Sentinel Monitoring Well Installation Work Plan Well B Location

Former Unisys Facility Lake Success, New York Site No. 130045, Operable Unit 2

Prepared for:

Lockheed Martin Corporation
Energy, Environment, Safety and Health
6801 Rockledge Drive
Bethesda, MD 20817

Submitted to:

Division of Environmental Remediation
New York State Department of Environmental Conservation, Region 1
SUNY Stony Brook
50 Circle Road
Stony Brook, New York 11790

Prepared by:

AMEC E&E, PC
214-25 42nd Avenue, Suite 3R
Bayside, NY 11361

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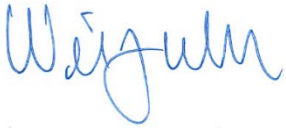
Eric Weinstock, PG
Project Manager



William J. Weber, PE
Project Principal

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Acronyms and Abbreviations

AMEC	AMEC E&E PC
ASTM	American Society for Testing and Materials
CAMP	Community Air Monitoring Plan
CHASP	Contractor Health and Safety Plan
Dig Safely	New York One Call Dig Safely
DOT	Department of Transportation
ELAP	Environmental Laboratory Approval Program
ESH	Environment Safety and Health
GWTS	ground water treatment system
HASP	Site-Specific Health and Safety Plan
IDW	investigation derived waste
Lockheed Martin	Lockheed Martin Corporation
MSL	mean sea level based on NAVD88
NAVD88	North American Vertical Datum of 1988
NTU	nephelometric turbidity unit
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PID	photoionization detector
PPM	parts per million
PVC	polyvinyl chloride
PWS	Public Water Supply
PWSPMP	public water supply protection and mitigation program
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RTO	Remediation Technical Operations
Site	the 90.5-acre Former Unisys Facility located in the Village of Lake Success, New York
USEPA	U.S. Environmental Protection Agency
USGS	United States Geologic Survey
VOC	volatile organic compound
TVOC	total volatile organic compounds (the sum of PCE, TCE, cis-1,2 DCE Freon 113 and vinyl chloride)
WAGNN	Water Authority of Great Neck North
Work Plan	Sentinel Monitoring Well Installation Work Plan

Section 1

Introduction and Site Background

This Sentinel Monitoring Well Installation Work Plan (Work Plan) has been developed as part of a remedy selected by the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) to meet remedial action objectives related to offsite groundwater impact from the former Unisys Facility located in Village of Lake Success, New York (the Site). The remedy, described in the December 2014 Record of Decision (ROD), Unisys Corporation, Operable Unit (OU) No. 2 (OU2) for Site No. 130045 (NYSDEC, 2014), requires that a public water supply protection and mitigation program (PWSPMP) be implemented to protect municipal wells that are, or could be, impacted from historical releases at the Site, "now or in the future, to assure for as long as the wells are used as public water supply (PWS) sources that drinking water standards are achieved and that the finished water is of no lesser quality as currently distributed due to actions taken as part of this remedy." The draft PWSPMP, submitted to NYSDEC in 2016, is a comprehensive document that evaluates each well field in the path of Site-related groundwater impact (hereafter referred to as the Former Unisys Site Plume) and develops action levels and response actions specific to each well field (AMEC, 2016).

A component of the draft PWSPMP is monitoring at sentinel wells installed upgradient of PWS wells to determine if groundwater impacts are approaching or exceeding levels that would require notification to state and local agencies, and possibly lead to further action as necessary to protect the water supply. Analysis presented in the PWSPMP indicated the need for additional wells to monitor groundwater quality near the Water Authority of Great Neck North (WAGNN) Water Mill Lane PWS well field, northwest of the Site. In August 2017, AMEC E&E PC (AMEC) completed the installation of a sentinel well pair, designated as MW-52, to monitor the potential plume migration (AMEC, 2017). The sentinel well pair, MW-52, was installed at the Lakeville Elementary School in the Village of Lake Success, which is between the Site and the Water Mill Lane well field and approximately 0.65 miles from the supply wells. The location of the MW-52 pair is shown on Figure 1-1. However, to further monitor the potential plume migration and

evaluate WAGNN PWS treatment system adequacy, the installation of a second sentinel well pair, closer to the Water Mill Lane public supply wells, has been deemed necessary by the NYSDEC.

AMEC has prepared this Work Plan on behalf of Lockheed Martin Corporation (Lockheed Martin) for the design and installation of the second pair of sentinel wells, specifically at Tain Drive between the Site and approximately 0.30 miles from the Water Mill Lane well field. As described in the draft PWSPMP, the primary location (B) is located near Northern Boulevard and on the right of way of Tain Drive in the Village of Russell Gardens and will serve to monitor the plume as it migrates towards the well field.

PWS Water Mill Lane wells, WAGNN 2A (N12796) and WAGNN 9 (N4388) have been determined by groundwater modeling to be potentially in the path of the Former Unisys Site Plume within the next 10 years. Refer to Groundwater Simulation Analysis performed by CDM Smith in Appendix A. Groundwater pumped from the Water Mill Lane PWS wells is currently treated at the Water Mill Lane facility for low concentration levels of volatile organic compounds (VOCs) that originate from historic local sources not associated with the former Unisys Site Plume. Logs of these wells are included in Appendix B. The Site and PWS well locations are shown on Figure 1-1.

This Work Plan is specific to one pair of new monitoring wells (Location B) approximately 0.30 miles upgradient of the Water Mill Lane Well Field as shown on Figure 1-2. The well pair will be installed to monitor different zones across the plume.

The Water Mill Lane public water supply wells are both screened above the Raritan Clay. Well 2A (N12796) has a screened interval between elevations -96 feet mean sea level (MSL) and -126 feet MSL (126 and 156 feet below grade) and Well 9 (N4388) has a screened interval between -102 feet MSL and -117 feet MSL (129 feet to 144 feet below grade). This Work Plan provides information regarding monitoring well design and location, and identifies the final design.

Section 2

Monitoring Well Installation

2.1 PROJECT DESCRIPTION

Potential locations for monitoring wells upgradient of the Water Mill Lane PWS wells were evaluated during the development of the draft PWSPMP (CDM Smith, 2018). A supplemental groundwater modeling analysis was completed to support and inform this work plan. A summary of this analysis is presented in Appendix A. A street level reconnaissance was performed by AMEC during April 2018 for the proposed well location B to identify potential properties within each target area. Locations were identified that allowed for the technical objectives of the PWSPMP to be met, while minimizing impacts to the local residents, community, and infrastructure. Based on this evaluation, an approximate target location proposed for the well pair is shown on Figure 1-2. The location for the second sentinel well pair is located near Northern Boulevard and on the right of way of Tain Drive in the Village of Russell Gardens. The proposed well location is presented on the Figure 3-1. An equipment layout for the proposed location is presented on Figure 2-1.

Wells will be installed vertically within the underlying water bearing formation to monitor for site-related VOCs at appropriate elevations within the aquifer. The depth of the monitoring wells will take into account the elevations of the screens of the PWS wells and the elevation of the ground surface at the selected drill sites. Results of geologic logging, field screening for VOCs in soil core samples collected during installation of the vertical profile boring for the wells, and groundwater sample results will be used to finalize the length and depth of well screens needed. The monitoring well design will be submitted to the NYSDEC for review and approval.

2.2 SENTINEL WELL GOALS

The following goals have been identified for this project:

a. Establish a "Target" area by plotting the distance that groundwater is estimated to travel towards supply wells 2A and 9 in a period of 2 years and 5 years. This was completed as part of the groundwater modeling analysis completed for the draft PWSPMP (CDM Smith, 2018) and is shown on Figure 1-2. Well Location B was then identified using this map as a guide;

b. Within or near target area B, design and install sentinel monitoring wells that are capable of detecting Former Unisys Site Plume related VOCs emanating from the Site at the depth of highest VOC concentration, if at all detected at that location;

c. Complete the installation of the wells so that they are in the flow pathway of the contamination migrating from the Former Unisys Site Plume as indicated by the groundwater modeling analysis (CDM Smith, 2018). The Location B well pair should be screened to hydraulically connect to the potential flow pathway of the emanating plume, the MW-52 well screens, and the WAGNN Water Mill Lane water supply wells to provide long-term monitoring capability for the specific protection of the Water Mill Lane wellfield.

2.3 PRE-MOBILIZATION ACTIVITIES

2.3.1 Site Access and Permits

The proposed well locations (shown on Figure 1-2) are between the Site and approximately 0.30 miles from the Water Mill Lane Well Field. An access agreement between Lockheed and the Village of Russel Gardens is being completed.

The following items are included in the agreement: work hours; work area and staging area requirements; temporary storage requirements of drilling wastes (e.g., drums); restoration of the drill site once the installation of the monitoring wells are completed; and health and safety related issues.

During the course of this work, care will be taken to minimize disturbance to existing conditions and property to the extent possible, to protect pedestrians and to provide safe access from local roads and along onsite roadways.

2.3.2 Utility Clearance

After an access agreement has been completed and prior to any intrusive work, the locations of subsurface utilities will be identified to ensure that no utilities are encountered during the drilling program. All available site utility maps/drawings will be reviewed to determine if the areas of proposed drilling or support areas coincide with any utilities. The boring locations will be marked and New York One Call Dig Safely (Dig Safely) will be notified (as required by statute) no more than 10 days prior and no less than 72 hours before intrusive activities. Additionally, a private geophysical company will be subcontracted to identify and clear utilities not covered by Dig

Safely. A ground penetrating radar unit, magnetic locator, and pipe and cable locator will be used to investigate subsurface utilities. The private geophysical company will provide a written report summarizing the methods employed and the locations of the utilities identified (if any). All identified utilities will be marked in the field with either spray paint or flags.

No intrusive work will be conducted within 30 inches of a subsurface utility marking, or as prescribed by the utility owner. A completed Risk Handling Checklist and Dig Permit will be provided to Lockheed Martin for approval prior to initiating field activities in support of Lockheed Martin administrative requirements (i.e., LMC EO-28).

2.3.3 Document Site Conditions

Prior to commencing work at the site, a photo survey will be completed to document surface conditions prior to drilling activities. The photos collected during this survey will be used during demobilization to ensure that the drilling site has been properly restored.

An electronic photo diary will be prepared in which digital photos will be annotated to indicate the date taken, a description of the contents of photograph, and the perspective of the photographer (i.e., location of camera and orientation of view when the photo was taken).

2.4 MOBILIZATION

2.4.1 Site Preparation

Site preparation will be needed at the proposed drilling location to facilitate equipment access, and provide a safe work site. With approval from the property owner and when access is secured, site preparation activities will be undertaken as needed and disturbances minimized to the extent practical. Site-specific landscaping requirements will be addressed.

