AL-Tech Specialty Steel
Lucas Avenue Plant (OU-1)
Chautauqua County
Dunkirk, New York

FINAL ENGINEERING REPORT
Site Number: 907022

AUGUST 2019

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Environmental Remediation
Remedial Bureau E
625 Broadway
Albany, New York 12233-7017

Prepared by:

ECOLOGY AND ENVIRONMENT ENGINEERING AND GEOLOGY, P.C.
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Certifications

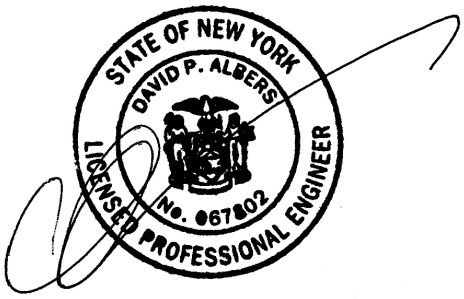
I, David P. Albers, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program activities, and I certify that the Remedial Design was implemented and that all construction activities were completed in substantial conformance with the Department-approved Remedial Design.

I certify that the data submitted to the Department with this Final Engineering Report demonstrates that the remediation requirements set forth in the Remedial Design and in all applicable statutes and regulations have been or will be achieved in accordance with the time frames, if any, established for the remedy.

I certify that all documents generated in support of this report have been submitted in accordance with the Division of Environmental Remediation's electronic submission protocols and have been accepted by the Department.

I certify that all data generated in support of this report have been submitted in accordance with the Department's electronic data deliverable protocols and have been accepted by the Department.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, David P. Albers, of Ecology and Environment Engineering and Geology, P.C., am certifying as Owner's Designated Site Representative for the site.



067802	8/28/19	
NYS Professional Engineer No.	Date	Signature

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List of Abbreviations and Acronyms

ACM	Asbestos-Containing Materials
AOC	Area of Concern
CAMP	Community Air Monitoring Plan/Program
CAP	Contractor's Application for Payment
CO	Change Order
COC	Contaminants of Concern
CPM	Critical Path Method
DIR	Daily Inspection Report
DUSR	Data Usability Summary Report
E & E	Ecology and Environment Engineering and Geology, P.C.
EBD	Empire Building Diagnostics, Inc.
ELAP	Environmental Laboratory Accreditation Program
EPA	United States Environmental Protection Agency
ESGI	The Environmental Service Group (NY), Inc.
FER	Final Engineering Report
FO	Field Orders
GC/MS	Gas Chromatography/Mass Spectroscopy
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDPE	High-density polyethylene
ICM	Interim Corrective Measure
IRM	Interim Remedial Measure
LAP	Lucas Avenue Plant
LF	Linear Feet
MBE/WBE	Minority-Owned Business Enterprise/Women-Owned Business Enterprise
mg/kg	milligrams per kilogram
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NIOSH	National Institute for Occupational Safety and Health

List of Abbreviations and Acronyms (cont.)

NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOL	New York State Department of Labor
OSHA	Occupational Safety and Health Administration
Paradigm	Paradigm Environmental Services, Inc.
PCB	Polychlorinated Biphenyl
PCO	Proposed Change Order
PID	photo-ionization detector
PM	Project Manager
PPE	Personal Protective Equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAO	Remedial Action Objective
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	Request for Further Information
RI	Remedial Investigation
ROD	Record of Decision
ROW	Right-of-Way
SAP	Sampling and Analysis Plan
SCO	Soil Cleanup Objective
SGC	Standards, Criteria and Guidance
sHASP	Site-specific Health and Safety Plan
SMP	Site Management Plan
SSO	Site Safety Officer
SVOC	Semi-volatile Organic Compound
VOC	Volatile Organic Compound
VRQ	Vendor Responsibility Questionnaire

Final Engineering Report

This Final Engineering Report (FER) provides information and details on the completion of the building demolition and soil remediation work performed at the Lucas Avenue Plant (LAP) of the AL-Tech Specialty Steel Corporation Site (AL-Tech), New York State Department of Environmental Conservation (NYSDEC) Site No. 907022. The work was performed by The Environmental Service Group (NY), Inc. (ESGI). Ecology and Environment Engineering and Geology, P.C. (E & E) provided engineering services during remedial construction for this work from August 2016 to June 2018. An electronic copy of this FER with supporting documentation is included as Appendix B.

1 Background and Site Description

ESGI entered into Contract No. D009632 with the New York State Department of Environmental Conservation (NYSDEC), executed on July 8, 2016, to remediate a 7.9-acre property located in Dunkirk, New York. The property was remediated to commercial use.

The site is located at 100 – 190 West Lucas Avenue in the City of Dunkirk, Chautauqua County, New York, approximately 0.5 miles west of Central Avenue (SBL No. 96.06-3-1). The site is located in a mixed industrial and residential area. The site is bounded to the north by West Lucas Avenue, to the south by an active railroad right-of-way (ROW) owned and maintained by Norfolk Southern Corporation, to the east by the City of Dunkirk Department of Public Works facility, and to the west by Brigham Road (see Figure 1-1). The boundaries of the site are fully described in Appendix A: Survey Map, Metes and Bounds.

The Lucas Avenue Plant (LAP) was a one-story, approximately 178,000-square-foot (SF) former steel manufacturing facility. The LAP was formerly a part of the adjoining 90-acre AL-Tech Specialty Steel Site to the south, which is not included as part of the remedial project. The original LAP facility was constructed in 1909, with additions constructed in 1920, 1936, 1940, and 1968. The LAP was primarily used for cold drawing of stainless steel to produce wire. Related activities included lime coating, pickling, bright annealing, and copper and lead plating.

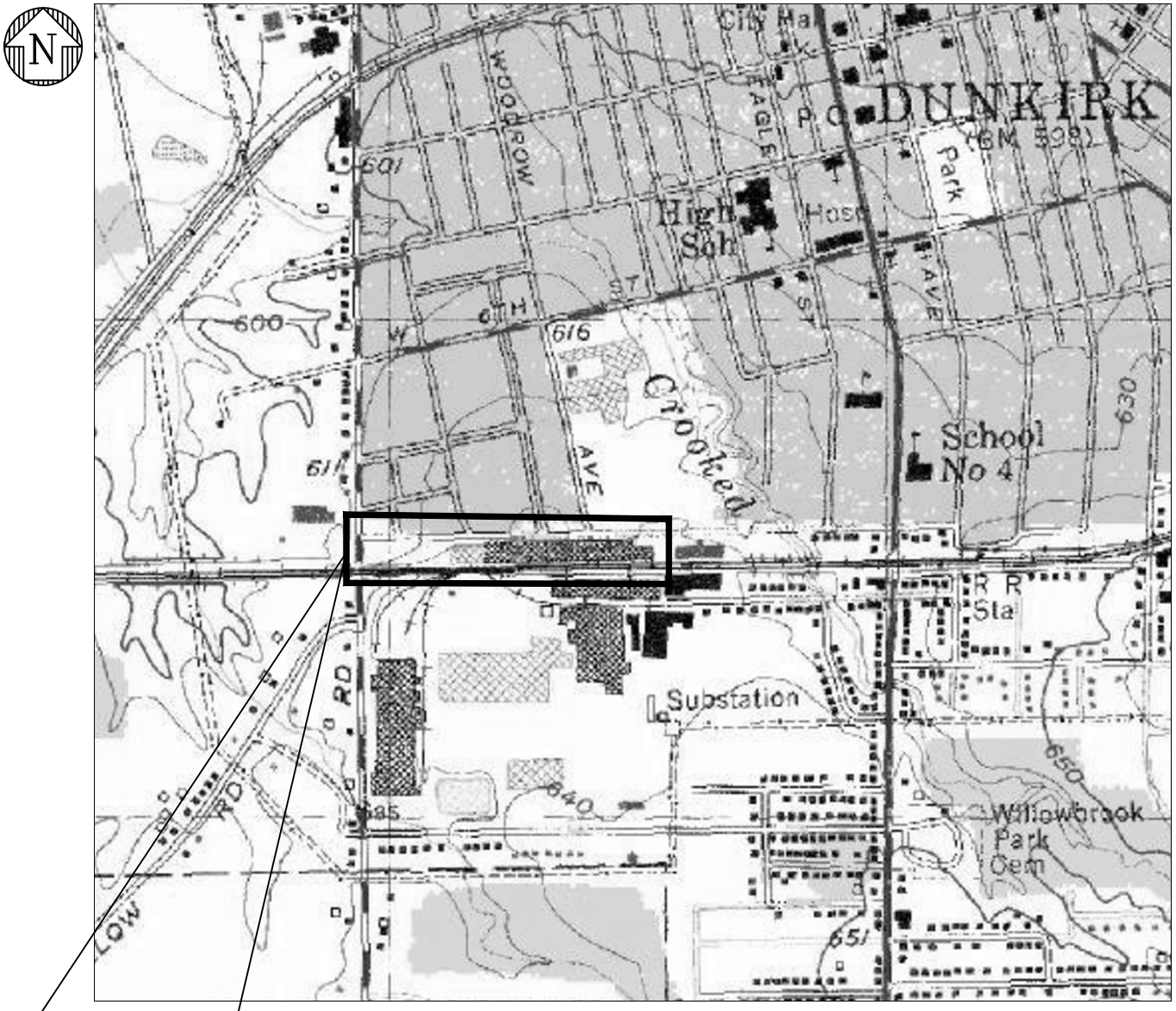
In 1992, AL-Tech submitted a Resource Conservation and Recovery Act (RCRA) Remedial Facility Assessment (RFA) in accordance with the RCRA Corrective Action Program (McLaren/Hart Environmental Engineering Corporation 1992). This assessment identified 24 Solid Waste Management Units and 11 Areas of Concern (AOC) throughout the site. Over the period of 1995 – 1997, AL-Tech conducted a RCRA Facilities Investigation (Environmental Strategies Corporation 1998), which documented waste disposal in areas of the LAP.

Manufacturing operations at the LAP ceased in 1997, and the vacant building had fallen into disrepair. After AL-Tech filed for bankruptcy in 1999, RealCo, Inc. (RealCo) assumed title of the LAP site. RealCo was responsible for management of an environmental remediation trust to implement RCRA corrective actions at the LAP. RealCo performed a soil investigation at the north end of the West Pickle Process Area at the LAP in order to delineate the nature and extent of contamination due to pickling operations (Benchmark Environmental Engineering &

Science 2001a). This investigation identified chromium and lead in soils at concentrations that have the potential impact the groundwater quality.

In February 2014 a letter of condemnation was issued for the building by the City of Dunkirk Office of the Housing, Building and Zoning Officer (Zurawski 2004).

Information regarding interim remedial measures performed at this site is provided in Section 3.



NOTE: THE SITE LOCATION AND VICINITY MAP SHOWN ARE NOT TO SCALE.

FIGURE 1-1 SITE LOCATION AND VICINITY MAP
FORMER AL-TECH SPECIALTY STEEL SITE
DUNKIRK, NEW YORK

2 Summary of Site Remedy

2.1 Remedial Action Objectives

The goal for the remedial program is to restore the site to be suitable for commercial reuse to the extent practicable. At a minimum, the remedy shall eliminate or mitigate significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

Based on the results of the Remedial Investigations discussed in Section 1, the following Remedial Action Objectives (RAOs) were identified for this site.

2.1.1 Groundwater RAOs

RAOs for Public Health Protection

- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.

RAOs for Environmental Protection

- Remove the source of groundwater or surface water contamination.

2.1.2 Soil RAOs

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure to, contaminants from contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

2.1.3 Soil Vapor RAOs

RAOs for Public Health Protection

- Mitigate impacts on public health resulting from existing or potential soil vapor intrusion into buildings at a site.

2.2 Description of Selected Remedy

The factors considered during the selection of the remedy in the NYSDEC November 2012 Record of Decision (ROD) (NYSDEC 2012) are those listed in 6 NYCRR 375-1.8. The following are the components of the selected remedy.

1. Remedial Design

The remedial design program provides the details for the construction, operation, maintenance, and monitoring of the remedial program. Green remediation principles and techniques were implemented to the extent practicable in the design, implementation, and site management of the remedy as per NYSDEC Program Policy DER-31 – Green Remediation.

The major green remediation components of the remedial design program are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling, and increasing reuse of materials that would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when practicable;
- Fostering green and healthy communities and working landscapes that balance ecological, economic, and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable redevelopment.

2. Removal of USTs and Transformers

Underground storage tanks (USTs) and electrical transformers were removed and properly disposed of under a previous interim remedial measure (IRM; E & E 2007). During this remedial effort, USTs were pulled from the east and west oil rooms, and impacted soils were excavated and disposed of.

3. Demolition

The dilapidated condition of the LAP and the presence of brick containing chromium and copper in the east and west pickle bath areas prevented the safe remediation of the site with the building in place. On February 14, 2014, the City of

Dunkirk issued a letter of condemnation for the facility (Zurawski 2014). On November 6, 2015, the New York State Department of Labor (NYSDOL), Division of Safety and Health, granted a variance allowing for the demolition of the LAP with asbestos-containing materials (ACM) left in place. Demolition of the building was necessary to remove and properly dispose of this material. The remaining building was demolished, leaving floor slabs in place. Building materials were reclaimed and recycled where practicable.

4. Excavation

A 2007 IRM (E & E 2007) removed a large quantity of contaminated soil from the site; however, the IRM did not address all areas at the site. The excavations for this IRM included the following:

- Excavation and off-site disposal of characteristic hazardous waste metals, including cadmium, chromium, and lead.
- Soil containing elevated levels of metals and/or semi-volatile organic compounds (SVOCs) were excavated and properly disposed of.
- Soils contaminated with volatile organic compounds (VOCs) were excavated and disposed of off-site. The remedial goal for the VOC-contaminated soils were the commercial values defined in 6 New York Codes, Rules and Regulations (NYCRR) Part 375-6.8.

5. In Situ Soil Treatment

Before backfilling the excavation containing VOCs, the bottom of the excavation was treated by applying a product(s) intended to hasten reductive dechlorination of remaining VOCs in soil and groundwater.

6. Site Cover

A site cover was required to allow for commercial use of the site. Where the soil cover was required, it comprises a minimum of 1 foot of soil, meeting the soil cleanup objectives (SCOs) for cover material as set forth in 6 NYCRR Part 375-6.7(d) for commercial use. The soil cover was placed over a demarcation layer, with the upper 6 inches of the soil of sufficient quality to maintain a vegetation layer. Any fill material brought to the site meets the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d).

7. Institutional Control

The ROD required the imposition of an institutional control in the form of an environmental easement for the controlled property that:

- Requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- Allows the use and development of the controlled property for commercial use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;

- Restricts the use of untreated groundwater as a source of potable or process water; necessary water quality treatment would be determined by the New York State Department of Health (NYSDOH) or the County DOH; and
- Requires compliance with the Department-approved Site Management Plan (SMP).

8. Site Management Plan (SMP)

The SMP (E & E 2019) developed for the site includes the following:

a. An Institutional and Engineering Control Plan that identifies use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective;

b. Institutional Controls: The environmental easement specifies the institutional controls needed to restrict use of the site, restrict groundwater use, ensure that the owner of the site incorporates a NYSDEC-approved SMP, and ensure periodic certification that the property is used only for activities allowed by the restrictions;

c. Engineering Controls: The soil cover will be maintained where building structures and pavement are not being maintained;

d. An Excavation Plan, which details the provisions for management of future excavations in areas of remaining contamination; and

e. A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but is not limited to:

   - monitoring of groundwater to assess the performance and effectiveness of the remedy;
   - a schedule of monitoring and frequency of submittals to NYSDEC;
   - monitoring for vapor intrusion in any buildings developed on the site;
   - descriptions of the provisions of the environmental easement, including any land use and groundwater use restrictions;
   - a provision for evaluating the potential for soil vapor intrusion in any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
   - provisions for the management and inspection of the identified engineering controls;
   - maintaining site access controls and NYSDEC notification; and
   - steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

3 Interim Remedial Measures, Operable Units, and Remedial Contracts

The information and certifications made in the October 2007 *Interim Remedial Measures for AL-Tech Specialty Steel Site, Volume I – III, Summary Report* (E & E 2007) were relied upon to prepare this report and certify that the remediation requirements for the site have been met.

3.1 Interim Remedial Measures

The AL-Tech Specialty Steel site LAP has been the subject of numerous investigations, studies, and remedial activities from 1998 through the present. An *Interim Corrective Measures (ICM) Work Plan for Decontamination and Demolition of the Lucas Avenue Plant* (Benchmark Environmental Engineering & Science 2001b) was issued April 2001. In 2006, an IRM was conducted to demolish the former Wire Mill Extension area to the west of the existing structure (prior to being removed under the current remedial action) and conduct targeted soil removal.

A history of remedial activities is presented below.

1. RCRA Facility Assessment Report (McLaren/Hart Environmental Engineering Corporation, December 1992).
2. Phase 1 RCRA Facilities Investigation Report, AL Tech Specialty Steel Corporation, Dunkirk, New York, Facility (Environmental Strategies Corporation, October 1998).
3. Sampling and Analysis Plan, Lucas Avenue Plant Decontamination and Demolition (Benchmark Environmental Engineering & Science, January 2001c).
4. ICM Work Plan for Decontamination and Demolition of Lucas Avenue Plant (Benchmark Environmental Engineering & Science, April 2001b).
5. Investigation Report for LAP West Soil ICM, Lucas Avenue Plant, Dunkirk, New York (Benchmark Environmental Engineering & Science, June 2001a).
6. Phase II RCRA Facility Investigation and ICM Report, Former AL Tech Specialty Steel Corporation, Dunkirk, New York (Benchmark Environmental Engineering & Science, October 2003).

7. Former AL Tech Specialty Steel Corporation Facility Supplemental Phase II RFI Field Activities and Findings York (Benchmark Environmental Engineering & Science, August 2004).
8. Corrective Measures Study/Feasibility Study York (Benchmark Environmental Engineering & Science, September 2006).
9. IRMs for AL Tech Specialty Steel Site, Site No. 9-07-022, City of Dunkirk, Chautauqua County, Volumes I-III Summary Report (Ecology and Environment Engineering, P.C., October 2007).
10. Record of Decision, AL Tech Specialty Steel Corporation, Operable Unit Number 01, Lucas Avenue Plant Remedial Program (NYSDEC November 2012).

