to the top of the existing leaching pits ("E", "H", "I", "J", "K", "L", "M", and "N"), extending laterally outward, and from existing grade to the bottom of the former leaching pits ("A", "B", "C", and "D"), extending laterally outward, as shown on the Contract Drawings, specified, or directed.

M. Waste materials shall be defined as non-hazardous rubbish and refuse generated from field offices and/or Contractor's offices located on site. These materials shall be disposed of in accordance with applicable federal, state, and local regulations as accepted by the Engineer.

SP-2 LINES, GRADES AND ELEVATIONS

A. The Contractor shall be responsible for all survey and control needed for construction and shall utilize services of a licensed surveyor. The locations of selected benchmarks are provided on the Contract Drawings. The Contractor shall verify bench marks and make all detail surveys needed for construction and preparation of "as-built" drawings.

B. The Contractor shall set and maintain all necessary intermediate points, lines, grades and elevations, and provide slope stakes, offset stakes, batter boards, stakes for pipe locations, and other such items at his own expense. Where the Contractor uses laser for control, he shall periodically check the grade and alignment during each days operation. The Contractor shall furnish copies of grade letters and cut sheets prepared by the Contractor to the Engineer in advance of construction.

C. The accuracy of the Contractor's survey and other required data is the sole responsibility of the Contractor, and the furnishing of data to the Engineer does not constitute a transferral of responsibility for checking.

D. Prior to excavation activities, the Contractor shall establish a maximum ten (10) foot grid over the site, and a maximum two (2) foot grid within and beyond the areal limits of the proposed excavations, and shall take elevations at each grid point. The Contractor shall maintain the grid until the completion of all material removal activities. The Contractor shall take elevations at each grid location within the areal limits of the excavations, at the top and bottom of each existing leaching pit ("E", "H", "I", "J", "K", "L", "M", and "N"), and at the completion of material removal activities within each leaching pit to measure the volume of surface soils and subsurface soils removed to substantiate that material removal is proceeding in accordance with the specifications and Contract Drawings. The Contractor shall take elevations at the completion of material removal activities within the former leaching pits ("A", "B", "C", and "D") to measure the volume of surface soils and subsurface soils removed to

substantiate that material removal is proceeding in accordance with the specifications and Contract Drawings. Payment for excavation and backfilling activities will be based on the in-place volume of excavated surface and subsurface soils. The elevation data shall be transmitted to the Engineer in hard copy and diskette (Auto CAD Release 11 or 12 on 3½-inch diskette) and be reviewed by the Engineer prior to backfilling the excavations. The Contractor may utilize additional, alternative methods to verify excavated volumes of material subsequent to the completed "prior review" by the Engineer. The Contractor shall perform as-built surveys of the limits of excavations.

SP-3 PRE-CONSTRUCTION MEETING

A. Prior to commencing any work, the Contractor's authorized representative(s) shall attend a Pre-Construction Meeting at a place and time designated by the Owner to discuss the implementation of the Project, of the terms and conditions of this Contract, lines of communication, and other issues. Representatives of the Owner, NYSDEC, New York Susquehanna and Western Railroad, and the Engineer may also attend the meeting. The Engineer will prepare the minutes of the meeting.

SP-4 PROGRESS AND COORDINATION MEETINGS

A. Progress and coordination meetings shall be held every week, or as otherwise directed by the Engineer, with the Contractor's supervisory representatives, with decision-making authority, in attendance.

B. Meeting minutes will be prepared by the Engineer and distributed to all attendees and others affected by decisions or actions from each meeting. As appropriate, a revised construction schedule shall be attached to the minutes.

SP-5 EMERGENCY CALLS

A. Prior to commencement of work, the Contractor shall provide the Owner with the phone numbers of at least three (3) responsible persons, to be used during non-working hours and weekends, who shall be in a position to dispatch personnel and equipment to the project in the event of an emergency.

SP-6 STAGING PLAN

A. Six weeks prior to commencement of work, the Contractor shall develop and submit methods and sequencing of all intended operations hereinafter referred to as the Staging Plan. The Staging Plan shall include, but not be limited to, methods, plans, and drawings necessary for staging trailers and equipment, stockpiling materials, designating work zones, and requirements for other construction activities. Construction activities shall not be initiated until the methods and sequencing of all operations are reviewed by the Engineer and approved by the Vice President of Engineering of the Railroad, or his designee.

SP-7 DUST CONTROL PROGRAM

A. The control of fugitive dust created as a result of this project shall be the obligation of the Contractor. Notwithstanding the requirements of the Contract Documents, the Contractor shall also comply with the requirements of OSHA 29 CFR 1910.1000 and NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4031 titled "Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites." A Dust Control Program shall be prepared and implemented by the Contractor which shall include, but not be limited to, the following:

1. Preparation of a Dust Control Plan including mitigation measures, control of operations, emergency measures to be used, monitoring requirements, and action levels.

2. Required particulate monitoring.

3. Implementation of mitigation efforts including reasonable suppression techniques.

4. Implementation of a response action when particulate action levels are breached.

5. Quality assurance/quality control (QA/QC) to assure accuracy of monitoring program.

B. The Plan shall be submitted to the Engineer at least three weeks prior to commencement of work, and is subject to review and approval by NYSDEC prior to acceptance by the Owner.

C. The results of monitoring for dust shall be provided to the Engineer on a daily basis.

SP-8 CONTRACTOR'S CONSTRUCTION QUALITY CONTROL PLAN

A. The Contractor shall prepare and implement a Construction Quality Control (CQC) Plan for the work of this Contract. The plan shall meet the requirements of 6 NYCRR Part 360 through 376 and shall include, as a minimum, the following:

1. Description of the CQC organization, including chart showing lines of authority and acknowledgment that the CQC staff shall be in addition to the job supervisory staff.

2. Names, qualifications, duties, responsibilities and authorities of each person assigned a CQC function.

B. The CQC staff shall include a CQC Manager who shall be required to be on-site during the construction period. The CQC Manager shall have demonstrated experience with earthwork projects, concrete, and drainage structures. The CQC Manager shall have a minimum of five years experience in materials and construction testing including a minimum of two years of soils testing experience.

C. The CQC staff shall also include CQC inspectors with a minimum of two years of experience in performing soils testing. The CQC Plan shall include, at a minimum, the following:

1. A copy of a letter to the CQC Manager signed by an authorized official of the Contractor's firm which describes the responsibilities and authorities of the CQC Manager.

2. Description of proposed field observations, tests, equipment, and calibration procedures for field testing equipment including:

   a. Sampling strategies
   b. Sampling protocols
   c. Sample size
   d. Sampling locations
   e. Frequency of sampling
   f. Laboratory procedures

3. Procedures for scheduling and managing submittals, including those of subcontractors, suppliers, and purchasing agents.

4. Proposed analytical testing laboratory:

5. Documentation and reporting procedures including proposed reporting formats.

D. The Contractor's CQC Analytical Laboratory shall be a New York State Department of Health Environmental Laboratory Program-, and Contract Laboratory Protocol-certified independent laboratory not owned by the Contractor and/or subcontractors or owned by a subsidiary of the Contractor and/or subcontractors. The Contractor's proposed CQC Analytical Laboratory is subject to the approval of the New York State Department of Environmental Conservation (NYSDEC). The CQC Analytical Laboratory shall have an internal QC plan to confirm that laboratory procedures conform to applicable standards. The laboratory shall follow the internal QC procedures. The laboratory shall allow the Owner, NYSDEC, and Engineer to observe sample preparation, testing procedures, record-keeping procedures, and some or all tests at any time, either announced or unannounced.

E. The CQC Analytical Laboratory shall submit references from three other similar projects. The Contractor's proposed CQC Analytical Laboratory shall submit qualifications for review by the Engineer and NYSDEC. The CQC Analytical Laboratory Manager shall have a minimum of five years of analytical testing experience. All analytical laboratory test results shall be certified by the Laboratory Manager.

F. The Contractor's CQC Plan shall be subject to acceptance by the Engineer prior to commencement of construction activities. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Engineer shall reserve the right to require the Contractor to make changes to his CQC Plan and operations as necessary to obtain the quality specified.

G. Following acceptance of the CQC Plan, the Contractor shall notify the Engineer in writing of any proposed changes. Proposed changes are subject to acceptance by the Engineer.

SP-9 NYSDEC REVIEW

A. The Contractor's Dust Control Program, Health and Safety Plan (HASP), Storm Water Pollution Prevention Plan (SWPPP) or Erosion and Sediment Control Plan (ESCP) (as required), Sampling and Waste Characterization Plan (SAWC), Construction Quality Control (CQC) Plan, Construction Water Management (CWM) Plan, Spill and Discharge Control Plan, Notice of Intent (NOI), and Notice of Termination (NOT) (hereafter referred to as "documents") shall be subject to the review and approval of NYSDEC prior to acceptance by the Engineer. The Contractor is advised that he should allow three weeks for NYSDEC review and comment on each draft of these documents submitted for NYSDEC review. No additional payment or extension of time shall be provided by the Owner to the Contractor for the preparation and implementation of or in the NYSDEC's acceptance of these documents.

B. Ten copies of each of these documents shall be provided to the Engineer six weeks prior to initiating construction activities.

C. No work shall be started until these documents have been approved by the NYSDEC and reviewed by the Vice President of Engineering of the New York Susquehanna and Western Railway. If conditions change during construction, the Contractor may be required to submit revised documents for NYSDEC and/or Railroad acceptance, as directed by the Engineer.

SP-10 NON-DISCLOSURE

A. The Contractor shall agree that any and all information, written or otherwise, obtained as a result of this Contract shall not be disclosed to any persons or parties, without the prior written consent of the Owner. This paragraph shall survive and remain in force after expiration of the Contract.

SP-11 NIGHT, WEEKEND, AND HOLIDAY WORK

A. Unless otherwise especially permitted, no work shall be done between the hours of 8:00 p.m. and 7:00 a.m., nor on Saturdays, Sundays, December 25 (or designated holiday for Christmas Day), January 1 (or designated holiday for New Year's Day), Thanksgiving Day and the day after; July 4 (or designated holiday for July 4); and the Monday designated holidays for Memorial Day and Labor Day, except as necessary for the proper care and protection of work already performed or in response to some emergency or other condition beyond the control of the Contractor. If it shall become absolutely necessary to perform work at night, the Engineer, NYSDEC and Railroad shall be informed of a reasonable time in advance of the beginning of performance of such work. Only such work shall be done at night as can be done satisfactorily and in a safe manner. Good lighting and all other necessary facilities for carrying out and inspecting the work shall be provided and maintained at all points where such work is being done. Minimum permissible illumination intensities are identified in 29 CFR

1910.120. All Contractor requests to perform night, Saturday, Sunday or Holiday work shall be made in writing to the Engineer.

SP-12 CONTRACTOR'S OFFICE

A. The Contractor shall erect, furnish and maintain a field office, with at least three telephones, at the Site during the entire period of construction. One telephone and adequate desk space are to be provided each to the Engineer and NYSDEC's project manager. The Contractor or an authorized agent shall be present at said office at all times or at a definite time while work is in progress. An external telephone ringer will be provided by the Contractor. Readily accessible copies of the Contract Documents, the latest approved working drawings, Contractor annotated record drawings, Contractor's Dust Control Program, HASP, SWPPP or ESCP (as required), SAWC Plan, CQC Plan, CWM Plan, Spill and Discharge Control Plan, Staging Plan, and other documents necessary or instrumental in completing the project shall be kept at said field office. This office shall be suitably heated and shall be equipped with proper sanitary facilities.

SP-13 NOISE CONTROL

A. It shall be the responsibility of the Contractor to take adequate measures for keeping noise levels, as produced by construction equipment, to safe and tolerable limits as set forth by OSHA and as set forth by other applicable federal, state and local regulations. All Contractor machinery and equipment presenting a potential noise nuisance, as determined by the Engineer, shall be provided with noise muffling devices or replaced at no additional cost to the Owner.

SP-14 EXISTING UTILITIES

A. Special precautions shall be observed to not cause interference or damage to any existing utilities, as specified in Section 4 of the General Provisions and elsewhere in the specifications.

B. The Contractor shall notify the proper utility companies (including but not limited to the New York, Susquehanna & Western Railway Corporation) at least seventy-two (72) hours before construction is started adjacent to such utilities. Proof of such notification shall be filed with the Engineer. Failure to provide such proof shall be cause for an automatic cessation of the work. Contractor shall determine the location of all utility lines, including fiber optic cables, in the vicinity of the Leaching Pits which potentially could be impacted by the work. Utilities shall be protected in the manner prescribed by the utility company. No additional compensation other than stated in the Payment Items herein will be made for coordination or requirements of others relative to existing utilities.

SP-15 EXISTING MONITORING WELLS

A. The approximate locations of existing monitoring wells at or near the site are shown on the Contract Drawings. Monitoring wells shall be protected from damage. Any monitoring wells which are damaged by the Contractor shall be repaired or replaced, at no additional cost, as directed by and to the satisfaction of the Engineer who will

oversee rehabilitation or replacement. The Owners' cost associated with bringing the Engineer on site for oversight of rehabilitation or replacement work will be deducted from payments due to the Contractor.

SP-16 BORROW MATERIALS

A. Contractor shall submit an affidavit from the owner of the source of each type of borrow material stating that to the best of his knowledge, the site of the source material was never used as a dump site for chemical, toxic, hazardous or radioactive materials, substances or wastes, or petroleum products, and it is not now nor ever has been listed as a suspected or confirmed depository for chemical, toxic, hazardous, or radioactive materials, substances or wastes, or petroleum products, by any federal, state, or other governmental agency, department, or bureau.

B. Each different type of off-site material incorporated into the work shall be sampled by the Contractor at a location or locations identified by the Engineer. Each grab or composite sample shall be analyzed for all characteristics of a hazardous waste found under Subpart C of 40 CFR 261.20 including percent solids, pH, flashpoint, reactive cyanide, and sulfide, as well as for each and every constituent identified on Table 1 contained therein which identifies Maximum Concentration of Contaminants for the Toxicity Characteristic. Laboratory detection limits for each analyte shall be less than the regulatory levels identified. Laboratory data shall be submitted to the Owner and Engineer immediately upon receipt and prior to use of the material on-site. The Engineer shall be the sole judge as to what constitutes each different type of material; however, the definition of "different" shall include, but not necessarily be limited to, variances in the physical properties of the same material, as well as the same material derived from separate borrow sources or separate areas in the same borrow pit. If the materials are found to be unacceptable by the Engineer, the Contractor shall remove and dispose of the materials at the Contractor's expense.

SP-17 NEW YORK, SUSQUEHANNA & WESTERN RAILWAY

The Contractor shall obtain any and all permits and approvals from the Railroad required to perform work on its property, including but not limited to the "Information Required for Work on NYS&W's Right-of-Way" and "Permit to Enter Upon Property of the New York Susquehanna and Western Railway Corporation." Before initiating work, the Contractor shall obtain, initial, sign, and return the most recent "Information Required Railroad's Right-of-Way," and shall meet all requirements identified therein. The Contractor shall pay all Railroad permit fees and provide the Railroad with the Certificates of Insurance naming Railroad as an additional insured as required by the "Permit to Enter Upon Property of the New York, Susquehanna and Western Railway Corporation.

SP-18 SITE ACCESS

A. The Owner has negotiated with B.W. Elliott Manufacturing Co. Inc. access at all reasonable times to the Site and structures, buildings and facilities on the Site for the implementation of the remedial design.

B. The Contractor shall be responsible for adhering to the requirements of access agreements and site safety requirements obtained by the Owner for purposes of this Contract, including the requirement to coordinate the implementation of the remedial design with B.W. Elliott Manufacturing Co. so as to minimize any impact on the ongoing operations of B.W. Elliott Manufacturing Co.

C. No additional payment shall be made to the Contractor for delays associated with access agreements, including access to Railroad property.

D. The designated representatives of B.W. Elliott Manufacturing Co. and Railroad shall be permitted to be present during, and to observe, all aspects of the implementation of the remedial design; provided that they comply with the requirements of all applicable health and safety plans.

E. Contractor shall furnish B.W. Elliott Manufacturing Co. evidence that, with respect to all work and operations at the Site implementing the remedial design, including those of its subcontractors, Contractor carries and maintains regular Contractor's Public Liability Insurance providing for public liability insurance covering personal injury and property damage with not less than $3,000,000 aggregate/$2,000,000 each occurrence limits of coverage, and that B.W. Elliott Manufacturing Co. is named as an additional insured on such insurance during the term of such work and operations.

SP-19 TRAFFIC CONTROL AND PRE-CONSTRUCTION SURVEY

A. Prior to the start of any on-site construction activities, the Contractor and the Engineer shall make a joint condition survey of roads to be utilized by the Contractor. The condition survey shall be performed using a video camera in VHS format. During the video survey, the Engineer and Contractor will verbally document any pre-existing damage and the location of the damage.

B. The Contractor shall provide for traffic control, as necessary for the Contractor to perform the Contractor's work, according to local, state, and federal requirements. The cost of such traffic control is to be borne solely by the Contractor.

SP-20 EXISTING ADJACENT STRUCTURES

A. All types of structures, surfaces, sidewalks, fences, gutters, culverts, railroad ties, and other features disturbed, damaged, or destroyed on the site or on existing adjacent properties during the performance of the Work, shall be restored, repaired, or replaced to a condition as good or better than that which was disturbed, at no additional cost, in accordance with the Section titled "Restoration of Surfaces" or as directed by and to the satisfaction of the Engineer who will oversee rehabilitation or replacement.

SP-21 SPECIAL CONSTRUCTION REQUIREMENTS

A. The Contractor shall visit the Site, including the adjacent Railroad property, before bidding the work to become familiar with the conditions affecting the work. Any special construction requirements in excess of those identified in the Contract Documents shall be the responsibility of the Contractor and no additional payment will be made to the Contractor because of lack of knowledge of such conditions. It must

be understood that the party or parties inspecting the site must assume all risks and liabilities.

SP-22 NOTICES

A. Whenever, under the terms of this Contract, written notice is required to be given by the Contractor to the Owner, it shall be directed to:

Mr. Michael Stoddard, REM
1427 River Road
Binghamton, NY 13901
Telephone: 607-648-4850
Pager: 800-698-0208

SP-23 PERMITS

A. No permits have been or will be obtained for the Project by the Owner. All required permits and disposal authorizations are the sole responsibility of the Contractor with simultaneous notice being provided to:

Judy A. Mastriano, P.E.
O'Brien & Gere Engineers, Inc.
5000 Brittonfield Parkway
P.O. Box 4873
Syracuse, New York 13221
Telephone: (315)437-6100

and

Thomas F. Walsh, Esq.
Jaeckle Fleischmann & Mugel, LLP
39 State Street
Rochester, New York 14614-1310

Telephone: (716)262-3640

SP-24 DECOMMISSIONING/DECONTAMINATION

A. The Contractor shall decommission/decontaminate the equipment and areas used during this Contract and restore all areas to conditions equal to or better than those that existed prior to the Work. The Contractor shall submit decommissioning/decontamination procedures at least six weeks prior to commencement of work.

B. The Contractor shall restore all areas outside of the limits of the excavations where potentially contaminated materials were handled to pre-remediation conditions. The Owner may require sampling to verify clean-up to pre-remediation conditions in accordance with the Section titled "Surface Soil, Subsurface Soil, Fill or Debris Relocation." All sampling, analysis, and restoration to pre-remediation conditions shall be at the Contractor's expense.

SP-25 ITEMS TO BE SUBMITTED WITH THE BID

A. The following items shall be included with the bid package as a requirement to receive consideration for review:

1. Specific objections or exceptions to any provisions of the Contract Documents. If exception is taken, resulting cost impact and the proposed

alternative must be indicated. No consideration will be given to exceptions to the Contract Documents after bid submittal.

2. Proposed work schedule providing the order and date on which the major construction features and sequence of operations will be started and completed, including allowances for preparation and prior review by others of required submittals (including, but not necessarily limited to, the: Railroad requirements, Dust Control Program, HASP, SWPPP or ESCP (as required), SAWC Plan, CQC Plan, CWM Plan, Spill and Discharge Control Plan, NOI, NOT, Staging Plan, and Decommissioning/Decontamination Procedures). The duration of the schedule shall match the number of calendar days identified in the Bid for completion of the work.

3. The area required for set-up and work during performance of each task.

4. A detailed description of the proposed approach to the work including, but not limited to, the following:

   a. Methods, plans and necessary drawings for site preparation (including mobilization, utility hook-ups and demobilization), construction water management and erosion control, excavation, removal, and off-site disposal of excavated materials, verification sampling, backfilling and grading excavations, site restoration, and other proposed construction activities.

   b. Proposed plans for collecting, minimizing the volume of, holding, desilting, and treating construction water including tankage and process sizes and safeguards which will be employed. Contractor will be responsible for providing tankage and process systems as required.

   c. How site security shall be maintained during the course of the work and after each work day.

   d. Regardless of the means and methods or approaches proposed by the Contractor in these regards, the Contractor will be solely responsible for completion of the Work in accordance with the requirements of the Contract Documents. Information provided in accordance with the proposed approach will not be used as a basis for extra payment due to changes in approach.