An appropriate barrier system to protect and isolate the work area will be installed as shown on Figure 2-1. This will include a combination of temporary and existing fencing fitted with sound insulation curtains. Fencing requirements will be discussed with the property owner prior to mobilization.

2.5 SOIL BORING AND WELL CONSTRUCTION

2.5.1 Drilling Methods

The roto-sonic drilling method will be employed as it provides the least disturbed and most continuous soil core for sample collection, geologic logging, and chemical screening.

A 4-inch diameter vertical profile boring will be drilled for the purposes of collecting soil cores for field screening, collecting groundwater samples for off-site laboratory analysis, and for the performance of a gamma log of the boring. The boring will extend from land surface to the top of the Raritan clay. Based on geologic evaluations performed by the United States Geologic Survey (USGS) (Stumm, 2001) the elevation of the top of Raritan Clay in target area is approximately -200 MSL. The exploratory borings may reach a total depth of more than 20 feet, depending on ground elevation and the elevation of the top of the Raritan clay. Details of the drilling procedures that will be employed are included in Appendix C.

2.5.2 Vertical Profile Boring

Continuous sonic core samples will be collected by the onsite geologist for logging and VOC screening with a photoionization detector (PID). The geologist will note the color and geologic composition of the soil collected in each sample. Soil samples will be described using the Unified Soil Classification System with sample color(s) referenced to a Munsell color chart. A gamma log of the boring will also be performed. The contacts between the Upper Glacial, Magothy and Raritan formations will be determined by evaluating the soil characteristics. Based on the most recent USGS publication, it is anticipated that the Magothy Formation terminates southeast of this location and the Upper Glacial Formation may lie directly over the Raritan Clay Formation. However, the termination point of the Magothy Formation in this area has not been confirmed with soil borings. Therefore, there is a possibility the Magothy Formation may have extended slightly further and may be encountered during this work. A description of the formations that will likely be encountered during the installation of the well pair are described below.

- The Upper Glacial (UG) Formation – This area of Nassau County may consist of tills containing unsorted clay, sand, gravel, cobbles and boulders. It may also consist of outwash deposits of brown to tan sand and gravel.
- The Magothy (MU) Formation – The Magothy Formation may be identified by a layer of gray, pink, yellow or white clay or by fluvial sediments, fine to medium sand interbedded

with lenses of clay and silt, and may contain pieces if lignite, pyrite and mica. The elevation of the top of the Magothy Formation varies locally as its surface was eroded. The basal portion of the Magothy consists of beds of coarse sand and gravel.

- The Raritan Clay (RC) – The Raritan Clay is solid, silty and typically white to gray, but may be red or mottled. Some sandy lenses may be present.

In addition, groundwater samples will be collected during advancement of the vertical profile boring and analyzed by an Environmental Laboratory Approval Program (ELAP)-approved local laboratory with results provided the next day. Groundwater samples will be collected at 10 foot intervals down to the Raritan Clay. It is anticipated that approximately 21 field samples (starting elevation 0 feet and continuing to elevation -200 feet) plus associated quality assurance/quality control (QA/QC) samples will be collected. This information will supplement field screening data with fixed laboratory data to confirm VOC concentrations (if any) and preliminary depths consideration for setting the monitoring well screens. The driller will advance a Sonic Water Sampler™ manufactured by Hole Products, a "push-ahead" type water sampler, ahead of the borehole to collect the water samples. The sampler will be cleaned with a mixture of Alconox and tap water and then rinsed with deionized water between uses. The water used to clean the sampler will be stored in container for proper disposal at an offsite facility.

A conceptual hydrogeologic cross-section of the strata located beneath the profile line shown on Figure 1-2 is presented on Figure 2-2. Groundwater sampling at location B (at an estimated elevation of 90 feet MSL) will begin at an elevation of approximately 0 feet MSL or 90 feet below grade as this is above the highest elevation that the groundwater flow would occur. Sampling will continue at 10 foot intervals until the Raritan Clay is encountered which is estimated to be at an elevation of approximately -200 MSL or 290 feet below grade.

The samples will be placed under chain-of-custody control in a cooler with ice and transported to a NYSDOH ELAP certified laboratory. QA/QC samples will also be collected as part of these activities. One duplicate sample, one matrix spike/matrix spike duplicate sample set, and one field blank will be collected for the entirety of the project. One trip blank per cooler will travel with the samples to and from the laboratory. Each of the water samples will be analyzed for VOCs using EPA method 8260C with low MDL (less than 1 ppb). The groundwater sample results will be used for screening purposes and to aid in the selection of the screened intervals at the wells. After the boring reaches the interface with the Raritan Clay, the borehole will be logged with a downhole

gamma logger. The tool will be lowered down the entire length of the borehole while recording. A second record will be collected as the tool is raised to the surface.

After the results of the water samples collected during the drilling program are received, a data validation package will be requested from the laboratory and a Data Usability Summary Report (DUSR) will be prepared.

2.5.3 Well Screen Interval Design

The groundwater flow and mass transport simulations performed for the PWSPMP predict that VOCs are migrating from the Site in a northwesterly direction and are likely present in the groundwater at Location B at elevations of approximately 0 to -200 MSL. Preliminary screen elevations for the sentinel wells are shown on Table 2-1; however, these will be refined as data collected during the exploratory vertical profile boring is obtained. The objective is to install wells with 20-foot long screens at different depths at Location B. The screened intervals will be selected based on the following criteria:

- The depths displaying the highest concentration of VOCs (if any) from the laboratory analysis of water samples collected at 10 foot intervals between elevations 0 to -200 msl;
- Depths that are hydraulically in line with the elevations of the MW-52 well pair and Water Mill Lane water supply wells;
- Permeable intervals of borehole that have a high sand content; and
- Intervals that display a low clay content based on the gamma log.

The results of the gamma logs, the boring logs, and the groundwater VOC analyses will be plotted on a drawing and provided to the NYSDEC. Recommendations for the depth intervals where the screens will be placed will also be provided. Based on the information available at this time, we anticipate that two wells with 20 foot long screens will be adequate to monitor this portion of the aquifer. This will be confirmed upon analysis of the field data.

Based on available USGS reports (Strumm, 2001), the proposed monitoring wells are anticipated to be screened in the Upper Glacial formation. Therefore, 0.020 – inch slotted (20 slot) well screens will be used for the construction of these wells. Well construction will consist of a 20-

foot length of 4-inch diameter 304 stainless steel well screen with sufficient 4-inch diameter riser to reach the ground surface for a flush mount well completion. The wells will be constructed using schedule 80 polyvinyl chloride (PVC) piping. The construction of the closest monitoring wells were considered for the Location B well pair and it was determined that the MW-52 well pair were screened at depth of 215 to 235 feet bgs and 300 to 320 feet bgs which is in the middle to basal Magothy using 0.020 – inch slotted screen. Additionally, nearby monitoring well locations (wells 37, 38, 39, and 45) were reviewed and it was determined that each of these wells were constructed with either 0.010-inch or 0.020-inch slotted (10 or 20 slot) well screens.

2.5.4 Well Installation

Once the screen placement has been approved, the 4-inch diameter borehole will be reamed to a diameter of 8-inches using the sonic drill rig. The deeper of the two monitoring wells will then be installed through the drill casing. To install the shallower of the two wells, a new 8-inch diameter borehole will be drilled using the sonic rig. A representative well construction diagram is presented as Figure 2-3; construction details presented on the figure and described below are subject to change based on an evaluation of the soil boring geologic, field screening data, and groundwater analytical data collected in support of the well design effort.

The AMEC field geologist will communicate field observations and any logged profile and screen depth recommendations to the NYSDEC. The well installation will not begin until the NYSDEC approves the proposed screened intervals for the wells.

2.5.5 Filter Pack

After setting the well screen and casing, a number 2 filter pack will be emplaced within the borehole annulus from its full depth to a minimum of approximately 10 feet above the top of the screen. The actual height of the filter pack will be adjusted based on the final well screen length. The filter pack will be placed with care to ensure that bridging of the material does not occur. An additional 2 feet of number 00 filter pack will be added above the number 2 sand pack to provide added support and avoid breaching of the overlying material.

2.5.6 Grout Seal

A bentonite seal (Volclay ® or equivalent) will be installed by tremie pipe within the annular space above the filter pack and will be at least 5-feet thick. Above the bentonite seal, a 90% neat cement

seal (Type I or Type III (ASTM C-150) Portland Cement)/ 10% bentonite mix will be emplaced to about 5 feet below land surface. A drainage sand will be placed above the grout seal in the remaining boring space in conjunction with construction of an approximate 8-inch diameter flush-mounted protective cover set in a 1 foot x 1 foot concrete pad. (see Figure 2-3).

2.5.7 Well Development

The wells will be developed using methods designed to clear the boring and sand pack of fines and establish a good hydraulic connection between the well and the aquifer. A combination of development methods consisting of pumping the well and surging by lowering the pump up and down will be employed. If these methods aren't successful, we will consider airlifting or jetting as alternatives. Any sediment remaining in the well sump after these efforts will be bailed from the well.

Field personnel will document water quality parameters (i.e. temperature, specific conductivity, dissolved oxygen, pH, oxygen reduction potential, and turbidity) on a well development log. Appendix D contains the well development log that will be used. Water quality readings will be documented at least every ten minutes or more frequently. Well development activities will continue until the well produces clear, sediment-free water with a development requirement of less than 50 NTUs. Well development water handling and disposal actions are described below and in Section 4.

2.5.8 Discharge of Water and Disposal of Sediment/Drill Cuttings

Water generated during well development will be placed in a truck-mounted tank and transported to the OU1 groundwater treatment system (GWTS) where it will be discharged to a settling tank. Once the sediment in the water has had time to settle, the water will be discharged to the GWTS for treatment prior to discharge to the aquifer via the system diffusion wells. All sediment generated during the development effort will be drummed, stored within the OU-1 GWTS fenced compound, and characterized for disposal. Drilling waste (i.e.: drill cuttings) will be placed in 55-gallon DOT-approved drums and temporarily staged by the drill rig. The drummed sediment and drill cuttings will be disposed of at a permitted waste disposal site, as discussed in more detail in Section 4.

2.5.9 Well Completion

Following well development, the well will be equipped with a locking cap and completed with an 8-inch, flush-mounted cover in an approximate 1x1 foot concrete pad.