Based on investigations completed to date, the primary contaminants of concern (COCs) at the LAP site were arsenic, barium, cadmium, chromium, lead, trichloroethene (TCE), and polychlorinated biphenyls (PCBs).

After public comments on the proposed remedial plans for the Former AL-Tech Steel Specialty Steel Lucas Avenue Site OU-1 Remedial Action Project were considered, a Remedial Action Plan (RAP) was selected and documented in a Record of Decision, which was issued on November 2012 (NYSDEC 2012).

3.2 Operable Units

The AL-Tech site is divided into three OUs, as shown on Figure 3-1:

- OU-1: the LAP, including the property owned by RealCo, situated north of the Norfolk Southern railway ROW and parallel to West Lucas Avenue;
- OU-1A: Lucas Avenue IRM;
- OU-2: Willowbrook Pond Tributary;
- OU-2A: Willowbrook Pond, located in the southwest corner of the site and previously remediated by the NYSDEC; and the unnamed tributary of Crooked Brook located south of Crooked Brook;
- OU-2B: a portion of the Brigham Road plant that has been demolished; and
- OU-3: the AL-Tech Specialty Steel site, including the remaining property within the main facility area owned by Dunkirk Acquisition LLC.

The remedial activities detailed in this report pertain only to OU-1 (see Figure 3-2), unless otherwise noted.

Date: 5/10/2019 Document Path: L:\Buffalo\AI_Tech\Maps\MXD\FER_Feb2019\Figure 3-1 Site Location Map Letter.mxd

Figure 3-1

Site Location Map with Operable Units OU-1, OU-2A, OU-2B, and OU-3

Dunkirk, New York

Stream/River (USGS NHD)

Railroad

Al Tech Specialty Steel Site (OU-3)

N W E S

0 150 300 600

Feet

Sources: Ecology and Environment, Inc. 2019; USGS 2018; NYSDEC 2018

Figure 3-2

Site Map

Dunkirk, New York

Stream/River (USGS NHD)

Railroad

Project Site

0 150 300 600 Feet

Sources: Ecology and Environment, Inc. 2019; USGS 2018; NYSDEC 2018

3.3 Remedial Contracts

Ecology and Environment Engineering and Geology, P.C. (E & E) was issued a work assignment in September 2013 to prepare a remedial design for the demolition and soil remediation of OU-1. The Contract Documents developed for the remedial design detailed the size, scope, and character of the site remediation. The Contract Documents consisted of the technical specifications, Contract Drawings, and a limited site data document (see Appendix C).

Following the Department's approval of the Remedial Design, E & E was issued a work assignment in May 2015 to provide engineering services, described in Section 4.2.3, during remedial construction.

3.4 Project Bidding Information and Award

The Contract Documents (E & E 2015a) were issued for competitive public bidding by NYSDEC with the assistance of E & E. The public advertisement announcing the availability of the Contract Documents for the public to bid on the remedial action project was published in newspapers in the local area (*Dunkirk Observer*) and the *Capital District News*. Electronic copies of the advertisement was also published in the New York State Contract Reporter for inclusion in the December 2015 issue.

A mandatory pre-bid meeting was held by NYSDEC and E & E at the project site on December 16, 2015. Potential bidders that attended were required to sign an attendance sheet to document their presence at the mandatory meeting. At the meeting, NYSDEC and E & E discussed the requirements for bidding on the project, technical requirements of the New York State Superfund (SSF) Contract Documents, and the administrative protocol required to support and document performance of the work. Potential bidders were given the opportunity to ask questions and walk the site to view existing conditions.

Following the pre-bid meeting, four addendums (Addendum Nos. 1 - 4) to the Contract Documents were issued in December 2015 (E & E 2015b). The contents of Addendum Nos. 1 - 4 included pre-bid meeting minutes, a site walkover attendance list, a plan holders list, the pre- and post-bid meeting questions and answers, additional limited site data, and Contract Drawing Cut Sheets (see Appendix C).

Eleven bids were opened by NYSDEC on January 28, 2016. Appendix D provides the Engineer's cost estimate and the bid tabulations. The low bidder for the project was Environmental Services Group, Inc. (ESGI) of Tonawanda, New York, at $4,295,195.

Following a review of additional post-bid information obtained from ESGI, a Notice to Proceed letter (NYSDEC 2016a) was issued by NYSDEC to ESGI in July 2016. Copies of the Contract Agreement (NYSDEC 2016b) were signed by ESGI and transmitted to NYSDEC on July 21, 2016. The Department of Audit and Control for the New York State Comptroller approved the Agreement on July 8,

2016. The Notice to Proceed date for the Former AL-Tech Specialty Steel Lucas Avenue Site OU-1 Remedial Action Project was officially established as July 21, 2016 (NYSDEC 2016b).

4 Description of Remedial Actions Performed

Remedial activities completed at the Site were conducted in accordance with the NYSDEC-approved Contract Documents for the AL-Tech site. Deviations from the remedial design are discussed in Section 4.12.

The Contract Documents divided the work into three remediation areas based on the previously identified levels of contamination. The areas were defined as follows.

West Process Area (see Figure 4-1):
The work in this area consisted of:

- Demolition with ACM in place, transport, and disposal of above-grade structures and plant equipment.
- Removal and disposal as hazardous waste of brick walls (floor to roof) and substructure foundations associated with the West Pickling Room.
- Removal of portions of the remaining floor slab and foundation walls in and around the former West Pickling Room to allow removal of contaminated soil areas “A” through “M”, as defined on Contract Drawing sheet 6 of 14.

East Process Area (see Figure 4-2):
The work in this area consisted of:

- Asbestos abatement, demolition, transport, and disposal of above-grade structures and plant equipment.
- Removal of tanks and ancillary equipment from the East Oil Room.
- Removal of portions of the remaining floor slab and foundation walls in and around the former East Pickling Room to allow removal of contaminated soil areas “N” and “O”, as defined on Contract Drawing sheet 6 of 14.

Remaining Site to Property Lines:
The work for the balance of the site consisted of:

- Clearing, grubbing, and removal of contaminated soil to the lines and grades identified on the Contract Drawings.
- Removal of abandoned utilities, concrete slabs, site fencing, grates, private hydrants, valves, meters, manholes and covers, rails, ties, structures, foundations, and sidewalks in and adjacent to the specified soil remediation areas.

4.1 Governing Documents

4.1.1 Contract Documents

As discussed in Section 3.3, the Contract Documents (see Appendix C) contained the remedial design for this OU.

4.1.2 Project Schedule

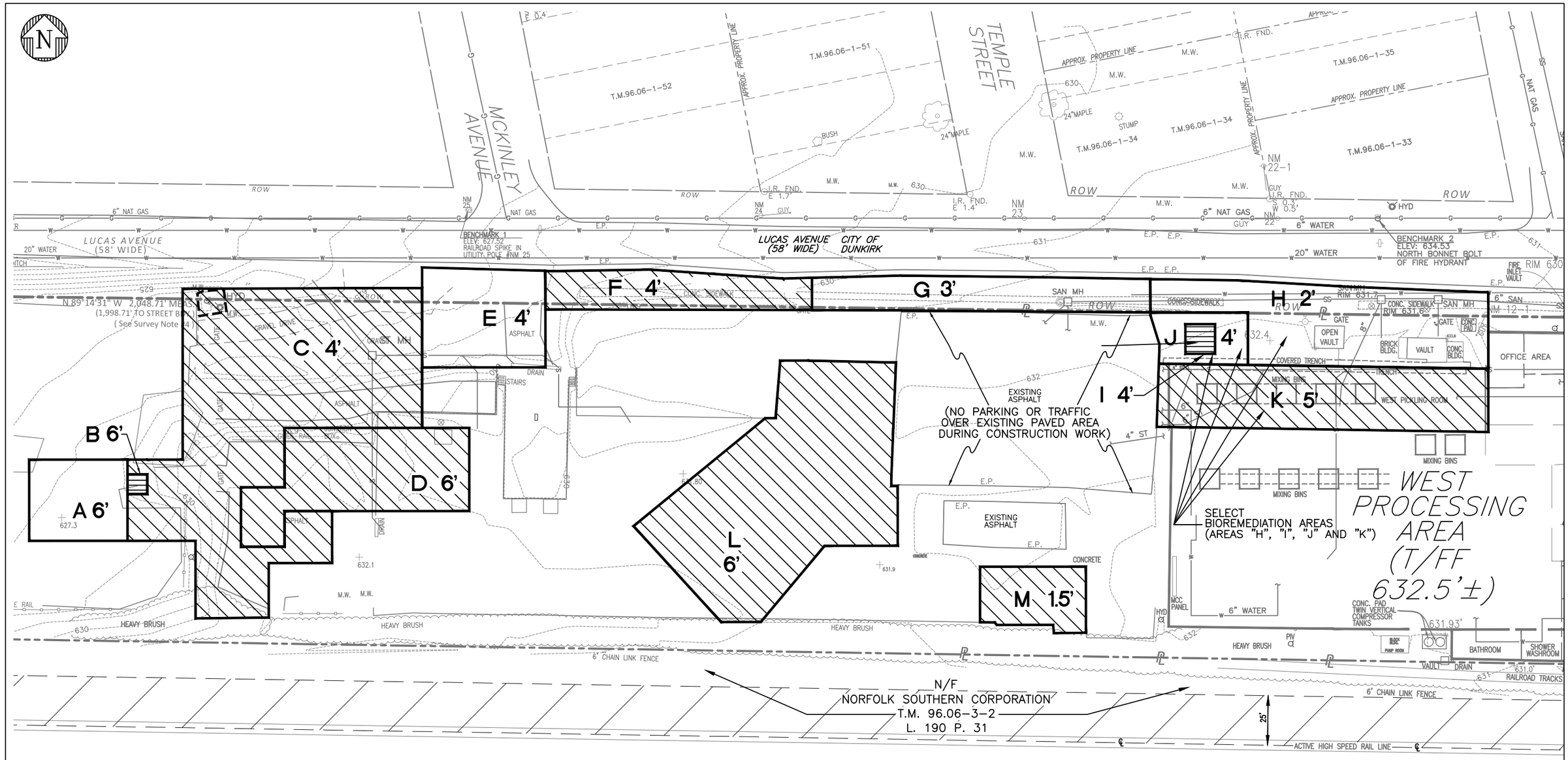
The length of the remediation, set forth in Section VI, Article 6 of the Contract Documents, from Notice to Proceed to Substantial Completion was established as 480 calendar days, with an additional 30 days to Final Completion, for a total of 510 calendar days. Change Orders (COs; see section 4.12.4) added 191 days to the Contract, for a total of 721 days.

ESGI submitted a Progress Schedule in CPM format, with estimated durations and milestones for major work elements, and provided details regarding priority, sequencing, and interdependence of activities. The schedule also provided information on how ESGI would anticipate foreseeable events that could affect cost, progress, performance, and completion of the work.

The Contract Documents required regular progress schedule updates, or as necessary, to evaluate the progress and performance of ESGI's work. ESGI provided regularly scheduled updates to review progress and to facilitate discussion of tasks and weather delays at progress meetings.

- The original progress schedule was submitted by ESGI on March 24, 2016.
- The amended master schedule was accepted by E & E on August 2, 2016.
- Revisions to the schedule were provided on a monthly basis.
- The last schedule revision was provided and approved on August 24, 2016.

ESGI's project submittals are provided in Appendix E.



SCALE IN FEET

0 50 100 150

LEGEND

M 1.5'	REMEDIATION AREA AND EXCAVATION DEPTH (IN FEET)
L 6'	REMEDIATION AREA AND EXCAVATION DEPTH WITH TCLP EXCEEDANCE – 2007 AND 2014 RESULTS
	PCB REMEDIATION AREA

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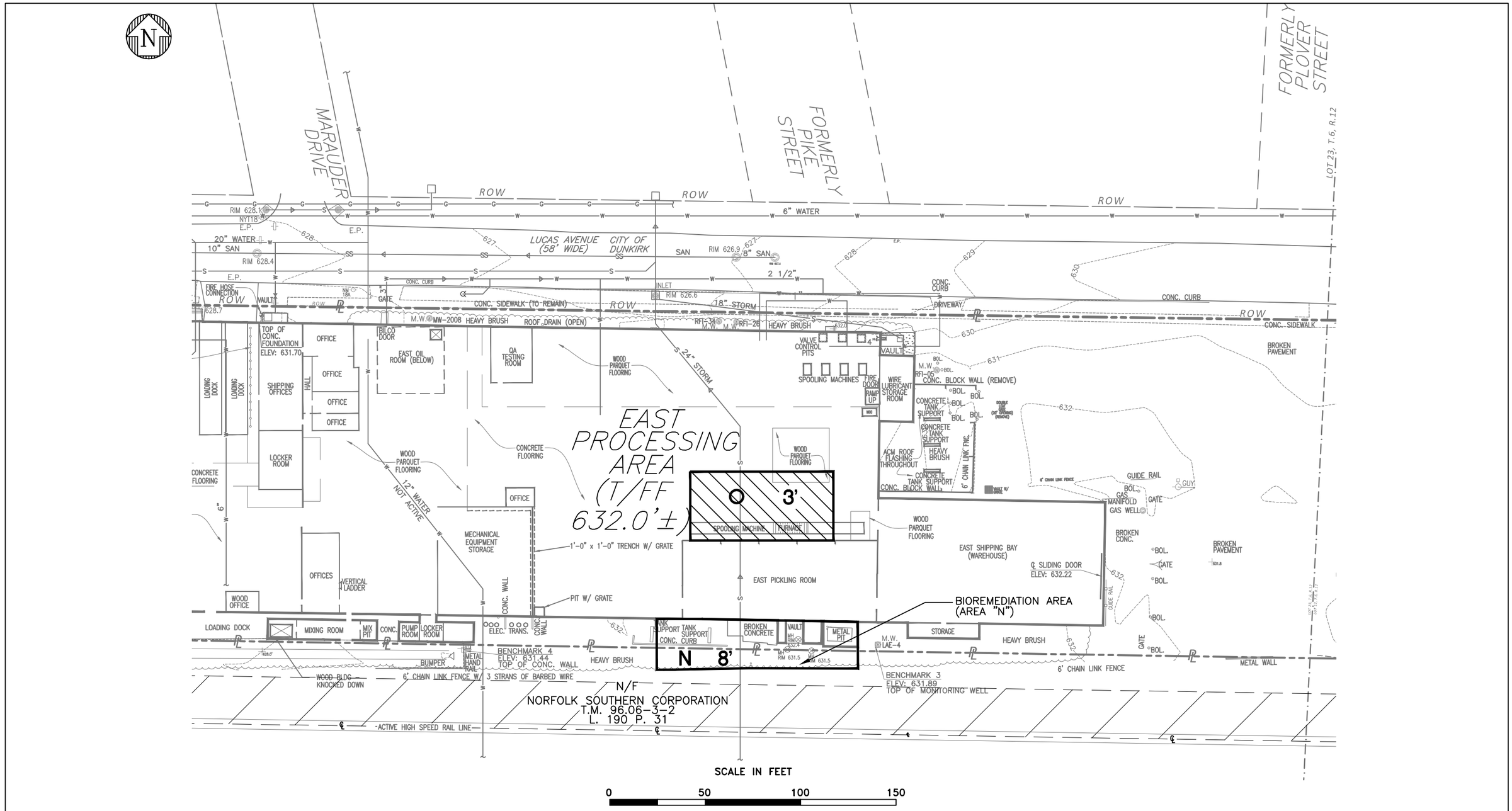
FIGURE 4-1 REMEDIAL EXCAVATION AREAS WEST
FORMER AL-TECH SPECIALTY STEEL SITE
DUNKIRK, NEW YORK



LEGEND

N 8'	REMEDIATION AREA AND EXCAVATION DEPTH (IN FEET)
0 3'	REMEDIATION AREA AND EXCAVATION DEPTH WITH TCLP EXCEEDANCE – 2007 AND 2014 RESULTS

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FIGURE 4-2 REMEDIAL EXCAVATION AREAS EAST
FORMER AL-TECH SPECIALTY STEEL SITE
DUNKIRK, NEW YORK

4.1.3 Site-Specific Health and Safety Plan (HASP)

Remedial work performed under this Remedial Action was in full compliance with governmental requirements, including site and worker safety requirements mandated by the federal Occupational Safety and Health Administration (OSHA).

Project Standard Specification, Section X - 00003 includes Minimum Requirements for Health and Safety, which are based on the following:

- OSHA Standards and Regulations contained in Title 29, Code of Federal Regulations (CFR) Parts 1910 and 1926,
- Applicable sections of the New York State Labor Law,
- EPA's Office of Emergency and Remedial Response Program, and
- National Institute for Occupation Safety and Health's (NIOSH's) procedures to provide safe operations at abandoned hazardous waste disposal sites.

The requirements included the following:

- Project Health and Safety Responsibilities and Organization;
- A site-specific Health and Safety Plan (sHASP) and Hazard Assessment;
- Training and Medical Surveillance documentation;
- Personnel and equipment decontamination procedures;
- A Community Air Monitoring and Protection Program;
- Emergency and first aid requirements; and
- Logs, reports, and recordkeeping.

On March 31, 2016, ESGI issued a sHASP to E & E for review as a part of their 5-day and 14-day submittal package requirement of the Contract Documents. On April 20, 2016, E & E reviewed the sHASP and verified that the Contractor had a site-specific plan and that the components were in compliance with the Contract Document requirements. ESGI provided E & E with copies of medical surveillance examinations and 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) and refresher training certifications for the individual ESGI and subcontracted personnel working near or within exclusion zones. NYSDEC and E & E provided copies of annual health and HAZWOPER refresher training certifications for their respective personnel to ESGI for on-site record-keeping purposes. The sHASP submittal milestones and the plan revisions are provided in the project submittal log (see Appendix E).