5. A list of proposed subcontractors for the various work activities including the dollar amount of the work to be incorporated into the project by each. Included with the list of proposed subcontractors, the Bidder shall provide subcontractor qualifications packages, including but not limited to descriptions of similar types of projects performed, references, latest financial statement, and description of the subcontractor project management and key individuals to be assigned to the project.

6. Proposed alternatives that may be a cost savings to the Owner (including the estimated savings) which still meet the intent of the design.

7. Evidence of experience and competence for projects of similar size and scope including, but not limited to, projects requiring shoring and sheeting, protection of adjacent structures, soil, sludge, and concrete removal and disposal, backfilling and grading, and site restoration.

8. A description of Contractor's project management and key individuals to be assigned to the project, including those individuals who will be on site and responsible for daily implementation of the Contract.

9. A breakdown of the lump sum costs.

10. A breakdown of the costs included in the Payment Item for the Health and Safety Plan for work in each of the following personal protective equipment levels:
    - Level A
    - Level B
    - Level C
    - Level D
    - Other levels proposed by the Contractor.

B. The Owner will take into consideration all of the above items, in addition to pricing, in the evaluation of the Contractor's Bid prior to award.

* * * * *

SECTION 02003

FIELD OFFICE TRAILER

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes one separate field office trailer for the exclusive use of the Engineer, Engineer's assistants, Owner's representatives, NYSDEC, and the Railroad.

1.2 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. The proposed layout of the trailer.

2. The proposed method of furnishing the utilities.

PART 2 PRODUCTS

2.1 GENERAL

A. The field office trailer shall be not less than 8 feet by 28 feet.

1. Built-In Items

a. Full width double desk on each end with two-drawer file cabinets, pencil drawers and overhead shelves.

b. Drafting table, minimum 36 inch by 72 inch with double storage below.

c. Forced air heat.

d. One air conditioning unit - not less than 8,000 BTU.

e. Toilet facilities including water closet, vanity, medicine cabinet and water heater.

f. Storage closet.

g. Ample parking.

2. Movable Items

a. Flat top movable desk, minimum 44 inch by 30 inch, with filing and storage drawers.

b. One desk chair.

c. Four office chairs.

d. Two large waste baskets.

e. One drafting stool.

f. One four-drawer, fire-proof, legal size, filing cabinet with lock.

g. Six folding or stacking chairs.

h. One eight place plan rack.

i. One telephone facsimile copying machine with paper supply as requested by the Engineer.

j. One Xerox type copying machine capable of copying legal size (8½ x 14 inch) paper, and a supply of 8½ x 11 inch and legal size paper as requested by the Engineer.

k. One telephone answering and message recording machine for the sole use of the Engineer.

l. One folding utility table 30 inches high with minimum top dimensions of 36 inches by 72 inches.

m. One telephone for NYSDEC's use.

B. Telephone Service

1. Install an individual direct line telephone for the exclusive use of the Engineer's telephone and a separate direct telephone line (different phone numbers) for the exclusive use of the Engineer's facsimile copying machine. Install another individual direct telephone line for NYSDEC telephone.

2. Include the cost of all local and long distance telephone charges necessary to the work applied to the telephones provided in the field office trailer.

PART 3 EXECUTION

3.1 INSTALLATION

A. The trailer shall be placed at a location on the Site approved by Engineer and convenient to the work.

1. The field office trailer shall be ready for occupancy a minimum of 10 days prior to starting work in the field.

2. The office shall be furnished and maintained until the completion of the Work and final acceptance of the Contract.

3. Relocate once, if directed, during the period of the Contract.

4. Upon the completion and acceptance of the Contract, the Contractor shall remove the field office trailer and restore the area in accordance with the Section titled "Restoration of Surfaces."

3.2 MAINTENANCE

A. The maintenance of the trailer shall include but not be limited to:

1. Adequate heating and cooling including a continual supply of fuel

2. Electric power and lights.

3. Water supply and sewer service.

4. Telephone service.

5. Snow removal in winter.

6. Janitorial services not less than weekly.

7. Immediate replacement or repair of any items which break or are otherwise rendered inoperable for their intended function.

B. Should sanitary and potable water services not be available on or near the site, portable facilities shall be provided.

1. At a minimum, commercial bottled water supply with hot and cold taps and portable sanitary facilities shall be provided.

2. When sanitary and potable water becomes available services shall be provided.

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SECTION 02006

HEALTH AND SAFETY

PART 1 GENERAL

1.1 SUMMARY

A. Contractor shall be solely responsible for the protection of the personnel working on the Site and persons living in the vicinity of the Site from exposure to on-site contaminants generated or released as a result of the Contractor's work on site.

B. Contractor shall prepare, submit to the Owner (at least six weeks prior to commencement of work) and implement a site-specific health and safety plan (HASP) to protect the personnel working on the Site and the persons living in the vicinity of the Site from exposure to on site contaminants generated or released as a result of the Contractor's work on Site.

1.2 REFERENCES

A. The HASP shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. National Institute for Occupational Safety and Health (NIOSH), United States Department of Health and Human Services

a. 85-115 - Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities

2. Code of Federal Regulations (CFR)

a. 29 CFR 1910 and 1926 - OSHA Safety and Health Standards, and citations adopted by reference

b. 49 CFR Parts 171-178 - Department of Transportation (DOT) Hazardous Materials Regulations

3. Unites States Environmental Protection Agency (USEPA)

a. 9285.1-03 - Standard Operating Safety Guides

4. American Conference of Governmental Industrial Hygienists (ACGIH)

a. ACGIH Threshold Limit Values and Biological Exposure Indices

5. New York State Department of Environmental Conservation (NYSDEC)

   a. Technical Administrative Guidance Memorandum (TAGM) Hazardous Waste Regulations (HWR) TAGM HWR 89-4031

1.3 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. Site Specific Health and Safety Plan including but not limited to:

   a. Contractor Organizational Chart

   b. Results of Health and Safety Risk Analysis performed by the Contractor

   c. Employee Training and Experience

   d. Summary of Medical Surveillance Program

   e. List of Standard Operating Procedures incorporated into the HASP

   f. A method to monitor entry and exit from the work site

   g. Personnel and Equipment Decontamination Procedures

   h. A Spill Containment Program

   i. Emergency Response Plan and Emergency Reporting Procedures

   j. Fire Emergency Protection Plan

   k. Confined Space Entry Procedures

   l. Monitoring Locations and Frequency

   m. Action Levels (and actions to be taken if action levels are exceeded)

   n. Testing Protocols

2. Certificates of completion of Health and Safety Training as required by 29 CFR 1910.120(e).

3. Resumes of the Contractor's Project Manager, Field Supervisor, and of the health and safety staff expected to work at this Site.

4. An employee and community contaminant monitoring program in accordance with 29 CFR 1910.120(h) and NYSDEC TAGM HWR 89-4031.

5. Evidence of coordination for emergency response with local police, fire, medical, and hazardous materials responders.

PART 2 PRODUCTS

2.1 GENERAL

A. The responsibility of development, implementation, and enforcement of the HASP lies with the Contractor and his health and safety personnel.

B. Prior to commencement of on-site activities, the Contractor shall prepare a site-specific HASP, reviewed and approved by a Certified Industrial Hygienist (CIH), which shall be implemented during performance of the work. All pertinent aspects of applicable regulations shall be addressed. The protective measures in the HASP shall be consistent with applicable protocols and provisions of the OSHA regulations and other applicable regulations. The HASP developed by the Contractor shall include, but not be limited to, programs for accident prevention, personnel protection and emergency response/contingency planning and shall be furnished as a separate document. A corporate safety and health manual may be furnished along with the HASP but this shall not satisfy the site-specific HASP requirement.

C. The Contractor's HASP shall be subject to review to the satisfaction of the NYSDEC and Railroad prior to acceptance by the Owner. The Contractor is advised that he should allow six weeks for NYSDEC and Railroad review and comment on each draft of the HASP. No additional payment or extension of time shall be provided by the Owner to the Contractor for delays caused by NYSDEC, Railroad or the Contractor in the preparation of or in NYSDEC's or Railroad's review of the HASP. Ten copies of the final CIH-approved Health and Safety Plan as reviewed by NYSDEC and Railroad shall be provided to the Owner at least three weeks prior to initiating on-site activities.

D. At least one copy of the HASP shall be present at the Site at all times.

PART 3 EXECUTION

3.1 ORGANIZATIONAL RESPONSIBILITIES

A. Key Personnel and Organizational Chart. The lines of authority, responsibility and communication shall be presented in the HASP. The Contractor must provide an organization chart and resumes of the Contractor's key personnel involved in all phases of construction activities at the site. This chart must include Senior-Level Management, Project Manager, Health and Safety Officer, Field Supervisor, and Foreman Personnel. Resumes are required for the Project Manager, Field Supervisor, Health and Safety Officer, and Health and Safety Staff.

B. Site Health and Safety Officer (HSO). The Contractor must identify and assign a Site Health and Safety Officer (HSO) for the project. That individual must be responsible to the Contractor and have the authority and knowledge necessary to implement the site Health and Safety Plan (HASP) and verify compliance with applicable safety and health requirements.

1. The HSO shall have the following responsibilities and authority to perform the following functions:

   a. Be present during Site operations.

   b. Have the authority to enforce the HASP and stop operations if personnel safety and health may be jeopardized.

   c. Evaluate health monitoring data and make necessary field decisions regarding safety and health.

   d. Initiate evacuation of the Site if necessary.

2. The HSO shall meet the following minimum qualifications:

   a. HSO shall possess a sound working knowledge of State and Federal occupational safety and health regulations and shall have formal educational training in occupational safety and health. Documentation shall be provided that the HSO has completed the 40 hr OSHA Training Course, the 8 hr OSHA Supervisor's Training Course and met the field experience requirements.

   b. Have documented experience that the HSO has worked on two (2) projects similar in nature to this one.

3.2 RISK ANALYSIS

A. Health and Safety Evaluation. The Contractor shall perform and provide in the HASP the results of a health and safety risk analysis for each location and operation to be performed.

B. The risk analysis shall be based upon the best information available regarding the contaminants and conditions present at the Site, including Railroad property, as well as the practices and tools to be applied in the operation and shall include but not be limited to the following:

1. Overview of the following information:

   a. Location, site topography, accessibility and size of the Site.

   b. Description of the Site operation and tasks to be performed. The specific tasks for the former CAE Electronics - Hillcrest Facility Site include, but are not limited to:

      - Site preparation.

      - Construction water management and erosion control.

- Excavation and removal of sludge, soils, and concrete.
- Backfilling and grading.
- Site restoration.
- Shoring and sheeting of the Railroad's ballast and trade, and B.W. Elliott Manufacturing Co. Inc.'s buildings and structures may also be required.

c. Approximate duration of the operation and of each task.

d. Chemical and physical properties of the known or suspected hazardous substances and health hazards.

e. Known or suspected pathways of hazardous substance dispersion pertinent to the operation and tasks performed.

2. An evaluation of the known or suspected contaminants and conditions that may pose inhalation, skin absorption/contact or ingestion hazards.

3. An evaluation of known or potential safety and health hazards associated with each task on the Site.

4. An evaluation of engineering and work practice controls to be applied to minimize potential harm to employees on Site from hazardous substances and activities during completion of the task.

a. Engineering and Work Practice Controls. The Contractor must consider the need to apply engineering and/or work practice controls as a means of protecting personnel in the performance of site-specific tasks.

1) When practicable, engineering controls shall be implemented to reduce and maintain employee exposures to or below acceptable levels for those tasks with known or suspected hazards.

2) Work practice controls shall be applied when engineering controls are deemed impractical and shall be incorporated as site-specific standard operating procedures (SOP) for personal precautions and routine operations.

5. An evaluation of the status and capabilities of emergency response teams.

3.3 MEANS TO CONTROL COMMUNITY EXPOSURE

A. Engineering and Work Practice Controls. The Contractor shall specify and implement engineering and work practice controls to minimize exposure of people living in the vicinity of the Site to contaminants generated or released as a result of Work on the Site.

B. The Contractor shall establish and implement an air monitoring program acceptable to NYSDEC to identify areas of elevated airborne contaminant concentrations and to determine the level of the concentrations relative to background. The Contractor shall provide the personnel, instruments, and materials necessary to perform such air monitoring and identify the individual responsible for administering the program.

C. The level of particulate leaving the Site shall be maintained below 150 $\mu g/m^3$, as specified in NYSDEC TAGM HWR 89-4031- Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites.

D. Monitoring

1. The Contractor shall implement an environmental (community) monitoring program in accordance with NYSDEC TAGM HWR 89-4031.

3.4 TRAINING

A. Training Requirements for On-Site Personnel

1. The Contractor will ensure that all employees engaged in on-site activities which expose or potentially expose them to hazardous substances and/or health hazards have satisfied the general and site specific training requirements of 29 CFR 1910.120 prior to the start of the employee's activities at the Site.

2. Employees who have not received the required training prior to the start of the employee's site operations are not to engage in Site operations which expose or potentially expose them to hazardous substances and/or health hazards until such training has been completed.

3. The Contractor shall provide written certification of completed training and acquired experience for all employees requiring training and/or experience. Such certification shall be supplied prior to the start of each employee's Site operations.

B. Personnel Protective Equipment and Levels of Protection

1. The Contractor shall provide and use, under each item of work requiring such protection, personnel protective equipment (PPE) under the provisions of 29 CFR 1910.132 and 29 CFR 1910.120.

2. The Contractor shall include in the HASP a list of components for each protective ensemble, the levels of protection (LOP) selected for each task, the rationale for each task-specific selection, any contaminant action levels to be followed in LOP decision making.

3.5 MEDICAL SURVEILLANCE

A. Medical Surveillance Program. The Contractor shall show evidence of a medical surveillance program (MSP) for employees engaged in on-site operations, consistent with 29 CFR 1910.120(f).

1. The MSP shall include physical examinations supervised or administered by a board certified physician familiar with occupational medicine. The Contractor shall include the name and business address of the certified physician in the HASP.

2. The Contractor shall address the need for personal exposure monitoring and post exposure medical screening in the HASP and include a summary of applicable monitoring and screening.

B. Personnel Certification

1. The Contractor shall provide written approval by a certified physician of the medical fitness for work of all employees designated to engage in on-site operations, prior to the employee's start of those operations.

C. Employee Heat and Cold Stress Prevention

1. As dictated by seasonal conditions, the Contractor shall implement an employee heat or cold stress prevention program during Site operations and shall incorporate the program into the site HASP.

3.6 SITE STANDARD OPERATING PROCEDURES

A. The Contractor shall be responsible for developing and implementing necessary standard operating procedures (SOP) for Site operations.

3.7 SITE CONTROL

A. Routine Requirements

1. For ongoing operations, the Contractor and/or his designee will be required to meet with the Owner or Engineer, when present, prior to the start of the day's activities to prepare all the necessary paperwork and outline the day's activities. The Contractor shall also meet at the completion of the day's activities to discuss the work performed.

B. Work Zones

1. The Contractor shall be responsible for conducting operations at the Site in such a controlled fashion as to minimize the possibility of employee and community contact with contaminants present on the Site and to prevent the removal of contaminants generated on the Site by personnel or equipment leaving the Site.

2. The Contractor shall delineate work zones in which specific operations or tasks will occur and shall institute specific Site entry, and decontamination procedures at Contractor designated control points in accordance with provisions set forth in 29 CFR 1910.120 and HWR 89-4031. At a minimum, three (3) work zones will be established to perform this work - an exclusion/contamination zone, a contamination reduction zone, and a support/clean zone. A map or diagram showing the work zones and a description of the site control plan shall be included in the HASP.

C. Routine and Emergency Communications

1. The Contractor shall incorporate plans for routine and emergency communications appropriate for the Site and project in the HASP.

D. Daily Visitor Log

1. The Contractor, in accordance with his security plan shall keep a daily visitor log, copies to be provided to the Owner/Engineer upon request. A time clock shall be used to record the arrival and departure times. This log shall include:

   a. Person visiting the site
   b. Affiliation
   c. Date
   d. Arrival time
   e. Departure time
   f. Purpose of visit

E. Personnel

1. The Contractor shall provide the Owner and Engineer a list of all Contractor and subcontractor personnel who are authorized to enter the Site prior to the start of operations, updating the list as necessary. No unauthorized persons shall be permitted to enter the Site. Prior to start of operations, all authorized Contractor and subcontractor personnel shall report their presence on-site to B.W. Elliott Manufacturing Co., Inc.'s facility manager.

F. Other

1. The Contractor shall be responsible for conducting operations in accordance with federal, state and local regulations and requirements for storage of the Contractor's hazardous materials and wastes (i.e. gasoline, lube oils, etc.) on-site, including locating staging areas, labeling/signage, etc.

2. The Contractor shall use a "buddy system" as required.

3.8 DECONTAMINATION

A. The Contractor shall develop and implement personnel and equipment decontamination procedures appropriate for site specific locations and activities and include those procedures in the HASP. The procedures shall include, but not necessarily be limited to, the necessary equipment and personnel and the steps to achieve contractor's specified level of decontamination, provisions for any personnel protection, and a discussion or diagram outlining the steps or stations in the procedures. The procedures must include containment and removal of any decontamination solutions and spent disposable protective apparel.

B. Decontamination shall be conducted in accordance with 29 CFR 1910.120 (k) and shall minimize employee contact with hazardous substances or with equipment that has contacted hazardous substances as well as minimize off-site transport of environmental media, debris and waste containing contaminants.

C. The Contractor shall provide provisions to facilitate personal hygiene at breaks and following daily operations.

D. Upon completion of construction activities, the Contractor shall obtain two samples of the surface soil beneath the decontamination pad. The samples shall be submitted to the laboratory and analyzed for cadmium using USEPA Method 6010, and VOCs using USEPA Method 8010/8020. The cost of the sample shipment and laboratory testing shall be paid for by the Contractor. The analytical data and chain-of-custody forms shall be submitted to the Engineer upon receipt of data. If the concentrations exceed the cleanup levels identified in Section 02232 3.2.f, the Contractor shall excavate and properly dispose the impacted soil in accordance with Section 02232, and undertake verification sampling and analyses.

3.9 SPILL CONTAINMENT

A. The Contractor shall incorporate a spill containment program prepared in accordance with 29 CFR 1910.120 in the HASP.

3.10 CONTINGENCY PLANNING

A. Emergency Response Plan. Prior to the start of site operations, the Contractor shall develop and implement an emergency response plan (ERP) to handle potential on-site emergencies. The ERP shall be incorporated into the site HASP as a separate section of that document and shall be periodically reviewed and, as necessary, amended to keep it current with new or changing site conditions or information.

1. The Contractor shall attend public meetings or briefings, as necessary, to discuss and present the HASP and ERP. In addition, the Contractor shall address the following requirements:

a. Prior to the start of Site operations, the Contractor shall attend any and all meetings necessary with local officials and/or those responsible for local emergency management and public safety (to include fire, police, hazardous material response teams, hospitals, and local health officials) for the purpose of coordinating the site-specific ERP with any emergency response efforts that would be performed by such agencies.

b. The Contractor shall contact the local medical facility selected for inclusion into the HASP and the ERP to ensure that said facility is willing and is capable of providing that medical support necessary to satisfy those anticipated hazards and emergencies detailed in the HASP and the ERP. Written verification of such contact, including the name of the individual contacted, shall be furnished to the Owner and Engineer prior to the start of Site operations.

B. Special Training

1. The Contractor shall ensure that at least one person holding up-to-date certifications (American Red Cross or equivalent) in basic first aid (8 hr minimum) and CPR is present at the Site during all Site operations.

C. Accident and Exposure Reports

1. The Contractor shall notify the Owner and Engineer of all on-site accidents at the time of occurrence and follow up in writing within 24 hours. This notification shall include, but not be limited to, the date, time and identity of individual(s) involved in the accident, witnesses to the accident, the nature of the accident, the actions taken to treat the victim(s), and the steps taken to prevent recurrence.

2. The Contractor shall notify the Owner and Engineer of all person(s) exposed at levels exceeding OSHA standards at the time of occurrence or determination and follow up in writing within 24 hours. This notification shall include, but not be limited to, the date, time, and identity of individual(s) involved in the exposure, witnesses to the exposure, the nature of the exposure episode, what the individual(s) were exposed to, the personal protective equipment worn during the exposure, and the steps taken to prevent recurrence.

3. The Contractor shall notify the Owner and Engineer of all environmental air measurements exceeding NYSDEC standards. This notification shall include, but not be limited to, the date, time, and identity of individual(s) involved in the exposure, witnesses to the exposure, the nature of the exposure episode, what the individual(s) were exposed to, the personal protective equipment worn during the exposure, and the steps taken to mitigate episode and prevent recurrence.