2.5.10 Location Survey

A New York State licensed surveyor will be contracted to provide horizontal and vertical coordinates for the new wells. The surveyor will provide elevations at ground surface, top of road box, and at an identified point on the rim of the well casings as a reference point for water level measurements. The survey will be accurate to the nearest 0.01 feet for vertical elevations in the North American Vertical Datum 1988 (MSL) and 0.1 feet for horizontal coordinates in the North American Datum 1983 at the top of the well casing. Groundwater elevations at the wells will be measured with a vertical accuracy of 0.01 feet.

Survey data will be included in the well record drawings.

2.5.11 Water Quality Sampling and Analysis

The newly installed wells will be sampled as part of the next scheduled sampling of the network of Site monitoring wells after the installation and development is completed. Samples will be collected no earlier than 14 days after development to allow conditions around the new well to equilibrate.

Samples for laboratory analysis of VOCs will be collected in pre-cleaned sample containers provided by the laboratory using a sampling pump and following procedures outlined in the current Site Wide Groundwater Monitoring Plan (Tetra Tech, 2016). The samples will be analyzed by EPA method 8260C with low MDL (less than 1 ppb).

2.6 SITE RESTORATION AND DEMOBILIZATION

Following the successful installation and development of the wells, the drilling contractor will demobilize and remove all equipment and personnel from the drilling site. The drilling site will be restored to pre-work conditions. Restoration will be discussed with the property owner prior to commencement of work so that all parties agree with the planned scope of work. Photographs will

be taken of the work area to document the post-restoration conditions. Copies of representative photos of pre-work and post-restoration photos will be included as attachments to the final report.

2.7 REPORTING

Upon completion of the installation and development of the well, AMEC will prepare a construction completion report describing the procedures and results for review by the NYSDEC. The report will contain all the data and pertinent information collected during the program, and will present a description of soil samples based on the Unified Soil Classification System, boring logs and well completion details for each new well.

Analytical results of samples collected during vertical profile boring will be presented in a summary table with detectable concentrations and detection limits presented. Potential screening and regulatory criteria will be noted in the tables and results will be compared to these in the report.

Section 3

Stakeholder Coordination

AMEC is committed to coordinating the installation of these monitoring and sentinel wells with the stakeholders related to the Former Unisys Site. Ample notice will be provided to the relevant stakeholders related to access and permitting. Properties surrounding the property at Tain Drive and the well location are shown on Figure 3-1.

3.1 PROPERTY OWNERSHIP

With respect to area B, AMEC has provided Figures 1-2 and 2-1 to the Village of Russel Gardens in advance of the well installation effort. Figure 1-3 shows the construction work area, anticipated layout of drilling equipment and service trucks. AMEC will continue to communicate with the property owner regarding access issues, and progress throughout the well installation program.

3.2 KEY PERSONNEL

Lockheed Martin

Project Leads	Glenda Clark	glenda.b.clark@lmco.com	817-495-0246

CDM Smith

Project Manager	Bill Glynn	glynnwk@cdmsmith.com	617-549-9344
Field Monitoring	David Manhardt	manhardtd@cdmsmith.com	603-289-1061

AMEC

Project Principal	William Weber	william.weber@amecfw.com	207-828-3381
Project Manager	Eric Weinstock	eric.weinstock@amecfw.com	347-836-4343
Project Geologist	Jazmin Logan	jazmin.logan@amecfw.com	347-836-4239
Site Health and Safety Coordinator	Laurie Gneiding	laurie.gneiding@amecfw.com	732-302-9500

Subcontractors

Cascade/ADT	Shawn Miller	smiller@aquiferdrilling.com	800-238-3745
Advanced	Kedra L. Burhart	kburhart@advancedutilitylocating.com	631-576-4822

Section 4

Site Security and Waste Management

4.1 SITE SECURITY

The work area will be cordoned off from the surrounding area using a combination of yellow caution tape and sound barrier fencing. Ingress and egress to the drilling area will be limited to authorized personnel. All personnel working at the site will wear high visibility reflective vests. Additional signage will be posted as necessary.

The site will be secured overnight. The sound barrier fencing, caution tape and traffic cones will be situated to secure the area after work has ceased for the day. The fence will be locked after work hours.

4.2 WASTE MANAGEMENT

Waste material generated during the well installation will be handled and disposed of in accordance with the site-specific waste management plan, local, state, and federal regulations. Waste anticipated to be produced from the well installation and development includes water, soil, and sediment. Subcontractors, and anyone involved in the shipment, preparation, loading for transport, and transportation of hazardous-waste, including signing hazardous-waste manifests must be trained in accordance with all state and federal protocols. However, it is not anticipated that hazardous waste will be encountered during this project. All personnel who may come in contact with contaminated materials will complete the appropriate Occupational Safety and Health Administration (OSHA) hazardous-waste operations (HAZWOPER) training and annual refresher training. Each waste stream will be handled and managed in accordance with NYSDEC guidance and regulations, especially, and DER-10, NYCRR Part 375, applicable US Department of Transportation (DOT), United States Environmental Protection Agency (USEPA), and Resource Conservation and Recovery Act (RCRA) regulations.

Drilling waste (i.e.: drill cuttings) will be placed in 55-gallon DOT-approved drums and staged by the drill rig, as shown on Figure 2-1. A maximum of approximately ten drums will be staged onsite.

As the number of drums on-site increases, they will be loaded onto a truck and transported to the OU1 GWTS area. After the well installation is complete, the soil will be disposed of at a permitted disposal facility. Sediments from the settling tank will also be placed into drums. AMEC will conduct waste characterization sampling for the drill cuttings and sediment from the frac tank that accumulated from the well installation in accordance with NYSDEC and landfill requirements and the results will be submitted to NYSDEC for approval prior to disposal. After the waste profile is approved, drums will be transported and disposed of by Waste Management. Depending on the number of drums that are accumulated, the soil may be consolidated in a roll-off container before they are shipped from the OU1 GWTS area.

Lockheed Martin or its authorized designee will sign waste disposal manifests. Waste disposal manifests, bills of lading, and waste profiles will be prepared by Waste Management and submitted to Lockheed Martin and its Remediation Technical Operations (RTO) contractor for review, and included in the Monitoring Well Construction Completion Report to NYSDEC.

4.3 WATER

The roto-sonic drilling method involves pumping water into their drill casing as it is advanced. The treated groundwater from the OU2 groundwater treatment system will be used for this purpose. A characterization of the water anticipated to be used for drilling is necessary to determine if the water may be a potential source of contaminants that may be encountered when collecting groundwater samples during vertical profile boring discussed in Section 2.5.2. Prior to mobilization, the water from OU2 will be sampled and analyzed for the same parameters as the groundwater samples.

To minimize accumulation of the drums generated, the potable water used for drilling will be placed into 55-gallon DOT-approved drums and the sediment will be allowed to settle overnight. Once the sediment has been visually observed to settle, the water will be cycled through a filter and pumped back into the drill casing using a sump pump.

Development water from the wells will be pumped into a water truck. The water truck will transport the development water to the OU-1 GWTS area where it will be discharged to a settling tank staged to allow solids to settle out. When the settling tank reaches capacity, the water will be

pumped through the OU1 GWTS for treatment and re-injection into the aquifer via the diffusion wells.

Section 5
Health and Safety

5.1 HEALTH AND SAFETY PLAN

All work will be conducted in accordance with AMEC's Site-Specific Health and Safety Plan (HASP) (Appendix E) and Cascade/ADT's Contractors Health and Safety Plan (CHASP).

All personnel on site will have current OSHA training in accordance with the approved HASP. Training certificates will be provided to AMEC prior to the start of work and will be maintained with the HASP.

5.2 COMMUNITY AIR MONITORING PROGRAM

A Community Air Monitoring Plan (CAMP) is required due to the Site's history of subsurface contamination. The CAMP requires real-time monitoring for VOCs and particulates (i.e., dust) at the downwind perimeter of each work area when certain intrusive activities (boring advancement, soil handling, and back filling) are in progress, on a periodic or continuous (15- minute) basis. The purpose of CAMP is to protect any downwind communities, including residences and businesses, from potential airborne contaminant releases and nuisance dust.

VOC and dust emission readings will be recorded by an AMEC employee on site. Weekly CAMP monitoring reports will be submitted to NYSDEC.

5.2.1 VOC Monitoring

Wind direction will be assessed with a weather station and the location of upwind and downwind monitoring locations will be recorded on a map daily. VOCs will be monitored at both the upwind and downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive activity and soil excavation/handling. A third monitoring unit will be located in the direction of the nearest residence. The monitoring work will be performed using equipment appropriate to measure the contaminants known or suspected to be present (MultiRAE PLUS with

a PID with a 10.6 eV lamp or equivalent model). The equipment will be calibrated on a daily basis prior to start of the field work. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background (upwind) for the 15-minute average, work activities will be temporarily halted and monitoring will continue. When the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background (upwind), work activities can resume with continued monitoring.

If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background (upwind) but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level at the downwind perimeter of the work area or exclusion zone is below 5 ppm over background (upwind) for the 15-minute average. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less—but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down until the problem is evaluated and resolved.

5.2.2 Particulate Monitoring

Air monitoring for particulates (i.e., dust) will be performed continuously during intrusive and soil excavation/handling activities. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. Particulates will be measured using DustTrack II or equivalent model. The particulate monitoring equipment will be calibrated at the start of each day as necessary. Depending upon daily wind direction, upwind (background) and downwind dust monitors will be set up at approximately 4 to 5 feet above ground surface (i.e., breathing zone). A third monitoring unit will be located in the direction of the nearest residence and will also be setup

at approximately 4 to 5 feet above ground surface. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

If after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 μg/m^3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume when dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 μg/m^3 of the upwind level and in preventing visible dust migration.

5.2.3 CAMP Reporting

AMEC will provide the NYSDOH Project Manager with a weekly CAMP monitoring report (via email). The CAMP report will include a site figure depicting work areas; wind direction; location of CAMP stations and data. Any exceedances and Corrective Actions taken will be communicated to the NYSDEC and NYSDOH Project Mangers within one business day.

Section 6

Project Schedule

An anticipated timeline of work activities to be conducted in support of the design, installation and development of the Area B monitoring wells presented herein is as follows:

Submit Monitoring Well Installation Work Plan to NYSDEC	3/7/19	
Approval of Installation Work Plan from the NYSDEC	3/21/19	2 weeks
Pre-Mobilization Activities (utility clearance, meeting w/ Village)	Week of 3/18-22/19	
Mobilization / Installation	4/1/19	1 week
Demobilization / Restoration	6/15/19	10 weeks
Reporting	4 to 8 weeks After Demobilization	

Overall, the installation of the wells in Area B is anticipated to take approximately 7 to 10 weeks to complete once the plan is approved and the driller is mobilized. The field start date is dependent on obtaining site access which cannot be precisely estimated at this time. The schedule assumes access will be granted in time to mobilize a drill rig by April 1, 2019.