ESGI's sHASP provided detailed decontamination procedures for project personnel and equipment, including construction equipment, entering and exiting the exclusion zones. The sHASP detailed the use of portable boot-wash stations, provided guidelines for the disposal of used personal protective equipment (PPE), contained descriptions of the equipment required and the proposed location of the

decontamination station, and identified the requirements covering the movement of equipment between contaminated and non-contaminated work zones.

ESGI provided an Emergency Response and Contingency Plan as a part of their sHASP. The plan included the chain-of-command and communication and evacuation procedures to be followed in the event of an emergency at the site; the locations of first aid equipment; and standard operating procedures and specific procedures to be followed in the event of an accident. A pre-designated route to a nearby medical facility was established, and a road map documenting the route was posted in the Contractor's site operations office.

ESGI compiled a comprehensive list of emergency contact information, including the names and telephone numbers of the responsible personnel involved with the Former AL-Tech Specialty Lucas Avenue OU-1 Remedial Action Project site. The list was distributed to the City of Dunkirk Police, Fire, and Engineering offices; NYSDEC; E & E; and the Chautauqua County Department of Environmental Planning (DEP). This list was periodically reviewed for accuracy during regularly scheduled progress meetings at the site and was redistributed to the responsible personnel whenever revisions were made.

Remedial and invasive work performed at the site complied with the sHASP.

4.1.4 Construction Quality Assurance / Quality Control (QA/QC) Plan

The Construction QA/QC Plan managed performance of the Contract tasks through designed and documented QA/QC methodologies applied in the field and in the lab. The QA/QC Plan provided a detailed description of the observation and testing activities that were used to monitor construction quality and confirm that remedial construction was in conformance with the remediation objectives and specifications.

The Contract Documents Supplementary Specifications, Section XI, Division 1 – Section 01400 – Quality Control, outlined specific requirements of the QA/QC Plan for the project. Included in this section were requirements for QA/QC of installations, references and standards, tolerances, field sampling, inspection and testing services, testing by the Contractor, and manufacturers' field services and reports.

ESGI submitted a QA/QC Plan to E & E on April 20, 2016. This submittal was part of ESGI's Work Plan, which was included with their submittal package following Notice of Apparent Low Bid. E & E rejected the QA/QC Plan on April 20, 2016, and ESGI re-submitted the plan on April 22, 2016. The resubmitted QA/QC Plan was reviewed and accepted by E & E on April 22, 2016.

The Contract Documents Supplementary Specifications, Section XI, Division 1, Section 01425 – Sampling, included NYSDEC Data Usability Summary Report (DUSR) requirements for environmental samples collected by the Contractor.

This process was a part of the QC procedures established by NYSDEC to verify the accuracy of laboratory analysis of samples collected by the Contractor.

The firms selected by ESGI for analytical services included Paradigm Environmental Services, Inc. (Rochester, New York) – waste characterization analyses; Galson Laboratories (East Syracuse, New York) – air analyses; and EMSL Analytical, Inc. (Depew, New York) – asbestos analysis.

ESGI submitted details for compliance with the DUSR requirements to E & E as part of the Sampling and QA/QC Plan. ESGI selected Vali-Data of Western New York, LLC, a subcontracted firm independent of the analytical laboratories, to complete the DUSRs for the project. Additional discussion on the validation of the project analytical data is presented in Section 4.5.3.

4.1.5 Materials Management, Transportation, and Disposal Plan

Per the requirements of Supplementary Specifications Section XI, Division 1, Specification 01560 of the Contract Documents, ESGI submitted a project-specific Transportation and Disposal Plan. The Plan contained proposed vehicle decontamination procedures, truck-weighing requirements, handling procedures for hazardous and non-hazardous wastes, haul routes and instructions, information on alternative disposal facilities and transporters, vehicle-loading procedures, emergency spill/contingency response procedures, placarding, and preparation of shipping documents (manifests).

The initial Transportation and Disposal Plan was submitted to E & E by ESGI in March 2016. The Non-hazardous Waste Transportation and Disposal Plan and the Hazardous Waste Transportation and Disposal Plan were approved by E & E on April 12, 2016.

On May 4, 2016, ESGI submitted an amendment to the Transportation and Disposal Plan for the transport of decontamination and dewatering fluids by ESGI Trucking to American Recycling Co.'s oil/waste treatment plant in Tonawanda, New York. Acceptance was provided by E & E on May 5, 2016. The project transportation and disposal submittal milestones and the plan revisions are provided in Appendix E.

4.1.6 Storm-Water Pollution Prevention Plan (SWPPP)

The erosion and sediment controls for remedial construction were performed in conformance with the requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control and the site-specific Storm Water Pollution Prevention Plan, July 2016 (see Appendix E).

Pursuant to the requirements of the Contract Documents Supplementary Specifications, Section XI – Division 1, Section 01560 – Erosion and Surface Water Control, ESGI submitted a Storm Water Pollution Prevention Plan (SWPPP) on August 26, 2016. The plan included a description of practices and temporary measures to prevent erosion on the site, including the use of drainage control

structures, silt fencing, straw bales, and silt sox. The SWPPP also included procedures for inspection, maintenance, and repair of temporary controls.

E & E reviewed and accepted the first revision of the document on August 28, 2016. The project SWPPP submittal milestones and plan revisions are included in the project submittal log (see Appendix E).

4.1.7 Community Air Monitoring Plan (CAMP)

Prior to intrusive activities, ESGI's Site Safety Officer (SSO) conducted baseline air sampling for fugitive dust emissions, both upwind and downwind of the exclusion zones, to determine ambient air quality. The SSO conducted daily real-time air sampling for total dust, lead, and chromium at the air sampling locations upwind and downwind of exclusion zones throughout the duration of intrusive activities.

The results for air samples collected during remedial operations at the Former AL-Tech Specialty Steel Lucas Avenue OU-1 Remedial Action Project site indicated that emissions guidelines established in the technical specifications were maintained. The on-site air monitoring was performed by the ESGI SSO. The analytical work associated with the on-site personnel air monitoring program was performed by Galson Laboratories, Inc.

4.1.7.1 Community Air Monitoring

ESGI's sHASP included provisions for a Community Air Monitoring Plan (CAMP) to comply with the requirements set forth in Standard Specifications, Section X –Section 00003 – Minimum Requirements for Health and Safety, of the Contract Documents. The CAMP and on-site related air monitoring work was performed by ESGI's SSO. E & E's subcontractor, Watts Architecture and Engineering, Inc. (Asbestos Project Monitor) provided air monitoring services during the asbestos portion of the remedial work.

The Contractor's sHASP called for up to four real-time dust monitors located outside the exclusion zones for evaluation of dust emissions during intrusive work. Each monitor was equipped with data-logging capabilities, and the data were downloaded and reviewed daily by the SSO. Audible alarms were included with each unit, which would sound in the event emissions exceeded regulatory levels. The CAMP was suspended during rain and snow events. The E & E site representatives verified the air monitors were installed at the start of each workday and confirmed the upwind/downwind placement of the monitors.

During excavation and sampling work, a hand-held photo-ionization detector (PID) was carried by the SSO to monitor VOC/SVOC levels in the work area.

The PID was also used during building demolition. Fugitive dust emissions that could have an impact on areas outside the site, such as those caused by the movement of trucks and equipment, were visually monitored. Whenever dust emanated from remedial operations, water was applied to the roadway surfaces as a

corrective action if fugitive dust was observed. Copies of ESGI's submittal of the CAMP daily air monitoring results and airborne asbestos sampling results are presented in Appendix F.

4.1.7.2 On-Site Air Monitoring Program

ESGI's SSO documented the air sampling and real-time air monitoring upwind and downwind of intrusive activities and for "at-risk" personnel working in the exclusion zones. Real-time air monitoring for dust was performed using DustTrak dust meters. Action levels for airborne contaminants were established per applicable regulatory guidelines and the Standard Specifications, Section X, Section 00003 – Minimum Requirements for Health and Safety, Section 1.15 – Air Monitoring Program of the Contract Documents.

Real-time data recorded by the meteorological station in the Contractor's trailer were reported to E & E and included in each Daily Inspection Report (DIR). ESGI SSO monitored real-time readouts on the DustTrak meters and provided the E & E site representative with printouts of the air monitoring data at the end of each day. E & E maintained a log of the downloaded data for each day that intrusive operations were performed on the project site. Air monitoring was suspended during days with significant rain or snow events.

4.1.8 Contractor's Work Plan

In accordance with the Contract Documents, Section III – Bidding Information and Requirements, the Work or Operations Plan, ESGI submitted a Work Plan that provided descriptions of methods, procedures, and equipment to be used to complete the project. The plan detailed ESGI's understanding of and proposed methods for executing the major and minor work items to be performed and linked to a CPM milestone schedule. The major elements of the ESGI's Work or Operations Plan included the following:

- Site mobilization and establishment of project support zones;
- Installation and maintenance of the temporary access roads and security fencing;
- Establishment of exclusion and contamination reduction zones;
- Clearing and grubbing;
- Equipment demolition and removal and transport of scrap metal and debris from the site buildings;
- Excavation and transport of hazardous and non-hazardous contaminated soils, including handling and storage;
- Excavation and removal of off-site hazardous contaminated materials;
- Site backfilling, topsoil, and restoration;
- Monitoring well installation, well revitalization, and well decommissioning; and

- Site cleanup and demobilization.

E & E reviewed and approved ESGI's Work Plan on April 12, 2017.

4.2 Remedial Program Elements

4.2.1 Contractors and Consultants

The successful low and responsible bidder for the AL-Tech Specialty Steel Lucas Avenue OU-1 Remedial Action project was ESGI, of Tonawanda, New York. The certifying Engineer of Record responsible for inspection of the work was E & E of Lancaster, New York.

4.2.2 Subcontractors

ESGI provided a list of subcontractors to be utilized throughout the duration of the project. Major subcontractors (i.e., with costs over $10,000) were required by the Contract to submit a Vendor Responsibility Questionnaire (VRQ). Firms that were subcontracted to provide professional services for the project were not require to submit a VRQ.

The following subcontractors were utilized by ESGI during the project. Subcontractors certified in New York State as minority- or women-owned business enterprises (MBE/WBE) are identified accordingly.

- Nature's Way Environmental - WBE (Alden, New York)
  - Monitoring well decommissioning and installation
- Page Trucking – WBE (Weedsport, New York)
  - Hazardous waste transportation
- Mallare Enterprises Trucking (Buffalo, New York)
  - Hazardous waste transportation
- St. George Enterprises, Inc. (Fredonia, New York)
  - Common fill transportation
- Chautauqua County Landfill (Jamestown, New York)
  - Non-hazardous soil disposal
- Michigan Disposal Waste Treatment Plant (Belleville, Michigan)
  - Hazardous soil disposal
- Empire Building Diagnostics, Inc. (Depew, New York)
  - Building demolition/asbestos abatement
- Paradigm Environmental Services, Inc. (Rochester, New York)
  - Chemical analytical services

- Fisher Associates (Rochester, New York)
  - Surveying services
- Waste Management of New York; Chaffee Landfill (Chaffee, New York)
  - Non-hazardous soil disposal
- Gernatt Sales (Dunkirk, New York)
  - Common fill source, aggregate source
- American Recyclers Co., Inc. (Tonawanda, New York)
  - Oil recyclers
- Niagara Metals, Inc. (Niagara Falls, New York)
  - Metal recyclers
- SJB Drilling and Compaction Testing, Inc. (Buffalo, New York)
  - Compaction Testing
- Chemtech – MBE (Mountainside, New Jersey)
  - Analytical services – confirmation analyses
- Galson Laboratories, Inc. (East Syracuse, New York)
  - Analytical services – air
- Vali-Data of WNY – WBE (West Falls, New York)
  - Data validation
- EMSL Analytical, Inc. (Depew, New York)
  - Asbestos analysis
- Rain for Rent (Cheektowaga, New York)
  - Frac tanks rental
- U.S. Bulk Transport, Inc. (Erie, Pennsylvania)
  - Hazardous waste transportation
- Fox Fence, Inc. (Niagara Falls, New York)
  - Temporary fencing
- Capital Fence, Inc. (Amherst, New York)
  - Permanent security fencing

4.2.3 Engineering Services during Remedial Construction

4.2.3.1 Ecology and Environment Engineering and Geology, P.C.

E & E provided the following engineering services during the remedial construction under Work Assignment D007617-34.

- Performed an initial review of the ROD, IRM Contract Document, including the Limited Site Data, and other project documents to gain an understanding of the scope of the project.
- Prior to construction, reviewed the Contractor's 5-day and 14-day plans submitted as a part of the evaluation to demonstrate whether the Contractor had an understanding of the project scope of work and Contract technical specifications.
- During remediation, reviewed the Contractor's materials, procedures, and product submittals for conformance with the technical specifications.
- Upon completion of the work, reviewed of the post-construction documentation that demonstrated the Contractor had fulfilled the technical and administrative requirements of the Contract Documents. ESGI provided a total of 53 submittals for review by E & E. After reviewing each submission, E & E either approved of or rejected the submittals, with or without conditions. A copy of each Project Submittal and the Project Submittal Log is provided in Appendix E.
- Prepared DIRs and submitted them to the NYSDEC Project Manager (PM) during the course of the remedial activities (see Section 4.2.8.1).
- Communicated with NYSDEC by telephone on a regular basis.
- Conducted progress meetings at the site every two weeks in the NYSDEC/Engineer's Field Office, or rescheduled as needed; prepared and issued agendas in advance of progress meetings; provided a sign-in sheet for attendees; and provided complete minutes and supportive documentation of each meeting to NYSDEC and attendees for record-keeping purposes. Attendees typically included representatives of NYSDEC, ESGI, E & E, subcontractors, and other parties to the project, as required. A total of 28 progress meetings were held with ESGI during the course of the project, including the meeting for project substantial completion. Copies of the progress meeting minutes are presented in Appendix G.
- During remediation, worked with NYSDEC to manage and resolve Requests for Information (RFIs) (see Section 4.12.1).
- Issued Field Orders (FOs) to the Contractor when directed by the NYSDEC PM (see Section 4.12.2).
- Evaluated the Proposed Change Orders (PCOs) generated by the Contractor or NYSDEC to determine whether they were appropriate and to describe any additional work not covered by the original scope of work for the project (see Section 4.12.3).
- Prepared COs based on costs and time for individual PCOs, and submitted them to the NYSDEC PM for approval and the New York State Office of the State Comptroller for acceptance and payment of funds (see Section 4.12.4.
- Reviewed the Contractor's completed bid items and quantities in the Contractor Application for Payment (CAP). This included field confirmation of the

project quantities requested in the CAP and review of the Contractor's and subcontractors' certified payrolls for compliance with the New York State Department of Labor's accepted wage rates for the project (see Section 4.2.8.2).

4.2.3.2 Watts Architecture and Engineering, Inc.

To support E & E, a subconsultant, Watts Architecture and Engineering, Inc. (Buffalo, New York), a New York State-certified MBE, assisted in providing engineering services during Plant Building Demolition and asbestos monitor during the remedial activities.

Watts Architecture and Engineering, Inc., applied for and received a variance on behalf of NYSDEC (File No. 15-1395) from the New York State Department of Labor for the removal of friable and non-friable asbestos during demolition of the LAP in accordance with Code Rule 56-11.5 (Controlled Demolition with Asbestos in Place).

The Project Records Manual for the Controlled Demolition with Asbestos-Containing Material submitted to E & E by Watts Architecture and Engineering, Inc., is provided in Appendix W.

4.2.4 Site Preparation

Prior to site mobilization, ESGI performed preconstruction sampling in the areas of support zone activities to obtain background analytical data (see Section 4.5.1).

4.2.4.1 Mobilization

ESGI mobilized to the Former AL-Tech Specialty Steel Lucas Avenue Site on Monday, August 1, 2016. ESGI mobilization equipment included hydraulic excavators, a smooth drum roller, bulldozer, backhoe, off-road dump truck, and other equipment necessary to initiate the work.

ESGI established an operations and equipment staging area and support zone at the east end of the site. Development of the operations/support zone area included installation of geotextile and crushed stone to serve as a parking area for site personnel and to provide a base for office trailers. A NYSDEC-approved project sign was erected at the project entrance and remained in place during all phases of the Remedial Action.

The staging and support areas are shown in the initial preconstruction survey drawings prepared by Fisher Associates. A copy of the preconstruction topographic site survey mapping performed by Fisher Associates is provided in Appendix A.

4.2.4.2 Clearing and Grubbing, Fencing, and Access Road Construction

Clearing and grubbing work began on August 4, 2016. Smaller bushes and trees from the cleared and grubbed areas were chipped and removed from site. The material was taken to the St. George Trucking and Borrow Source Facility, located in

Fredonia, New York, and staged for future use on-site. Larger trees were cut down to existing grade and relocated outside of the work area. Grubbed materials, including roots, root balls, and tree trunks, were further chipped and left on-site.

Concurrent with the clearing and grubbing phase, temporary site security fencing was installed around the perimeter of the site. Fox Fence, Inc. (subcontractor to ESGI) installed the temporary fencing to secure the remedial excavation areas and create the exclusion zone. Access gates were constructed at the east and west ends of the site; both were adjacent to the north property boundary and Lucas Avenue.

A temporary access road was constructed using geotextile and stone in accordance with ESGI's approved Work Plan and the Contract Documents. The access road was approximately 550 feet long and terminated on the west end of the site. Installation of the temporary access road was ongoing during the building demolition and soil excavations, eventually traversing the entire site from east to west.

4.2.4.3 Erosion and Sedimentation Controls

The initial work included installation of silt fencing and erosion control features on-site in accessible areas where no clearing and grubbing was initially required.

Once clearing and grubbing was completed, the erosion and sedimentation controls specified on the Contract Drawings and in the approved SWPPP were installed. The SWPPP is included in Appendix E.

4.2.4.4 Preconstruction Meeting with NYSDEC

A preconstruction meeting was held with NYSDEC and contractors on July 20, 2016. The meeting was held in the offices of E & E's headquarters located at 368 Pleasant View Drive, Lancaster, New York. NYSDEC (via conference call), ESGI, Watts Architecture and Engineering, Inc., and E & E representatives were in attendance.