3.11 FIRE PREVENTION AND PROTECTION

A. The Contractor shall develop procedures for handling and responding to small and large fires. This Fire Protection Plan (FPP) shall be included in the HASP as a separate document. The FPP shall include procedures for requesting emergency assistance and notifying the Owner and Engineer of the incident. The Contractor shall insure that fire traffic lanes are available (not blocked) and all fire exits are properly marked.

3.12 CONFINED SPACE OPERATIONS

A. Standard Operating Procedures

1. Because Site operations may include activities within confined spaces, the Contractor shall develop and implement SOPs in accordance with 29 CFR 1910.146 and shall incorporate them in the HASP as a separate section of that document.

3.13 DRUM AND CONTAINER HANDLING OPERATIONS

A. Standard Operating Procedures

1. Should site operations include activities requiring the handling of drums and containers, (both encountered on-site and brought on-site), the Contractor shall develop and implement SOP's in accordance with 29 CFR 1910.120(j) and incorporate them in the HASP.

3.14 OPERATIONS WITHIN AND ADJACENT TO POWER LINES

A. Standard Operating Procedures

1. Should site operations include activities requiring the operation of cranes or derricks within or adjacent to power lines, the Contractor shall develop and implement SOP's in accordance with 29 CFR 1926.550(a) - Cranes and Derricks and incorporate them in the HASP.

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SECTION 02009

PROJECT PHOTOGRAPHS

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes furnishing the services of a professional photographer to provide color photographs of the progress of the project as well as pre- and post-construction videotaping of the project.

B. Significant events and milestones shall be photographically documented for the duration of the Contract at the time and locations as directed by the Engineer.

PART 2 PRODUCTS

2.1 GENERAL

A. The photographs shall be printed as 4" x 6" and two (2) sets of each taking shall be furnished the Engineer within two (2) weeks.

1. All photographs and negatives shall be consecutively numbered.

2. Each print shall have the photograph number, date taken, project name and number, and photographer's name clearly marked on the back, as well as a description of the photograph.

PART 3 EXECUTION

3.1 GENERAL

A. Twenty-four (24) photographs shall be taken each month for the duration of the Contract at the time and locations as directed by the Engineer.

1. Only one day's notice shall be required for any photographs to be taken.

B. A minimum of 36 photographs shall be taken of pre-construction and final construction. The final photographs shall be taken from the same locations as the pre--construction photographs. Additionally, each pre- and post-construction route shall be walked and panned with a camcorder. Narrative shall be provided identifying locations, salient features, compass, bearing, etc.

C. Upon the completion of the project, the Contractor shall submit a complete file of the negatives for the project photographs to the Engineer.

D. Upon the completion of the videotaping, three standard VHS copies shall be furnished to the Engineer.

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SECTION 02110

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes clearing and grubbing by removal or destruction of landscaping, trees, underbrush, logs, stumps, decayed or growing organic matter above the surface of the ground, and snow and ice which interfere with construction and removal of poles, posts, fences, walks and pavement designated to be removed by the Contractor, as shown on the Contract Drawings, within or adjacent to the lines of work.

PART 2 PRODUCTS

2.1 GENERAL

A. Contractor shall protect trees, bushes, poles, posts and fences not designated for removal which are located adjacent to work areas with suitable stakes.

PART 3 EXECUTION

3.1 GENERAL

A. Only those portions of the site necessary and essential to be cleared for work shall be cleared.

B. Tree protection

1. The work of this project may necessitate the removal of some trees. Any tree which will not, in the opinion of the Engineer, hinder construction or landscaping shall be protected.

2. Special care shall be exercised to minimize injury to trees that will not be removed. Careful digging will be performed to minimize root damage. Roots may be cut and removed up to 25 percent of the estimated root area. If more than 25 percent is required to be cut, the Engineer shall decide whether the tree shall be removed. Straggling roots shall be pruned. When it becomes absolutely necessary to remove a tree, it shall be completely taken out, including the stump.

3. Any tree which is trimmed during construction shall be cut cleanly outside of the branch collar.

C. Removal of brush, trees, stumps and spoil

1. Contractor may chip brush, tree trunks and tree limbs.

2. Contractor may likewise chip tree stumps and roots, except where the tree was located in a potentially contaminated area, in which case all soil and stump/root material must be properly disposed off site in accordance with the Section titled "Surface Soil, Subsurface Soil, Fill or Debris Relocation" and in a manner accepted by the Engineer.

3. All brush, trees, stumps, and spoil material shall be removed from the area and properly disposed of either on site, or off site at a NYSDEC-certified sanitary landfill by the Contractor, in a manner accepted by the Engineer. Material that is from a non-contaminated area may be disposed on-site if approved by the Engineer.

D. Utility Poles

1. Existing utility poles within the limits of the excavations shall be removed only as directed by the Engineer. The removed poles shall be either: returned to the appropriate utility following decontamination; kept by the Contractor following decontamination; or chipped and properly disposed off-site.

2. Existing electrical hardware (excluding transformers) shall be disposed of in accordance with the Section titled "Surface Soil, Subsurface Soil, Fill or Debris Relocation." All transformers shall be returned to the appropriate utility or otherwise properly disposed of with all documentation being presented to the Engineer showing that proper and lawful transformer disposal was performed.

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SECTION 02141

CONSTRUCTION WATER MANAGEMENT

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the development of an acceptable Construction Water Management Plan detailing the handling, storing, monitoring, treating (if necessary), and disposing all construction water and associated sludge generated during construction, in accordance with all applicable Local, State, and Federal regulations.

B. The Contractor is to obtain (if necessary) and operate within all required Local, State, and Federal Permits, Approvals, and requirements.

C. Provide all labor, materials, and equipment required for handling, testing, storage, treatment, and disposal of construction water in accordance with the Construction Water Management Plan.

D. Perform all specified and necessary sampling and analyses to ensure compliance with required permits, and applicable Local, State, and Federal laws and regulations, or as directed by the Engineer.

1.2 REFERENCES

A. Materials and installation, and sampling and analyses, shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. New York Code of Rules and Regulations (NYCRR)

a. 6 NYCRR Part 703 - Surface Water and Groundwater Quality Standards and Groundwater Effluent Standards

b. 6 NYCRR Part 750-757 - State Pollutant Discharge Elimination System

c. 6 NYCRR Part 364 - Waste Transporter Permits

d. 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes

e. 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities.

f. 6 NYCRR Part 373 - Hazardous Waste Treatment, Storage and Disposal Facility Requirements

1.3 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. Construction Water Management Plan

2. Shop drawings and test results used in design of the method of handling construction water.

PART 2 PRODUCTS

2.1 GENERAL

A. Construction Water Management Plan

1. The Contractor shall submit his plan for handling construction water at least six weeks prior to commencement of work. The plan shall include, but not be limited to, the Contractor's proposed methods for handling, sampling and analyses (if required), minimizing the volume of construction water and associated sludges, storage (if necessary), treatment (if necessary), monitoring, and disposal of construction water generated during construction.

2. Acceptable methods of handling construction water include, but are not limited to collection, transport, off-site treatment, and disposal in accordance with all applicable Local, State and Federal regulations.

3. Acceptable methods of handling sludge generated by the Contractor's management of construction water include, but are not limited to collection, transport, off-site treatment and disposal in accordance with all applicable Local, State and Federal regulations.

PART 3 EXECUTION

3.1 GENERAL

A. It shall be the responsibility of the Contractor to investigate and comply with all applicable Federal, State, and Local laws and regulations governing the handling, storage and disposal of construction water and associated sludge. All construction water and associated sludge shall be disposed of in a manner which meets applicable permit requirements and approvals, laws, and regulations.

B. The Contractor shall obtain all required permits and manifests required for the handling, storage, transport, treatment and disposal of construction water and associated sludge.

C. All testing required for release or discharge in accordance with all applicable Local, Federal, and State regulations shall be the responsibility of the Contractor.

D. Any sampling and analyses necessary to protect the health and welfare of the Contractor's employees and/or agents, or to characterize collected water or treated water and associated sludge, shall remain the sole responsibility of the Contractor.

E. Contractor shall characterize construction water and any settled solids as necessary for disposal.

F. No Contractor-proposed facility for off-site disposal shall be utilized without prior written approval by the Owner. For all wastes disposed of off-site, Contractor is responsible for characterizing such material and arranging for proper temporary storage, transportation and disposal in accordance with all applicable Federal, State and Local regulations at no additional cost to the Owner.

G. Contractor shall dispose of waters designated for off-site disposal within 30 days of collection.

H. Contractor shall mark, label, placard, package, and manifest solids and wastes in accordance with applicable codes, regulations, and statutes.

I. The Contractor shall make every effort to minimize the generation of construction water and associated sludges. Appropriate methods to minimize generation of construction and contaminated water include, but are not limited to, erection of temporary berms, use of low permeability tarpaulin or suitable means to cover exposed areas of soil containing VOCs and metals limiting the amount of exposed work areas, grading to control run-on and run-off, engineering controls on construction activities to minimize contact of personnel and equipment with work areas thus minimizing the amount of decontamination required, and other appropriate methods.

J. Construction water and associated sludges shall be handled using equipment compatible with anticipated contaminants which may be present.

K. The Contractor shall be solely responsible for on-site construction water treatment system (if used) set up, debugging, operation, testing, shut-down, decontamination, dismantling and removal subsequent to completion of the Work, including removal of all materials incidental to treatment system operations.

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SECTION 02143

SPILL AND DISCHARGE CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes all work required to describe and implement the minimum procedures the Contractor shall follow in the event of spills, discharge, leaks or other inadvertent releases of hazardous materials, debris, waste or soils containing the VOCs and metals of concern during Site work.

1.2 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. Spill and Discharge Control Plan

2. Spill Incident Reports

PART 2 PRODUCTS

2.1 GENERAL

A. Spill and Discharge Control Plan

1. The Contractor shall develop, implement, maintain, supervise, and be responsible for a Spill and Discharge Control Plan. This plan shall be submitted to the Engineer at least six weeks prior to commencement of work, and shall provide contingency measures for potential spills of construction-related materials including, but not limited to, fuels, hydraulic fluids, lubricants, stockpiled soils, debris or waste containing the VOCs and metals of concern, and discharges of water generated by decontamination.

2. Procedures outlined in the Spill and Discharge Control Plan shall follow applicable Local, State, and Federal laws and regulations. The plan shall, at a minimum, contain the following:

a. Procedures for Containing Dry and Liquid Spills.

b. Absorbent Material available on-site.

c. Storage of Spilled Materials.

d. Decontamination Procedures. Decontamination procedures may be required after cleanup to eliminate traces of the substance spilled or reduce it to an acceptable level. "Acceptable level" shall mean in

accordance with all applicable Local, State, and Federal laws and regulations and shall be approved by NYSDEC in consultation, where applicable, with Railroad. Complete cleanup will require removal of any soils, debris or waste impacted by the spill, leak release or discharge. All contaminated materials that cannot be decontaminated must be properly containerized, labeled, and properly disposed of within 30 days. Any and all testing and disposal costs related to the cleanup of a spill, leak or release related to an act or omission of Contractor or otherwise arising out of Contractor's activities shall be borne by the Contractor.

e. Spill Incident Report. A written report detailing the spill, leak, release or discharge shall include, at a minimum, the cause and resolution of the incident, outside agencies involved, and date the incident occurred. The report shall be submitted to Engineer, NYSDEC and Railroad (if affecting Railroad property), and if required by applicable law to USEPA, within 24 hours of the incident. The Contractor shall document the location of all spills on the site Drawings and submit the Drawings to the Engineer at project completion.

B. Spill and Discharge Control

1. The Contractor shall promptly provide methods, means, equipment, facilities, and personnel required to prevent the further contamination of soil, water, air, equipment, or materials by the wastes from spills related to Contractor's act or omission or otherwise arising out of Contractor's activity operations.

2. The Contractor shall promptly provide methods, means, equipment, facilities and personnel to perform emergency measures required to contain and remove spilled materials and soils, debris, waste or liquids that become contaminated due to the spill, release, discharge or leak. All collected material, soils, debris, waste and liquids shall be properly disposed of at the Contractor's expense.

C. Decontamination

1. The Contractor shall provide equipment and personnel to perform decontamination measures that may be required to remove any contaminants related to the spill, leak release or discharge from previously uncontaminated structures, equipment, or material. Decontamination residues shall be properly disposed of at the Contractor's expense.

PART 3 EXECUTION

3.1 GENERAL

A. Contractor shall be responsible for all liability resulting from a spill, leak, release or discharge related to an act or omission of Contractor, or arising out of Contractor's responsibilities, the Work, or Contractor's activities.

B. In the case of such a spill, leak, release, or discharge, the Contractor shall follow procedures outlined in the Spill and Discharge Control Plan.

3.2 NOTIFICATION

A. The Contractor shall immediately notify the Engineer, NYSDEC and Owner in the case of such a spill, leak, release or discharge.

B. The Contractor shall report such a spill, leak, release or discharge to other regulatory agencies, only as necessary to comply with Local, State, and Federal regulations.

* * * * *

SECTION 02221

EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes excavation and backfilling including the loosening, removing, refilling, transporting, storage and disposal of all materials classified as "earth", including but not limited to surface soil and subsurface soil, necessary to be removed for the construction and completion of all work under the Contract, and as shown on the Contract Drawings, specified or directed.

1.2 REFERENCES

A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards, and specifications, except where more stringent requirements have been specified herein:

1. American Society for Testing and Materials (ASTM)

a.	A328	Specification for Steel Sheet Piling
b.	D698	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3)
c.	D1556	Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
d.	D1760	Specification for Pressure Treatment of Timber Products
e.	D2922	Test Methods for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)

1.3 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. If the use of sheeting, shoring, bracing and/or a lateral support system is proposed, the Contractor shall engage a Professional Engineer, registered in the State of New York, to design, prepare all drawings for, and stamp all drawings for the sheeting, shoring, bracing and/or lateral support system. The design and all assumptions, computations, and calculations associated with the design shall be signed and sealed by the Professional Engineer engaged by the Contractor and if not on Railroad property, submitted to the Engineer for review no less than two weeks prior to installation. If on Railroad property, Contractor shall submit all drawings and computations to the Engineer and three copies to Railroad five weeks prior to

installation. The system installed shall be in conformity with the design. Field oversight during installation shall be provided by, and written certification that the system was installed in accordance with the design and that field oversight was provided during installation shall be provided by, the Professional Engineer engaged by the Contractor to render the design. In addition, if the installation is to occur on Railroad property, a Railroad field representative must be present during installation. The lateral support system shall be adequate to withstand all pressures to which the excavations will be subjected. Any vertical or lateral movement or bulging which may occur shall be corrected by the Contractor at his own expense, under the direction of the Professional Engineer engaged by the Contractor, so as to provide the necessary clearances, dimensions, and safe condition.

1.4 DEFINITIONS

A. Excavation (or Trenching) means:

1. Grubbing, stripping, removing, storing and rehandling of all materials of every name and nature necessary to be removed for all purposes incidental to the construction and completion of all the work under construction.

2. All sheeting, sheetpiling, bracing and shoring, and the placing, driving, cutting off and removing of the same.

3. All diking, ditching, fluming, cofferdamming, pumping, bailing, draining, well pointing, or otherwise disposing of water.

4. The removing and disposing of all surplus materials from the excavations in the manner specified.

5. The maintenance, accommodation and protection of travel and the temporary paving of highways, roads and driveways.

6. The supporting and protecting of all highways, roads, driveways, tracks, rails, buildings, curbs, sidewalks, pavements, overhead wires, poles, trees, vines, utilities, fiber optic cables, shrubbery, pipes, sewers, conduits, railroad tracks and ballast, or other structures or property in the vicinity of the work, whether over- or underground or which appear within or adjacent to the excavations, and the restoration of the same in case of settlement or other injury.

7. All temporary bridging and fencing and the removing of same.

B. Earth means:

1. All materials such as surface soil, subsurface soil, sand, gravel, clay, loam, ashes, cinders, pavements, muck, roots or pieces of timber, soft or disintegrated rock, not requiring blasting, barring, or wedging from their original beds, and specifically excluding all ledge or bedrock and individual boulders or masonry larger than one-half cubic yard in volume.

C. Backfill means:

1. The refilling of excavation and trenches to the line of filling indicated on the Contract Drawings or as directed using materials suitable for refilling of excavations and trenches; and the compacting of all materials used in filling or refilling by rolling, ramming, watering, puddling, etc., as may be required.

D. Spoil means:

1. Surplus excavated materials not required or not suitable for backfills or embankments.

E. Embankments means:

1. Fills constructed above the original surface of the ground or such other elevation as specified or directed.

F. Limiting Subgrade means:

1. The underside of the pipe barrel for pipelines
2. The underside of footing lines for structures

G. Excavation Below Subgrade means:

1. Excavation below the limiting subgrades of structures or pipelines.

2. Where materials encountered at the limiting subgrades are not suitable for proper support of structures or pipelines, the Contractor shall excavate to such new lines and grades as required.

PART 2 PRODUCTS

2.1 MATERIALS AND CONSTRUCTION

A. Wood Sheeting and Bracing

1. Shall be sound and straight; free from cracks, shakes and large or loose knots; and shall have dressed edges where directed.

2. Shall conform to National Design Specifications for Stress Grade Lumber having a minimum fiber stress of 1200 pounds per square inch.

3. Sheeting and bracing to be left-in-place shall be pressure treated in accordance with ASTM D1760 for the type of lumber used and with a preservative approved by the Engineer.

B. Steel Sheeting and Bracing

1. Shall be sound.

2. Shall conform to ASTM A328 with a minimum thickness of 3/8 inch.

3. If required to support railroad tracks, shall at a minimum conform to the requirements set forth in Railroad's "Information Required for Work on NYS&W's Right-of-Way."

PART 3 EXECUTION

3.1 UNAUTHORIZED EXCAVATION

A. Whenever excavations are carried beyond or below the lines and grades shown on the Contract Drawings, or as given or directed by the Engineer, all such excavated space shall be refilled with special granular materials, concrete or other materials as the Engineer may direct. All refilling of unauthorized excavations shall be at the Contractor's expense.

B. All material which slides, falls or caves into the established limits of excavations due to any cause whatsoever, shall be removed and disposed of at the Contractor's expense and no extra compensation will be paid the Contractor for any materials ordered for refilling the void areas left by the slide, fall or cave-in.

3.2 REMOVAL OF WATER

A. General

1. The Contractor shall at all times provide and maintain proper and satisfactory means and devices for the removal of all water entering the excavations, and shall remove all such water as fast as it may collect, in such manner as shall not interfere with the prosecution of the work or the proper placing of pipes, structures, or other work.

2. Water shall not be allowed to flow into excavations until at least 24 hours after backfilling and no stream of water shall be allowed to flow over such work until such time as the Engineer may permit.

3. Where the presence of fine grained subsurface materials and a high groundwater table may cause the upward flow of water into the excavation with a resulting quick or unstable condition, the Contractor shall install and operate a dewatering system to prevent the upward flow of water during construction. Dewatering systems shall be designed and installed to prevent inclusion of and filter fine grained soils during operation.

4. Water pumped or drained from excavations, or any sewers, drains or water courses encountered in the work shall be disposed of in a suitable manner without injury to adjacent property, the work under construction, or to pavements, roads, drives, and water courses and in accordance with the Section titled "Construction Water Management". No water shall be discharged to sanitary sewers. Sanitary sewage shall be pumped to sanitary sewers or shall be disposed of off-site in accordance with all applicable Local, State, and Federal requirements. It shall be the responsibility of the Contractor to perform any sampling or analyses required to

characterize free liquids or solids in conformance with all applicable Local, State, and Federal waste disposal requirements, prior to disposal.

6. Any damage caused by or resulting from dewatering operations shall be the sole responsibility of the Contractor.

B. Work Included

1. The construction and removal of cofferdams, sheeting and bracing, and dewatering associated with removal of water associated with components of the work and the furnishing of materials and labor necessary therefor.

2. The excavation and maintenance of ditches and sluiceways.

3. The furnishing and operation of pumps, well points, and appliances needed to maintain thorough drainage of the work in a satisfactory manner.

C. Well Point Systems (if used)

1. Installation

a. The well point system shall be designed and installed by or under the supervision of an organization whose principal business is well pointing and which has at least five consecutive years of similar experience and can furnish a representative list of satisfactory similar operations.

b. Well point headers, points and other pertinent equipment shall not be placed within the limits of the excavation in such a manner or location as to interfere with the laying of pipe or trenching operations or with the excavation and construction of other structures.

c. Detached observation wells of similar construction to the well points shall be installed at intervals of not less than 50 feet along the opposite side of the excavation from the header pipe and line of well points, to a depth of at least five feet below the proposed excavation. In addition, one well point in every 50 feet shall be fitted with a tee, plug and valve so that the well point can be converted for use as an observation well. Observation wells shall be not less than 1-1/2" in diameter.

d. Standby gasoline or diesel powered equipment shall be provided so that in the event of failure of the operating equipment, the standby equipment can be readily connected to the system. The standby equipment shall be maintained in good order and actuated regularly not less than twice a week.