Section 7
References

1. AMEC, 2015. "Draft Public Water Supply Protection and Mitigation Program" AMEC E&E PC. January 29, 2016.

2. CDM Smith, 2012. OU-2 Feasibility Groundwater Remediation Simulation Report. Feasibility Study Report. Operable Unit No. 2 for the Unisys Site, Great Neck, New York. May 2012.

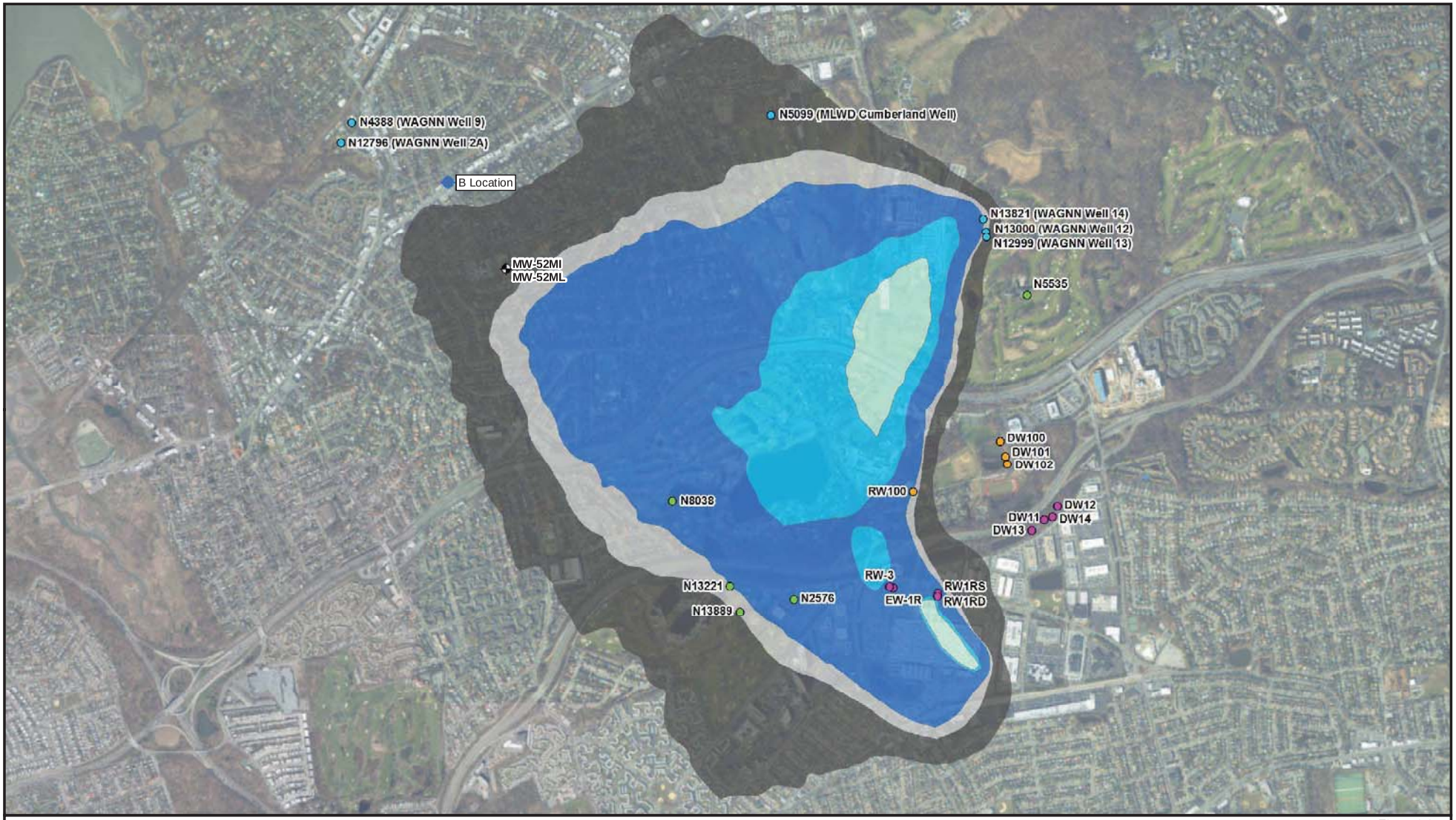
3. NYSDEC, 2014. "Record of Decision, Operable Unit Number 02: Offsite Groundwater", New York State Department of Environmental Conservation, Albany, NY, December 2014.

4. Stumm, Frederick, 2001, Hydrogeology and Extent of Saltwater Intrusion of the Great Neck Peninsula, Great Neck, Long Island, New York, USGS Water-Resources Investigations Report 99-4280.

5. NYSDEC, 2010, DER-10 / Technical Guidance For Site Investigation and Remediation

6. AMEC, 2017. "Sentinel Monitoring Well Installation Report, Well Location MW-52" AMEC E&E PC. November 23, 2017

FIGURES



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

N

0 750 1,500 Feet

Prepared/Date: BRP 06/28/18 | Checked/Date: JL 06/28/18

Notes:
1. Simulation by CDM Smith (based on 2015 data)
2. TVOC is generally defined as the sum of PCE, TCE, cis-1,2-DCE and Freon 113 groundwater concentrations. At a few wells on or close to the site, TVOC may also include vinyl chloride.

Legend

Proposed Well Location

Wells:
- Current Monitoring Well
- Public Water Supply
- OU1 Pumping/Diffusion
- OU2 Pumping/Diffusion
- Irrigation

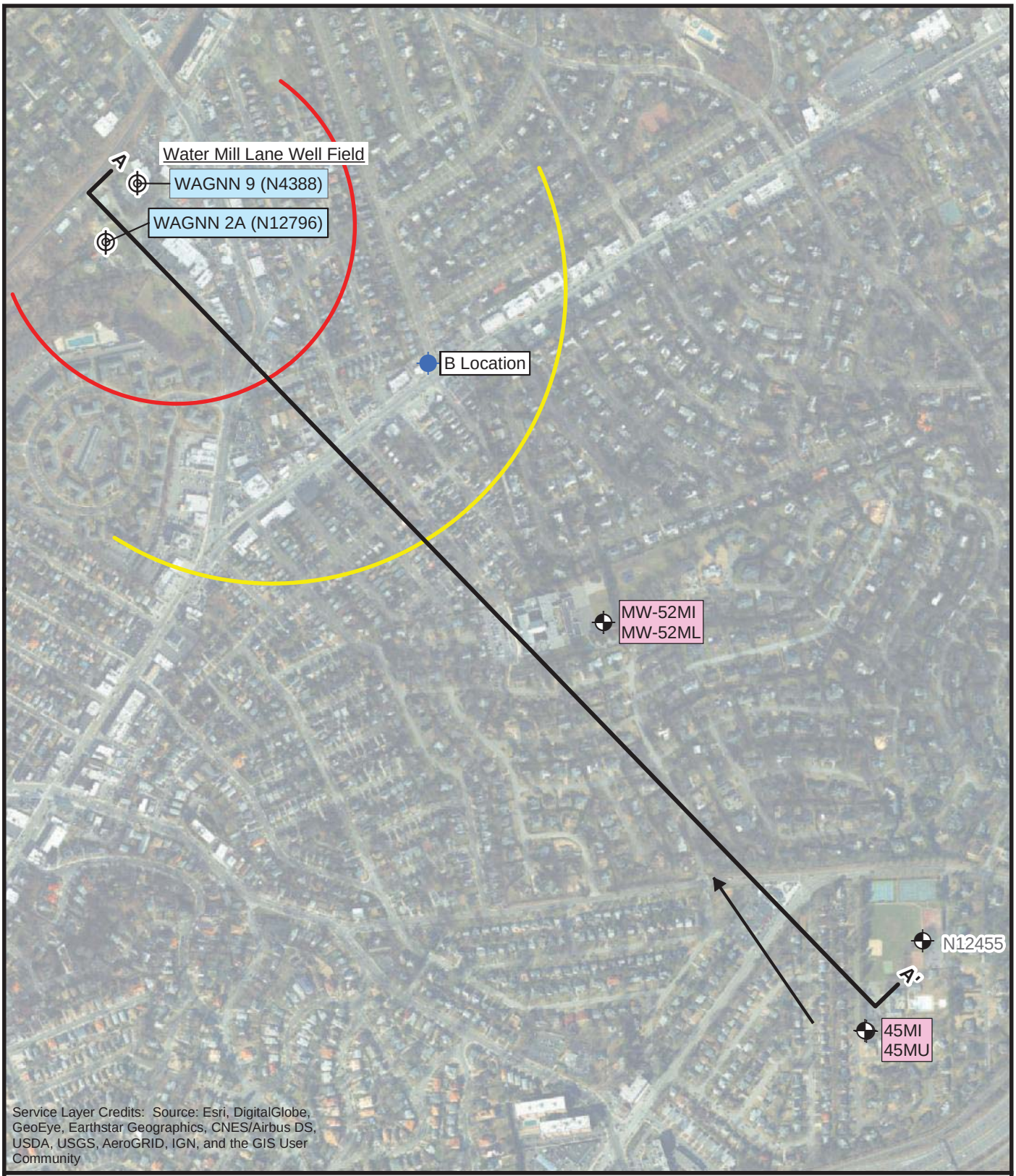
Simulated TVOC (µg/L):
- 5 - 50
- 50 - 100
- 100 - 500
- 500 - 1000
- > 1000

Figure 1-1
Site Location, Plume Extent and Public Supply Wells

Sentinel Monitoring Well Installation Work Plan
Lockheed Martin Corporation
Former Unisys Facility
Lake Success, New York

amec

Document: P:\Projects\Lockheed\Great Neck OMM\4.0_Deliverables\4.5_Databases\GIS\MapDocuments\Public Water Supply Protection\Sentinel_Well_WP_2018_11x17LS.mxd PDF: P:\Projects\Lockheed\Great Neck OMM\4.0_Deliverables\4.5_Databases\GIS\Figures\Sentinel Well Install WP 2018\Figure 1-1 - Site Location Plume Extent and Public Supply Wells.pdf 06/28/2018 12:22 PM brian.peters



Legend

- Proposed Well Location
- Generalized direction of flow: Magothy Aquifer
- Simulated Time of Travel:
  - 2 years
  - 5 years
- A A' Location of Cross Section
- Municipal Public Water Supply Well
- Monitoring Well
- 45MU Current Monitoring Well