The meeting began with introduction of project staff and their responsibilities. Discussions included review of the Contract time and liquidated damages, coordination efforts with local officials, and review of the general and supplementary conditions of the Contract. Individual task schedules, project submittals (work plans and shop drawings), transport and disposal concerns, and field coordination by the prime contractor were also discussed.

A copy of the preconstruction agenda and meeting minutes for the ESGI Contract work is provided in Appendix G.

4.2.5 General Site Controls

ESGI provided site security and security fencing (Fox Fencing); flagman traffic controls; field offices and support areas; temporary utilities; erosion and sedimentation controls, including surface water controls; disposal of contractor-generated

solid waste; vibration monitoring; noise, odor, dust, and vapor controls; staging/stockpiling and processing areas; survey controls for grades and elevation (Fisher Associates); access road construction; personnel decontamination trailer; and sanitary facilities.

ESGI mobilized two field office trailers to the site. One trailer contained an office for the contractor and their general site operations facilities; the other trailer contained a conference area and was used as an office by the E & E Site Representative. Both trailers were furnished with office furniture and an all-in-one copier (facsimile, scanning machine, and internet access). A third trailer contained shower facilities for site asbestos abatement workers.

Potable water service was not available at the Former AL-Tech Specialty Steel Lucas Avenue Site. Potable water was provided in bottles, while water used for sanitation (i.e., hand washing and showers) and dust control were supplied via a metered City of Dunkirk hydrant.

A Health and Safety meeting was held at the start of each workday during the construction phase of the project. ESGI's SSO was responsible for the day-to-day assessment of potential work hazards and was required to advise ESGI and E & E personnel of any known or potential health and safety issues.

4.2.5.1 Site Security

During the entire time ESGI was at the site, and as a requirement of the sHASP, daily sign-in logs were required for all personnel entering or leaving the site. These logs were also used for security purposes. Copies of the sign-in and security logs are presented in Appendix H.

4.2.5.2 Project Surveys

ESGI subcontracted the surveying work to Fisher Associates, a professional land surveyor licensed in the State of New York. Documentation of the surveying services included the initial (preconstruction) Site Topographic Survey (Entire Site), End-point Sampling Locations, Final Excavation Depth and Volume calculations (Excavations), and As-Built Survey. These drawings are provided in Appendix A.

Fisher Associates established the excavation limits based on the Contract Drawings during their first week on-site.

4.2.5.3 Equipment Decontamination and Residual Waste Management

A decontamination pad was constructed in accordance with project specifications near the northeast access gates. The decontamination station provided decontamination of equipment and transport vehicles (including tires) prior to their exiting the site.

During decontamination, ESGI personnel manually removed any gross debris from the remedial construction equipment and transport vehicles to remove any contaminated materials adhering to the surfaces. ESGI then rinsed them using a pressure washer prior to moving them from the decontamination reduction zone and off the site.

E & E's site representatives visually inspected vehicles and other construction equipment exiting the decontamination station. The wash water used in the on-site decontamination process was collected in on-site frac tanks and then sampled and analyzed prior to off-site transport and disposal in accordance with the Supplementary Specifications, Section XI, Division 2, Section 02140 – Dewatering and 02223 – Transportation and Disposal.

4.2.6 Nuisance Controls

4.2.6.1 Truck Routing

In accordance with the requirements of the Contract Documents, ESGI provided periodic inspection and maintenance of the access road and site security fencing during the course of the project. This included grading and rolling the access road to prevent ruts and washouts after rain events in order to maintain access to the site. Site fencing was adjusted as needed based on city snow plowing access for Lucas Avenue, expanded excavation requirements, or security issues.

4.2.7 CAMP Results

The CAMP is discussed is Section 4.1.7. Copies of field data sheets relating to the CAMP are provided in electronic format in Appendix F.

4.2.8 Reporting

DIRs (see below) are included in electronic format in Appendix I. The digital photo log required by the Contract is included in electronic format in Appendix J.

4.2.8.1 Daily Inspection Reports

E & E prepared DIRs and submitted them to the NYSDEC PM during the course of the field work. Each DIR documented the remedial construction progress and monitoring performed at the site on the given day, provided photos of major aspects of the work, and outlined the work anticipated to be completed the following day. Copies of the DIRs are provided in Appendix I. Additional photos not included in the DIRs are provided in Appendix J.

4.2.8.2 Contractor's Application for Payment (CAP)

ESGI submitted eleven CAPs during the Contract period, including a final release of retention in accordance with the Contract Documents. E & E evaluated the accuracy of each CAP for quantities and percentage of completion of individual Contract bid items according to Section XII – Measurement for Payment. When errors were encountered, E & E discussed the discrepancies with the Contractor and instructed the Contractor to revise and resubmit the request. After the CAP was accepted and recommended for payment by E & E, each CAP was submitted to NYSDEC for processing. Table 4-1 provides a list of the CAPs submitted by

ESGI for the project. Copies of the E & E-approved CAPs submitted to NYSDEC for approval are provided in Appendix K.

Table 4-1 Former AL-Tech Specialty Steel Lucas Avenue Site - Contractor Applications for Payment (CAPs)

CAP No.	Date Submitted to NYSDEC	Amount
1	9/13/2016	$201,518.75
2	10/7/2016	$270,037.50
3	11/11/2016	$292,552.50
4	12/31/2016	$465,090.31
5	3/15/2017	$42,132.50
6	5/25/17	$280,457.91
7	6/20/17	$706,860.19
8	9/18/17	$1,145,040.37
9	10/31/17	$478,611.02
10	9/6/18	$926,117.23
Final	12/27/18	$581,439.80
	Total[1]	**$5,389,858.08**

[1] Total payment includes all change orders.

4.2.8.2.1 Certified Payrolls

Work performed under this Contract required that the Contractor and its subcontractors pay at least the prevailing wage and pay or provide the prevailing supplements, including premium rates for overtime pay, as issued by the New York State Department of Labor.

ESGI submitted certified payrolls in conformance with prevailing wage rates published in the Contract Documents (and updated annually to E & E) with each CAP. Current wage rates were included in the Contract Documents under Section XIII. E & E verified that the proper wage rate for individual ESGI employees, and the employees of subcontractors working on the project, was accurate before approving each CAP.

The Contractor's certified payroll data is included with each CAP in Appendix K.

4.3 Contaminated Materials Removal

The COCs for the project were arsenic, barium, cadmium, chromium, lead, TCE, and PCBs. In accordance with the ROD, the analytical results were evaluated against the Soil Clean-up Objectives (SCOs) for Commercial use as defined in 6 NYCRR Part 375, Table 375-6.8(b). A list of the SCOs for the COCs for this project is provided in Table 4-2.

Table 4-2 Soil Cleanup Objectives for Contaminants of Concern

Primary Contaminants of Concern	Commercial SCO
arsenic	16 mg/kg
barium	400 mg/kg
cadmium	9.3 mg/kg
chromium	1,500 mg/kg
lead	1000 mg/kg
TCE	200 mg/kg
PCBs	1.0 mg/kg

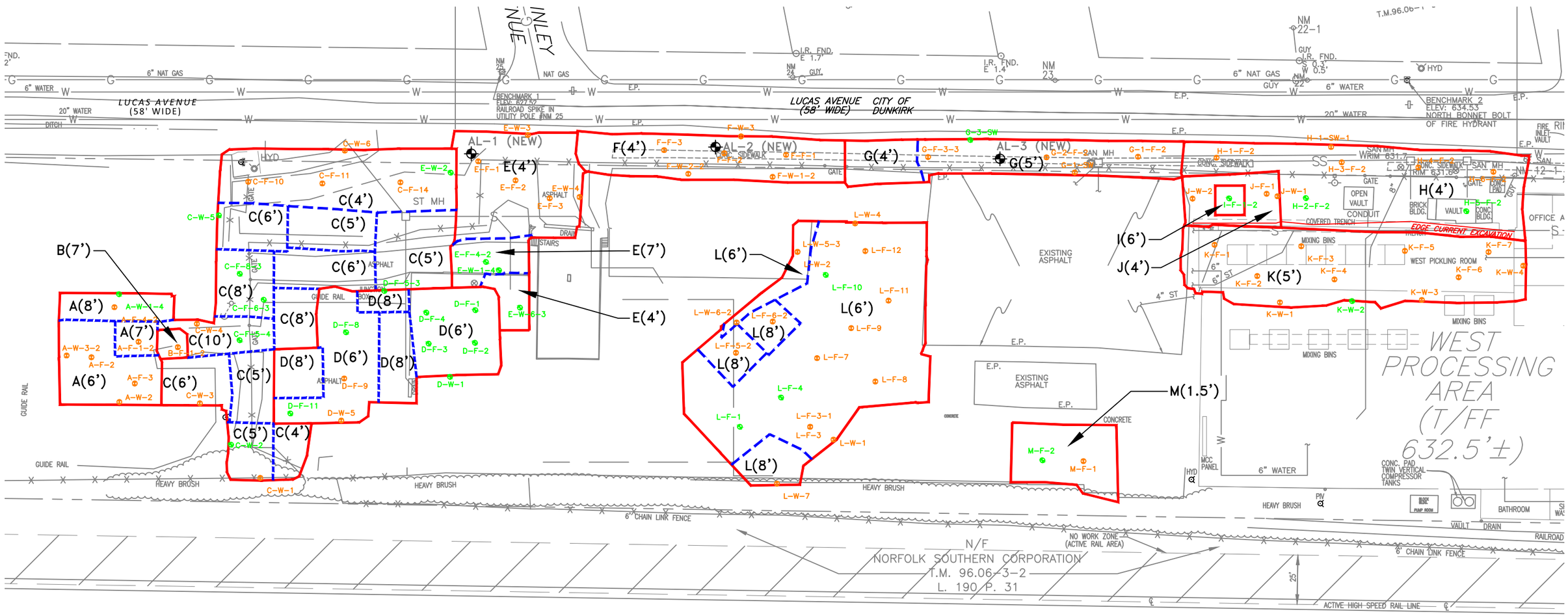
Key:
mg/kg = milligrams per kilogram
PCB = polychlorinated biphenyls
SCO = soil cleanup objective
TCE = trichloroethene

Figures 4-3A and 4-3B identify the final excavation areas and the confirmation/documentation samples collected for this project.

4.3.1 Plant Building Demolition and Asbestos Abatement

The Building Demolition and Asbestos Abatement work of the plant building included the following:

- Collection, treatment, and analysis of contact water from demolition, steel/metals decontamination procedures, and engineering controls for airborne particulates throughout demolition;
- Personal and perimeter air monitoring/sampling for airborne asbestos fibers throughout demolition and abatement;
- Cleanup of ACM debris on the buildings concrete slab and around the former plant building;
- Removal and disposal of chromium-contaminated structural wall and floor bricks in the building;
- Dismantling, decontamination, and off-site disposal of structural steel (via metal recycling);
- Cleaning and dewatering of pits, chambers, and trenches; and
- Demolition, dismantling, and disposal (via metal recycling or disposal facility) of the two underground oil rooms, tanks, and process piping in the east and west areas of the former plant building.



SCALE IN FEET

0 50 100 150

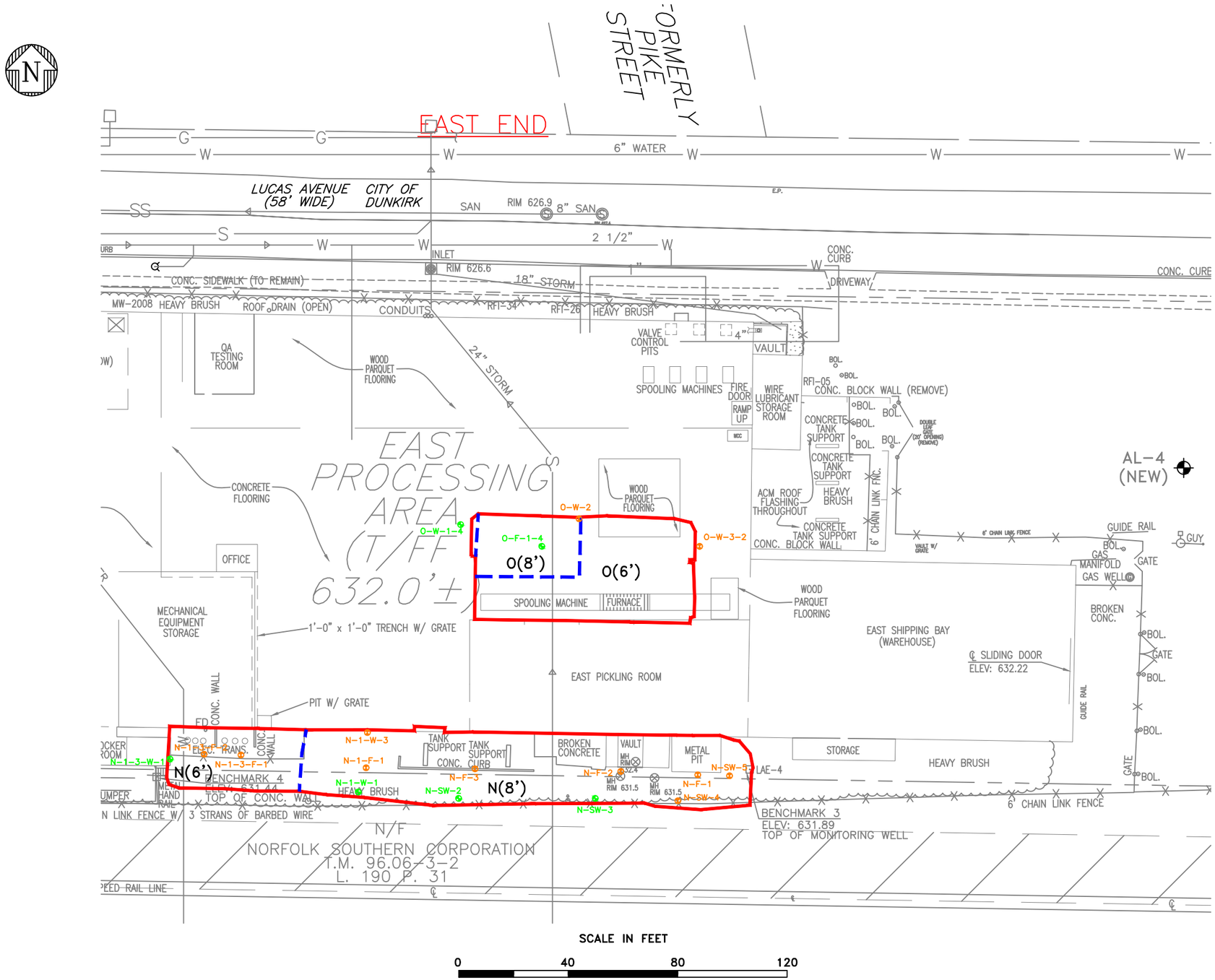
LEGEND

- FINAL EXCAVATION LIMITS
- EXCAVATION SUB–AREA
- L — EXCAVATION AREA NAME
- (6') — EXCAVATION DEPTH
- CONFIRMATION SAMPLE
- DOCUMENTATION SAMPLE

NOTE

1. MAP ENTITLED "SAMPLE POINT LOCATIONS" PREPARED BY FISHER ASSOCIATES, FIRST ISSUED 12/2007 (CAD FILE ALtech Excavations and Samples.dwg)

FIGURE 4–3A EXCAVATIONS AND RE–EXCAVATIONS WEST
FORMER AL–TECH SPECIALTY STEEL SITE
DUNKIRK, NEW YORK



LEGEND

- FINAL EXCAVATION LIMITS
- EXCAVATION SUB-AREA
- N — EXCAVATION AREA NAME
- (6') — EXCAVATION DEPTH
- CONFIRMATION SAMPLE
- DOCUMENTATION SAMPLE

NOTE

1. MAP ENTITLED "SAMPLE POINT LOCATIONS" PREPARED BY FISHER ASSOCIATES, FIRST ISSUED 12/2007 (CAD FILE ALtech Excavations and Samples.dwg)

FIGURE 4-3B EXCAVATIONS AND RE-EXCAVATIONS EAST FORMER AL-TECH SPECIALTY STEEL SITE DUNKIRK, NEW YORK

ESGI's subcontractor Empire Building Diagnostics, Inc. (EBD) installed high- and low-pressure water systems, including a water misting machine, at the perimeter of the exclusion zone prior to the start of demolition as an engineering control for airborne particulates.

Prior to building demolition work, EBD, Watts Architecture and Engineering, Inc., and ESGI personnel donned level "D" PPE per the sHASP. Building demolition work then began on the east side of the building and progressed to the west side of the building. The work was performed under New York State Department of Labor (NYSDOL) variance File No. 15-1395, building demolition with non-friable ACM in place.

Demolition material was sorted into ACM, chromium-contaminated brick, and recyclable materials, stockpiled on a high-density polyethylene (HDPE) liner, and covered with two layers of 6-mil poly for off-site disposal. Hazardous brick debris was temporarily stockpiled within designated locations in the on-site exclusion zone prior to being transported off-site for disposal.

4.3.2 General Procedures for Soil Remediation/Sampling and Analysis

Areas of contamination were defined by E & E through the data collected during the pre-design investigation (E & E 2015c). Layout of the vertical and horizontal excavation limits for areas to be remediated, based on the Contract Drawings (see Figures 4-1 and 4-2), was performed by ESGI's surveyor, Fisher Associates.

Once an initial excavation was completed by ESGI, the end-point/confirmation and documentation sampling locations in the individual excavation areas were determined as established in the Contract Documents, Supplementary Specifications, Section XI, Division 1, Section 01425 – Sampling. The samples were collected as follows:

1. Samples were collected from the floor of each excavation area and from sub-areas at a minimum of one sample per 900 square feet. A minimum of one floor sample was collected at each depth interval for stepped excavations.
2. Samples were collected every 30 linear feet (LF) along the sidewalls of the excavation areas and sub-areas where the excavation depth changed by 2 or more feet. Samples were collected at the mid-point of the excavation wall depth.
3. For excavation areas shallower than 2 feet deep, samples were collected at the base of the excavations, at a spacing of 30 LF, along the excavation perimeter. These samples served as both bottom and sidewall samples.
4. Confirmation samples were collected every 30 LF along the property boundary line for excavations bordering the Lucas Avenue ROW.
5. Documentation/Confirmation samples consisted of five-point composites from either the bottom of the excavation or the sidewall. The center point of the

five-point confirmation sampling location was surveyed both horizontally and vertically for later inclusion in NYSDEC's Environmental Data program.