2. Operation

a. Where well points are used, the ground water shall be lowered and maintained continuously (day and night) at a level not less than two feet below the bottom of the excavation. Excavation will not be permitted at a

level lower than two feet above the water level as indicated by the observation wells.

b. The effluent pumped from the well points shall be examined periodically by qualified personnel to determine if the system is operating satisfactorily without the removal of fines.

c. The water level shall not be permitted to rise until construction in the immediate area is completed and the excavation backfilled.

d. Water removed shall be handled in accordance with the Section titled "Construction Water Management".

3.3 STORAGE OF MATERIALS

A. Excavated Materials

1. All excavated materials shall be stored in locations so as not to endanger the work, and so that easy access may be had at all times to all parts of the excavation. Stored materials shall be kept neatly piled and trimmed, so as not to cause any inconvenience to public travel or to adjoining property holders.

2. Special precautions must be taken to permit access at all times to fire hydrants, fire alarm boxes, police and fire department driveways, and other points where access may involve the safety and welfare of the general public.

3.4 DISPOSAL OF MATERIALS

A. Spoil Material

1. All uncontaminated spoil materials shall be disposed of on site as accepted by the Engineer.

2. Potentially contaminated spoil material shall be disposed of off site in accordance with all applicable Local, State, and Federal regulations as accepted by the Engineer.

3. The surface of all spoil areas shall be graded and dressed as accepted by the Engineer and no unsightly mounds or heaps shall be left on completion of the work.

3.5 SHEETING AND BRACING

A. Installation

1. The Contractor shall furnish, place and maintain such sheeting, bracing and shoring as may be required to support the sides and ends of excavations in such manner as to prevent any movement which could, in any way, injure the pipe, structures, utilities, railroad track or ballast, fiber optic cables, or other work; diminish the width necessary for construction; otherwise damage or delay the work of the

Contract; endanger existing structures, pipes or pavements; or cause the excavation limits to exceed the right-of-way limits.

2. In no case will bracing be permitted against pipes or structures in trenches or other excavations.

3. Sheeting shall be driven as the excavation progresses, and in such manner as to maintain pressure against the original ground at all times. The sheeting shall be driven vertically with the edges tight together, and all bracing shall be of such design and strength as to maintain the sheeting in its proper position. Seepage which carries fines through the sheeting shall be plugged to retain the fines.

4. Where breast boards are used between soldier piles, the boards shall be back packed with soil to maintain support.

5. The Contractor shall be solely responsible for the adequacy of all sheeting and bracing and shall be responsible for any personal injury or damage to the site, utilities, personal property, adjacent properties, or the New York Susquehanna and Western Railroad resulting from the failure of any such sheeting or bracing.

B. Removal

1. In general, all sheeting and bracing, whether of steel, wood or other material, used to support the sides of trenches or other open excavations, shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a pipe or structural foundation shall not be withdrawn, unless otherwise directed, before more than six inches of earth is placed above the top of the pipe or structural foundation and before any bracing is removed. The voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

2. The Contractor shall not remove sheeting and bracing until the work has attained the necessary strength to permit placing of backfill.

3. All sheeting and bracing shall be properly decontaminated prior to its removal from the Site.

C. Left in Place

1. If, to serve any purpose of his own, the Contractor files a written request for permission to leave sheeting or bracing in the trench or excavation, the Engineer may grant such permission, in writing, on condition that the cost of such sheeting and bracing be assumed and paid by the Contractor.

2. The Contractor shall leave in place all sheeting, shoring and bracing which are shown on the Contract Drawings or specified to be left in place or which the Engineer may order, in writing, to be left in place or as may be required to be left in place by Railroad's "Information Required for Work on NYS&W's Right-of-Way." All shoring, sheeting and bracing shown or ordered to be left in place will

be paid for under the appropriate item of the Contract. No payment allowance will be made for wasted ends or for portions above the proposed cutoff level which are driven down instead of cut-off.

3. In case sheeting is left in place, it shall be cut off or driven down as directed so that no portion of the same shall remain within 18 inches of the street subgrade or finished ground surface.

3.6 BACKFILLING

A. General

1. All excavations shall be backfilled to the original surface of the ground or to such other grades as may be shown, specified or directed.

2. Backfilling shall be done with suitable excavated materials which can be satisfactorily compacted during refilling of the excavation. In the event the excavated surface soils are not suitable, Special Backfill as specified or ordered by the Engineer shall be used for backfilling.

3. Any settlement occurring in the backfilled excavations shall be refilled and compacted by the Contractor at no additional cost to the Owner.

B. Unsuitable Materials

1. Stones, pieces of rock, pieces of foundation or pieces of pavement greater than one cubic foot in volume or greater than 1.5 feet in any single dimension shall not be used in any portion of the backfill.

2. All stones, pieces of rock, pieces of foundations or pieces of pavement shall be distributed through the backfill and alternated with earth backfill in such a manner that all interstices between them shall be filled with earth.

3. Frozen earth shall not be used for backfilling.

C. Compaction and Density Control

1. The compaction shall be as specified for the type of earthwork, i.e., structural, trenching or embankment.

   a. The compaction shall be the percent of maximum dry density as specified for the type of earthwork.

   b. The compaction equipment shall be suitable for the material encountered.

2. Where required, to assure adequate compaction, in-place density testing shall be made by an approved testing laboratory at the expense of the Contractor.

   a. The moisture-density relationship of the backfill material shall be determined by ASTM D698, unless otherwise specified.

1) Compaction curves for the full range of materials used shall be developed.

b. In-place density shall be determined by the methods of ASTM D1556 or ASTM D2922 and shall be expressed as a percentage of maximum dry density.

3. Where required, to obtain the optimum moisture content, the Contractor shall add, at his expense, sufficient water during compaction to assure the specified maximum density of the backfill. If, due to rain or other causes, the material exceeds the optimum moisture content, it shall be allowed to dry, assisted if necessary, before resuming compaction or filling efforts.

4. The Contractor shall be responsible for all personal injury or damage done to pipes, structures, personal property, utilities, adjacent property or Railroad property due to improper placing or compacting of backfill.

5. The Contractor shall place and compact fill material from the base of the excavations to within 6 feet of finished grade utilizing a backhoe, or similar equipment. The remaining fill shall be placed and compacted in 2-foot lifts to finished grade. The Contractor may utilize other comparable fill and compaction techniques as approved by the Engineer.

3.7 OTHER REQUIREMENTS

A. Drainage

1. All material deposited in roadway ditches or other water courses shall be removed immediately after backfilling is completed and the section, grades and contours of such ditches or water courses restored to their original condition, in order that surface drainage will be obstructed no longer than necessary.

B. Unfinished Work

1. When, for any reason, the work is to be left unfinished, all trenches and excavations shall be filled and all roadways, sidewalks and watercourses left unobstructed with their surfaces in a safe and satisfactory condition. The surface of all roadways and sidewalks shall have a temporary pavement.

C. Hauling Material on Streets

1. When it is necessary to haul material over the streets or pavements, the Contractor shall provide suitable tight vehicles so as to prevent deposits on the streets or pavements. In all cases where any materials are dropped from the vehicles, the Contractor shall clean up the same as often as required to keep the crosswalks, streets and pavements clean and free from soil, sludge, dirt, mud, stone, construction water, and other hauled material.

D. Dust Control

1. It shall be the sole responsibility of the Contractor to control the dust created by any and all of his operations to such a degree that it will not endanger the safety and welfare of the general public. The Contractor shall provide and implement a Dust Control Program and comply with the requirements of OSHA 1910.1000 and NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites.

2. Calcium chloride and petroleum products shall not to be used for dust control.

E. Disposal of Excavated Materials

1. All excavated earth or other excavated materials shall be handled in accordance with the Section titled "Surface Soil, Subsurface Soil, Fill or Debris Relocation" or as otherwise directed by the Engineer.

F. Test Pits

1. For the purpose of verifying locations of underground obstructions, structures and utilities the Contractor shall make excavations in advance of the work. Payment for the excavations ordered by the Engineer will be made under an appropriate item of the Contract and shall include sheeting, bracing, pumping, excavation, and backfilling.

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SECTION 02223

EMBANKMENT

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes construction of earth embankments constructed to established lines and grades at the locations shown on the Contract Drawings and as directed by the Engineer.

1.2 REFERENCES

A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. American Society for Testing and Materials (ASTM)

a. D698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3)

b. D1556 - Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

c. D2922 - Test Methods for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)

1.3 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. Proposed testing laboratory

2. Source of off-site materials

3. Compaction curves for all materials to be used.

4. Particle size distribution curves for all materials to be used.

5. Affidavit from Owner of source and results of hazardous waste testing in accordance with the Special Provisions.

1.4 TESTING

A. All testing, including field and laboratory services, shall be at the Contractor's expense without additional compensation, except where separate payment is specified.

PART 2 PRODUCTS

2.1 GENERAL

A. Embankment material shall be free from frost, stumps, trees, roots, sods, muck, marl, vegetable matter or other unsuitable material and shall be suitable for compaction as described in the following provisions. Where embankments are to be placed underwater only acceptable granular materials shall be used unless otherwise specified.

B. Embankment materials shall be obtained from approved off-site sources.

PART 3 EXECUTION

3.1 PREPARATION OF SUBGRADE

A. The entire surface to be covered with embankment shall be grubbed and stripped of all grass, vegetation, topsoil, rubbish, or other unsuitable materials before any embankment material is placed. Grubbed and stripped materials shall be removed as spoil.

B. Compaction of material onto which embankments are to be placed may be accomplished by the following methods, subject to acceptance by the Engineer upon completion of on-site field tests by the Contractor.

1. Pneumatic - Tired Compactors:

The minimum pneumatic compactor class shall consist of Class F with a tire size of 13.00 X 24, number plys is 18, inflation pressure (psi) of 100* and the range of ballasted wheel loads (lbs. per wheel) shall be 8,000 - 10,000. The minimum effort for all pneumatic compactors shall be 6 passes, at speeds up to 12 feet per second (fps) on no more than the first 2 passes, and all subsequent passes at speeds of 6 fps or less.

(* Inflation pressure for not less than the last two passes on each lift. May be reduced during earlier passes and gradually increased to this level.)

2. Vibratory Drum Compactors:

This type of compactor is defined as a machine which primarily develops its compactive effort from the vibrations created and is classified for use according to the developed compactive force rating per linear inch of drum width (PLI). The minimum effective compactive force, PLI, used shall be 740 and the minimum effort shall be 6 passes of 4.5 fps.

3. Sheepsfoot Rollers:

The minimum stress level shall consist of a tire psi of 40. The minimum effort for all sheepsfoot rollers shall be 6 passes, operating at speeds not exceeding 6 feet per second when towed and 15 feet per second when self-propelled. Compaction shall continue until the sheepsfoot roller can "walk out" of the compacted material.

4. Other Type of Compactor:

Compactor types other than those classified above may be employed by the Contractor, subject to acceptance by the Engineer of the proposed minimum applied effort (minimum number of passes and travel speed). Such acceptance by the Engineer will be based upon the results of appropriate on-site field tests.

3.2 PLACEMENT AND COMPACTION

A. Materials shall be placed in lifts not greater than 8 inches of thickness unless greater thicknesses are allowed by the Engineer upon demonstration by the Contractor that the materials and compaction efforts are adequate to obtain the required density.

B. Material shall be placed in a uniform lift and thoroughly compacted by compaction equipment suitable for the material encountered to obtain the required density prior to the placement of succeeding lift.

1. Each lift shall be tested for proper compaction before successive lifts are applied.

C. Stones shall not exceed 6 inches in greatest dimension and shall be well distributed throughout the soil mass. Stone shall be defined as rock material either in its natural or broken state.

D. Stones not well mixed with soil material shall not be used in earth embankments unless the stone material is sufficiently deteriorated or friable so as to be compactible to achieve minimum voids and required density.

E. If the required density is not obtained, compaction of the embankment shall continue until specified densities are obtained, before any additional embankment is placed. Improperly compacted embankment shall be removed.

F. Where required, the Contractor shall, at his expense, add sufficient water during the compaction effort to assure proper density. If, due to rain or other causes, the material exceeds the optimum moisture content for satisfactory compaction, it shall be allowed to dry, assisted by discing or harrowing, if necessary, before compaction or filling effort is resumed.

G. The Contractor shall be required to "seal" the working surface at the close of each day's operation and when practical prior to rainfall so that the working surface is able to drain. Sealing shall be accomplished by rolling the surface with a smooth wheel steel roller.

H. Compaction or consolidation achieved by traveling trucks, machines and other equipment will not be accepted unless such procedures are approved by the Engineer and proper compaction density is achieved.

I. Hand tamping shall be required around buried utility lines or other subsurface features that could be damaged by mechanical compaction equipment.

J. Embankments shall be constructed to such elevations as to make allowance for any settlement that may occur. Prior to the construction of any structure, roadway or other ground feature and before final acceptance of the contract, the Contractor shall regrade the embankments to conform to the established lines and grades.

3.3 DENSITY CONTROL

A. Embankments shall be compacted to 90% of maximum dry density as determined by the density tests designated in ASTM D 698, Method D.

1. Compaction curves for the full range of soil materials to be used in the embankment shall be developed by an approved independent testing laboratory.

B. Field control samples shall be taken and tested by the testing laboratory as required to assure that adequate compaction of the embankment material is being achieved.

C. A minimum of one (1) in-place density test shall be made for every 1,500 square feet of compacted area per lift, or a minimum of one at each leaching pit location.

1. In-place density of soils shall be determined by the methods described in ASTM D1556 or ASTM D2922 and expressed as a percentage of the maximum dry density.

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SECTION 02229

ROCK REMOVAL

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes removal to the widths and depths shown on the Contract Drawings or as directed by the Engineer, including the loosening, removing, transporting, storing and disposal of all materials requiring barring or wedging for removal from their original beds, and backfill of rock excavations with acceptable materials.

1.2 DEFINITIONS

A. Rock means:

1. All pieces of ledge or bedrock, boulders or masonry larger than one-half cubic yard in volume.

2. Any material requiring barring, or wedging for removal from its original bed.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 BLASTING

A. General

1. No blasting shall be permitted.

3.2 EXCAVATION AND BACKFILL

A. Rock removal and backfilling shall be performed in accordance with the applicable provisions of the Section titled "Earthwork".

B. The rock excavated which cannot be incorporated into the backfill material, as specified, shall be properly disposed off site and shall be replaced with the quantity of acceptable material required for backfilling.

* * * * *

SECTION 02231

SELECTED FILL

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes selected fill materials used in either embedment or special backfill, as specified or as directed by the Engineer.

1.2 REFERENCES

A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards, and specifications, except where more stringent requirements have been specified herein:

1. American Society for Testing and Materials (ASTM)

a. D422 Method for Particle-Size Analysis of Soil

b. D698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft - lbf/ft^3) (600 kN-m/m^3)

1.3 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. The name and location of the source of the material.

2. Samples and laboratory test reports of the material.

3. Affidavit from Owner of the source and results of hazardous waste testing in accordance with the Special Provisions for each type of select fill.

4. Gradation curves and data for each select fill or special backfill material required during construction.

1.4 DEFINITIONS

A. Special backfill for structures shall mean:

1. Any selected fill material specified or directed to be placed within the excavation limits, either in, under or adjacent to a structure.

B. Special Granular Material

1. Special granular material shall mean any of the granular materials listed below or other materials ordered by the Engineer.

1.5 TESTING REQUIRED

A. All testing services, as specified herein, necessary for the Contractor to obtain approved select fill material shall be provided by the Contractor. All testing including laboratory and field services required during construction shall be provided by the Contractor.

B. All select fill materials shall be, at a minimum, tested for compaction in accordance with ASTM D 698 and grain size in accordance with ASTM D422. Both tests shall be conducted at a frequency of one test per 500 cubic yards of material. A minimum of one test for compaction and grain size shall be performed at each leaching pit excavation. In the event that less than 500 cubic yards of a given select fill material is to be used, at least one test for that material shall be supplied.

PART 2 PRODUCTS

2.1 MATERIALS

A. Type A

1. Crushed Gravel

a. Thoroughly washed crushed, durable, sharp angled fragments of gravel free from coatings. Crushed particles shall be a minimum of 85% by weight of the particles with at least two fractured faces. The total area of each fractional face shall exceed 25% of the maximum cross-sectional area of the particle.

b. Crushed gravel shall have the following gradation by weight:

% Passing	Sieve
100%	1-1/2-inch
0-25%	3/4-inch
0-5%	½-inch

B. Type B

1. Crushed Stone

a. Thoroughly washed clean, sound, tough, hard crushed limestone or approved equal free from coatings. Gradation for crushed stone shall be the same as specified for Type A material.

C. Type C

1. Crushed Stone

a. Thoroughly washed, clean, sound, tough, hard, crushed limestone or approved equal free from coatings. It shall have a gradation by weight of 100% passing a one-inch square opening and 0 - 15% passing a 1/4-inch square opening.

D. Type D

1. Washed Sand

a. Washed coarse sand having the following gradation by weight:

% Passing	Sieve
100	3/8-inch
95 - 100	No. 4
80 - 100	No. 8
50 - 85	No. 16
25 - 60	No. 30
10 - 30	No. 50
2 - 10	No. 100

E. Type E

1. Run-of-Bank Gravel

a. Run-of-bank gravel or other acceptable granular material free from organic matter with a gradation by weight of 100% passing a 1-1/2 inch square opening, 30 to 65% passing a 1/4 inch square opening and not more than 10% passing a No. 200 mesh sieve as determined by washing through the sieve in accordance with ASTM D422.

F. Type F

1. Run-of-crusher Stone

a. Run-of-crusher hard durable limestone or approved equal having the following gradation by weight:

% Passing	Screen Size (inches)
100	1-1/2
95 - 100	1
65 - 80	1/2
40 - 60	1/4
0 - 10	#200 Sieve

G. Type G

1. A mixture of Type E material and Portland cement mixed in a ratio of 15:1 and placed and compacted in a dry state.

H. Type H

1. Crushed Screened Limestone

a. Thoroughly washed, crushed, screened, clean, durable limestone or approved equal free from coatings.

b. Crushed, screened limestone shall have the following gradation by weight:

%Passing	Screen Size (inches)
100%	1-1/2
90-100	1
0-15	1/2
0	1/4

PART 3 EXECUTION

3.1 INSTALLATION

A. Special backfill where specified or directed shall be placed in accordance with the Section titled "Earthwork" unless otherwise specified.

3.2 DISPOSAL OF DISPLACED MATERIALS

A. Potentially contaminated materials displaced through the use of the above materials shall be disposed of off-site in accordance with Local, State, and Federal regulations as accepted by the Engineer. Uncontaminated materials displaced by the use of the above materials may be otherwise disposed on-site as accepted by the Engineer. The cost for such disposal shall be included in the price bid for each of the materials.

3.3 SETTLEMENTS

A. Any settlements in the finished work shall be made good by the Contractor, at no additional cost to the Owner.

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SECTION 02232

SOIL, LEACHING PIT, SLUDGE, AND PIPING REMOVAL AND DISPOSAL

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes excavation, handling, staging, backfilling, and disposing all materials classified as surface soil, subsurface soil, leaching pits, sludge,piping, or debris required for the completion of all work under the Contract.

B. Excavation to the widths and depths shown on the Contract Drawings, specified, or directed by the Engineer.

1.2 REFERENCES

A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except when more stringent requirements have been specified herein:

1. American Society for Testing and Materials (ASTM)

a. ASTM D698 Test Method for Laboratory Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3)

b. ASTM D2922 Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

c. ASTM D3017 Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.3 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. Proposed methods and schedules for excavation, staging, loading, and backfilling activities.

2. Proposed analytical testing laboratory.

3. Analytical testing results including chain of custody forms.

4. Copies of all permits, licenses, manifests, bills of lading, and other applicable tracking documents.

5. Proposed dewatering procedures.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 SURFACE SOIL, SUBSURFACE SOIL, LEACHING PIT, SLUDGE, PIPING, AND DEBRIS EXCAVATION

A. Excavation of surface soil, subsurface soil, leaching pits, sludge, and piping to the extent shown on the Contract Drawings or as directed by the Engineer. All subsurface soil, leaching pits, sludge, piping and debris shall be characterized and disposed of off-site in accordance with all applicable Federal, State, and Local regulations, as accepted by the Engineer. Surface soils shall be characterized and disposed of in accordance with the requirements of Section 3.2.

B. The Contractor shall perform the excavations by means of appropriate procedures and equipment.

C. The Contractor shall avoid excessive disturbance of the excavated material to control the release of odors and dust.

D. The Contractor shall make all reasonable efforts to grade cut areas in a manner to achieve the required subgrade following compaction of the said cut areas.

E. The Contractor shall remove and properly dispose of piping associated with the leaching pits as directed by the Engineer. Soil excavated beneath the piping shall be excavated to the limits as directed by the Engineer and handled as "subsurface soil."