0 375 750 Feet

N

Figure 1-2
Proposed Well Location
WAGNN Water Mill Lane Well Field

Sentinel Monitoring Well Installation Work Plan
Lockheed Martin Corporation
Former Unisys Facility
Lake Success, New York

Prepared/Date: BRP 08/09/18 | Checked/Date: EW 08/09/18

amec

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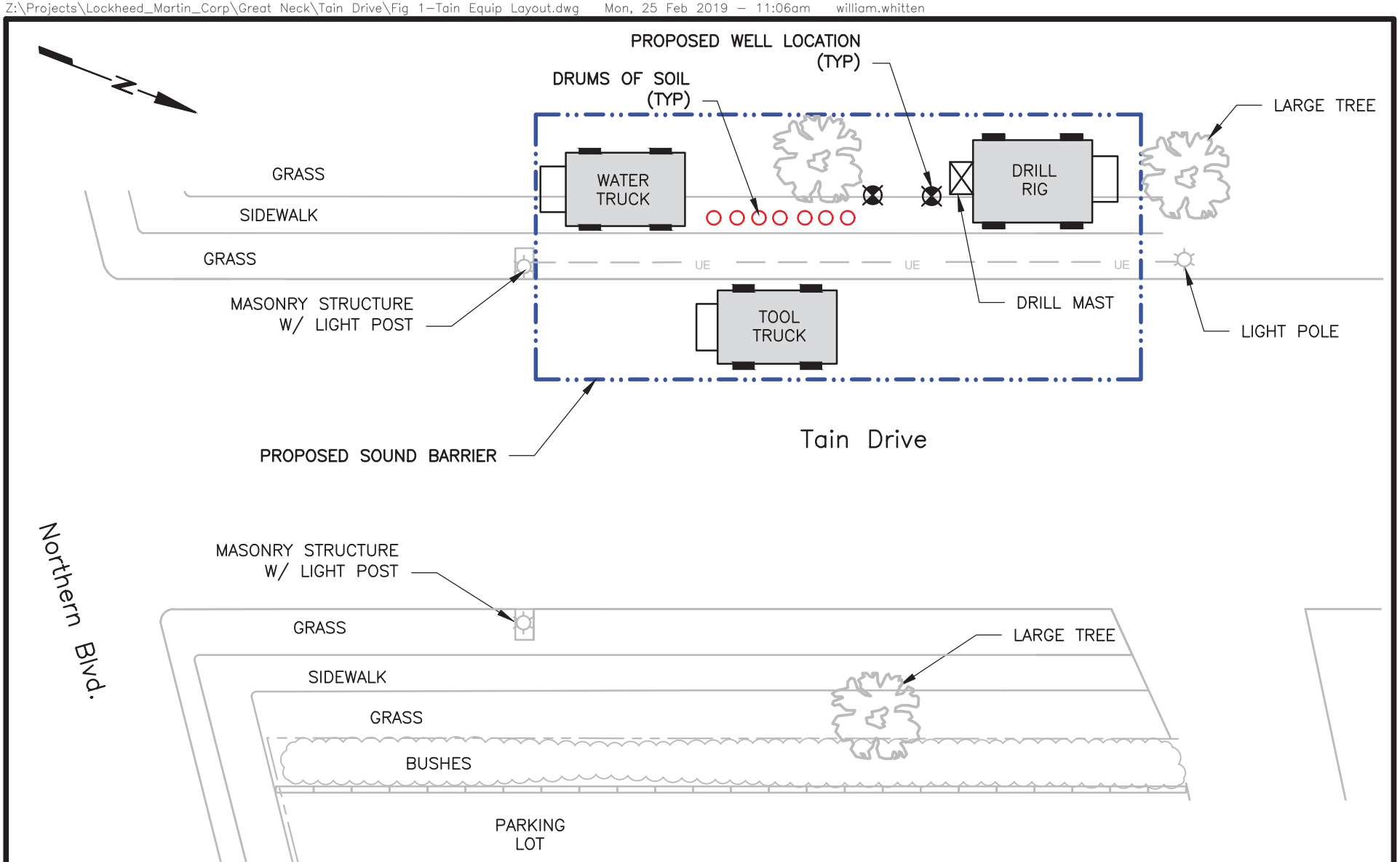
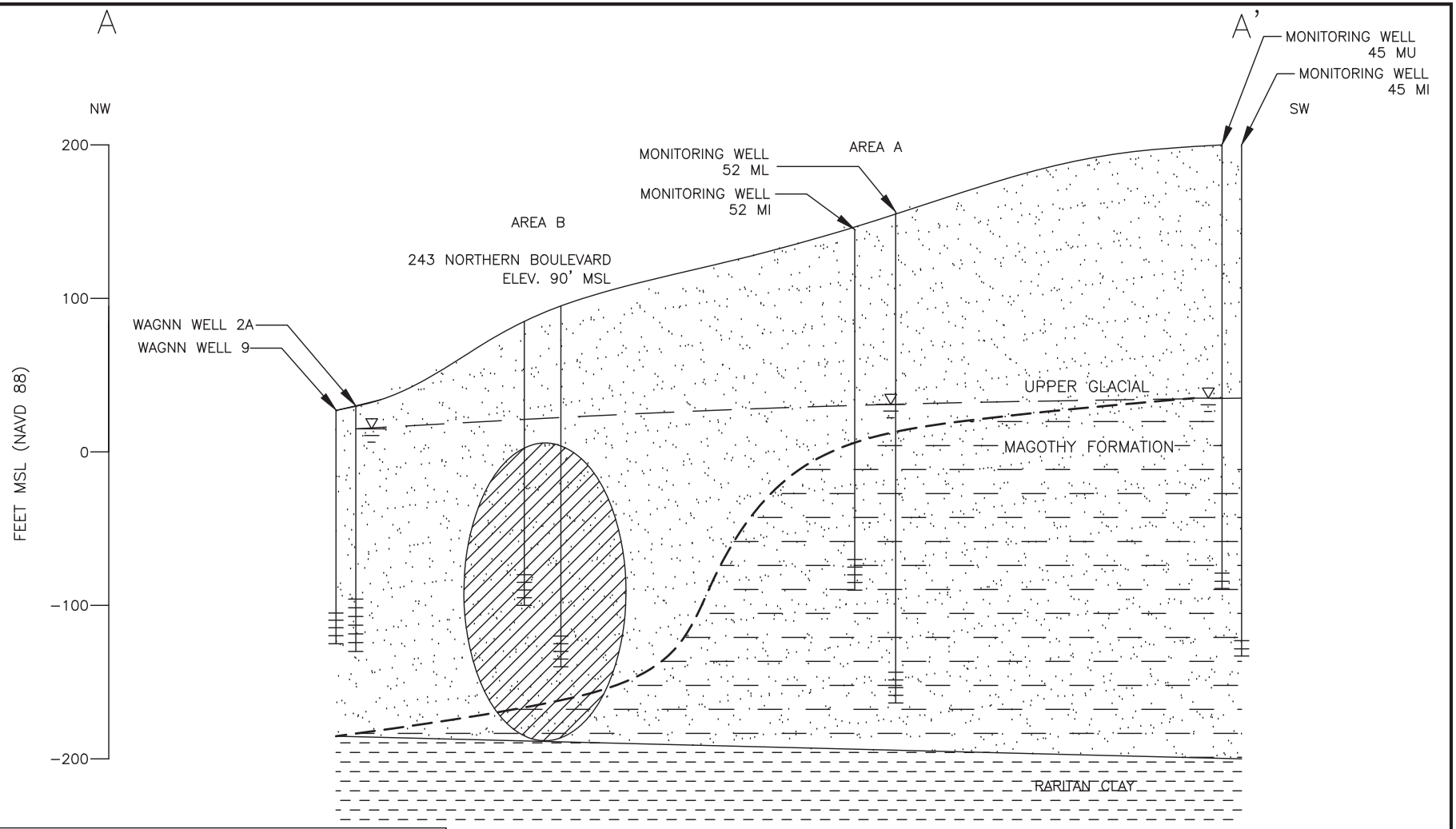


NOTE:
SOME STREET SIGNS MAY HAVE TO BE TEMPORARILY REMOVED AND REPLACED.

Prepared/Date: WJW 02/25/2019
Checked/Date: EW 02/25/2019

LOCKHEED MARTIN CORPORATION Former Unisys Facility Lake Success, NY	Amec E & E, PC 214-25 42nd Avenue, Suite 3R Bayside, NY 11361 (347) 836-4445	Proposed Equipment Layout for Tain Drive Project 3612-17-2359 Figure 2-1



LEGEND:

- WATER TABLE
- APPROXIMATE CONTACT BETWEEN UPPER GLACIAL AND MAGOTHY FORMATION
- APPROXIMATE CONTACT BETWEEN MAGOTHY FORMATION AND RARITAN CLAY
- PROPOSED BORING AND ZONE IDENTIFIED FOR VERTICAL PROFILING.