The samples were then collected and shipped to ESGI's subcontracted laboratory, Paradigm. The samples were analyzed using a 24-hour turn-around-time upon receipt by the lab.

Once the analytical results were received by ESGI, they were compared, by ESGI and E & E, to the SCOs to determine whether the cleanup goals had been achieved. When the analytical results were equal to or below the SCO requirements, the excavation was terminated.

At the direction of NYSDEC, if the analytical results exceeded an SCO, additional excavation, sampling and analysis, and surveying of the sample locations was performed. The excavation, sampling and analysis, and surveying cycle continued until the SCOs were achieved or excavation was no longer feasible. If SCOs were not achieved, documentation samples were collected at the final excavation elevation to document the levels of residual contamination for future site management and monitoring purposes.

Following the completion of excavation work, the horizontal and vertical limits of excavation were re-established by ESGI's surveyor, Fisher Associates, in accordance with the Contract Drawings, and used to calculate the volume of soils removed (see Figures 4-3A and 4-3B).

Prior to backfilling, demarcation layers were placed at the final excavation depth per the Contract Documents for these and all disturbed soil areas.

Once the excavation work was completed and the sample analytical results confirmed that the project SCOs had been achieved, approved imported common fill was delivered to the site to begin backfilling, site grading, and restoration. Site restoration and compaction testing of the common fill was performed by SJB Enterprises (see Section 4.6.1).

Fifteen areas, "A" through "O", were excavated from the West and East Process areas. An additional test pit area was excavated to the north of Area N, based on visual observation of stained soil.

As indicated in Table 4-3, 12 of the 15 project excavation areas required at least one additional excavation. The final documentation/confirmation samples and analytical results are discussed in Section 4.5. The surveyed locations of the endpoint/confirmation samples are provided on the as-built drawings prepared by Fisher Associates. The locations of the final sampling points for these project phases and the sample analytical results are provided on Figures 4-3A and 4-3B.

Table 4-3 Additional Excavation Summary

Area	
A	**First additional excavation** – North wall excavated 1 additional foot to the north – South wall excavated 1 additional foot to the south – West wall excavated 2 additional feet to the west – Northeast quadrant of the floor excavated 1 additional foot in depth **Second additional excavation** – North wall excavated 2 additional feet to the north **Third additional excavation** – North wall excavated 10 additional feet to the north **Fourth additional excavation** – Portion of the floor excavated 2 additional feet in depth
B	**First additional excavation** – Floor excavated 1 additional foot in depth
C	**First additional excavation** – Portions of floor excavated 2 additional feet in depth – Portions of floor excavated 1 additional foot in depth **Second additional excavation** – Portions of floor excavated 2 additional feet in depth **Third additional excavation** – Portion of floor excavated 2 additional feet in depth
D	**First additional excavation** – Portion of floor excavated 2 additional feet in depth **Second additional excavation** – Portion of south wall excavated 4 additional feet to the east – Portions of the floor excavated 2 additional feet in depth **Third additional excavation** – Portion of south wall excavated 4 additional feet to the east – Portions of the floor excavated 2 additional feet in depth
E	**First additional excavation** – South wall excavated 4 additional feet to the south **Second additional excavation** – South wall excavated 2 additional feet to the south **Third additional excavation** – South wall excavated 2 additional feet to the south **Fourth additional excavation** – Portion of south wall excavated 7 additional feet to the south **Fifth additional excavation** – Portion of south wall excavated 3 additional feet to the south – Portion of floor excavated 3 additional feet in depth **Sixth additional excavation** – Portion of south wall excavated 5 additional feet to the south **Seventh additional excavation** – Portion of south wall excavated 4 additional feet to the south **Eighth additional excavation** – Portion of south wall excavated 6 additional feet to the south

Table 4-3 Additional Excavation Summary

Area	
F	**First additional excavation** - South wall excavated 4 additional feet to the south
G	**First additional excavation** - Portion of south wall excavated 3 additional feet to the south - Eastern portion of floor excavated 2 additional feet in depth **Second additional excavation** - Western portion of floor excavated 1 additional foot in depth
H	**First additional excavation** - Floor excavated 2 additional feet in depth
I	**First additional excavation** - Floor excavated 2 additional feet in depth
J	Initial excavation met SCOs. No additional excavation necessary.
K	Initial excavation met SCOs. No additional excavation necessary.
L	**First additional excavation** - Northwest wall excavated 2 additional feet to the northwest - Southwest wall excavated 2 additional feet to the southwest - Portions of floor excavated 2 additional feet in depth **Second additional excavation** - Northwest wall excavated 2 additional feet to the west
M	Initial excavation met SCOs. No additional excavation necessary.
N	(See Section 4.13.2 for additional details) **First additional excavation (N-1)** - West wall excavated 45 additional feet to the west **Second additional excavation (N-2)** - West wall excavated 20 additional feet to the west **Third additional excavation (N-3)** - West wall excavated 15 additional feet to the west
O	**First additional excavation** - East wall excavated 1 additional foot to the east - West wall excavated 1 additional foot to the west - Portions of the floor excavated 1 additional foot in depth **Second additional excavation** - East wall excavated 2 additional foot to the east - Southeast portion of the floor excavated 2 additional feet in depth - Arsenic and cadmium contamination remains above commercial cleanup objectives but is 8 feet below grade and has a demarcation layer installed. No further work was performed in this area.
Test Pit	**First additional excavation** - West wall excavated 5 additional feet to the west - North wall excavated 4 additional feet to the north

4.3.3 Excavation of Non-hazardous Soils

A preconstruction topographic survey was performed in the remedial areas of the site to confirm the site grades (see Appendix A). The seven areas identified in the

Contract Documents as non-hazardous areas (Areas A, E, G, H, J, L, and N) were then sampled for waste characterization purposes. See Appendix L for the analytical results.

Each of the seven delineated areas were excavated to horizontal and vertical limits of excavation indicated on the Contract Drawings according to the procedures described in Section 4.3.2.

The excavated soils were either stockpiled in designated areas throughout the site prior to being transported to disposal facilities or direct loaded for transport and disposal. The stockpile areas were established using HDPE liners and covered with two layers of a 6-mil plastic at the end of each work day.

The volume of non-hazardous soils removed from the site was approximately 3,619 CY. The contract bid quantity was 2,600 CY.

4.3.4 Excavation of Hazardous Soils

Six areas were identified in the Contract Documents as soil containing hazardous levels of lead (Areas C, D, F, and M), chromium (Area K), or cadmium (Area O). Excavation of hazardous soils began in May 2017.

Each of the six delineated areas were excavated to horizontal and vertical limits of excavation indicated on the Contract Drawings according to the procedures described in Section 4.3.2.

The excavated hazardous soils were amended on-site with portland cement, sampled, analyzed to determine whether the soils met the Chaffee Landfill disposal requirements, and temporarily stockpiled and covered in a segregated area in the northwest area of the site prior to transport and off-site disposal.

The volume of hazardous soils and debris removed from the site was approximately 9,258 CY, which is approximately 29% above the contract quantity of 7,150 CY.

4.3.5 Excavation of PCB Hazardous Soils

The analytical results for two soil samples (from Areas B and J) showed that the PCB concentration exceeded 50 part per million; therefore, the soils from these areas required disposal as hazardous waste.

The two delineated areas were excavated to the depths indicated on the Contract Drawings according to the procedures described in Section 4.3.2.

4.4 Disposal Details

4.4.1 Waste Profiles for Disposal Facility Acceptance

Prior to performing bulk soil excavations, ESGI collected waste characterization soil samples. The analytical results for these samples were used to generate waste profiles, which were submitted to the waste disposal facilities listed in Table 4-4.

The number of characterization samples collected from each of the proposed excavation areas was based on the estimated volume of soils to be removed from each area. Each sample was analyzed for the required target contaminants and for Metals, Ignitability, Corrosivity, and Reactivity. Based on the sample results, waste profiles were submitted to and approved by the appropriate disposal facilities.

ESGI utilized the disposal locations identified in Table 4-4 to dispose of the hazardous and non-hazardous soils, metals (for recycling), contaminated dewatering fluids, and solid wastes generated at the Former AL-Tech Specialty Steel Lucas Avenue Site OU-1 Remedial Action Project. The metal wastes selected for recycling were visually inspected by an E & E Resident Engineer and Watts Architecture and Engineering, Inc., for visible contamination and ACM.

The waste profiles and approvals are provided in Appendix M. No waste profiles were required for the disposal of non-hazardous solid waste or the recycling of metals at the Niagara Metals Recycling facility.

Table 4-4 Waste Disposal Locations

Disposal Materials	Disposal Locations
Non-hazardous soils	Waste Management, Chaffee Landfill, Chaffee, New York
Hazardous soils	Michigan Disposal Waste Treatment Plant, Belleville, Michigan
Contaminated waters collected, treated, and discharged (LS-4)	Discharged to City of Dunkirk, New York, stormwater collection system after treatment through onsite Wastewater Treatment Plant
Noncontaminated waste and recycled materials	Niagara Metals, Niagara Falls, New York
Hazardous debris transported and disposed of	Waste Management, Chaffee Landfill, Chaffee, New York
Hazardous chromium contaminated brick/ACM	Michigan Disposal Waste Treatment Plant, Belleville, Michigan
ACM debris	Waste Management, Chautauqua County Landfill, Jamestown, New York

ESGI utilized the following haulers to transport the hazardous and non-hazardous soils, liquids, non-hazardous solid waste, and metal (for recycling) generated at the site:

- Page Trucking (hazardous soils);
- Mallare Enterprises Trucking (hazardous soils);
- EBD (recyclable metal);
- ESGI, (dewatering and decontamination fluids waste);

- St. George Enterprises, Inc. (non-hazardous solid waste);
- Niagara Metals Recycling, Inc. (metal and equipment recycling).

Manifests and bills of lading are included in electronic format in Appendix N.

4.4.2 Disposal of Plant Building Demolition Debris

Demolition debris, including brick, siding, and roofing material, that contained ACM was segregated into a separate stockpile and transported to and disposed of at the Michigan Disposal Waste Treatment Plant, in Belleville, Michigan.

The chromium-contaminated brick debris in the pickling rooms was designated as hazardous and sampled for chromium per the Toxicity Characteristic Leaching Procedure for chromium in accordance with 40 CFR 261.24. The hazardous brick debris was loaded from a segregated stockpile into individual transport vehicles, which were decontaminated and weighed on-site, and the debris was then transported to the Michigan Disposal Waste Treatment Plant for disposal.

Non-hazardous brick was stockpiled and subsequently reduced in size and used as backfill in the trench and pit excavations (see Section 4.4.9).

4.4.3 Disposal of Non-hazardous Soils

Soils determined to be non-hazardous in accordance with 40 CFR 262.11 were loaded from a segregated stockpile onto individual transport vehicles, which were decontaminated and weighed on-site and manifested to the permitted disposal facility. The non-hazardous soils were transported to and disposed of at Waste Management's Chaffee Landfill.

4.4.4 Disposal of Non-PCB Hazardous Soils

After the excavated hazardous soils were amended on-site to achieve the requirements of the disposal facility (i.e., determined to be non-hazardous using the Toxicity Characteristic Leaching Procedure for lead and chromium in accordance with 40 CFR 261.24), the soils were loaded onto individual transport vehicles, which were decontaminated and weighed on-site and manifested to the Chaffee Landfill.

4.4.5 Disposal of PCB Hazardous Soils

Soils contaminated with hazardous levels of PCBs were transported to and disposed of at the Michigan Disposal Waste Treatment Plant, in Belleville, Michigan.

4.4.6 Volumes of Waste Transported and Disposed of, by Specific Waste Streams

Table 4-5 shows the total quantities of each bid item unit cost (UC) of material removed from the site. The bid items were defined as follows:

- UC-3 Excavation of Non-Hazardous Soils

- UC-4 Excavation of Hazardous Soils
- UC-5 Handling, Transport and Off-Site Disposal of Non-Hazardous Soils
- UC-6A Handling, Transport, and Off-Site Disposal of Hazardous Soils
- UC-6B Handling, Transport, and Off-Site Disposal of Hazardous Debris

As shown in Table 4-5, the tonnage of non-hazardous soil disposed of was approximately 45% greater than the tonnage estimated in the Contract; and the tonnage of the hazardous soil disposed of was approximately 26% greater than the tonnage estimated in the Contract.

Table 4-5 Former AL-Tech Specialty Steel Lucas Avenue Site - Total Weight of Waste Disposed of, by Type

Bid Item	Bid Quantity	Units	Actual Quantity
UC-3 Non-Hazardous Soils	2,600	CY	3,619.36
UC-4 Hazardous Soils/Debris	7,150	CY	9,257.87
UC-5 Off-Site Disposal of Non-Hazardous Soils	4,420	Tons	6,399.63
UC-6A Off-Site Disposal of Hazardous Soils	12,240	Tons	15,424.14
UC6-B Off-Site Disposal of Hazardous Debris	2,950	Tons	1,437.40

Key:
CY = cubic yard
UC = Unit Cost

4.4.7 Drum Waste Characterization

Oil and water waste generated from cleaning out pits and vaults was collected in 55-gallon drums. The drummed waste was sampled and analyzed for waste characterization prior to off-site transport and disposal.

4.4.8 Certificates of Disposal and/or Destruction

A summary of the manifests and weights of disposed of materials, by waste stream, and certificates of Disposal and/or Destruction are provided in Appendix N.

4.4.9 On-Site Reuse

Crushed non-hazardous brick and concrete from on-site demolition activities, reduced to a maximum size of two inches, was used as fill at the site in the trench and pit excavations. St. George (ESGI Subcontractor) utilized a stone crusher from May 3 to May 10, 2017, and from October 31 to November 2, 2017, to reduce brick and concrete debris for reuse at the site. After the material was reduced, approximately 18 CY of brick and concrete was reused throughout the site.

4.5 Remedial Performance/Documentation Sampling

4.5.1 Project Documentation Sampling

Pre- and post-construction samples were collected by ESGI at the support zones and contamination reduction zones located east of the site. The preconstruction samples were collected by ESGI on August 1, 2016, and witnessed by E & E, and the sampling locations were surveyed by Fisher Associates. The samples were analyzed by Paradigm to establish the baseline level of contaminants prior to the contractor establishing work zones at the site.

The presence and locations of targeted contaminants was documented in previous remedial investigations and in waste characterization samples collected by ESGI prior to excavation in each phase of work. When the analytical results compiled by Paradigm indicated that contaminant levels had been reduced to levels below the SCOs, the final excavation limits had been achieved.

Baseline samples were collected in support and operations areas prior to and after the performance of remedial work. The results from these samples were used to determine whether these areas had been contaminated as a result of the work performed. The baseline sample results indicated that contaminants were present at concentrations above the SCOs in soil beneath the Site Representative's Trailer and the East Truck Decontamination Pad. Excavation was performed in these areas to remove the contaminated soil after the remedial areas had been completed, just prior to the 2017 demobilization. The post-excavation sample analytical results for these areas indicated that the SCOs had been met. Baseline and post-excavation analytical results are provided in Appendix L.

4.5.2 Construction Support Sampling

4.5.2.1 Contaminated Soil Waste Characterization

Hazardous and non-hazardous areas were delineated based on the horizontal and vertical limits depicted on the Contract Drawings. The site was initially surveyed and staked out by Fisher Associates and ESGI prior to waste characterization sampling. Samples were then collected manually with hand tools for shallow excavations, in accordance with ESGI's sampling plan. At each sampling location, the suspected contaminated soil was placed in a stainless steel pan, homogenized, and then transferred to 4- or 8-ounce amber jars. The sampling tools were decontaminated after each sample collection in accordance with ESGI's sampling plan.

4.5.2.2 Confirmation and Documentation Sampling

As discussed in Section 4.3.2, confirmation and documentation soil samples were collected and analyzed as required by Supplementary Specification, Section XI, Section 01425 - Sampling. The Contractor collected confirmatory samples at post-excavation locations as described in the specifications and as directed by the Engineer (E & E) to determine whether residual contaminant concentrations in soil were at or below the SCOs. The final sample analytical results were intended to confirm that the SCOs had been achieved and also enable the Engineer to verify the limits of excavation for payment purposes.

Sample analysis was provided by ESGI's subcontracted laboratory, Paradigm. In total, 140 confirmatory or documentation samples were collected as part of the remedial work performed under the Contract Documents. The final analytical results for the remediation areas are provided in Table 4-6. The analytical reports from Paradigm are provided in Appendix L.