3.2 SAMPLING/DISPOSAL

A. Sampling of excavated surface soils

a. Following excavation and separate stockpiling of surface soils from each leaching pit, as accepted by the Engineer, the Contractor shall collect one representative sample from the surface soil from each leaching pit as directed by the Engineer.

b. The Contractor shall transport and deliver the surface soil samples to a New York State Department of Health Environmental Laboratory Approval Program-, and Contract Laboratory Protocol-certified laboratory using chain-of-custody protocol. The laboratory will provide level 1 quality control.

c. The surface soil samples shall be analyzed for cadmium in accordance with EPA Method 6010 and VOCs (including all VOC parameters listed in NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4046) using EPA Method 8010/8020. Twenty-four hour turn-around of analytical results is required. The cost of sample shipment and laboratory testing shall be paid for by the Contractor. The analytical results and

corresponding chain of custody forms shall be submitted to the Engineer upon receipt of data.

d. If the cadmium and total VOC concentrations are less than the site-specific soil cleanup objectives, the surface soils from those stockpiles shall be used as backfill, as accepted by the Engineer. If results of analyses show that concentrations of cadmium or total VOCs in one or more stockpiles are above the site-specific soil cleanup objectives set forth below the surface soil from those stockpiles shall be sampled and submitted for TCLP analyses and otherwise properly characterized by the Contractor and disposed of off site in accordance with all federal, state, and local requirements, the requirements of this Section, and as directed by the Engineer. Soils which exceed the toxicity characteristic levels for any compound or the total soil concentration levels listed in Appendix I of NYSDEC TAGM No. 3028 will be managed as hazardous waste for disposal. Total chromium will be compared to the Chromium III standard. Soils exhibiting concentrations below those levels will be considered by the Department to no longer contain hazardous waste, if they ever did, and managed for disposal as non-hazardous industrial solid waste.

e. Additional testing may be required at the request of the Engineer.

f. The site-specific clean-up levels are:

Parameter	TAGM/HEAST Standards (1)
Antimony	30
Barium	4,000
Beryllium	0.16
Cadmium	80
Chromium	80,000
Cyanide	2,000
Hexavalent Chromium	400
Lead	250
Manganese	20,000
Mercury	20
Nickel	2,000
Silver	200
Zinc	20,000
Total VOCs	10

(1) Standard levels in mg/kg.
(2) HEAST Standards are the cleanup objective for metals. TAGM level for total VOCs is cleanup level for VOCs.

B. Sampling of excavated subsurface soils

a. Following excavation and separate stockpiling of subsurface soils from each leaching pit, as accepted by the Engineer, the Contractor shall collect one sample from each stockpile and analyze it for VOCs (including all VOC

parameters listed in NYSDEC TAGM No. 4046) using EPA Method 8010/8020 and for the constituents identified in Table 1 of 40 CFR 261.24. - Toxicity Characteristic, as directed by the Engineer, and as required to determine if the material is hazardous or non-hazardous. Soils exhibiting toxicity characteristic levels for any compounds or the total soil concentration levels listed in Appendix I of NYSDEC TAGM No. 3028 shall be managed as hazardous waste for disposal. Total chromium will be compared to the Chromium III standard. Soils exhibiting concentrations below the threshold levels will be considered by the Department to no longer contain hazardous waste, if they ever did, and managed for disposal as non-hazardous industrial solid waste. The Contractor shall perform all required sampling and analyses, and shall properly dispose of the material off site.

b. The Contractor shall transport and deliver the surface soil samples to a New York State-certified laboratory using chain-of-custody protocol. The laboratory will provide level 1 quality control.

c. One week turn-around of analytical results is required. The cost of laboratory testing shall be paid for by the Contractor. The analytical results and corresponding chain of custody forms shall be submitted to the Engineer upon receipt of data.

d. Additional testing may be required at the request of the Engineer.

C. Verification sampling in the excavations

a. Following excavation of the soils, leaching pits, and sludge as shown on the Contract Drawings, or directed by the Engineer, verification samples at a frequency of one sample per 12 feet of circumference will be collected from the wall of each of the twelve excavations. Sample locations will include the base of incoming and outgoing pipelines (if encountered), and visually impacted soil, as directed by the Engineer.

b. Each verification sample will be submitted to a New York State-certified laboratory using chain-of-custody protocol and analyzed for the indicator metal cadmium, utilizing EPA Method 6010. The laboratory will provide level 1 quality control. Twenty-four hour turnaround time on the analytical results shall be obtained. The cost of laboratory testing shall be paid for by the Contractor. The analytical results and corresponding chain of custody forms shall be submitted to the Engineer upon receipt of data.

c. If the analytical results of a sample show concentrations of cadmium above 80 mg/kg, at a minimum, an additional one- foot of soil (from the outer edge of the excavation) will be excavated from the ground surface to the ground water table in the area which exceeds the limits (i.e., the area between two sample locations which show concentrations less than or equal to 80 mg/kg.). Samples will be collected from the re-excavated area at the same frequency described above. The surface and subsurface soils will be stockpiled separately, and sampled and analyzed as described above. This process will

continue until the next verification samples of the soils remaining in place indicate that cadmium is less than 80 mg/kg.

d. Additional testing may be required at the request of the Engineer.

3.3 STAGING

A. All excavated materials shall be staged at the locations as accepted by the Engineer in such a manner as to prevent erosion and impact to the surrounding areas.

B. At a minimum, all excavated surface soil, subsurface soil, and leaching pits/sludge shall be stockpiled separately at each individual leaching pit location. The materials shall be placed on a durable polyethylene sheeting or staged in a similar environmentally sound manner.

C. All staging areas will be covered with adequately ballasted polyethylene sheeting or similarly protected to minimize run-on onto, and potentially impacted run-off from, staging areas during rainfall. Run-on and run-off that comes in contact with potentially impacted surface soils, subsurface soils, fill, or debris shall be handled in accordance with the Section titled "Construction Water Management".

D. Trenching in accordance with the Section titled "Earthwork" or berming in accordance with the Section titled "Embankment" shall be constructed around stockpiles as shown on the Contract Drawings, or as directed by the Engineer.

E. Upon completion of construction activities, the Contractor shall obtain two samples of the surface soil beneath each excavated subsurface soil stockpile location. The samples shall be submitted to the laboratory and analyzed for cadmium using USEPA Method 6010, and VOCs using USEPA Method 8010/8020. The cost of the sample shipment and laboratory testing shall be paid for by the Contractor. The analytical data and chain-of-custody forms shall be submitted to the Engineer upon receipt of data. If the concentrations exceed the cleanup levels identified in Section 02232 3.2.f, the Contractor shall excavate and properly dispose the impacted soil in accordance with Section 02232, and undertake verification sampling and analyses.

3.4 BACKFILLING

A. No backfilling of surface soil or off-site borrow material shall be performed until the Engineer has accepted sampling and analytical results, and performed as-built surveys of the limits of excavations.

B. Excavated areas shall be backfilled with clean embankment material or surface soils deemed suitable for backfill, and compacted to 4" less than the existing grades, in accordance with the Section titled "Earthwork", or as directed by the Engineer.

C. Excavated areas which are not be repaved shall be vegetated in accordance with the Section titled "Topsoil and Seeding", as shown on the Contract Drawings, specified, or directed by the Engineer.

3.5 DEWATERING

A. Proposed dewatering procedures shall be approved by the Engineer.

C. At the Engineer's request, the Contractor shall perform paint filter tests as required to demonstrate the effectiveness of the proposed dewatering methods to render excavated material for acceptance at the Owner-approved disposal facility. These tests shall be performed at no additional cost to the Owner.

3.6 OFF-SITE DISPOSAL

A. All excavated materials to be disposed of off-site shall be done in accordance with all applicable Federal, State, and Local regulations, as accepted by the Engineer.

B. All materials scheduled for off-site disposal shall be characterized by the Contractor as required by the disposal sites or in accordance with approved waste profiles. Results of all analytical testing shall be submitted to the Engineer upon receipt.

C. It shall be the responsibility of the Contractor to perform any sampling or analyses required to characterize free liquids or solids in conformance with all applicable Local, State, and Federal waste disposal regulations, prior to disposal.

D. Contractor shall be solely responsible for fines or costs associated with overweight vehicles or any other vehicular violations or infractions.

E. Contractor shall mark, label, placard, package and manifest wastes in accordance with applicable codes, regulation, and statutes.

F. Contractor shall load, transport, and dispose surface soils, subsurface soils, fill, and debris in accordance with all applicable Federal, State and Local regulations.

G. All off-site disposal facilities shall be accepted by Engineer and NYSDEC, and approved by the Owner.

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SECTION 02270

EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes erosion and sediment control performed to minimize erosion of soils and sediments into drainage channels and lands adjacent to or affected by the Work, and to prevent storm water run-on onto work areas and to prevent potentially contaminated storm water run-off (including soils and sediment) from leaving the Site without appropriate treatment.

B. Erosion and sediment control measures to be implemented shall be in accordance with this specification and as may be required by the New York State Department of Environmental Conservation (NYSDEC) and the Railroad. In the event of discrepancies between this Specification and the NYSDEC and/or Railroad requirements, the more stringent of the Railroad or NYSDEC requirements shall govern.

C. Erosion and sediment controls shall be constructed at additional locations as ordered by the Engineer and without additional cost when the Engineer is of the opinion that additional measures may be required to provide adequate erosion and sediment control.

1.2 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. a. Prior to any site disturbance work, the Contractor shall prepare a Storm Water Pollution Prevention Plan (SWPPP) for implementation during the construction period consistent with the applicable requirements set forth in the "New York State Department of Environmental Conservation (NYSDEC) State Pollution Discharge Elimination System (SPDES) General Permit For Storm Water Discharges Classified As "Associated With Construction Activities". In addition to the SWPPP, the Contractor shall be responsible for applying for general permit coverage by submitting the Notice of Intent (NOI) and Notice of Termination (NOT) forms to NYSDEC.

b. The Contractor's SWPPP, NOI, and NOT shall be submitted to the Engineer at least six weeks prior to commencement of work, and shall be subject to review and approval by Railroad and NYSDEC prior to acceptance by Engineer on behalf of the Owner. The Contractor is advised that he should allow six weeks for Railroad and NYSDEC review and comment on each draft of the NOI, SWPPP, and NOT submitted for Railroad and NYSDEC review. No additional payment or extension of time shall be provided by the Owner to the Contractor

for delays caused either by NYSDEC or Railroad, or the Contractor in the preparation of or in the Railroad or NYSDEC's acceptance of the SWPPP, NOI, or NOT.

c. The approved SWPPP shall be signed by the Contractor and each subcontractor, implemented, and kept current in accordance with the intent of the aforementioned NYSDEC and Railroad requirements. Ten copies of the SWPPP shall be provided to the Owner prior to initiating site disturbance work.

d. Compliance sampling, recordkeeping and monitoring requirements identified with SWPPP, or as required by NYSDEC or Railroad as a condition for approval of the SWPPP, will be conducted by the Contractor at no additional cost to the Owner.

e. Copies of all records, including sample collection and monitoring, relative to the development and implementation of the SWPPP shall be provided to the Owner. Contractor shall retain copies of the SWPPP, all records required by the SWPPP, and records of all data used to complete the NOI covered by the SWPPP for a period of at least three years from the date that the Site is finally stabilized. This period may be extended by the NYSDEC at any time upon written notification.

2. If NYSDEC and Railroad do not require development of a SWPPP, then prior to initiation of any site work, the Contractor shall prepare and submit to Engineer and Railroad an Erosion and Sediment Control Plan (ESCP) which shall satisfactorily address, at minimum, the following criteria:

a. Construction schedule and work sequencing. The plan will clearly describe for each major construction activity the appropriate erosion, sediment, run-off and run-on control measures which will be implemented and the timing for implementation. (For example, perimeter controls for one portion of the Site will be installed after the clearing and grubbing necessary for installation of the measure, but before the clearing and grubbing for the remaining portions of the site. Perimeter controls will be actively maintained until final stabilization of those portions of the Site upward of the perimeter control. Temporary perimeter controls will be removed after final stabilization).

b. Locations of temporary and permanent (if proposed) measures.

c. Vegetative erosion and sediment control measures (i.e., seed, mulch, etc.).

d. Structural erosion and sediment control measures (i.e., traps, silt fences, sedimentation basins, etc.).

e. Stabilized construction entrance, including provisions for wheel washdown.

f. Storm water (run-on and run-off) management including methods to direct clean Storm water away from the work area and to contain and minimize the amount of Storm water entering the work area which may require treatment, provisions for containment/holding prior to treatment, etc.

3. The ESCP shall be a document with criteria incorporated from standard references including but not limited to USDA-SCS, Guidelines for Erosion and Sediment Control in Urban Areas of New York State. Contractor shall submit the ESCP to Engineer and Railroad six weeks prior to initiation of on-site work, and shall be subject to review and approval by Railroad prior to acceptance by Engineer on behalf of the Owner.

1.3 SPECIAL REQUIREMENTS

A. In addition to appropriate permit, SWPPP and/or ESCP requirements, construction procedures shall include protection of the environment in accordance with all pertinent federal, state and local regulations. Construction procedures that are prohibited in the undertaking of work associated with this project include, but are not limited to:

1. Indiscriminate, arbitrary, or capricious operation of equipment in any stream corridors, any wetlands or within the 100-year floodplain of any surface waters.

2. Pumping of silt-laden water from trenches or other excavations into any surface waters or any stream corridors, or any wetlands.

3. Damaging vegetation beyond the extent necessary for the work of this project.

4. Disposal of trees, brush, and other debris in any stream corridors, any wetlands, or within the 100-year floodplain of any surface waters.

5. Dumping of spoil material into any stream corridor, any surface waters, or at any unspecified or unapproved locations.

6. Open burning of any debris.

B. Upon approval of the SWPPP and/or the ESCP, the Contractor shall implement and maintain the Plan. In addition, the Contractor shall place silt fence along the downgradient perimeter of the site at the approximate limit of the Work or as directed by the Engineer.

C. The Engineer shall have the authority to limit the surface area exposed by clearing, grubbing and excavation, and to direct the Contractor to implement additional erosion, run-off and run-on control measures as he deems necessary with no additional consideration for payment being made to the Contractor in this regard.

PART 3 EXECUTION

3.1 GENERAL

A. Clearing schedules shall be formulated to provide minimum practical exposure of soils. Local run-on/run-off control measures shall be implemented as conditions warrant. The Contractor shall make every reasonable effort so as not unduly disturb the ecological or environmental quality of the area.

3.2 EROSION AND SEDIMENT CONTROL

A. During the land disturbance period of this project, the following sequence shall be adhered to:

1. Clearing and grubbing for those areas necessary for installation of perimeter controls.

2. Construction of perimeter controls including, but not necessarily limited to the installation and maintenance of silt fencing along the entire downgradient perimeter beyond the outer limits of potential set-up and work areas.

3. Remaining clearing and grubbing.

4. Trenching and excavation, providing temporary stabilization/erosion/run-off/run-on controls as required.

5. Performance of work.

6. Final grading and permanent stabilization.

7. Removal of perimeter controls.

B. Sediment and erosion control measures may include straw bale dikes, silt fences, earth dikes, stone outlet sediment traps, stabilized construction entrances, rip rap, seeding/sodding, properly anchored mulch, and/or other measures as required.

C. Sediment and erosion control measures shall be properly maintained and adequately functioning. Any existing measures that are damaged shall be immediately repaired.

D. Excavated material shall be protected from erosion by using appropriate devices or stabilization.

E. Trapped sediment shall be removed from the area of deposition and disposed of within the limits of the backfilled area.

F. As soon as possible after disturbance of a graded area, slope stabilization through the use of mulches (wood chips or straw anchored appropriately) or matting shall be provided.

G. Any storm water discharge shall be placed into a desilting structure or similar upgradient settling basin prior to discharge. Storm water which has come into contact with potentially contaminated sources shall be treated in accordance with the Section titled "Construction Water Management."

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SECTION 02503

RESTORATION OF SURFACES

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes restoration and maintenance of all types of surfaces, sidewalks, curbs, gutters, culverts and other features disturbed, damaged or destroyed during the performance of the work under or as a result of the operations of the Contract, as specified herein or as modified or described in the Special Provisions.

B. The quality of materials and the performance of work used in the restoration shall produce a surface or feature equal to or better than the condition of each before the work began.

C. Where Railroad property is involved, restoration shall be in conformance with Railroad requirements, and subject to Railroad review and approval with no additional consideration for payment being made to the Contractor in this regard.

1.2 REFERENCES

A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. American Society for Testing and Materials (ASTM)

a. D698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3)

1.3 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. A schedule of restoration operations shall be submitted to Engineer and Railroad by the Contractor for review. After an accepted schedule has been agreed upon it shall be adhered to unless otherwise revised with the approval of the Engineer, and where Railroad property is involved, of Railroad too.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 GENERAL

A. In general, permanent restoration of paved surfaces will not be permitted until one months' time has elapsed after excavations have been completely backfilled and compacted as specified. A greater length of time, but not more than nine months may be allowed to elapse before permanent restoration of street surfaces is undertaken, if additional time is required for shrinkage and settlement of the backfill.

B. The replacement of surfaces at any time, as scheduled or as directed, shall not relieve the Contractor of responsibility to repair damages by settlement or other failures.

3.2 TEMPORARY PAVEMENT

A. Immediately upon completion of refilling of excavations, the Contractor shall place a temporary pavement over all disturbed areas of highways, roads, streets, driveways, sidewalks, and other traveled places where the original surface has been disturbed as a result of his operations.

B. Unless otherwise specified or directed the temporary pavement shall consist of compacted run-of-crusher limestone to such a depth as required to withstand the traffic to which it will be subjected.

C. Where concrete pavements are removed, the temporary pavement shall be surfaced with "cold patch". The surface of the temporary pavement shall conform to the slope and grade of the area being restored.

D. For dust prevention, the Contractor shall treat all surfaces, not covered with cold patch, as frequently as may be required.

E. The temporary pavement shall be maintained by the Contractor in a safe and satisfactory condition until such time as the permanent paving is completed. The Contractor shall immediately remove and restore all pavement as shall become unsatisfactory.

3.3 PERMANENT PAVEMENT REPLACEMENT

A. The permanent and final repaving of all streets, driveways and similar surfaces where pavement has been removed, disturbed, settled or damaged by or as a result of performance of the Contract shall be repaired and replaced by the Contractor, by a new and similar pavement.

1. The top surface shall conform with the grade of existing adjacent pavement and the entire replacement shall meet the current specifications of the local community for the particular types of pavement.

2. Where the local community has no specification for the type of pavement, the work shall be done in conformity with the NYSDOT Standard which conforms the closest to the type of surfacing being replaced, as determined by the Engineer.

3.4 PREPARATION FOR PERMANENT PAVEMENT

A. When scheduled and within the time specified, the temporary pavement shall be removed and a base prepared, at the depth required by the local community or Highway Permit, to receive the permanent pavement.

1. The base shall be brought to the required grade and cross-section and thoroughly compacted before placing the permanent pavement.

2. Any base material which has become unstable for any reason shall be removed and replaced with compacted base materials.

B. Prior to placing the permanent pavement all service boxes, manhole frames and covers and similar structures within the area shall be adjusted to the established grade and cross-section.

C. The edges of existing asphalt pavement shall be cut a minimum of one foot beyond the excavation or disturbed base whichever is greater.

1. All cuts shall be parallel or perpendicular to the centerline of the street.

3.5 ASPHALT PAVEMENT

A. The permanent asphalt pavement replacement for streets, driveways and parking area surfaces shall be replaced with bituminous materials of the same depth and kind as the existing unless otherwise specified.

B. Prior to the placement of any bituminous pavement a sealer shall be applied to the edges of the existing pavement and other features.

C. The furnishing, handling and compaction of all bituminous materials shall be in accordance with the NYSDOT Standards.

3.6 CONCRETE PAVEMENT AND PAVEMENT BASE

A. Concrete pavements and concrete bases for asphalt, brick or other pavement surfaces shall be replaced with 4,000 psi, 28 day compressive strength, air-entrained concrete.

B. Paving slabs or concrete bases shall be constructed to extend one foot beyond each side of the trench and be supported on undisturbed soil. Where such extension of the pavement will leave less than two feet of original pavement slab or base, the repair of the pavement slab or base shall be extended to replace the slab to the original edge of the pavement or base unless otherwise indicated on the Contract Drawings.

C. Where the edge of the pavement slab or concrete base slab falls within the excavation, the excavation shall be backfilled with Special Backfill compacted to 95% maximum dry density as determined by ASTM D 698 up to the base of the concrete.

D. The new concrete shall be of the same thickness as the slab being replaced and shall contain reinforcement equal to the old pavement.

1. New concrete shall be placed and cured in accordance with the applicable provisions of the NYSDOT Standards.

3.7 STONE OR GRAVEL PAVEMENT

A. All pavement and other areas surfaced with stone or gravel shall be replaced with material to match the existing surface unless otherwise specified.

1. The depth of the stone or gravel shall be at least equal to the existing.

2. After compaction the surface shall conform to the slope and grade of the area being replaced.

3.8 CONCRETE WALKS, CURBS AND GUTTER REPLACEMENT

A. Concrete walks, curbs and gutters removed or damaged in connection with or as a result of the construction operations shall be replaced with new construction.