0 500 1000 2000

SCALE IN FEET

Prepared/Date: BJH 03/22/18
Checked/Date: EW 03/22/18

BASED ON STUMM, 2001

LOCKHEED MARTIN CORPORATION
FORMER UNISYS FACILITY
LAKE SUCCESS, NEW YORK
MONITORING/SENTINEL WELLS

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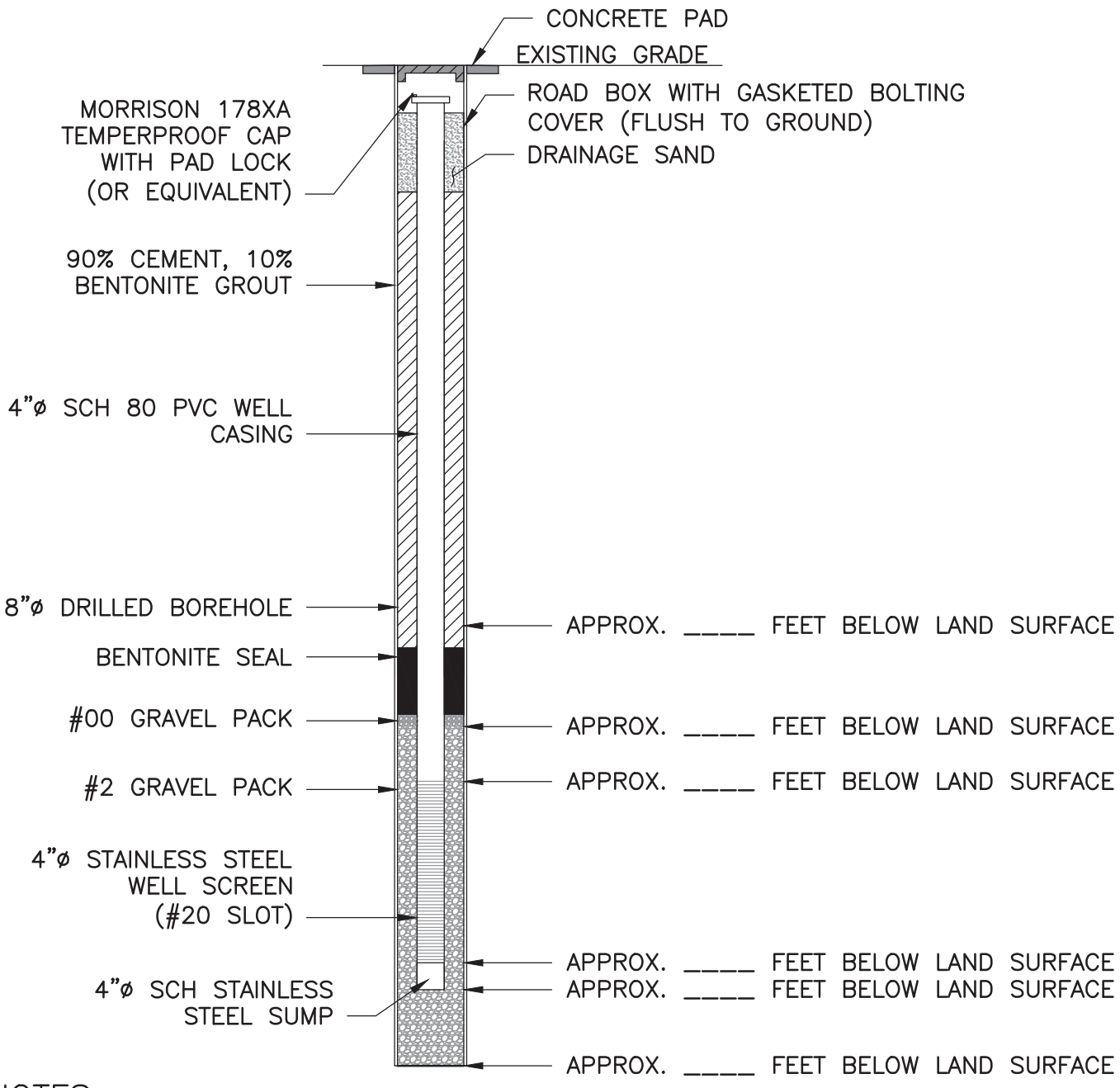
HYDROGEOLOGIC
CROSS-SECTION
PROJECT 3612172359
Figure 2-2



NOTES:

1. WELL CONSTRUCTION DEPTHS AND RELATED WELL CONSTRUCTION ITEMS (i.e., SCREEN LENGTH/ SLOT SIZE, GRAVEL PACK) ARE APPROXIMATE. WELL DESIGN WILL BE FINALIZED BASED ON GEOLOGIC LOGGING AND SCREENING RESULTS.
2. DEPTHS TO BE COMPLETED IN THE FIELD, SEE TABLE 2–1 FOR TARGET DEPTH AND ELEVATIONS.

Prepared/Date: JMF 08/17/17
Checked/Date: EW 08/17/17

DETAIL NOT TO SCALE

LOCKHEED MARTIN CORPORATION
MONITORING/SENTINEL WELLS
FORMER UNISYS FACILITY,
LAKE SUCCESS, NEW YORK

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PROPOSED SENTINEL WELL CONSTRUCTION DETAIL
Project 3612172359
Figure 2-3

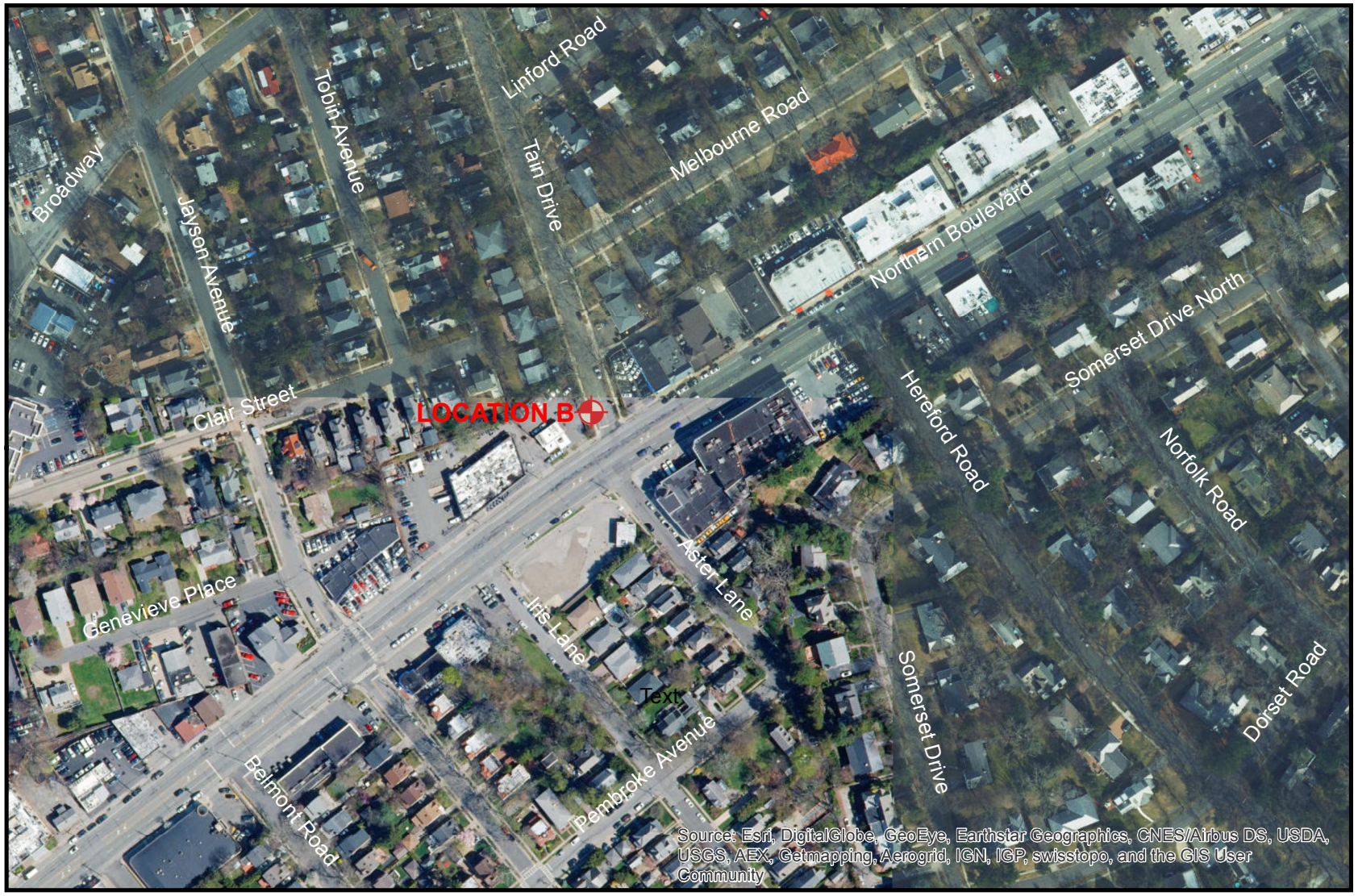


Figure 3-1
Proposed Well Location B Neighborhood

Sentinel Monitoring Well Installation Work Plan
Lockheed Martin Corporation
Former Unisys Facility
Lake Success, NY

Prepared/Date: JCL 03/07/19	Checked/Date: EAW 03/07/19

TABLES

Table 2-1
Well Target Specifications
WAGNN Water Mill Lane
Sentinel Monitoring Well Installation Work Plan, Well Pair B

Lockheed Martin Corporation
Former Unisys Facility
Lake Success, New York

Well Field	Well ID[4]	Screened Aquifer	Ground Elevation[1]	Existing Screen Interval[2] (feet bgs)			Existing Screened Elevation[3]			Type
Water Mill Lane	WAGNN-2A	UG[5]	30	126	to	156	-96	to	-126	Water Supply Well
Water Mill Lane	WAGNN-9	UG[5]	27	129	to	144	-102	to	-117	Water Supply Well
Water Mill Lane	MW-52-MI	MI	150	215	to	235	-65	to	-85	Sentinel Monitoring well
Water Mill Lane	MW-52-ML	ML	150	300	to	320	-150	to	-170	Sentinel Monitoring well
	Area B			**Target Screen Interval[2] (feet bgs)**			**Target Screened Elevation[3]**			
Water Mill Lane	MW53-Shallow	UG[6]	90	170	to	190	-80	to	-100	Sentinel Monitoring well
Water Mill Lane	MW53-Deep	UG[6]	90	210	to	230	-120	to	-140	Sentinel Monitoring well

Notes:

1. Approximated elevation NAVD88 shown, well depths rounded to the nearest foot. Ground Elevation will be surveyed to site datum (NAVD88) once well locations are finalized.
2. Final screen elevations will be determined based on elevation target and observed geology and VOC screening during drilling.
3. UG Target Screen elevation interval shown is based on screen elevation of Water Mill Lane supply wells. UG elevation is a placeholder that will be adjusted based on field data.
4. Well Numbers will be assigned during final design
5. Based on Strumm, 2001
6. We expect these wells to encounter Upper Glacial material based on existing USGS Reports. The formation name will be determined upon exmaination of the soils.

Screened Aquifer Definition

UG = Upper Glacial

MU = Upper portion of the Magothy.

MI = Intermediate or Middle portion of the Magothy.

ML = Lower or Basal portion of the Magothy.

APPENDICES

APPENDIX A — GROUNDWATER SIMULATION ANALYSIS

Lockheed Martin, Great Neck

Groundwater Modeling Analysis for Sentinel Monitoring Well Installation Work Plan 243 Northern Blvd, Great Neck, NY

August 20, 2018

CDM Smith

Lockheed Martin, Great Neck

Groundwater Modeling Analysis for Sentinel Well Installation Work Plan, 243 Northern Blvd, Great Neck NY

Introduction

This report presents a planning level analysis, based on groundwater flow and mass transport simulation results, of the potential screen intervals of monitoring wells that will be installed at 243 Northern Blvd, northwest of the Former Unisys Site between the Long Island Expressway and Water Authority of Great Neck North (WAGNN) Water Mill Lane wells. This well cluster will be installed to monitor the migration of the Total Volatile Organic Compound (TVOC) groundwater plume associated with the Former Unisys Site. TVOC is defined as the sum of PCE, TCE, cis-1,2-DCE, vinyl chloride and Freon 113 groundwater concentrations, although vinyl chloride has only been detected at a few monitoring wells.