Table 4-6 Final Confirmation/Documentation Sample Analytical Results

			Concentration in mg/kg[2]						
Area	Sample ID[1]	Date Sampled	As	Cr	Pb	Ba	PCBs	Cd	TCE
A	A-F-2	8/3/2017	9.8	222.0	207.0	149.0	**0.1**	0.6	ND
A	A-F-3	8/3/2017	7.2	24.4	22.1	140.0	ND	0.4	ND
A	A-W-2	8/3/2017	10.6	519.0	126.0	149.0	ND	0.4	ND
A	A-F-1-2	9/1/2017	8.3	301.0	44.7	127.0	**0.5**	ND	ND
A	A-W-3-2	9/1/2017	8.7	415.0	57.6	54.2	ND	ND	ND
A	A-W-1-4	9/26/2017	13.3	**1,770.0**	310.0	106.0	**0.2**	0.2	ND
A	A-F-4-2	10/6/2017	8.6	199.0	164.0	125.0	**0.1**	4.6	ND
B	B-F-1-2	9/1/2017	8.6	131.0	138.0	119.0	ND	ND	ND
C	C-W-1	8/4/2017	7.3	158.0	20.4	34.5	ND	0.4	ND
C	C-W-2	8/24/2017	9.1	669.0	488.3	59.3	ND	0.8	ND
C	C-W-3	8/24/2017	7.4	218.0	30.2	51.5	ND	0.6	ND
C	C-W-4	8/24/2017	7.9	147.0	49.3	40.5	ND	0.6	ND
C	C-W-5	8/24/2017	**16.6**	330.0	56.9	128.0	ND	1.4	ND
C	C-W-6	8/24/2017	8.3	421.0	105.0	72.7	ND	1.1	ND
C	C-F-10	8/24/2017	12.6	534.0	262.0	136.0	ND	1.7	ND
C	C-F-11	8/24/2017	11.7	362.0	123.0	130.0	ND	1.0	ND
C	C-F-14	8/14/2017	10.5	197.0	128.0	106.0	ND	0.9	ND
C	C-F-2-2	9/8/2017	9.0	9.0	11.5	44.0	ND	0.2	ND
C	C-F-3-2	9/8/2017	9.9	1,170.0	397.0	89.2	ND	0.6	ND
C	C-F-4-2	9/8/2017	9.9	26.7	132.0	79.8	ND	0.3	ND
C	C-F-6-2	9/8/2017	**35.9**	**8,820.0**	**2,550.0**	86.4	ND	4.3	ND
C	C-F-7-2	9/8/2017	7.9	557.0	438.0	115.0	ND	0.4	ND
C	C-F-8-2	9/8/2017	**18.1**	**3,990.0**	473.0	71.4	ND	0.8	ND
C	C-F-9-2	9/8/2017	8.0	53.7	28.8	115.0	ND	ND	ND
C	C-F-12-2	9/8/2017	9.2	79.1	60.6	106.0	ND	0.7	ND
C	C-F-13-2	9/8/2017	6.9	237.0	34.2	119.0	ND	ND	ND
C	C-F-6-3	9/20/2017	**18.6**	**2,380.0**	724.0	121.0	ND	2.1	ND
C	C-F-8-3	9/20/2017	**20.3**	74.0	78.5	147.0	ND	3.4	ND
C	C-F-5-4	10/2/2017	**5.5**	16.2	**15.9**	91.6	ND	ND	0.0
D	D-F-1	9/20/2017	13.0	1,250.0	**1,350.0**	135.0	ND	1.7	ND
D	D-F-2	9/20/2017	**22.1**	**2,790.0**	**1,930.0**	185.0	ND	3.2	ND
D	D-F-3	9/20/2017	**37.0**	**1,770.0**	**2,420.0**	170.0	ND	**13.4**	ND
D	D-F-4	9/20/2017	**17.9**	**2,470.0**	985.0	121.0	ND	3.2	ND
D	D-W-1	9/20/2017	**17.7**	**1,790.0**	889.0	152.0	ND	2.6	ND
D	D-W-5	10/23/2017	7.2	23.9	11.9	38.6	ND	ND	ND

Table 4-6 Final Confirmation/Documentation Sample Analytical Results

Area	Sample ID[1]	Date Sampled	Concentration in mg/kg[2]						
			As	Cr	Pb	Ba	PCBs	Cd	TCE
D	D-F-8	10/23/2017	**21.8**	**3,610.0**	457.0	183.0	ND	3.0	ND
D	D-F-9	10/23/2017	10.5	189.0	152.0	68.3	**0.0**	ND	ND
D	D-F-11	10/23/2017	11.7	1,200.0	**1,690.0**	147.0	ND	0.5	ND
D	D-F-5-3	9/20/2017	**22.0**	**1,820.0**	**9,410.0**	179.0	ND	2.8	ND
E	E-F-1	7/31/2017	12.9	14.4	14.8	72.8	ND	0.1	ND
E	E-F-2	7/31/2017	5.7	28.0	56.9	82.3	ND	0.5	ND
E	E-F-3	7/31/2017	11.8	14.2	20.1	66.3	ND	0.2	ND
E	E-W-2	7/31/2017	**23.9**	**3,740.0**	**10,400.0**	169.0	ND	0.6	ND
E	E-W-3	7/31/2017	3.3	148.0	48.4	235.0	ND	ND	ND
E	E-W-4	7/31/2017	8.9	51.2	33.5	83.2	ND	0.2	ND
E	E-W-1-4	9/15/2017	**21.5**	**1,650.0**	**8,460.0**	**3,300.0**	**9.9**	**9.5**	ND
E	E-W-1-4	9/21/2017	**28.7**	**1,960.0**	**2,650.0**	270.0	ND	**12.0**	ND
E	E-F-4-2	10/11/2017	**12.9**	359.0	**315.0**	144.0	ND	0.9	ND
E	E-W-6-3	11/20/2017	**7.5**	323.0	**154.0**	55.0	**0.0**	0.3	ND
F	F-F-1	7/10/2017	5.6	67.7	237.0	288.0	ND	0.7	ND
F	F-F-2	7/10/2017	5.1	66.9	125.0	160.0	ND	0.6	ND
F	F-F-3	7/10/2017	4.9	58.4	70.4	156.0	ND	0.4	ND
F	F-W-3	7/10/2017	6.3	217.0	435.0	219.0	ND	0.4	ND
F	F-W-1-2	7/26/2017	10.1	31.9	27.4	105.0	ND	0.2	ND
F	F-W-2-2	7/26/2017	6.2	500.0	543.0	142.0	ND	0.6	ND
G	G-1-SW	6/30/2017	6.2	433.0	128.0	288.0	ND	0.2	ND
G	G-3-SW	6/302017	9.5	**4,130.0**	**1,100.0**	**3,300.0**	ND	0.8	ND
G	G-1-F-2	7/25/2017	5.5	280.0	33.2	116.0	ND	0.7	ND
G	G-2-F-2	7/25/2017	5.7	33.1	11.6	99.3	ND	0.7	ND
G	G-W-2-2	7/25/2017	11.3	16.6	18.5	**95.4**	ND	0.8	ND
G	G-F-3-3	8/3/2017	9.1	19.4	12.4	90.3	ND	0.3	ND
H	H-1-SW-1	7/5/2017	7.4	337.0	151.0	155.0	ND	0.3	ND
H	H-2-SW-1	7/5/2017	6.6	167.0	308.0	112.0	ND	0.8	ND
H	H-1-F-2	7/5/2017	3.8	64.0	33.0	157.0	ND	0.2	ND
H	H-2-F-2	7/5/2017	4.5	161.0	68.7	**418.0**	ND	0.2	
H	H-3-F-2	7/5/2017	5.9	181.0	71.0	229.0	ND	ND	ND
H	H-4-F-2	7/5/2017	5.7	133.0	44.7	117.0	ND	0.2	ND
H	H-5-F-2	7/5/2017	6.9	704.0	127.0	185.0	ND	0.4	ND
H	H-6-F-2	7/5/2017	7.1	124.0	44.3	119.0	ND	0.2	ND
I	I-F-1-2	8/3/2017	2.0	39.0	12.2	66.8	ND	0.2	ND
J	J-F-1	6/16/2017	3.8	23.7	10.7	98.6	ND	0.4	ND
J	J-W-1	6/16/2017	7.1	342.0	119.0	118.0	**60.7**	0.6	ND
J	J-W-2	6/16/2017	7.0	324.0	62.0	97.0	**12.0**	0.5	ND
K	K-F-1	7/10/2017	7.2	464.0	240.0	228.0	**0.2**	ND	ND
K	K-F-2	7/10/2017	4.5	112.0	759.0	119.0	ND	0.4	ND
K	K-F-3	7/10/2017	3.9	408.0	135.0	118.0	ND	0.3	ND
K	K-F-4	7/10/2017	4.1	258.0	69.0	111.0	ND	0.3	ND

Table 4-6 Final Confirmation/Documentation Sample Analytical Results

Area	Sample ID[1]	Date Sampled	Concentration in mg/kg[2]						
			As	Cr	Pb	Ba	PCBs	Cd	TCE
K	K-F-5	7/10/2017	5.3	392.0	772.0	148.0	ND	0.4	ND
K	K-F-6	7/10/2017	6.2	344.0	150.0	154.0	**0.0**	ND	ND
K	K-F-7	7/10/2017	5.3	161.0	679.0	162.0	ND	0.4	ND
K	K-W-1	7/10/2017	3.9	261.0	185.0	187.0	ND	0.5	ND
K	K-W-2	7/10/2017	5.5	1,280.0	209.0	252.0	ND	0.5	ND
K	K-W-3	7/10/2017	5.5	990.0	207.0	163.0	ND	0.4	ND
K	K-W-4	7/10/2017	6.0	34.8	67.8	120.0	ND	0.4	ND
L	L-F-1	6/16/2017	8.3	127.0	563.0	111.0	**7.4**	0.6	ND
L	L-F-3	6/16/2017	10.0	26.4	125.0	135.0	ND	0.6	ND
L	L-F-4	6/16/2017	5.6	146.0	486.0	**434.0**	**24.1**	0.5	ND
L	L-F-7	6/16/2017	7.8	116.0	494.0	134.0	ND	0.8	ND
L	L-F-8	6/16/2017	6.3	12.3	9.4	134.0	ND	0.5	ND
L	L-F-9	6/16/2017	6.4	88.2	457.0	220.0	ND	0.6	ND
L	L-F-10	6/16/2017	14.0	788.0	794.0	226.0	**40.5**	0.9	ND
L	L-F-11	6/16/2017	4.4	12.3	15.4	90.6	ND	0.4	ND
L	L-F-12	6/16/2017	3.1	11.0	38.9	121.0	ND	0.3	ND
L	L-W-1	6/16/2017	7.6	14.0	31.0	85.0	ND	0.5	ND
L	L-W-2	6/16/2017	5.6	14.8	11.9	105.0	ND	0.5	ND
L	L-W-4	6/16/2017	6.0	21.8	10.9	273.0	ND	0.5	ND
L	L-W-7	6/16/2017	5.8	15.0	25.5	78.4	ND	0.5	ND
L	L-F-3-1	7/25/2017	7.5	14.9	16.0	ND	ND	0.8	ND
L	L-F-5-2	7/27/2017	7.4	117.0	316.0	143.0	ND	0.7	ND
L	L-F-6-2	7/27/2017	4.0	20.3	13.2	76.6	ND	0.4	ND
L	L-W-6-2	7/27/2017	6.0	108.0	210.0	148.0	ND	0.6	ND
L	L-W-5-3	8/3/2017	10.8	28.7	16.6	113.0	ND	ND	ND
M	M-F-1	6/16/2017	7.3	373.0	167.0	91.8	ND	0.6	ND
M	M-F-2	6/16/2017	9.8	546.0	256.0	112.0	**17.4**	1.1	ND
N	N-F-1	5/18/2017	13.1	19.3	25.5	158.0	ND	ND	140.0
N	N-F-2	5/18/2017	7.2	252.0	31.2	118.0	ND	0.1	13.0
N	N-F-3	5/18/2017	10.0	1,050.0	114.0	118.0	**0.0**	1.5	26.8
N	N-SW-2	5/18/2017	8.9	528.0	129.0	175.0	ND	0.8	**567.0**
N	N-SW-3	5/18/2017	14.4	**8,280.0**	87.4	86.8	ND	1.7	33.1
N	N-SW-4	5/18/2017	8.0	617.0	223.0	99.6	ND	0.5	0.1
N	N-SW-5	5/18/2017	8.6	1,010.0	117.0	99.1	**0.2**	6.2	108.0
N	N-1-W-1	8/28/2017	8.8	37.6	25.9	161.0	ND	1.2	**1,930.0**
N	N-1-W-3	8/28/2017	4.3	134.0	15.6	22.2	ND	0.8	ND
N	N-1-F-1	8/28/2017	9.3	419.0	16.6	97.0	ND	1.2	72.4
N	N-1-3-F-1	9/21/2017	8.5	409.0	394.0	115.0	**0.0**	1.5	ND
N	N-1-3-F-2	9/21/2017	9.2	245.0	41.3	138.0	ND	1.4	ND
N	N-1-3-W-1	9/21/2017	4.4	237.0	30.2	79.5	**0.1**	**84.8**	ND
O	O-W-2	9/21/2017	9.6	498.0	89.5	76.2	ND	8.5	ND
O	O-W-3-2	10/2/2017	7.1	9.9	23.0	51.5	ND	0.3	ND

Table 4-6 Final Confirmation/Documentation Sample Analytical Results

Area	Sample ID[1]	Date Sampled	Concentration in mg/kg[2]						
			As	Cr	Pb	Ba	PCBs	Cd	TCE
O	**O-F-2-3**	10/11/2017	14.4	218.0	226.0	138.0	ND	**25.2**	0.0
O	**O-F-3-3**	10/11/2017	8.5	25.4	14.2	57.8	ND	ND	ND
O	**O-F-4-3**	10/11/2017	**25.7**	634.0	33.3	137.0	ND	ND	ND
O	**O-F-1-4**	10/18/2017	**20.2**	803.0	268.0	131.0	ND	**35.6**	0.0
O	**O-W-1-4**	10/18/2017	**22.8**	146.0	60.3	60.5	ND	**10.0**	0.2

6 NYCRR Part 375 Table 375-6.8(b): Restricted Use Soil Cleanup Objectives, Commercial:
Arsenic (As) = 16 mg/kg
Barium (Ba) = 400 mg/kg
Cadmium (Cd) = 9.3 mg/kg
Chromium (Cr), trivalent = 1,500 mg/kg
Lead (Pb) = 1,000 mg/kg
Trichloroethene (TCE) = 200 mg/kg
Polychlorinated biphenyls (PCBs) = 1.0 mg/kg

Notes:
1. For samples in which grab and composite samples were taken at the same location (i.e., with the same sample ID number), the analytical results for VOCs (i.e., TCE) were sampled and reported as grab samples; the analytical results for metals (arsenic, barium, cadmium, chromium, and lead) and PCBs (Aroclor) were sampled and reported as the maximum concentrations for each composite sample.
2. Reported validated data was provided by Paradigm Environmental Services, Inc.
3. Highlighted cells indicate that the sample result exceeded the SCO.

Key:

NA = Sample not analyzed for specific parameter
ND = Non-detect at the parameter's reporting limit

4.5.3 DUSR Review of Analytical Data

The analytical data obtained by ESGI from Paradigm was independently verified by Vali-Data of WNY (West Falls, New York) in accordance with the requirements of the Contract Documents and the project-specific Quality Assurance Project Plan (QAPP). The DUSRs provided reviews of the analytical data generated by ESGI.

Vali-Data of WNY further certified that the data was validated according to the protocols and QA requirements of the analytical methods detailed in the Contractor's QAPP and by the project specifications. The reviewer noted no discrepancies in the chains-of-custody for sample handling, preservation, and transport to the laboratory as stipulated for the designated samples. In addition, Vali-Data of WNY reviewed the following items for the DUSR:

- Sample data package narrative and deliverables compliance;
- Holding times;
- Surrogate compound recoveries;
- Matrix spike/matrix spike duplicate (MS/MSD) recovery summary forms;

- Laboratory check sample/laboratory check sample duplicate (LCS/LCSD) recovery summary forms;
- Positive results reported for method blanks;
- Gas chromatography/mass spectroscopy (GC/MS) tuning summary forms;
- Initial and continuing calibration summaries; and
- Internal standard area and retention time summary forms.

Any deviations from acceptable QC specifications are discussed in the DUSRs. Qualifiers were added to the specific data, if appropriate, to indicate potential concerns regarding data usability, and these qualifiers were transferred to the data summary reports. No major concerns were encountered regarding the usability of the analytical data provided by Paradigm.

DUSRs were submitted to E & E at the completion of the analytical services provided by the Contractor's approved analytical laboratory. DUSR submittals were delivered to and reviewed by E & E. Electronic copies of the DUSRs prepared by Vali-Data of WNY are provided in Appendix O.

4.6 Imported Backfill

As specified in the Contract Documents, excavations were to be restored to the proposed grading plans with imported clean common fill. Supplementary Specifications, Section XI, Division 2, Section 02920 – Fill Materials, Topsoil, Seeding, and Mulch, established requirements for the installation and compaction of clean common fill materials and restoration of the site.

Imported fill samples were obtained from St. George Gravel Co., Fredonia, New York. The samples were analyzed for physical properties and grain size, and the analytical results were reviewed and evaluated by E & E. The analytical results indicated the common fill was in conformance with the Contract Documents and acceptable for use at the site. Electronic copies of the lab data for the imported material are provided in Appendix P.

4.6.1 Backfill Placement at Excavated Areas

Prior to backfilling, demarcation layers were placed at the final excavation depth per the Contract Documents for these and all disturbed soil areas. Delivery of common backfill, and stockpiling on site, began on December 16, 2017. Stockpiling of backfill stopped after ESGI requested a temporary demobilization on January 31, 2017, due to adverse weather conditions. Upon return to the site by ESGI on April 18, 2018, initial backfill placement from the stockpiled area was restarted. The backfill material placement included grading and compaction of the common fill to achieve the contours established by the grading/drainage plan. Once backfilling had achieved the proposed grades after rolling, compaction testing was performed by SJB Services, Inc. The compacted fill requirements established for the site were 90% of the Proctor maximum dry density method. The results of the site compaction tests performed by SJB Services, Inc., for ESGI are

provided in Appendix Q. For areas where compaction of common fill was required, the Contract Document compaction requirements were achieved.

4.7 Contamination Remaining at the Site

Since contaminated soil remains beneath the site after completion of the Remedial Action, Institutional and Engineering Controls are required to protect human health and the environment. These Institutional and Engineering Controls are described in Section 4.11. Long-term management of these Institutional and Engineering Controls and residual contamination will be performed under the SMP approved by the NYSDEC.

Table 4-6 and Figures 4-3A and 4-3B summarize the results of all soil samples collected that met or exceeded the Commercial Use SCOs at the site after completion of the remedial action. The soil contaminant classes that remain above SCOs include the following: metals (arsenic, chromium, barium, lead, and cadmium); VOCs (i.e., TCE); and PCBs. Table 4-6 identifies the remaining contamination at the site, the specific area with-in the site and the sample ID.

The analytical results exceeded the 16 mg/kg SCO for arsenic in 17 out of 124 documentation samples (approximately 14 percent), with a maximum value of 37 parts per million (ppm) in a sample collected 6 feet below grade on the floor in Area D. The soil in this area was determined to be at a depth where human contact with the soil was unlikely to occur.