1. The minimum replacement will be a flag or block of sidewalk and five feet of curb or gutter.

B. Walks shall be constructed of 4,000 psi, 28 day compressive strength, air-entrained concrete with selected fill Type H aggregate on a 4-inch base of compacted gravel or stone.

1. The walk shall be not less than 4 inches in thickness or the thickness of the replaced walk where greater than 4 inches, shall have construction joints spaced not more than 25 feet apart, shall have expansion joints spaced not more than 50 feet apart and shall be sloped at right angles to the longitudinal centerline approximately 1/8 inch per foot of width.

C. One-half inch expansion joint material shall be placed around all objects within the sidewalk area as well as objects to which the new concrete will abut, such as valve boxes, manhole frames, curbs, buildings and others.

D. Walks shall be hand-floated and broom-finished, edged and grooved at construction joints and at intermediate intervals matching those intervals of the walk being replaced.

1. The intermediate grooves shall be scored a minimum of 1/4 of the depth of the walk.

2. The lengths of blocks formed by the grooving tool, and distances between construction and expansion joints shall be uniform throughout the length of the walk in any one location.

E. The minimum length of curb or gutter to be left in place or replaced shall be 5 feet. Where a full section is not being replaced, the existing curb or gutter shall be saw cut to provide a true edge.

1. The restored curb or gutter shall be the same shape, thickness and finish as being replaced and shall be built of the same concrete and have construction and expansion joints as stated above for sidewalks.

F. All concrete shall be placed and cured in accordance with NYSDOT requirements.

3.9 LAWNS AND IMPROVED AREAS

A. The area to receive topsoil shall be graded to a depth of not less than 4 inches or as specified, below the proposed finished surface.

1. If the depth of existing topsoil prior to construction was greater than 4 inches, topsoil shall be replaced to that depth.

B. The furnishing and placing of topsoil, seed and mulch shall be in accordance with the Section titled "Topsoil and Seeding".

C. When and if required to obtain germination, the seeded areas shall be watered in such a manner as to prevent washing out of the seed.

D. Any washout or damage which occurs shall be regraded and reseeded until a good sod is established.

E. The Contractor shall maintain the newly seeded areas, including regrading, reseeding, watering and mowing, in good condition.

3.10 CULTIVATED AREA REPLACEMENT

A. Areas of cultivated lands shall be graded to a depth to receive topsoil of not less than the depth of the topsoil before being disturbed. All debris and inorganic material shall be removed prior to the placing of the topsoil.

B. The furnishing and placing of topsoil shall be in accordance with the Section titled "Topsoil and Seeding".

C. After the topsoil has been placed and graded, the entire area disturbed during construction shall be cultivated to a minimum depth of 12 inches with normal farm equipment.

1. Any debris or inorganic materials appearing shall be removed.

2. The removal of stones shall be governed by the adjacent undisturbed cultivated area.

D. Grass areas shall be reseeded using a mixture equal to that of the area before being disturbed, unless otherwise specified.

3.11 OTHER TYPES OF RESTORATION

A. Trees, shrubs and landscape items damaged or destroyed as a result of the construction operations shall be replaced in like species and size.

1. All planting and care thereof shall meet the standards of the American Association of Nurserymen, and each planting shall survive at least one year or be replaced by Contractor at no additional cost to Owner.

B. Water courses shall be reshaped to the original grade and cross-section and all debris removed. Where required to prevent erosion, the bottom and sides of the water course shall be protected.

C. Culverts destroyed or removed as a result of the construction operations shall be replaced in like size and material and shall be replaced at the original location and grade. When there is minor damage to a culvert and with the consent of the Engineer, a repair may be undertaken, if satisfactory results can be obtained.

D. Should brick pavements be encountered in the work, the restoration shall be as set forth in the Special Provisions or as directed.

3.12 MAINTENANCE

A. The finished products of restoration shall be maintained in an acceptable condition for and during a period of one year following the date of Substantial Completion or other such date as set forth elsewhere in the Contract Documents.

* * * * *

SECTION 02981

TOPSOIL AND SEEDING

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes topsoil, fertilizer, seed, mulch, anchorage, and associated work and maintenance required until acceptance.

1.2 REFERENCES

A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. American Society of Testing and Materials (ASTM)

a. ASTM D422 Method for Particle-Size Analysis of Soils

b. ASTM D2974 Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Materials

c. ASTM D4972 Standard Test Method for pH of Soils

d. ASTM D5268 Specification for Topsoil used for Landscaping Purposes

1.3 SUBMITTALS

A. In addition to those submittals identified in the General Provisions, the following items shall be submitted:

1. Documentation giving location of properties from which the topsoil will be obtained, names and addresses of the owners, and depth to be stripped.

2. Documentation giving the seed vendor's certified statement for the grass seed mixture required, stating common name, scientific name, percentage by weight, and percentages of purity and germination.

3. Documentation giving data concerning hydroseeding equipment (if used), including all material application rates.

4. Documentation regarding test results for particle size, acidity, fertility, and texture performed on representative samples of soil.

5. Affidavit from owner of source and hazardous waste testing results in accordance with the Special Provisions.

PART 2 PRODUCTS

2.1 TOPSOIL

A. The topsoil shall be unfrozen, natural, fertile, friable, clayey loam soil characteristic of productive soils in the vicinity and shall comply with ASTM D5268. No admixtures of subsoil shall be allowed. Topsoil must be uniform in composition and texture, clean and free from clay lumps, stones, weeds, sticks, brush, stumps, roots, toxic substances, and debris or similar substances 2-inches or more in greatest dimension.

B. Prior to and during installation of the topsoil layer, material from the borrow source shall be tested in accordance with the following standards and frequencies:

Parameter	Standard	Minimum Frequency	Criteria
Topsoil Particle Size	ASTM D422	Once	Monitoring consistency of borrow source
Topsoil pH	ASTM 4972	Once	pH in the range of 5.5 and 7.6
Topsoil Organic Content	ASTM 2974	Once	not less than 5% nor more than 20%

2.2 GRASS SEED

A. Seed mixtures shall be of commercial stock of the current season's crop and shall be delivered in unopened containers bearing the guaranteed analysis of the mix.

B. Seed Mixture: Pounds Per Acre

Common Name	% By Weight	% Purity	% Germination
Timothy	30	90	90
Clover	20	90	90
Perennial Ryegrass	40	90	90
Annual Ryegrass	10	90	90

2.3 FERTILIZER

A. Fertilizer shall be a standard quality commercial carrier of available plant food elements. A complete prepared and packaged material containing a minimum of 10 percent nitrogen, 10 percent phosphoric acid and 10 percent potash.

B. Each bag of fertilizer shall bear the manufacturer's guaranteed statement of analysis.

2.4 MULCH

A. Mulch shall be unrotted stalks of oats, wheat, rye or other approved crops which are free from noxious weeds, salt, mold, or other objectionable material.

B. Other sources of mulch may be utilized if approved by the Engineer.

PART 3 EXECUTION

3.1 INSTALLATION

A. All areas to be topsoiled shall receive a minimum of 4-inches of topsoil. The area to receive topsoil shall be graded to a depth of not less than 4 inches or as specified below the proposed finished surface. If the depth of topsoil existing prior to construction was greater than 4 inches, the topsoil shall be replaced not less than the greater depth.

1. All debris and inorganic material shall be removed and the surface loosened for a depth of 2 inches prior to the placing of topsoil.

B. The topsoil shall not be placed until the subgrade is in suitable condition and shall be free of frost and excessive moisture.

C. Topsoiled surfaces shall be seeded in accordance with this Section. All surfaces shall then be mulched and fertilized in accordance with this section.

3.2 APPLICATION PROCEDURES

A. The finished surface shall conform to the lines and grades of the area before disturbed or as shown on the Contract Drawings. Any irregularities shall be corrected before the placement of fertilizer and seed. Furnished grades shall not cause stormwater to flow against or into any buildings.

B. The Contractor shall proceed with the complete landscape work as rapidly as portions of the site become available, working within seasonal limitations of each type of work required.

C. The fertilizer shall be applied uniformly at the rate of 20 pounds per 1000 square feet.

1. Following the application of the fertilizer and prior to application of the seed, the topsoil shall be scarified to a depth of at least 2 inches with a disc or other suitable method traveling across the slope if possible.

D. When the topsoil surface has been fine graded, the seed mixture shall be uniformly applied upon the prepared surface with a mechanical spreader at a rate of not less than 8 pounds per 1000 square feet.

1. The seed shall be raked lightly into the surface and rolled.

2. Seeding shall be suspended when wind velocities exceed 5 miles per hour or as directed by the Engineer.

E. Mulch shall be hand or machine spread to form a continuous blanket over the seed bed, approximately 2 inches uniform thickness at loose measurement. Excessive amounts of bunching of mulch will not be permitted.

1. Mulch shall be anchored by an acceptable method.

2. Unless otherwise specified, mulch shall be left in place and allowed to disintegrate.

3. Any anchorage or mulch that has not disintegrated at time of first mowing, shall be removed. Anchors shall be removed or driven flush with ground surface.

F. Seed bed shall be moistened following application of mulch. A muddy soil condition will not be acceptable.

G. Hydroseeding may be accepted as an alternative method of applying fertilizer, seed and mulch. The Contractor must submit all data regarding materials and application rates to the Engineer for review.

H. Seeded areas shall be watered as often as required to obtain germination and to obtain and maintain a satisfactory sod growth. Watering shall be in such a manner as to prevent washing out of seed.

I. The stand of grass resulting from the seeding shall not be considered satisfactory until accepted by the Engineer. An acceptable lawn shall have a minimum of 90% of the area covered with plants of the specified seed mix and no areas greater than one foot square of bare surface. If areas are determined to be unacceptable, the remaining mulch will be removed and all areas shall be reseeded, refertilized and remulched as per the above application procedures at the Contractor's expense.

3.3 MAINTENANCE

A. The Contractor shall begin maintenance period immediately after planting of landscape materials.

B. The Contractor shall maintain, including mowing as necessary, grass areas, for the periods required to establish an acceptable growth, but not less than 60 days after date of substantial completion. If seeded in the fall and not given a full 60 days of maintenance, or if not considered acceptable by the Engineer at that time, continue maintenance during following spring until acceptable, grass stand is established.

C. Seeded areas shall be watered as often as required to obtain germination and to obtain and maintain a satisfactory sod growth. Watering shall be in such a manner as to prevent washing out of seed.

* * * * *

Site operation, maintenance and monitoring plan

WORK PLAN

Site Operation, Maintenance and Monitoring Plan

Former CAE Electronics - Hillcrest Facility
Binghamton, New York

March 1998

6250.001

WORK PLAN

Site Operation, Maintenance and Monitoring Plan

Former CAE Electronics - Hillcrest Facility
Binghamton, New York

March 1998

O'BRIEN & GERE
ENGINEERS, INC.

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Appendices

1. Introduction

1.1. General

This Site Operation, Maintenance and Monitoring Plan discusses routine post construction operation and maintenance of Site facilities related to the remedial action, including physical Site security, and Site access. This Plan also includes the Ground Water and Surface Water, and Sediment Monitoring Plan (Section 3) to be implemented to evaluate the effectiveness of the remedial action, as specified in the ROD.

Ground water and surface water/sediment monitoring will be used to assess the effectiveness of the source control remedy by evaluating reductions over time in concentrations of site-related contaminants in ground water. The Plan will also assess the extent to which site-related contaminants have impacted the surface water/sediment from the Chenango River, if at all. The Plan identifies the monitoring wells and surface water/sediment locations to be sampled, the frequency, and the analytical parameters.

1.2. Background

The "Hillcrest facility" is a 17-acre manufacturing facility located at 11 Beckwith Avenue in the Town of Fenton, Broome County, New York (Site). The Hillcrest facility was recently sold by CAE Electronics, Inc. (CAE Electronics) to B.W. Elliott Manufacturing Co., Inc. However, for most of its operational history the Hillcrest facility was owned by Singer Link.

The facility is located five miles northeast of the City of Binghamton in a mixed commercial/residential area. A site plan is shown on Figure 1-1. A railroad runs along the eastern edge of the property separating the Site from the Chenango Valley Cemetery. Although the surrounding land is mostly residential, there are several commercial/industrial facilities located nearby. The commercial/industrial facilities include auto body shops, industrial platers, and gasoline stations.

The Chenango River is located approximately 2,500 feet west of the facility and flows south, draining a significant portion of central New York State into the Susquehanna River. Approximately 300 feet to the south of the Site is a small stream known as Phelps Creek which flows intermittently during wet periods from east to west into the Chenango River.

The Hillcrest facility contains a two-story manufacturing/office building which has produced aviation related products (primarily flight simulators and related equipment) since 1940. The eastern portion of the building was used mainly for manufacturing while the western portion contains mostly offices.

Prior to July 1986, sanitary waste waters, cafeteria waste waters, non-contact cooling water and industrial process waste water were discharged to a subsurface leaching system regulated by a State Pollutant Discharge Elimination System (SPDES) Permit. The permitted outfall (004) consisted of twelve leaching pits, A, B, C, D, E, H, I, J, K, L, M, and N. The waste water discharge included chromium, cadmium, silver, zinc, copper, nickel, rhodium, gold, and tin/lead alloy, trichloroethene, 1,1,1-trichloroethane, and methylene chloride.

Remediation of the Site began in October 1983 when leaching pits A, B, C, and D of outfall 004 were taken out of service, excavated, and removed. Moreover, in July 1986, all waste water discharges including those from all industrial process water, boiler blowdown, and sanitary and cafeteria waste waters were connected to the Binghamton / Johnson City Sewer District.

Investigations at the Site include "Hydrogeologic Evaluation and Risk Analysis Study" (March 1984, H2M), "Phase II Report, Contaminant Plume Identification at the Singer Link Company, Hillcrest Facility" (May 1986, H2M), and "Phase III Report, Ground water Investigation at the Singer Link Company, Hillcrest Facility" (September 1987, H2M).

In early 1988, samples were collected from private drinking water supplies along Brandywine Highway which is located immediately to the west of the Site. All the wells sampled contained volatile organic compounds (VOCs) similar to the Site's ground water constituents. Ground water investigations in this area were required as part of the Remedial Investigation/Feasibility Study (RI/FS). All commercial/industrial facilities and residences within the vicinity of the Site are now supplied with drinking water from the Town of Fenton Water District.

The NYSDEC and the Singer Link Flight Simulator Division, Hillcrest Facility entered into an Administrative Consent Order in February 1988 which required an RI/FS to be conducted to address the Site-related analytes and compounds of concern. The RI (1990, H2M) focused on identifying the physical nature and extent of the Site-related analytes and compounds of concern within the soil and ground water.

The RI analytical data confirmed the presence of the Site ground water plume consisting of VOC and inorganics (chromium and cadmium) and determined the configuration of the off-site VOC plume. The VOCs were quantified above New York State guidance values or standards for drinking water. The majority of inorganic constituents appear to be limited in mobility and are found predominantly on Site in the near vicinity of Outfall 004.

According to the RI, the key release mechanism of the VOCs and inorganics at the Site is via percolation of rainfall through the leaching pits into ground water. The VOCs and inorganics from the leaching pits travel via ground water pathways west-northwest toward the Chenango River. If any VOCs ever actually reach the river, their impact is expected to be insignificant, because of the high volume and flow rate of the River relative to discharge from ground water.

On March 30, 1994, a Record of Decision (ROD) was issued to present the selected remedial action for the Site based on the Administrative Record of NYSDEC for the Site, and upon public input to the Proposed Remedial Action Plan presented by NYSDEC. The Order on Consent for the remedial design and implementation of the remedial design was entered on February 29, 1996 between NYSDEC and CAE Electronics, Inc.

Preliminary design investigations were performed in two phases in accordance with the Remedial Design (RD) Work Plan (January 1996) and the addendum to the RD Work Plan (September 3, 1996). The initial predesign investigations which were performed between April 11 and 16,

1996 evaluated the horizontal and vertical extent of the VOCs and inorganics in the soils around the leaching pits. These investigations consisted of advancing twelve soil borings to the water table in the vicinity of leaching pits "A" and "J."

The second phase of investigations included soil sampling to correlate total, Toxicity Characteristic Leaching Procedure (TCLP), and Synthetic Precipitate Leaching Procedure (SPLP) data. These investigations consisted of advancing three soil borings to the ground water table around leaching pit "A" and collecting two samples from each boring. The locations for the soil borings were selected based upon the analytical data obtained in the April 1996 phase investigations. Detailed discussions regarding the results of the investigations are provided in Section 2.2 of the Preliminary Design for Soil Remediation (December 1996, O'Brien & Gere).

On March 21, 1997, NYSDEC finalized an Explanation of Significant Difference to support a modification of a component of the ROD-selected remedial alternative in accordance a with the recommendation of the Preliminary Design. *In-situ* stabilization of the soils beneath the twelve leaching pits was replaced by excavation and off-site disposal of the impacted soil.

2. Post-construction operation and maintenance

2.1. General

Subsequent to completion of the excavation and off-site disposal of impacted soils and the leaching pits, and backfilling and establishment of cover, there will be no expected operation and maintenance activities associated with the remedial action. However, to maintain the integrity of the property and the existing monitoring wells, site security and site access procedures will be implemented as presented below.

2.2. Site security

The former CAE property is currently surrounded by a chain link fence. Subsequent to Site remediation, the chain link fence will restored. The purpose of the fence is to prevent damage to property, including the existing monitoring wells which will be utilized as part of the ground water monitoring program presented in Section 3 below.

2.3. Site access

Subsequent to completion of the remedial activities at the Site, complete access to the eastern portion of the property will be restored to its original conditions. Access to the former CAE property is limited to the gate located on the western side of the facility. No access to the remediated Site (other than for the current owner's personnel) will be allowed without prior authorization by the current owner.

3. Ground water, surface water, and sediment monitoring

3.1. Introduction

3.1.1. General

The purpose of this Ground Water, Surface Water, and Sediment Monitoring Plan is to provide parties involved with the collection and use of field data with a common understanding of the field work to be conducted. The section outlines the field sampling activities for the sampling program related to the remedial action, including objectives, rationale, sampling locations, sampling methodologies, and general analytical requirements. This section defines in detail the sampling methods to be used and is written so that a field sampling team is able to gather the samples and field information required.

NYSDEC will be notified by telephone at least two weeks before initiation of field sampling. This notification will include the sampling date and location, sampling media, and the number of samples from each media.

3.1.2. Sampling objectives

The goal of the ground water, surface water, and sediment monitoring program is to provide sufficient information to evaluate the current distribution of VOCs with respect to the surface water and sediment in the Chenango River, and of VOCs and metals in ground water at the site. The specific objectives of the program will build upon data previously gathered and include the following:

- Characterize the nature of VOCs in the Chenango River surface water and sediments at two locations: one each at the location just downstream and upstream of the point that the ground water from the Site discharges to the river.

- Evaluate the trends of VOCs and metals in the ground water aquifer which has previously exhibited VOCs and metals, and which is hydraulically connected to the Site.

3.1.3. Sampling location and frequency

Surface water and sediment sampling in the Chenango River

The objective of the surface water and sediment sampling in the Chenango River is to further evaluate the potential effects of VOC releases on the Site to the part of the Chenango River which receives ground water discharge from the Site, including an evaluation of upstream concentrations.

It is anticipated that two surface water and sediment samples will be collected from the locations identified on Figure 1 (SW/SED-01(upstream) and SW/SED-02 (downstream)). However, the actual sample locations will be as agreed to by a representative of NYSDEC and CAE. The selected locations will be pre-marked in the field. The sediment samples will be gathered from the biologically active (0"-4") sediments.

Surface water and sediment samples will be collected annually for five years as part of this plan. Surface water and sediments will be analyzed for VOCs (EPA Method 8010/8020). Sediments will also be analyzed for percent solids.

Ground Water Elevation Monitoring. The objective of the ground water elevation monitoring program will be to expand the existing data base and to continue to evaluate flow gradients in the ground water aquifer. Water level monitoring will be conducted from all of the designated Site monitoring wells prior to implementation of the remedial action, and during four quarterly events over the five years following completion of the remedial action, at which time the post-remedial monitoring program will be reviewed and revised as necessary as part of NYSDEC's five-year review of the efficacy of the entire remedial program.

Ground Water Sampling and Analyses. The objective of the ground water sampling and analyses program is to collect additional analytical data from a select network of monitoring wells.

The monitoring wells were selected based upon previous data which indicated VOCs and metals, and based upon their locations upgradient and

downgradient of the Site. In addition, a monitoring well situated between the Site and a municipal well (MW-20) was also selected.

The monitoring wells included in the sampling program include: MW-6, MW-20, MW-22, MW-23, MW-24, MW-25, and MW-26.

Based upon previous data, ground water samples from each of the selected monitoring wells will be analyzed for VOCs (EPA Method 8010/8020). Samples from monitoring wells MW-6 and MW-26 will also be analyzed for cadmium and chromium (EPA Method 6010). Samples will be obtained from each of the selected monitoring wells prior to implementation of the remedial action, and quarterly for five years following completion of the remedial action. After the initial five years of quarterly sampling, the number of wells to be sampled, the frequency of sampling, and the parameters for which an analysis will be performed will be determined based on the results of all the previous sampling events.