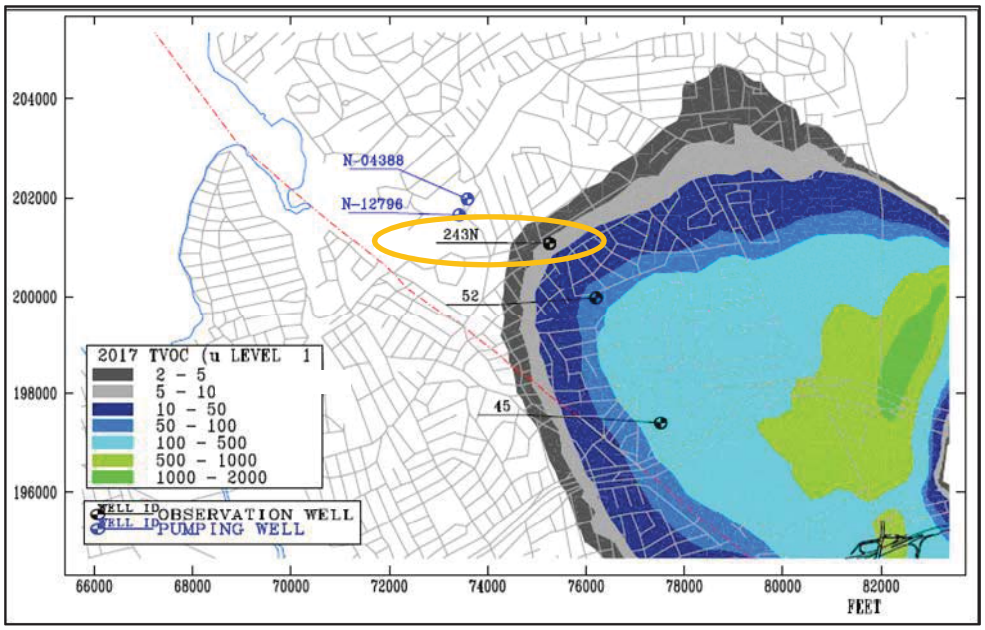
Figure 1 shows the location of the proposed well site at 243 Northern Blvd and the estimated 2017 TVOC distribution, based groundwater monitoring data, and groundwater flow and TVOC mass transport simulations. Also shown is the location of Well Cluster 52, which was installed in 2017 and consists of two wells, 52MI and 52ML. In 2017, reported TVOC concentrations at 52MI were less than 5 µg/L, while at 52ML the reported TVOC concentration was 56 µg/L and 91 µg/L.

Background

The proposed sentinel well location at 243 Northern Blvd is one of the monitoring locations described in the draft Public Water Supply Protection and Mitigation Program (PWSPMP). The PWSPMP is one element of the selected groundwater remedy described in the *Record of Decision for Unisys Corporation Operable Unit Number 02: Offsite Groundwater* (New York State Department of Environmental Conservation [NYSDEC], December 2014; hereafter referenced as "OU-2 ROD").

The groundwater flow model used for the analysis described herein was originally developed for the OU-2 Remedial Investigation and Feasibility Study (*Remedial Investigation Report. Operable Unit No. 2 for the Unisys Site. Great Neck New York. Site No. 130045*; ARCADIS, May 2012 and *Feasibility Study. Operable Unit No. 2 for the Unisys Site. Great Neck New York. Site No. 130045*; ARCADIS, May 2012). The model is periodically updated to support PWSPMP elements and to assist with tracking the migration of the Former Unisys Site groundwater plume.

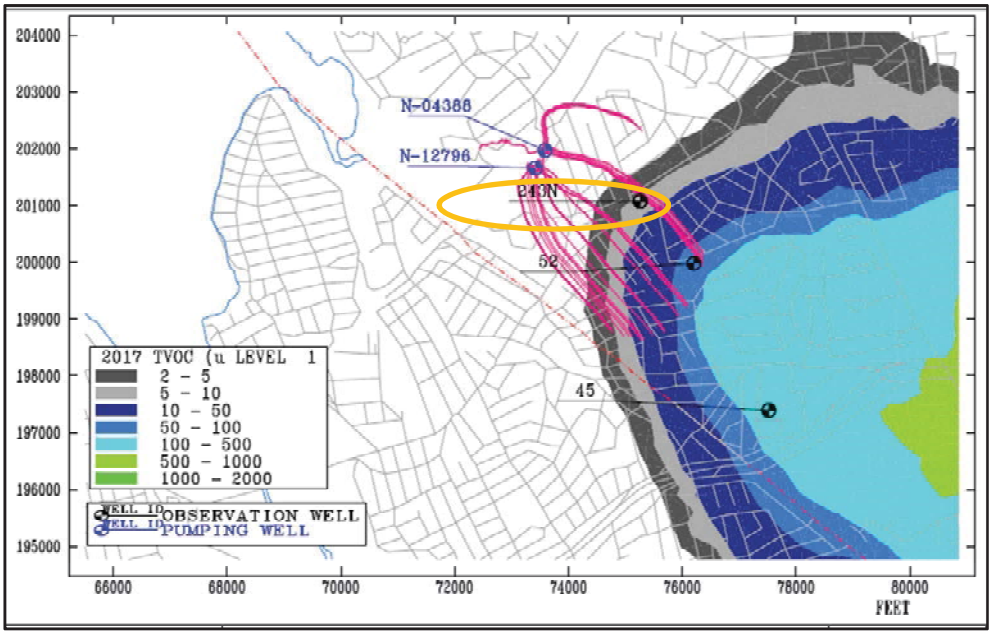
Figure 1. Estimated 2017 TVOC Plume in Vicinity of Water Mill Lane Wells N-04388 and N-12796. Contours Represent Maximum Simulated Concentration Over all Aquifer Layers. Proposed sentinel well location indicated by "243N".



Particle Track Simulations

Particle track simulations were performed to evaluate groundwater flow pathways near the proposed sentinel well location and the Water Mill Lane wells. The simulated particle tracks are "reverse particle tracks" starting at the well screen of the water supply wells. The particle tracks were simulated for a period of 7 years based on the simulated historical flow field for 2011 – 2017. An effective porosity of 20% was assigned to the Upper Glacial and Magothy aquifer model layers. The simulated particle tracks are shown, in pink, on **Figure 2**.

Figure 2. Simulated Reverse Particle Tracks, Shown in Pink, from Water Mill Lane Wells. Proposed sentinel well location indicated by "243N".



Planning Level Monitoring Well Depths at 243 Northern Blvd Site

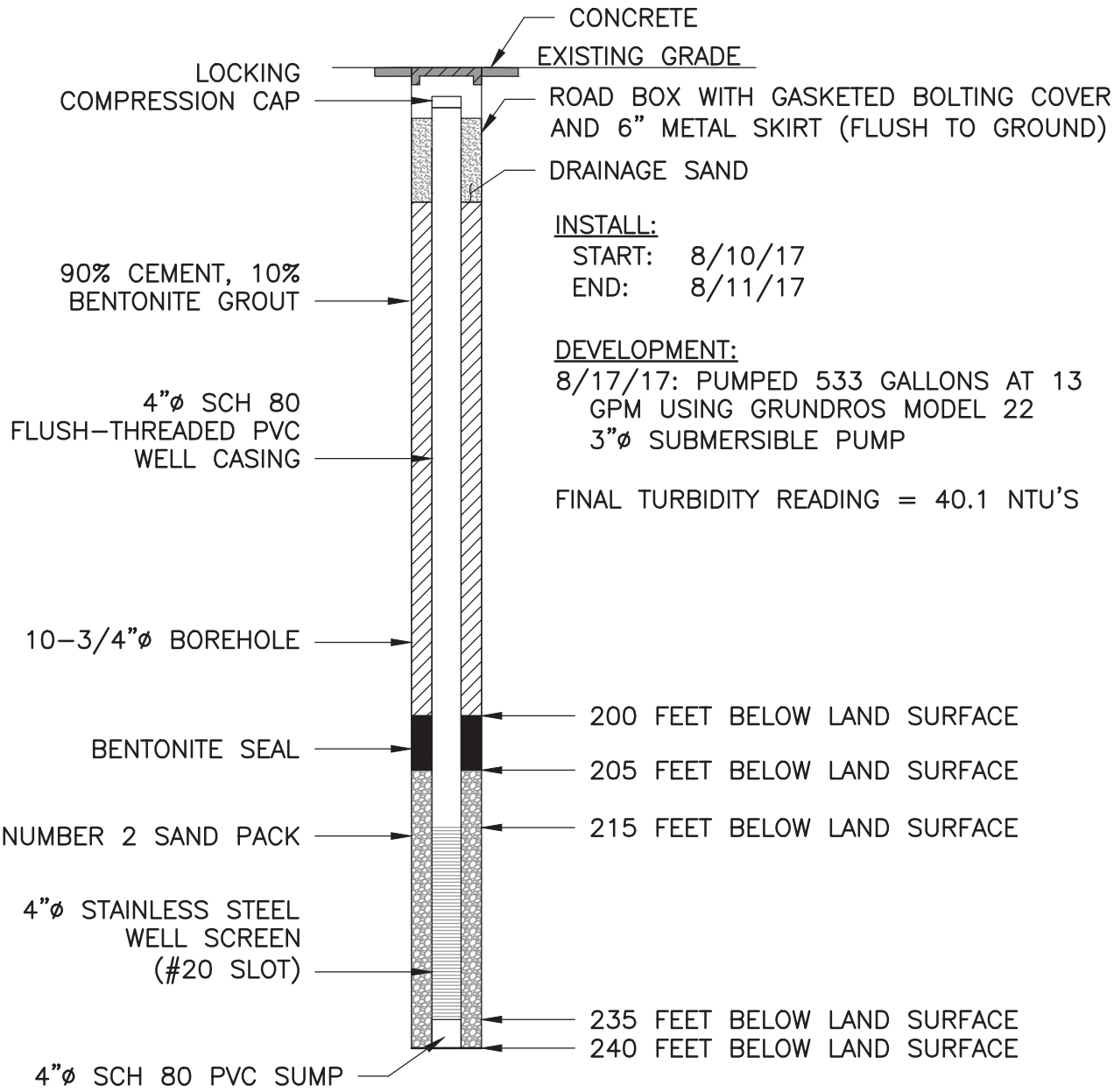
Planning level details regarding well depths, developed based on particle tracking simulation results, are presented in **Table 1**. The simulated reverse particle tracks at the 243 Northern Blvd site were approximately at an elevation of -150 to -140 Feet MSL, or at approximately 230 to 240 feet depth. The well depths and screened intervals provided in Table 1 are for planning purposes and will be finalized in the field depending on actual subsurface conditions encountered during the drilling of the vertical profile boring at the proposed sentinel well location.