The analytical results exceeded the 400 mg/kg SCO for barium in 4 out of 124 documentation samples (approximately 3 percent), with a maximum value of 3,300 ppm in a sample collected 2 feet below grade along a side wall in Area G and 3,300 mg/kg in a sample collected 6 inches below grade in Area E. These samples were collected along Lucas Avenue; therefore, no further excavation was completed.

The analytical results exceeded the 9.3 mg/kg SCO for cadmium in 7 out of 124 documentation samples (approximately 6 percent), with a maximum value of 84.8 ppm in a sample collected 8 feet below grade along a side wall in Area N. This sample was collected along the property boundary with Norfolk Southern Corporation; therefore, no further excavation was completed.

The analytical results exceeded the 1,500 mg/kg SCO for chromium in 14 out of 124 documentation samples (approximately 11 percent), with a maximum value of 8,820 ppm in a sample collected 6 feet below grade on the floor in Area C. The soil in this area was determined to be at a depth where human contact with the soil was unlikely to occur.

The analytical results exceeded the 1,000 mg/kg SCO for lead in 10 out of 124 documentation samples (approximately 8 percent), with a maximum value of 10,400 ppm in a sample collected 0.5 feet below grade along a side wall in Area

E. The soil in this area was removed during excavation activities in Area C, which was contiguous with Area E.

The analytical results exceeded the 1.0 mg/kg SCO for PCBs in 7 out of 124 documentation samples (approximately 6 percent), with a maximum value of 60.7 ppm in a sample collected 2 feet below grade along a side wall in Area J. The soil in this area was removed during excavation activities in Area H, which was contiguous with Area J.

The analytical results exceeded the 200 mg/kg SCO for TCE in 2 out of 124 documentation samples (approximately 2 percent), with a maximum value of 1,930 ppm in a sample collected along a side wall in Area N. This sample was collected along the property boundary with Norfolk Southern Corporation; therefore, no further excavation was completed.

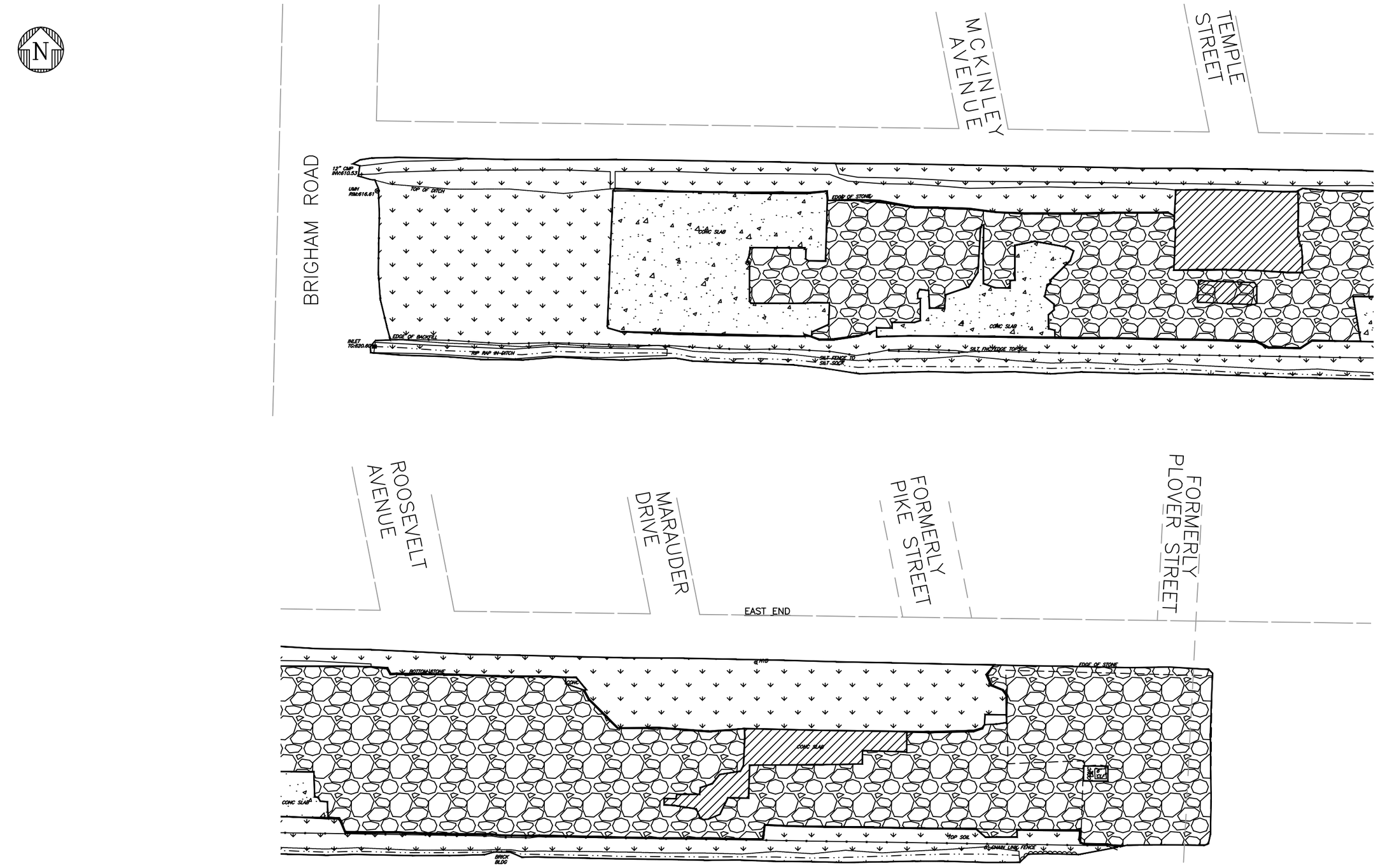
4.8 Soil Cover System

Exposure to remaining contamination in soil/fill at the site is prevented by a soil cover system placed over the site. This cover system is comprised of a minimum of 12 inches of clean soil. An Excavation Work Plan, which outlines the procedures required in the event the cover system and/or underlying residual contamination are disturbed, is provided in Appendix A of the SMP (E & E 2019). See Figure 4-4 for the locations of the soil cover system (Engineering Control).

4.8.1 Erosion Control Matting, Topsoil, Soil Supplements, and Seeding

Supplemental Specification, Section XI, Section 02920 – Fill Materials, Topsoil, Seeding, and Mulch established the requirements for the installation of erosion control matting, topsoil, and seeding for restoration of the site. ESGI submitted the name and location of each proposed source of topsoil material, along with samples, for review by E & E. The analytical results initially submitted by ESGI for the proposed source of imported topsoil indicated the source material was contaminated with pesticides. The submittal was rejected, and an alternative topsoil source was proposed by ESGI. Topsoil from the alternative location was sampled and analyzed; the results met the requirements of NYSDEC DER-10, and the topsoil was approved.

The areas of the project site that required the application of erosion control matting, topsoil, and seeding included the ROW along the road frontage on Lucas Avenue and the southern property boundary adjacent to Norfolk Southern rail corridor. Erosion control straw was used on the side slopes of the North and South ditch improvements, and in the French Drain. The erosion control matting specifications were submitted for review and conformance with the Contract Documents.



NOTE

1. AS-BUILT CONDITIONS SURVEY PREPARED BY FISHER ASSOCIATES (JUNE 2018).

FIGURE 4-4 ENGINEERING CONTROLS LOCATIONS
FORMER AL-TECH SPECIALTY STEEL SITE
DUNKIRK, NEW YORK

The seed was a mix of 42% timothy grass, 25% clover, 16% orchard grasses, and 17% native grasses and flower seeds, as required by the Contract Documents. Documentation of the seed bags delivered to the site was reviewed by E & E.

Topsoil and mulch deliveries were received and stockpiled at the project site until application could be performed. Delivery tickets for topsoil, mulch, seeds, and fertilizer are provided in Appendix E.

E & E monitored the installation of the erosion control matting and the application of topsoil and hydroseeding.

4.8.2 Drainage Improvements

Following installation of the demarcation layer, the French Drain, was installed in accordance with the Contract Drawings. Installation of the French Drain included excavation, grading, and placement of geotextile and stone.

North Ditch improvements were performed for site water collection into the pre-existing catch basin on the west end of the site in accordance with the Contract Documents. North Ditch improvements included clearing of vegetation, regrading, placement of geotextile, installation of stone to design grade, and construction of check dams.

The location of the South Ditch was modified from the Contract Drawings via CO #2. Excavation was performed to create a connection from the existing ditch along the railroad ROW to the west end of the site to achieve positive drainage. The ditch was graded, geotextile and stone were placed, and check dams were installed in accordance with the Contract Drawings.

4.8.3 Permanent Site Fencing Installation

New permanent fencing was installed along the south property line of the site. Information regarding fencing materials, concrete for the posts, and the installation subcontractor was submitted by ESGI for review and conformance with the Contract Documents. Capital Fence, Inc., was approved and installed a total of 1,600 LF of new permanent fencing at the site. The fence submittal is provided in Appendix E.

4.8.4 Monitoring Well Decommissioning

As excavation work progressed across the site, six monitoring wells (TW-1, TW-3, TW-10, RFI-08, LAW-5, and LAW-6) were decommissioned between May 8 and June 21, 2017. The well decommissioning work was performed by ESGI's subcontractor, Nature's Way Environmental. Daily reports documenting the well removals are provided in Appendix R.

4.8.5 New Monitoring Well Installation

Four new monitoring wells, AL-1, AL-2, AL-3, and AL-4 were installed at the site. The monitoring well installation work was performed by ESGI's subcontractor, Nature's Way Environmental. Information regarding the well materials was

submitted for review and conformance with the Contract Documents (see Appendix E). Documentation of the installation of new wells is provided in Appendix R. Figure 4-5 identifies the locations of the monitoring wells.Insert Figure (page 1 of 2)

4.8.6 Monitoring Well Improvements

The Contract Drawings required that improvements be made on a number of on-site and off-site monitoring wells. These improvements included the installation of new well casings, concrete pads, well labels/tags, and locks and keys.

A total of 20 monitoring wells were revitalized per the Contract Documents, and seven new steel protective casings were installed in and around the site per the schedule on the Contract Drawings. Information regarding the new well casing materials, concrete, tags, and locks for the well revitalization program was submitted for review and conformance with the Contract Documents (see Appendix E). Figure 4-5 identifies the locations of the monitoring wells.

4.8.7 Demobilization of Equipment and Support Facilities

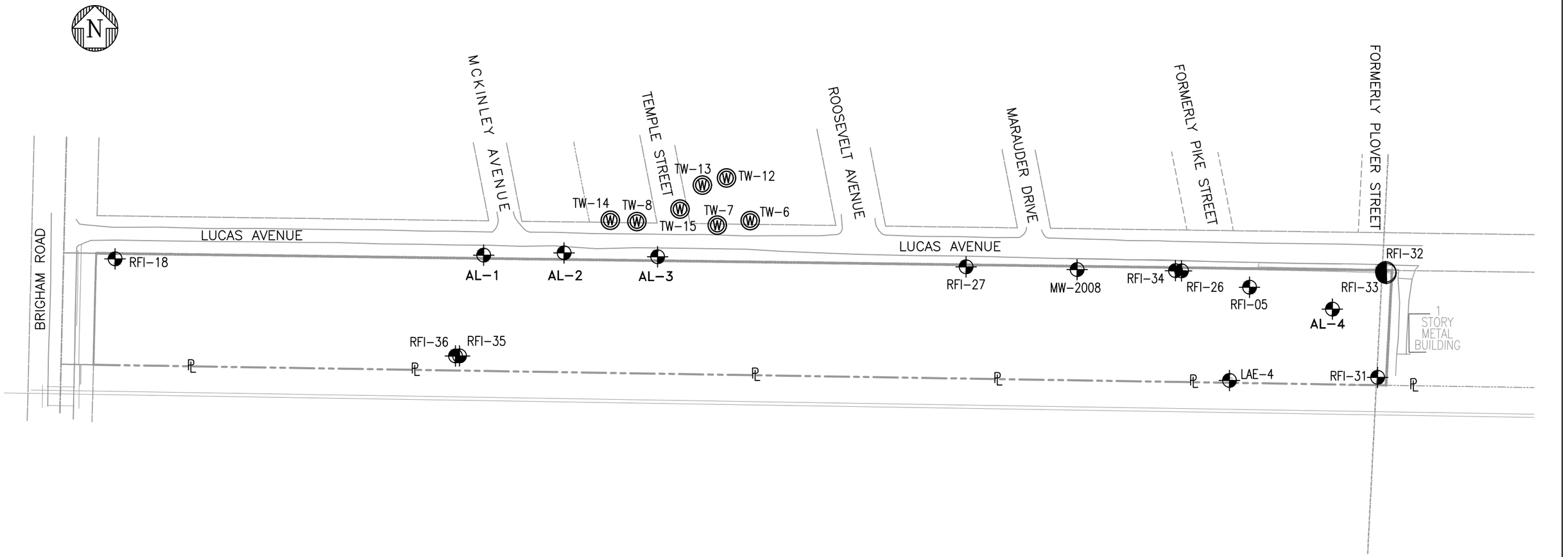
Site services provided by the Contractor were terminated upon Substantial Completion of the Contract on November 20, 2017. The field office trailers were removed from the site on December 21, 2017; however, it was determined that critical restoration items could not be completed until the spring of 2018 due to winter weather conditions. Therefore, Final Completion was modified from December 2017 to June 29, 2018. E & E and ESGI personnel remained on-site until Final Completion of the construction activities was achieved on June 29, 2018.

4.9 Project Completion

4.9.1 Substantial Completion

ESGI submitted a Substantial Completion letter to NYSDEC dated November 20, 2017. E & E acknowledged receipt of the Substantial Completion letter and scheduled a site inspection on December 4, 2017. Representatives of NYSDEC, E & E, and ESGI performed the Substantial Completion inspection on December 18, 2017.

After the inspection, E & E, in consultation with NYSDEC, prepared a punch-list of remaining work items and an Estimate of Cost Value for Final Completion. Outstanding work items included final site restoration; installation of asphalt; repair and labeling of groundwater monitoring wells; fencing installation; post-construction submittals; and removal of the project sign. In a letter dated January 9, 2018, ESGI was informed that NYSDEC was providing ESGI with a Certificate of Substantial Completion and was provided with the punch-list of remaining work items and cost values. Letters pertaining to Substantial Completion are provided in Appendix S.



NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

FIGURE 4-5
MONITORING WELL LOCATIONS
FORMER AL-TECH SPECIALTY STEEL SITE
DUNKIRK, NEW YORK

4.9.2 Final Completion

On October 31, 2018, ESGI prepared and submitted CAP No. 11 for the final payment of $581,439.80. E & E reviewed CAP No. 11, including certified payrolls, ESGI's letter indicating certification of payments to subcontractors, certifications from ESGI's subcontractors, final payment release, a certification statement of ESGI as prime contractor, and ESGI's certification of bond performance. On December 27, 2018, E & E submitted CAP No. 11 to NYSDEC, recommending approval of the payment based on review and verification of the final CAP documentation.

4.10 Other Engineering Controls

The remedy for the site did not require the construction of additional Engineering Control systems beyond the soil cover system.

4.11 Institutional Controls

The site remedy requires that an environmental easement be placed on the property to (1) implement, maintain and monitor the Engineering Controls; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the site to commercial uses only.

The environmental easement for the site was executed by the Department on September 1, 2015, and filed with the Chautauqua County Clerk on September 21, 2015. The County Recording Identifier number for this filing is DE2015005623. A copy of the easement and proof of filing is provided in Appendix V.

The SMP will establish inspection, monitoring, and maintenance guidelines to protect human health and safety from the remaining contamination.

4.12 Deviations from the Remedial Action Work Plan

4.12.1 Requests for Information

Requests for Information (RFIs) were submitted for clarification or interpretation of the Contract Documents or Contractor operations by the Contractor and E & E as necessary. Each RFI was addressed by the party it was directed to and then evaluated by E & E. A total of five (5) individual RFIs were submitted to E & E and are summarized in Table 4-7.

Table 4-7 Former AL-Tech Specialty Steel Lucas Avenue Site - RFI List Summary

RFI Number	Date Received	Description	Date of Response	Action
001	6/1/2016	**Requested by ESGI** – Request for CAD drawings.	6/3/2016	ESGI signed CAD drawing release agreement and E & E provided the CAD files
002	8/4/2016	**Requested by E & E** – Questioned if analysis is just for priority pollutants listed in 01425 or the full priority pollutant scan.	8/10/2016	E & E notified ESGI that the full priority pollutant analysis was required
003	10/31/2016	**Requested by E & E** – Crushing methods to be used to resize brick for use on-site.	11/3/2016	ESGI to crush bricks from the building demolition per the requirements of the Contract Documents.
004	3/7/2017	**Requested by ESGI** – Locations of pits/trenches.	4/6/2017	E & E notified ESGI that Project Drawings sheet 6 of 14, Notes 16-D, 16-E, and 16-F state excavation of subsurface vaults shall be performed. Perform excavation of subsurface piping, along with blocking, plugging and capping pipe.
005	8/8/2017	**Requested by ESGI** – Shutdown the vibration monitoring effort since the monitoring was required for demolition.	8/9/2017	ESGI Shutdown vibration monitoring program per the Contract Documents

4.12.2 Field Orders

A total of 35 Field Orders (FOs) were issued by E & E as directed by NYSDEC in response to (a) changes in field conditions that required additional direction or (b) where additional excavation work was required to meet the project SCOs. Each of the 35 FOs issued by E & E were subsequently included in a Potential Change Order (PCO). The FOs were primarily issued for re-excavation work in each of the phases of the project to achieve the SCOs.