Quality Control Samples. A trip blank will be included in each cooler of samples, and analyzed for VOCs. A level 1 laboratory quality control package will be obtained. ASP Category B will not be utilized.

3.1.4. Sample designation

Samples will be labeled using standard notation for the various matrices sampled. Existing designations will be used where appropriate. For example monitoring wells will be labeled "MW" followed by the well number and sampling round. A sample collected during the first round of sampling from monitoring well number 6 would be labeled MW-6-1. The second sample would be MW-6-2 and so on. A similar method will be used for collection of surface water and sediment samples. This labeling system will allow for easy identification of the site sample location, matrix, and round of sampling.

3.1.5. Sampling equipment and procedures

Surface water/sediment in Chenango River

At the downstream surface water/sediment sampling location, (SED/SW-02) surface water will be collected first at approximately 1 ft to 3 ft from the shore nearest the Site. Turbidity will be measured. The surface water will be collected by a procedure that does not disturb the sediment. Then, the sediment samples will be collected from areas exhibiting deposition of fine-grained sediments in the river. Samples will next be collected upstream at SED/SW-01 to minimize the disturbance due to stream bed

agitation. All sample locations will be established in the field and documented in the field logbook. During collection of sediment samples, the sampler will enter the river bed or stand downstream of the collection point in order to collect a sample of undisturbed sediment. Where possible, sediment samples will be collected at a depth of 0 to 4 inches below the sediment/surface water interface using a pre-cleaned stainless steel Lexan Tube®. Surface water samples will be collected by immersing appropriate sampling jars into the water body with the jar mouth pointed upstream.

Temperature, pH, turbidity, and specific conductance measurements will also be recorded at the surface water sampling locations. A physical description of the sediment at the locations will be recorded which will include color and visual grain size distribution according to the Wentworth scale presented in Appendix B. A sufficient volume of surface water and sediment sample will be collected to allow for sample splitting by the DEC. A detailed protocol for the collection of surface water and sediment samples is presented in Appendix B.

Ground water elevation monitoring
A round of ground water level measurements will be collected from the site monitoring wells within the 12-hour period prior to collection of ground water samples described below. Measurements will be collected relative to the surveyed point on the risers in monitoring wells.

Monitoring well sampling
Monitoring wells will be developed in accordance with the protocol presented in Appendix C. During collection of the ground water samples, the sampler will sample upgradient monitoring well first, then proceed with sampling the remaining monitoring wells. Ground water samples will be obtained in accordance with Appendix D.

Field tests will be conducted on the well samples. These tests will consist of measurements for temperature, turbidity, pH, and specific conductivity and will be conducted during well purging and after the samples requiring laboratory analyses are collected.

Decontamination
Sampling equipment will be decontaminated before each use and before it is moved from the Site. Decontamination procedures will be performed in accordance with Appendix E.

3.1.6. Sampling handling and analysis

Field documentation

Field documentation is an essential part of the monitoring program. The field crew will have an assigned team leader who is responsible for written documentation. Field log books will serve as permanent documentation for the monitoring work. In addition, the field investigator will summarize the events and conditions of the work in a log book.

Field Log Book. A bound field log book will be maintained by the assigned sampling team leader, or a designee, for documentation purposes. The log book will contain information such as names of workers and other staff members, weather conditions, samples collected, measurements, and significant events, observations, or other pertinent data - notably, unusual occurrences during field investigations. Pages will be numbered, signed, and dated. Field logbooks will be kept neat and organized. Original data recorded in field logbooks will be written in ink. Entries will be legible, factual, detailed, and objective.

If an error is made on an entry, corrections will be made by crossing a single line through the error and entering the correct information above. Erroneous information will not be erased, obliterated, or torn out. Errors in the field log will be corrected by the person who made the entry. Corrections will be initialed and dated.

The following items will be included in the field logbook:

- Name, address and phone number of the sampling team leader
- Owner and client information
- Names and affiliations of the personnel on site
- General description of the day's field activities
- Documentation of weather conditions during sampling
- Location of sampling (station number as description)
- Name and address of field contact (in cover of log book)
- Description of accidents involving personnel on site

- Records of field equipment malfunction and repair
- Records of site visitations
- Records of field and lab equipment calibrations
- Matrix type and sample description
- Date and time of sample collection
- Collector's sample identification number
- Sample distribution (e.g., laboratory, hauler, etc.)
- Observations of sample collection environment, if required
- Field measurements made
- Sampler's name
- Sample type (composite, split, etc.)
- Source and types of preservatives used.

At the end of the sampling day, the sampling team leader or a designee will collect and store the log books in a safe location.

Photographic Documentation. Photographic documentation will be gathered to complement the field log book. Where possible, the photographs will include reference objects so that the photographed area can be easily identified.

Photographs taken with a Polaroid camera will include descriptive information on the back of the photograph. If a 35 mm or digital camera is used, a serial type record of the frames exposed will be kept in the bound field log book along with the information required for the photographs. The field investigator will then enter the required information on the prints, utilizing the strip of negatives and the serialized photographic record maintained in the bound field log, to identify a photograph. The negatives will be maintained with the bound field log in the project file.

Chain-of-Custody

The collection and handling of samples will be documented to demonstrate that a sample was collected following the appropriate sampling protocols. As possession of the sample is relinquished by one technician and transferred to another, the chain-of-custody document will be so revised.

Sample container, preservation, and holding time

The appropriate container, preservation material and holding time associated with surface water, sediment, and ground water samples will be utilized.

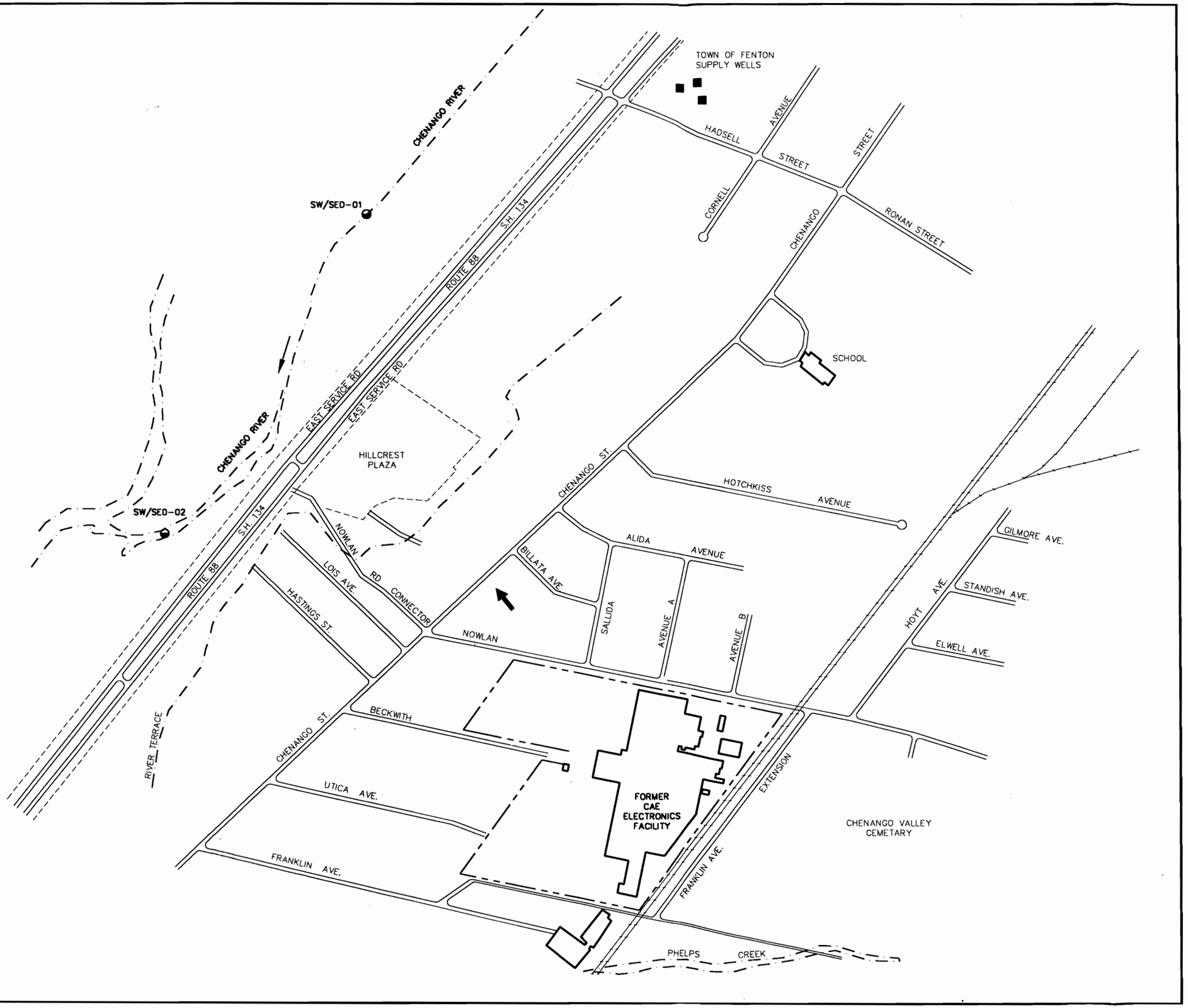
4. Reporting

The results will be submitted to NYSDEC via a report on a quarterly basis for review and comment. Results will be summarized in tabular form. Ground water flow maps will also be presented. A narrative discussion of methods used, approved deviations (if any), field results, and other pertinent findings will be presented.

Figure 1

Chenango River surface water/sediment sample location plan

FIGURE 1



LEGEND

SW/SED-01 — SURFACE WATER/SEDIMENT SAMPLE LOCATION

→ GROUND WATER FLOW DIRECTION

FORMER CAE ELECTRONICS FACILITY
BINGHAMTON, NEW YORK

CHENANGO RIVER SURFACE WATER/SEDIMENT SAMPLE LOCATION PLAN

0 500 1000
APPROX. SCALE IN FEET

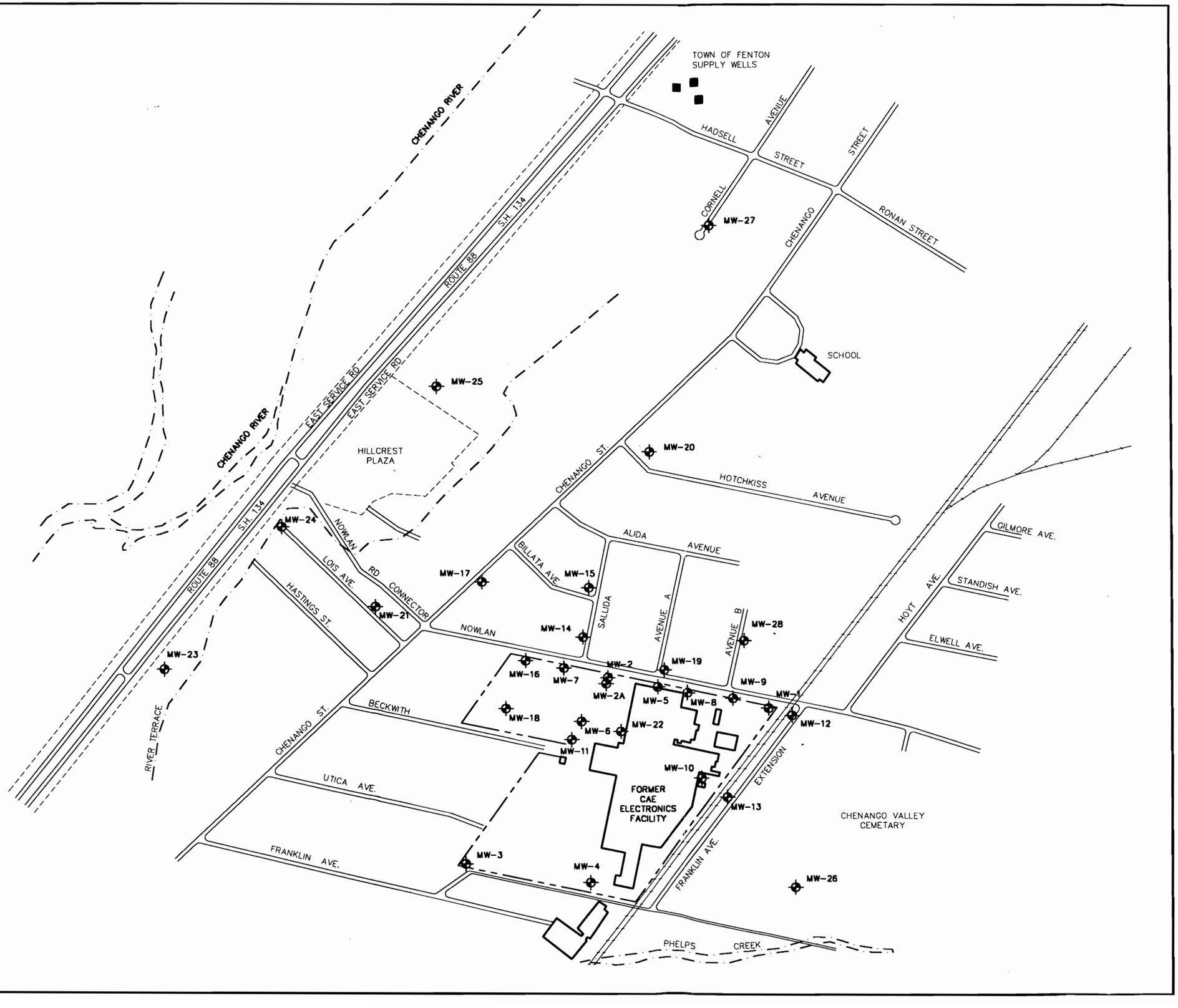
FILE NO. 6250.001-013

O'BRIEN & GERE ENGINEERS INC.

Figure 2

Monitoring well location plan

FIGURE 2



LEGEND

MW-26 — APPROXIMATE LOCATION OF EXISTING MONITORING WELLS

FORMER CAE ELECTRONICS FACILITY
BINGHAMTON, NEW YORK

MONITORING WELL LOCATION PLAN

0 500 1000

APPROX. SCALE IN FEET

FILE NO. 6250.001-014

O'BRIEN & GERE ENGINEERS INC.

Appendix A

Soil classification

Appendix A. Soil classification

Follow these instructions to classify soils:

1. Descriptive information:

   - Color name of the logged interval or sample.
   - Color notation including chroma, hue, value, and qualifiers.
   - Mottling with abbreviations, descriptors, and criteria for descriptions of mottles. Table A-1 lists these terms.

Table A-1. *Descriptors for mottling.*

Abundance	Size	Contrast
f: few (<2%)	fine (<5 mm)	faint
c: common (2%-20%)	medium (5-15 mm)	distinct
m: many (>20%)	coarse (>15 mm)	prominent

2. Water state (dry, damp, moist, wet, saturated, or combinations).

3. Description of texture. Count the blows of each 12-inch increment of the splitspoon (ASTM-1586-84), if applicable. Use the values in table A-2 to describe the texture.

Table A-2. *Terms to describe texture.*

Cohesive clays		Non-cohesive granular soils	
0-2	very soft	0-3	very loose
2-4	soft	4-9	loose
5-7	firm	10-29	medium dense
8-15	stiff	30-49	dense

Table A-2. *Terms to describe texture. (Continued)*

Cohesive clays		Non-cohesive granular soils	
16-29	hard	50-80	very dense
30-49	very hard	80+	extremely dense
50-80.	extremely hard		

4. Soil description according to Modified Wentworth Scale. This description is listed on the following pages.

Modified Wentworth Scale. Geologists typically use the values listed in Table A-3 to reckon grain sizes.

Table A-3. *Grain size scales - Modified Wentworth Scale.*

Grade Limits		Grade names		
mm	mm			
4096				
		very large		
2048				
		large		
1024			boulders	
		medium		
512				
		small		
--256-------	----	----	----	----
		large		
128			cobbles	
		small		*gravel*
--64-------	----	----	----	----
		very coarse		

Table A-3. *Grain size scales - Modified Wentworth Scale. (Continued)*

Grade Limits		Grade names		
mm	mm			
32				
		coarse		
16				
		medium	pebbles	
8				
		fine		
4				
		very fine		
--2-------	----	----	----	----
		very coarse		
1				
		coarse		
1/2	0.500			
		medium	sand	*sand*
1/4	0.250			
		fine		
1/8	0.125			
		very fine		
--1/16-------	--0.062-------	----	----	----
		coarse		
1/32	0.031			
		medium		
1/64	0.016		silt	
		fine		
1/128	0.008			
		very fine		

Table A-3. *Grain size scales - Modified Wentworth Scale. (Continued)*

Grade Limits		Grade names		
mm	mm			
--1.256-------	--0.004-------	----	----	mud---
		coarse		
1/512	0.002			
		medium		
1/1024	0.001		clay size	
		fine		
1/2048	0.005			
		very fine		
--1/4096-------	--0.00025-------	----	----	----

Source: Ingram. Cited by AGI data sheet 29.1.

Appendix B

River water/sediment sampling protocol

Appendix B. River water and sediment sampling protocol

River water. River water samples will be collected from the Chenango River at locations specified in the O&M Plan prior to the collection of sediment samples to minimize disturbances due to sample collection. A log book listing the various samples to be collected will be prepared for use on-site. The surface water sampling protocol will be as follows:

- When sampling from an open body of water, care must be exercised to collect a representative sample. The safety of the sampler should not be compromised; therefore, the sample will be collected about 3´ from the river bank with another team member present. The sample should cause as little disturbance to the water body as possible and be collected from areas of low or minimal turbulence. Do not disturb the sediment. Avoid taking a sample of water which shows evidence of sediment, debris, or other material which may have been stirred up by the presence of the sampler.

- At each designated sampling point, surface water sample collected for volatile analyses will be collected from the mid-depth of the water body directly into pre-preserved sample containers. The volatile organic compound (VOC) "split" sample, if taken, will be collected at the same time and place as the initial sample.

- Samples will be taken while facing upstream away from the influence of the sampler on water flow (if applicable). The downstream sample will be collected first.

- Collection is accomplished by submerging a clean container at the sampling point to the depth required. For deep rivers such as this one, a Kemmerer, a VanDorn, or another sampler specifically designed for this purpose may be used.

- Samples should then be placed in the proper containers. VOC samples will be placed directly into pre-preserved containers. Sample containers will be stored as necessary for the analyses to be performed. Pertinent information should be recorded including sample date and location, sample identification, and chain-of-custody forms.

- At the time of surface water sample collection, water quality parameter measurements of pH, specific conductance, dissolved oxygen, turbidity and hardness will be recorded.

River bed. River bed sediment samples will be collected from approximately the same locations as the surface water samples. They will be visually logged according to the Wentworth classification system for grain size. Surface water samples will be collected prior to the collection of sediment samples to minimize disturbances due to sample collection. A log book listing the various samples to be collected will be prepared for use on site.

Sediment samples will be collected using a stainless steel shovel or trowel, or other suitable device capable of a vertical penetration into soil to a depth of 4", depending on the amount of sediment available.

- If possible, avoid collecting samples under or immediately adjacent to vegetation structures.
- Enter a site description in the field log.
- Complete a chain-of-custody form for each sample.
- VOC samples must be collected from the mid-point of the 4-inch sample.

Appendix C

Well development protocol

Appendix C. Well development protocol

The following procedures will be used to develop wells that, if required. Documentation of well development will be recorded in a bound field book and will include: well location; date and time; names of personnel; weather; development of methods and equipment; observations; and field measurements. Transcriptions in the field book will be with indelible ink and the notebook pages will be sequentially numbered.

- Prior to initiating well development, equipment will be cleaned using the decontamination procedures for sampling equipment outlined in Appendix E of this document.

- Subsequent to removing the well cover, check the air in the breathing zone with an organic vapor meter and check the air in the well casing with an explosimeter. If high readings are noted, refer to the Health and Safety Plan for guidance.

- Wells will be developed using a suitably sized decontaminated surge block in conjunction with a bailer or pump. No air, detergents, soaps, acids, bleaches, or additives will be used during well development. For wells screened in low-yield formations, an outside source of approved potable water may be introduced into the well via jetting through a tremie pipe and nozzle to facilitate development, provided previous chemical analyses have been completed on the potable water supply.

- Development will remove foreign debris, if any, and fine-grained sediments which may have settled in and around the screen since the last sampling event. Development will be completed to enhance the hydraulic connection between the well and formation.

- Well development will continue until the following conditions are met:

    - The turbidity remains within a 10 nephelometric turbidity unit (NTU) range for at least 10 minutes and the suspended sediment content is low.

- Measurements of pH, temperature, and specific conductance have stabilized. Stabilization is defined as follows: temperature $\pm$ 1°C, pH $\pm$ 0.1 units, and SC $\pm$ 5%.

- Meters used during development will be calibrated at the frequency indicated in Table 1. The calibration fluids used will bracket the ranges expected from the ground water.

- The development water will be contained and stored in a labelled liquid D.O.T. drum located on site.

- After surging and/or jetting, check the well depth to make sure the well is fully cleared of sediment.

- Replace the well cap and lock the well protection assembly before leaving the well location.

Appendix D

Ground water sampling protocol

Appendix D. Ground water sampling protocol

This protocol provides methods and procedures for the collection of representative ground water samples using a pump.

D.1. Objective

This protocol is designed to reduce variability and to encourage continuity in sample collection among samplers who collect ground water samples. The objectives of this protocol are the following:

- To enable personnel to collect representative samples of ground water for laboratory analysis.
- To assess the horizontal and vertical distribution of pollutants in a water-bearing unit.

D.2. Technical basis

The sampler must follow correct procedures to collect samples that represent accurately the ground water. It is the responsibility of the sampler to see that the sample is neither altered nor contaminated by the sampling and handling procedures.

The ground water in the casing of the well and near the well is probably not representative because of the influence of the well itself. The well is bailed to remove the water altered by the well and to draw ground water that is more typical for that well point.

Moreover, the hydrogeological environment in the subsurface is different from that at the surface. The water's temperature, gas content, reduction-

oxidation potential, and other physical, biological, and chemical conditions usually vary between the subsurface and the surface. When the sampler follows appropriate procedures, the sample will typify subsurface ground water conditions.

Before taking the sample, the well will be pumped until three or more well-volumes have been removed. The pump should not be lowered to the bottom of the well before the well is purged because it will inhibit the complete purging of the well.

The following methods may be used to evaluate the purging of a well. The method selected during the first sampling event will be documented in the field logbook and will be utilized during the three remaining sampling events.

- Monitor the water level in the well while it is pumped. When the level has stabilized, most of the water being pumped will be coming from the aquifer.

- Monitor the temperature, specific conductivity, and pH of the water while it is pumped. When they are stable, little or no water will be coming from the casing's storage.

Effective purging is also possible by initially pumping or removing water from the top of the water column and then slowly moving the pump through the water column.

Sampling systems can alter the physical, chemical, and biological conditions of the ground water. Equipment that constricts the flow of the water can change the pH of the sample simply because it changes the partial pressure of the sample's dissolved gases. Equipment that introduced dissolved oxygen in the sample can alter organic and inorganic constituents. Turbulence and reduction of pressure can change the contents of dissolved oxygen, carbon dioxide, and volatile organic compounds.

The sampling equipment should not affect the sample. The sampling system used depends on several factors including the type and size of the well, the pumping level, the type of contaminant, the analytical procedures, and the presence or absence of permanent pumping fixtures.

D.3. Method

The following procedures are provided to obtain representative samples from wells using a pump. The procedures, divided into four subsections, are provided below.

- Equipment needed
- Collection of descriptive data
- Sampling procedure
- Procedure after taking sample

D.3.1. Equipment needed

- Adjustable rate, positive displacement pumps (for example, centrifugal or bladder pumps constructed of stainless steel or Teflon).
- Tubing - Teflon or teflon lined polyethylene must be used to collect samples for organic analysis. For samples collected for inorganic analysis, teflon or teflon lined polyethylene, PVC, tygon, or polyethylene tubing may be used.
- Water level measuring device, 0.01 foot accuracy (electronic preferred for tracking water level drawdown during all pumping operations).
- Flow measurement supplies (for example, graduated cylinder and stop watch).
- Power source (generator, nitrogen tank, etc.).
- Indicator parameter monitoring instruments - pH, turbidity, specific conductance, and temperature. Optional indicators - eH and dissolved oxygen.
- Decontamination supplies.
- Logbook(s).
- Interface probe, if needed.

- Sample bottles.
- Sample preservation supplies (as required by the analytical methods).
- Sample tags or labels.
- Well construction data, location map, field data from last sampling event.
- Field sampling plan.

D.3.2. Collection of descriptive data

Before collecting a sample with a pump, data are compiled about the well and the ground water in the well. Before collecting the sample, measure the water level to ascertain the volume of ground water to be removed from the well. This datum also is used for other hydrogeological evaluations. Follow these steps to measure the water level:

- Survey the site to locate wells.
- Check that the water level measuring equipment is operating correctly.
- As feasible, begin measuring at wells with the least amount of contamination and proceed to those that are more contaminated.
- Record in field book changes in the well such as erosion or cracks in protective concrete pad or the integrity of the well.
- Don a new pair of disposable gloves.
- Slit the center of a plastic sheet and slip the sheet over the well. This creates a clean surface on which the sampling equipment can be positioned.
- Clean meters, tools, and sampling equipment before placing them on the plastic sheet in accordance with Appendix E, R.3 - Field Equipment Decontamination.
- Measure VOCs at the rim of the well with a PID instrument and record the reading in the field logbook.

- Using an electric water level probe, measure the depth to the ground water and the depth to the bottom of the well twice. Note the measuring points on the well's casing.

- Clean the well probe in accordance with Appendix E, E.3. - Field Equipment Decontamination. Rinse it with distilled water after use.

- Compute the volume of water in the well. Use the following equation for the calculation:

$$well\ volume = \pi\ r\ 2h \quad (7.48)$$

r = radius of well
h = height of water column

The measures for r and h are in feet; the well volume is in gallons. Table D-1 shows the volume of water found in wells of typical sizes.

Table D-1. *Examples: volume of wells per length.*

diameter (inch)	volume (gal/ft)
2	0.1632
3	0.3672
4	0.6528
6	1.4688

To find the total volume of water, multiply the values in the second column of the table by the total length of the water column. Record this volume on the Ground Water Field Sampling Log. For low permeable formations, the water in the sand pack must also be purged. Calculate the purge volume based on the borehole's radius.

D.3.3. Sampling procedures

A positive displacement type pump will be used to purge and sample monitoring wells which have a 2-inch I.D. or greater well casing.

Pump, safety cable, tubing, and electrical lines will be lowered slowly into the well to a depth corresponding to the center of the saturated screen section of the well. It is also advisable to keep the pump intake at least two feet above the bottom of the well in order to prevent mobilization of any sediment present in the bottom of the well.

Measure the water level again with the pump in the well before starting the pump. Start pumping the well at 0.2 to 0.5 liters per minute. Ideally, the pump rate should cause little or no water level drawdown in the well (less than 0.3´ and the water level should stabilize). The water level should be monitored every three to five minutes (or as appropriate) during pumping. Care should be taken not to cause pump suction to be broken or entrainment of air in the sample. Record pumping rate adjustments and depths to water. Pumping rates should, if needed, be reduced to the minimum capabilities of the pump (for example, 0.1 - 0.2 l/min) to avoid pumping the well dry and/or to ensure stabilization of indicator parameters. If the recharge rate of the well is very low and the well is purged dry, then sampling shall commence as soon as the well has recharged to a sufficient level to collect the appropriate volume of samples with the pump.

During purging of the well, monitor the field indicator parameters (turbidity, temperature, specific conductance, pH, etc.) every three to five minutes (or as appropriate). The well is considered stabilized and ready for sample collection once all the field indicator parameter values remain within 10% for three consecutive readings. If the parameters have stabilized, but the turbidity is not in the range of the 5 NTU goal, the pump flow rate should be decreased and measurement of the parameters should continue every three to five minutes.

VOC samples will be collected first and put directly into pre-preserved sample containers. All sample containers should be filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

Samples requiring pH adjustment will have their pH checked to assure that the proper pH has been obtained. For VOC samples, this will require that a test sample be collected to determine the amount of preservative that needs to be added to the sample containers prior to sampling.

D.3.4. Procedure after taking sample

After you have taken the sample, follow these practices to complete the documentation and leave the well intact and secure:

- Pack the sample. The type of analysis for which a sample is collected determines the type of container, preservative, holding time, and filtering requirement. Samples are transferred directly from the sampler to the container. The container should hold any necessary preservative and should be correctly labeled before the sample is transferred to it.

  Next, log the sample. Put the samples in a cooler to keep them at 4°C. Ship samples within twenty-four hours or within their holding time, whichever is shorter. Include adequate packing and coolant with the samples so that the samples arrive unimpaired.

- Begin the chain-of-custody.

- Remove the pump and tubing from the well and disconnect the pump from the tubing. The tubing may either be dedicated to the well for future sampling events (by hanging the tubing in the well) or be properly discarded.

- Replace the well cap and lock the well protection assembly before leaving the well location.

- Put the gloves and plastic sheet in a plastic bag for disposal.

- Decontaminate the equipment. Sampling equipment will be decontaminated prior to use and following sampling of each well. Pumps will not be removed between purging and sampling operations. The pump and tubing (including support cable and electrical wires which are in contact with the sample) will be decontaminated by the procedures listed below. Alternative procedures must be approved by the Quality Assurance Officer prior to the sampling event.

  - The decontaminating solutions can either be pumped from buckets through the pump or the pump can be disassembled and flushed with the decontaminating solutions. It is recommended that detergent and methanol used in the decontamination process be used sparingly and water flushing steps be extended to ensure that any sediment trapped in the pump is flushed out. The outside of

the pump and the electrical wires must be rinsed with the decontaminating solutions, as well. The procedure is as follows:

- Flush the equipment/pump with potable water.
- Flush with non-phosphate detergent solution (five gallons).
- Flush with tap water to remove all of the detergent solution.
- Flush with distilled/deionized water.
- Flush with methanol.
- Flush with distilled/deionized water.

Appendix E

Sampling equipment decontamination protocol

Appendix E. Sampling equipment decontamination protocol

This protocol documents the procedure to decontaminate equipment and materials used to sample or otherwise to handle water, soil, sediment, or other media that is being sampled for chemical quality.

Sampling equipment must be decontaminated before each use and before it is removed from a site. Decontamination is an essential step in the quality assurance of a sampling protocol. Improperly cleaned or prepared sampling equipment can lead to misinterpretation of environmental data due to cross contamination. Cross contamination can result when contaminants are introduced to a location by equipment which has either been cleaned improperly or not cleaned at all. Since laboratories will be analyzing the samples with sensitive instruments, the quality control that decontamination contributes to is critical.

Sampling equipment is decontaminated before it reaches the field. If the equipment is reused and if laboratory cleaning is not an option, a decontamination station must be established in the field, and the decontamination procedures are conducted there.

E.1. Objective

Decontamination procedures are designed to remove particles and compounds which could affect the integrity and, thus, the interpretation of environmental sampling data. Decontamination of materials and equipment used in field sampling work is required for the following reasons:

- Maintain the acceptability of field samples for the data they will generate.
- Prevent cross contamination of samples.
- Minimize the spread of contaminants.

- Reduce the potential for workers to be exposed to contaminants.

E.2. Method

To establish decontamination methods for a particular site, the site superintendent must comprehend the conditions of the site and the expected concentrations of the contaminants. An awareness of site contaminants aids in the selection of reagents for decontamination. For example, if acetone is a contaminant of concern, it will not be used in the solvent rinse step of decontamination.

Decontamination methods and materials are selected based upon the type of contamination and decontamination method's ability to remove the contaminants. The following are elementary items in decontamination:

- Equipment which has the potential to contact the environmental medium to be sampled should be washed with a detergent solution and rinsed with control water before it is used. Control water is clean water from a potable supply with a known chemical composition.

- A solvent, methanol for example, is used to remove contamination from organic compounds. The solvent causes the contamination to enter solution.

- Acid is used when sampling for inorganic contaminants. It provides a low pH solution and causes the inorganic contaminant to withdraw from the equipment and enter solution.

- The materials used to contain solutions and to scrub the equipment must be resistant to attack from the solvent and acid solutions.

Specific limitations to field decontamination include the following items:

Weather. Cold temperatures reduce the potential of solvents to volatize.

Space requirements. Decontamination requires space both for the decontamination process itself and for the storage of equipment and materials after decontamination. This space must be available at the site of the work and must be away from the area of greatest contamination.

Disposal issues. Materials generated by the decontamination process, such as rinse waters, are likely to be hazardous and must be properly disposed.

E.3. Field equipment decontamination

A field decontamination station should be located away from any source of contamination (to prevent potential cross contamination) but close enough to the sampling teams to facilitate equipment handling. The decontamination station should also be set up in a way to not affect clean areas of the site. Whenever possible, field sampling should be initiated in the area of the site with the lowest known contaminant probability and proceed to the area of highest known or suspected contamination.

The use of multiple sampling units allows decontamination teams to rotate sampling equipment effectively. The following is a step-by-step procedure for field equipment decontamination:

- Using a laboratory grade detergent and control water, remove visible particles and residual oils and grease. Note the following:
  - This step may be preceded by a steam or high pressure wash at an approved area in order to facilitate residual removal.
  - For equipment that cannot be adequately cleaned with a brush due to internal mechanisms or tubing, the decontamination solution should be circulated through the equipment.
- Rinse the equipment thoroughly with control water or distilled deionized water to remove the detergents. Since no inorganic analytes will be collected, rinsing with nitric acid will not be performed.
- Rinse the equipment with a highly pure solvent (pesticide grade) to remove traces of organic compounds. Isopropyl alcohol, acetone, methanol, and other solvents are acceptable for the solvent rinse step. Methanol will be used in this program.
- Allow the solvent rinse to evaporate and the equipment to air dry.

- Give the equipment a thorough rinse with distilled deionized water rinse to remove any residual traces of solvent.

- Wrap the sampling equipment with an inert material such as aluminum foil for transport to the sample collection area. Note that household aluminum foil often has a coating of oil and should not be used for this purpose.

The decontamination process should be well documented. Each step, materials used, and the disposition of waste should be recorded in a field notebook. Miscellaneous items such as weather conditions, nearby activities, and other issues which could affect results should be recorded.

The decontamination fluids will be contained in appropriately labelled liquid D.O.T. drums on site.

E.4. Decontamination of heavy equipment (well development)

Other equipment and materials associated with well development, if required, must be cleaned before and after use at a site. Items such as pipes, surges blocks, and miscellaneous heavy equipment all present potential sources of interference to environmental samples. These items may contact the materials to be sampled and may retain contaminants from other sources such as roadways or storage areas. They may also hold soil material from previous job sites that have not been removed. Field decontamination of heavy equipment requires a large area of ground which will be covered by plastic to control liquid discharge to the ground. The used water will be contained and stored in drums on site.

Two options are available to clean heavy materials:

Steam cleaning. A steam generator uses high pressure to remove visible debris and residuals. Steam generators are typically easy to handle, and they generate low volumes of waste water. This method also has disadvantages. It requires a fixed or portable power source, and they may not be economical for use on small pieces of equipment or for sampling events that are of short duration.

Manual scrubbing. This procedure can be as effective as steam cleaning, or it can be preferred in situations where steam cleaning fails to remove visible material. The field technician scrubs the equipment with a laboratory grade detergent solution to remove material. After the scrubbing, the technician rinses the equipment with water. Manual scrubbing is labor-intensive, and it generates large volumes of wash and rinse solutions.

Either or both of these methods will be employed as necessary based on conditions encountered in the field.

E.5. References

ASTM. 1990 *"Standard practice for decontamination of field equipment used at non-radioactive waste sites."* Current Edition Approved, June 29, 1990. D5088-90.

New Jersey Department of Environmental Protection and Energy. 1992. *"Field sampling procedures manual."*

USEPA. 1987. *"Completion of Superfund field operations methods."* EPA/540/P-18/001.

Appendix 8-1

Contingency plan

REPORT

Contingency Plan

Former CAE Electronics - Hillcrest Facility
Binghamton, New York

March 1998

6250.001

Report

Contingency Plan

Former CAE Electronics - Hillcrest Facility
Binghamton, New York

March 1998

O'BRIEN & GERE ENGINEERS, INC.

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Contents

List of Tables

1. Introduction

The purpose of the Contingency Plan for remedial activities at the former CAE Facility in Binghamton, New York is to provide guidance for protection of on-site remedial action construction workers, samplers, oversight personnel, and the local affected population in the event of an accident or emergency during the remedial activities.

The Contingency Plan discusses the volatile organic compounds (VOCs) and priority pollutant metals (metals) which are known to be present in on-site soil and ground water based upon previous analyses. The Plan also incudes a presentation of physical hazards and a discussion of the planned responses to elevated air monitoring in the work zone and at the fenceline. The Emergency Response Plan, Personal Protective Equipment Program and Perimeter Air Monitoring and Dust Control Plan, referenced in this Contingency Plan, will be prepared by the construction contractor (in accordance with the Technical Specifications) and implemented, as appropriate, in the event that chemical or physical hazards are encountered or elevated air concentrations occur in the work zone or at the fenceline.

2. Potential health and safety hazards

2.1. General

The Health and safety hazards identified in this section are those that are associated with the remedial activities that will be performed at the Site. These activities include excavation of leaching pits (including sludge) and soil containing VOCs and metals at levels in excess of the identified site-specific clean-up levels to the ground water table, and off-site disposal. Potential health and safety hazards are associated with constituents in the soil and ground water. Other hazards are associated with physical hazards and potential air emissions.

2.2. Soil and ground water data

The data presented in Table 1 below includes the maximum concentrations reported in soil/sludge and ground water for each parameter during the site investigations.

Table 1. Soil and ground water data

Parameter	Max. Reported Conc.	
	Soil (ppm)	Water (ppm)
VOCs		
Vinyl Chloride	ND	0.013
Methylene Chloride	ND	1.1
Acetone	1.9	0.049
1,1-Dichloroethene	ND	0.017
1,1-Dichloroethane	26	3.1
trans-1,2-Dichloroethene	ND	2.8

Parameter	Max. Reported Conc. Soil (ppm)	Water (ppm)
1,2-Dichloroethene (total)	ND	0.52
Chloroform	NA	0.059
1,2-Dichloroethane	ND	0.024
1,1,1-Trichloroethane	530	0.09
Trichloroethene	610	6
1,1,2-Trichloroethane	ND	0.023
cis-1,2-Dichloropropene	ND	0.027
Tetrachloroethene	1.7	0.001
Dibromochloromethane	ND	0.076
Chlorobenzene	0.19	ND
Chloroethane	46	0.002
Xylene (total)	1.5	0.012
Metals		
Aluminum	30,200	708
Antimony	112	0.156
Arsenic	ND	0.41
Barium	637	4.19
Beryllium	5.9	0.101
Cadmium	4,020	7.29
Calcium	150,000	7030
Chromium	8,410	21.9
Hexavalent Chromium	ND	1.8
Cobalt	16.2	0.646
Copper	14,700	22.8

Parameter	Max. Reported Conc.	
	Soil (ppm)	Water (ppm)
Fluoride	ND	1.8
Iron	41,200	1,800
Lead	7,250	1.43
Magnesium	22,100	1,830
Manganese	3,370	57.7
Mercury	0.93	0.003
Nickel	4,690	1.99
Potassium	ND	36.6
Silver	50.5	0.16
Sodium	NA	151
Vanadium	ND	0.901
Zinc	6,110	4.8
Cyanide	287	0.395

NA = Data not available
ND = Non detect

2.3. Physical hazards

In addition to the chemical hazards present in the soil and ground water, the potential for physical hazards is also present on Site. Potential physical hazards include, but are not limited to, tripping due to loose soil and uneven terrain, slipping due to wet or muddy surfaces, back strain from lifting, electrical shock, pit or structure collapse during excavation, confined space hazards in the unexcavated leaching pits, and impact from falling objects or moving parts of heavy equipment. Also, there is a potential for stinging insects.

2.4. Potential air emissions

Particulates, some of which may contain adsorbed VOCs and/or metals, and volatile compounds may be emitted during the excavation and material handling processes.

3. Emergency responses

3.1. Physical hazards

In the event that a physical hazard results in a personal injury, the Contractor shall follow the procedure presented in the Emergency Response Plan prepared by the Contractor. The Emergency Response Plan shall be prepared in accordance with the Technical Specifications. The Contractor will notify the owner's representative and NYSDEC of all on-site accidents at the time of occurrence and follow up in writing within 24 hours in accordance with the Emergency Reporting Procedures specified in the Technical Specification.

3.2. Elevated air emissions

3.2.1. Work zone

In the event that elevated air concentrations are detected in the work zone through monitoring performed in accordance with 29 CFR 1910.120, the Contractor shall follow the upgrade requirements of his Personal Protective Equipment ("PPE") program as specified in the Technical Specifications. The Contractor will notify the owner's representative of all person(s) exposed at levels exceeding OSHA permissable exposure levels, action levels and other standards in accordance with the Emergency Reporting Procedures specified in the Technical Specification.

3.2.2. Fenceline

Perimeter air monitoring will be performed in accordance with the Perimeter Air Monitoring and Dust Control Plan specified in the Technical Specifications. If the level of particulates or VOCs leaving the Site reaches

or exceeds the specified New York State acceptable levels, work will be discontinued and measures will be taken to reduce the levels. Dust will be reduced using measures which include, but are not limited to, those specified in the Technical Specifications. VOCs will be reduced using air emissions controls instituted by the Contractor in accordance with the Technical Specifications.