4.12.3 Proposed Change Orders (PCO)

A total of 12 PCOs were issued during the project. Each PCO was developed by E & E based on changes in conditions or additional activities required at the site to achieve the Contract requirements. The NYSDEC PM requested the FOs be converted into PCOs if the FO required a change in Contract duration or cost. Each PCO was reviewed by E & E after discussions with both NYSDEC and the Contractor's PM. PCOs were either approved by the Project Engineer and then implemented by the Contractor, or tabled for future consideration in accordance

with the General Conditions of the Contract Documents. Once a PCO was executed and completed, the Contractor submitted final costs and time for E & E's review. The PCOs are summarized in Table 4-8. Copies of the individual PCOs and a complete PCO log are presented in Appendix T.

Table 4-8 Former AL-Tech Specialty Steel Lucas Avenue Site - PCO List

PCO No.	Brief Description of Proposed Change Order	Cost Increase	Time Increase
001	Removal of railroad ties to facilitate installation of erosion and sediment controls, and construction of site drainage swale at the site restoration phase.	$3,884.76	0 Days
002	Labor, equipment, and materials for the additional characterization sampling in Pits 2 and 3 for residual site wastes. Accessed each pit for cleaning, transport, and off-site disposal of residual wastes. Removed residual equipment and piping for decontamination and recycling. Provided blocking and plugging of any utility openings and backfill.	$76,472.72	0 Days
003	Collection of water in Excavation H from City of Dunkirk municipal water line breaks, analysis, and discharge per requirements of the permit.	$79,384.61	0 Days
004	Performance of exploratory digging around the AL-Tech site for the identification of water shutoff valves.	$2,177.52	0 Days
005	Additional excavation work in Areas A, B, C, D, E, F, G, H, I, L, N, and O.	$210,078.24	0 Days
006	Installation of a concrete top over the storm sewer located in Area N.	$3,133.13	0 Days
007	Demarcation layer over excavation areas greater than 12 inches.	$18,421.99	0 Days
008	Additional excavation and grading to meet the concrete parking lot grades at the west end of the site.	$15,751.01	0 Days
009	Excavation, cutting, plugging, and blocking of the 12-inch water line utility on the south side of the AL-Tech site. On the north side of the site, cutting the 12-inch water line, dewatering, and water treatment for discharge to the City of Dunkirk Waste Water Treatment Plant. Plugging and securing of utilities to reduce preferential pathway was covered under the excavation specification of the Contract Documents. Backfill and restoration was performed under the backfill and restoration requirements of the Contract Documents.	$11,972.49	0 Days
010	Extension of Contract Time request by ESGI until June 29, 2018.	-	191 Days
011	Labor, equipment, and materials for winter services and remobilization in spring 2018 to perform site restoration work.	$26,376.54	0 Days

Table 4-8 Former AL-Tech Specialty Steel Lucas Avenue Site - PCO List

PCO No.	Brief Description of Proposed Change Order	Cost Increase	Time Increase
012	12-inch cover of No. 2 crushed gravel substituted for proposed asphalt cover areas. Existing flush-mount well RFI-31 converted to a stick-up well, and existing flush-mount well AL-4 raised to the gravel's final grade.	$158,976.55	0 Days
	Totals:	**$606,629.56**	**191**

4.12.4 Change Orders (CO)

Two COs were issued to EGSI. The COs combined multiple PCOs.

CO No. 1 was approved by NYSDEC in March 2018. It included a cost increase of $899,758.16 and a time increase of 191 days (see Table 4-9).

Table 4-9 Former AL-Tech Specialty Steel Lucas Avenue Site - CO No. 1

	Change Order Item	Original Quantity	New Quantity	Difference	Unit Cost	Change Order Adjustment
A.	Addition to Lump Sum Cost Item - LS-1 (PCO #001)	0 LS	1 LS	1 LS	$ 3,884.76	$ 3,884.76
B.	Addition to Lump Sum Cost Item - LS-5 (PCO #002)	0 LS	1 LS	1 LS	$ 76,472.72	$ 76,472.72
C.	Addition to Lump Sum Cost Item - LS-4 (PCO #003)	0 LS	1 LS	1 LS	$ 79,384.61	$ 79,384.61
D.	Addition to Lump Sum Cost Item - LS-4 (PCO #004)	0 LS	1 LS	1 LS	$ 2,177.52	$ 2,177.52
E.	Addition to Lump Sum Cost Item - LS-5 (PCO #006)	0 LS	1 LS	1 LS	$ 3,133.13	$ 3,133.13
F.	Line Item Extension for Site Services (UC-1)	280	325.00	45.00	$ 750.00	$ 33,750.00
G.	Line Item Extension for Excavation of Non-Hazardous Soils (UC-3)	2,600	3,619.36	1,019.36	$ 8.00	$ 8,154.88
H.	Line Item Extension for Excavation of Hazardous Soils (UC-4)	7,150	9,257.87	2,107.87	$ 35.00	$ 73,775.45
I.	Line Item Extension for Handling, Transport, and Off-site Disposal of Non-Hazardous Soils (UC-5)	4,420	6,399.63	1,979.63	$ 55.00	$ 108,879.65
J.	Line Item Extension for Handling, Transport, and Off-site Disposal of Hazardous Soils (UC-6A)	12,240	15,424.14	3,184.14	$ 95.00	$ 302,493.30
K.	Line Item Extension for Handling, Transport, and Off-site Disposal of Hazardous Debris (UC-6B)	2,950	1,437.40	(1,512.60)	$ 125.00	$(189,075.00)
L	Line Item Extension of Post-Excavation Confirmatory Soil Sampling and Analysis (UC-7)	95	200	105	$ 900.00	$ 94,500.00
M.	Clean Common Fill (UC-12)	1,680	13,881.18	12,201.18	$ 23.00	$ 280,627.14
N.	Chain Link Fencing (UC-18)	700	1,600	900	$ 24.00	$ 21,600.00
					Total	**$ 899,758.16**

CO No. 2 was approved by NYSDEC in October 2018 and included a cost increase of $229,156.82 (see Table 4-10).

Table 4-10 Former AL-Tech Specialty Steel Lucas Avenue Site - CO No. 2

	Change Order Item	Original Quantity	New Quantity	Difference	Unit Cost	Change Order Adjustment
A.	Addition to Lump Sum Cost of Item - LS-8 (PCO #005)	0 LS	1 LS	1 LS	$210,078.24	$210,078.24
B.	Addition to Lump Sum Cost of Item - LS-9 (PCO #007)	0 LS	1 LS	1 LS	$ 18,421.99	$ 18,421.99
C.	Addition to Lump Sum Cost of Item - LS-10 (PCO #008)	0 LS	1 LS	1 LS	$ 15,751.01	$ 15,751.01
D.	Addition to Lump Sum Cost of Item - LS-11 (PCO #009)	0 LS	1 LS	1 LS	$ 11,972.49	$ 11,972.49
E.	Addition to Lump Sum Cost of Item - LS-12 (PCO #011)	0 LS	1 LS	1 LS	$ 26,376.54	$ 26,376.54
F.	Addition to Lump Sum Cost of Item - LS-13 (PCO #012)	0 LS	1 LS	1 LS	$158,976.55	$158,976.55
G.	Subtraction to Unit Cost of Item - UC-11	5,590 SY	0 SY	(5,590) SY	$ 38.00	$(212,420.00)
					Total	**$ 229,156.82**

For a detailed list and description of each of the scope revisions, refer to executed CO Nos. 1 and 2, which are provided in Appendix U.

4.12.4.1 Changes to Project Schedule

The original Contract time for ESGI was 480 calendar days to Substantial Completion. Construction delays in the project schedule were incurred due to adverse weather conditions and changes to the scope of work. As indicated in Table 4-11, 191 days were added to the contract.

Table 4-11 Changes to Project Schedule

	Calendar Days*	Substantial Completion Date	Final Completion Date
Original Contract Time	530	November 20, 2017 (480 + 20 Calendar Days)	December 20, 2017 (510 + 20 Calendar Days)
Net Change Order #1:	191	December 29, 2017 (39 Calendar Days)	June 29, 2018 (191 Calendar Days)
Net Contract Time In Change Order #1:	721	December 29, 2017 (539 Calendar Days)	June 29, 2018 (721 Calendar Days)
Net Change In Change Order #2:	0	December 29, 2017 (0 Calendar Days)	June 29, 2018 (0 Calendar Days)
Net Contract Time In Change Order #2:	721	December 29, 2017 (539 Calendar Days)	June 29, 2018 (721 Calendar Days)

*Days from July 8, 2016, to Final Completion.

4.12.4.2 Changes to Contract Quantities and Costs

The total cost of several unit-cost bid items changed due to changes in schedule and quantity, including excavation and disposal of waste types not previously identified in the Contract Documents. Of the 26 original bid items, 8 remained unchanged, 11 items increased in quantity, 7 items decreased in quantity, and 6 lump sum items were added. A comparison of ESGI's bid with the estimated bid quantities versus the actual quantities and cost of those bid items that changed is presented in Table 4-12.

4.13 Issues and Concerns

4.13.1 Weather Conditions during Construction

Weather conditions at the site during the construction phase of the project are documented in the E & E Daily Inspection Reports (Appendix I).

The planned duration of the building demolition and remediation resulted in a planned winter shutdown between January and March 2017. Remedial construction continued through December 2017. Due to the remediation extending into December, a second, unplanned, winter shutdown was authorized under CO No. 1. Site restoration resumed in the spring of 2018.

4.13.2 Additional Sampling and Soils Removal – Excavation Area N

During the review of the Contract Drawings, it was discovered that a portion of the southeast section of the property to the west of Area N contained Soil Boring (SB-01), had elevated levels of chromium based on initial design sampling (see Appendix C, Sheet 7 of 14 of the Contract Drawings). This area was not included in the original design of the contaminated soil remediation program and was newly designated as remedial Area N-1.

At the direction of NYSDEC, additional soil excavation and confirmation sampling was performed by ESGI on October 13, 2017, to evaluate the extent of soil contamination. The samples were analyzed by Paradigm. E & E provided evaluation of the analytical results (see Appendix L), which indicated the chromium concentration to the west of Area N-1 was above the SCOs and this area was designated as remedial Area N-2.

Additional confirmation sampling was performed on November 12, 2017, after excavation of Area N-2, to further evaluate the horizontal and vertical limits of soils in the southeast section of the site. The additional samples were also analyzed by Paradigm. The analytical results showed that the chromium contamination on the western wall of Area N-2 area exceeded the SCOs. This area was designated as remedial Area N-3 and was excavated to achieve the project SCOs.

Table 4-12 Former AL-Tech Specialty Steel Lucas Avenue Site - Bid Item Cost Changes

Payment Item Number	Type of Work	Unit Price	Estimated (Bid) Quantity	ESGI Bid	Actual Quantity	Actual Cost
LS-1	Site Preparation/Mobilization/ Demobilization (Limited to 7.5% of Total Bid)	$265,000.00	1 LS	$265,000.00	1 LS	$265,000.00
LS-1 (PCO #1)	Site Preparation/Mobilization/ Demobilization	$3,884.76	--	--	1 LS	$3,884.76
LS-2	Surveys	$38,000.00	1 LS	$38,000.00	1 LS	$38,000.00
LS-3	Asbestos Abatement, Process Equipment Removal and Decontamination, and Building Demolition	$905,000.00	1 LS	$905,000.00	1 LS	$905,000.00
LS-4	Dewatering and Contact Water Treatment	$75,000.00	1 LS	$75,000.00	1 LS	$75,000.00
LS-4 (PCO #3)	Dewatering and Contact Water Treatment	$79,384.61	--	--	1 LS	$79,384.61
LS-4 (PCO #4)	Dewatering and Contact Water Treatment	$2,177.52	--	--	1 LS	$2,177.52
LS-5	Demolition of Aboveground and Belowground Oil Vaults, Tanks, Ancillary Structures, and Chambers	$72,000.00	1 LS	$72,000.00	1 LS	$72,000.00
LS-5 (PCO #2)	Demolition of Aboveground and Belowground Oil Vaults, Tanks, Ancillary Structures, and Chambers	$76,472.72	--	--	1 LS	$76,472.72
LS-5 (PCO #6)	Demolition of Aboveground and Belowground Oil Vaults, Tanks, Ancillary Structures, and Chambers	$3,133.13	--	--	1 LS	$3,133.13
LS-6	Bioremediation	$13,500.00	1 LS	$13,500.00	1 LS	$13,500.00
LS-7	Winter Shutdown	$25,000.00	1 LS	$25,000.00	1 LS	$25,000.00

Table 4-12 Former AL-Tech Specialty Steel Lucas Avenue Site - Bid Item Cost Changes

Payment Item Number	Type of Work	Unit Price	Estimated (Bid) Quantity	ESGI Bid	Actual Quantity	Actual Cost
LS-8 (PCO-05)	Re-Excavation Services	$210,078.24	--	--	1 LS	$210,078.24
LS-9 (PCO-07)	Additional Demarcation Layer Installation	$18,421.99	--	--	1 LS	$18,421.99
LS-10 (PCO-08)	West End Additional Grading and Concrete Removal	$15,751.01	--	--	1 LS	$15,751.01
LS-11 (PCO-09)	Dewatering, Collection and Treatment of Groundwater	$11,972.49	--	--	1 LS	$11,972.49
LS-12 (PCO-11)	Winter Site Inspection Services and Spring 2018 Mobilization and Demobilization	$26,376.54	--	--	1 LS	$26,376.54
LS-13 (PCO-12)	Restoration Work Summer 2018	$158,976.55	--	--	1 LS	$158,976.55
UC-1	Site Services (Limited to 7.5% of Total Bid)	$750.00	280 Days	$210,000.00	325 Days	$243,750.00
UC-2	Health and Safety	$450.00	250 Days	$112,500.00	249 Days	$112,050.00
UC-3	Excavation/Removal of Non-Hazardous Soils	$8.00	2,600 CY	$20,800.00	3,619.36 CY	$28,954.88
UC-4	Excavation/Removal of Hazardous Soils and Debris	$35.00	7,150 CY	$250,250.00	9,257.87 CY	$324,025.45
UC-5	Handling, Transport, and Off-Site Disposal of Non-Hazardous Soils	$55.00	4,420 Tons	$243,100.00	6,399.63 Tons	$351,979.65
UC-6A	Handling, Transport, and Off-Site Disposal of Hazardous Soils	$95.00	12,240 Tons	$1,162,800.00	15,424.14 Tons	$1,465,293.30
UC-6B	Handling, Transport, and Off-Site Disposal of Hazardous Debris	$125.00	2,950 Tons	$368,750.00	1,437.40 Tons	$179,675.00
UC-7	Post-Excavation Confirmatory Soil Sampling and Analysis	$900.00	95 Ea	$85,500.00	200 Ea	$180,000.00
UC-8	Well Decommissioning	$36.00	110 LF	$3,960.00	110 LF	$3,960.00

Table 4-12 Former AL-Tech Specialty Steel Lucas Avenue Site - Bid Item Cost Changes

Payment Item Number	Type of Work	Unit Price	Estimated (Bid) Quantity	ESGI Bid	Actual Quantity	Actual Cost
UC-9	New Monitoring Well Installation	$120.00	80 LF	$9,600.00	62.5 LF	$7,500.00
UC-10	Existing Monitoring Well Modifications	$600.00	10 Ea	$6,000.00	10 Ea	$6,000.00
UC-11	Paving	$38.00	5,590 SY	$212,420.00	- SY	-
UC-12	Clean Common Fill	$23.00	1,680 CY	$38,640.00	13,881.18 CY	$319,267.14
UC-13	French Drain	$25.00	650 LF	$16,250.00	650 LF	$16,250.00
UC-14	Ditch Improvements	$23.00	930 LF	$21,390.00	930 LF	$21,390.00
UC-15	Topsoil	$35.00	2,510 CY	$87,850.00	1,960 CY	$68,605.60
UC-16	Restoration - Establishing Turf	$175.00	147 MSF	$25,725.00	129 MSF	$22,627.50
UC-17	Restoration - Shrub Plantings	$48.00	195 Ea	$9,360.00	- Each	-
UC-18	Chain Link Fencing (Used)	$24.00	700 LF	$16,800.00	1,600 LF	$38,400.00
	Total			**$4,295,195.00**		**$5,389,858.08**

Key:
CY = Cubic yards
Ea = Each
LS = Lump sum
MSF = Thousand square feet
SY = Square yards

Since unit costs for excavation, sampling, soil disposal, backfill, and restoration were established in the bid, the additional areas were included as part of the overall Contract scope of work.

The end-point sample analytical results for Areas N-1, N-2, and N-3 are included in the Area N results presented in Section 4.5.2.

4.13.3 Well Installation - North Slope

During clearing, grubbing, and building demolition, it was noted that monitoring wells RFI-05, RFI-26, RFI-34, and MW-2008 were damaged. These wells were repaired by Nature's Way Environmental in November and December 2017. Nature's Way Environmental also conducted inspections of four monitoring wells located off-site on the north side of Lucas Avenue. Inspection and repair was also performed on two above-grade well structures located on the southwest section of the site. Physical measurements of the wells were taken, and depth to water and bottom of well measurements were performed by Nature's Way Environmental and reviewed by E & E.

Well development was performed on new wells AL-1, AL-2, AL-3 and AL-4. The development water was placed in 55-gallon drums, and a purge water sample was collected from the drums on January 13, 2018, for waste stream documentation and to evaluate the potential groundwater contamination in these areas of the site. The samples were tested for chlorinated VOCs and metals. The analytical results did not indicate the presence of any contaminants at concentration above NYSDEC groundwater standards. The purge water was discharged to the municipal sewer in accordance with ESGI's permit. The analytical results are provided in Appendix L. NYSDEC will include these wells as part of the future site management.

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A Site Surveys

B Electronic Copy of FER

C Contract Documents

D

Engineer's Cost Estimate and Bid Tabulation

E Project Submittals

F

Air Monitoring Data

G

Progress Meeting Minutes

H Site Security Logs

Daily Inspection Reports

J

Photo Log

See Appendix I – Daily Inspection Report (DIR)
A Daily Photo Log is included with each DIR

K

Contractors Application for Payments

L Analytical Data

M Waste Profiles and Approvals

N Waste Manifests and Bills of Lading

O DUSRs

P Borrow Source Samples

Q Compaction Testing

R Monitoring Well Decommissioning

S Substantial Completion Letter

T PCOs

U Change Orders

V Easement

W Project Records Manual