Table 1. Monitoring Well Construction Planning Level Details

Detail	Elevation (Ft MSL)	Total Depth (Ft)
Land Surface	90	--
Screen Interval/Depth –Screen 1	-80 to -100	190
Screen Interval/Depth – Screen 2	-120 to -140	230

APPENDIX B —CONSTRUCTION LOGS OF NEARBY WELLS

WELL#: MW-52-MI
ELEVATION TOC: 152.38 FT NAVD 1988



Prepared/Date: JMF 09/13/17
Checked/Date: EW 09/13/17

DETAIL NOT TO SCALE

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LAKE SUCCESS, NEW YORK

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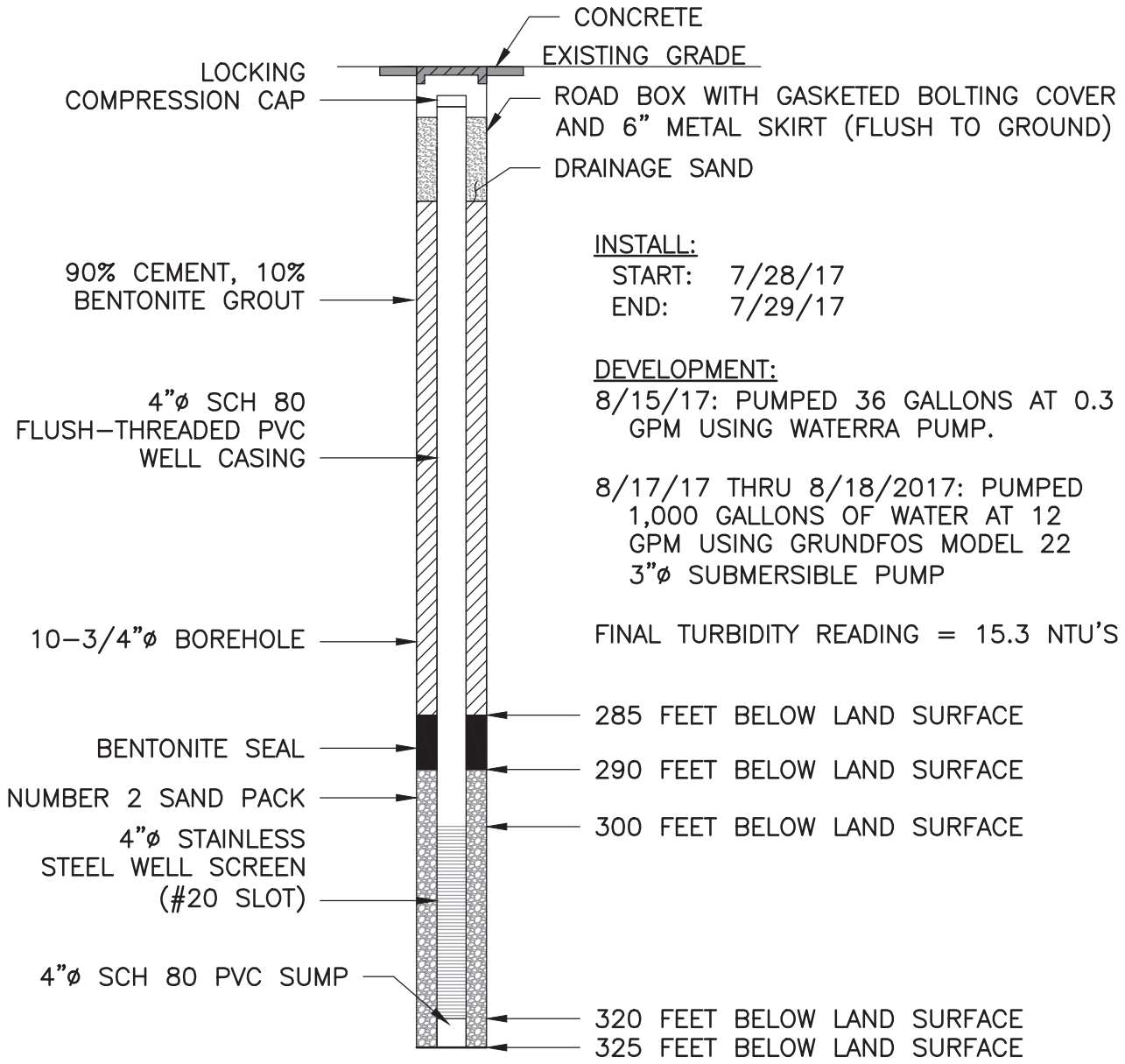
SENTINEL WELL
CONSTRUCTION DETAIL
Project 3612172359

WELL#: MW-52-ML
ELEVATION TOC: 152.93FT NAVD1988



INSTALL:
START: 7/28/17
END: 7/29/17

DEVELOPMENT:
8/15/17: PUMPED 36 GALLONS AT 0.3 GPM USING WATERRA PUMP.

8/17/17 THRU 8/18/2017: PUMPED 1,000 GALLONS OF WATER AT 12 GPM USING GRUNDFOS MODEL 22 3"ø SUBMERSIBLE PUMP

FINAL TURBIDITY READING = 15.3 NTU'S

Prepared/Date: JMF 09/14/17
Checked/Date: EW 09/14/17

DETAIL NOT TO SCALE

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LAKE SUCCESS, NEW YORK

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SENTINEL WELL CONSTRUCTION DETAIL
Project 3612172359

Z:\Projects\Lockheed_Martin_Corp\Great Neck\Figures\Figure-Sentinel Well Construction Detail_MW-52-ML.dwg Thu, 14 Sep 2017 - 11:23am john.french

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

County Nassau

Well Number 2R

COMPLETION REPORT—LONG ISLAND WELL

OWNER: Water Authority of Great Neck North

ADDRESS: 171 Great Neck Road, Great Neck, NY

LOCATION OF WELL: 175 Great Neck Road, Great Neck, NY

DEPTH OF WELL BELOW SURFACE: 155.0'

DEPTH TO GROUNDWATER FROM SURFACE: 7.0'

CASINGS

DIAMETER	20 in.	16 in.	16 in.
LENGTH	121 ft.	124 ft.	5 ft.

SEALING: N/A

CASINGS REMOVED: N/A

SCREENS

MAKE: Johnson

OPENINGS: .050

DIAMETER	16 in.	in.	in.
LENGTH	30 ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING: 4.0'

PUMPING TEST

DATE: 2/11/97

TEST OR PERMANENT PUMP? Test

DURATION OF TEST: days | 8 hours

MAXIMUM DISCHARGE: 1016 gallons per min.

STATIC LEVEL PRIOR TO TEST: 11 ft. | 5 in. below top of casing

LEVEL DURING MAXIMUM PUMPING: 65' | in. below top of casing

MAXIMUM DRAWDOWN: 53 ft.

Approximate time of return to normal level after cessation of pumping: 1 hours | min.

PUMP INSTALLED

TYPE: Sub	MAKE: Ingersoll Dresser	MODEL NUMBER: 12H110-5
MOTIVE POWER: Sub motor	MAKE: Pleuger	H.P.: 75

CAPACITY: 1000 g.p.m. against 140 ft. of discharge head

NUMBER OF BOWLS OR STAGES: 5

230' ft. of total head

DROP LINE	SUCTION LINE
DIAMETER: 10 in.	DIAMETER: N/A in.
LENGTH: 110 ft.	LENGTH: N/A ft.

METHOD OF DRILLING: ☒ rotary ☐ cable tool ☐ other

USE OF WATER: Public supply

WORK STARTED: January, 1997

COMPLETED: June, 1997

DATE: 6/6/97

DRILLER: S. Steffen

REGISTRATION NO.: 1684

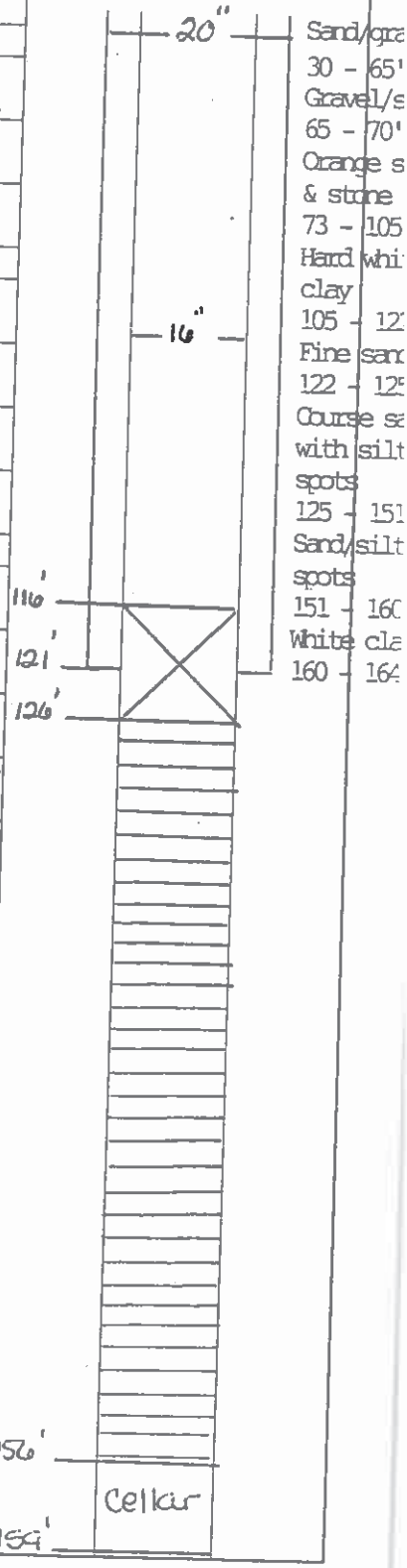
* NOTE: Show log of well materials encountered, with depth below ground surface, water bearing beds and water levels in each, casings, screens, pump, additional pumping tests and other matters of interest. Describe repair job. See instructions as to Well Driller's Registration and Reports.

*LOG

Ground Surface

EL. unknown ft. above sea

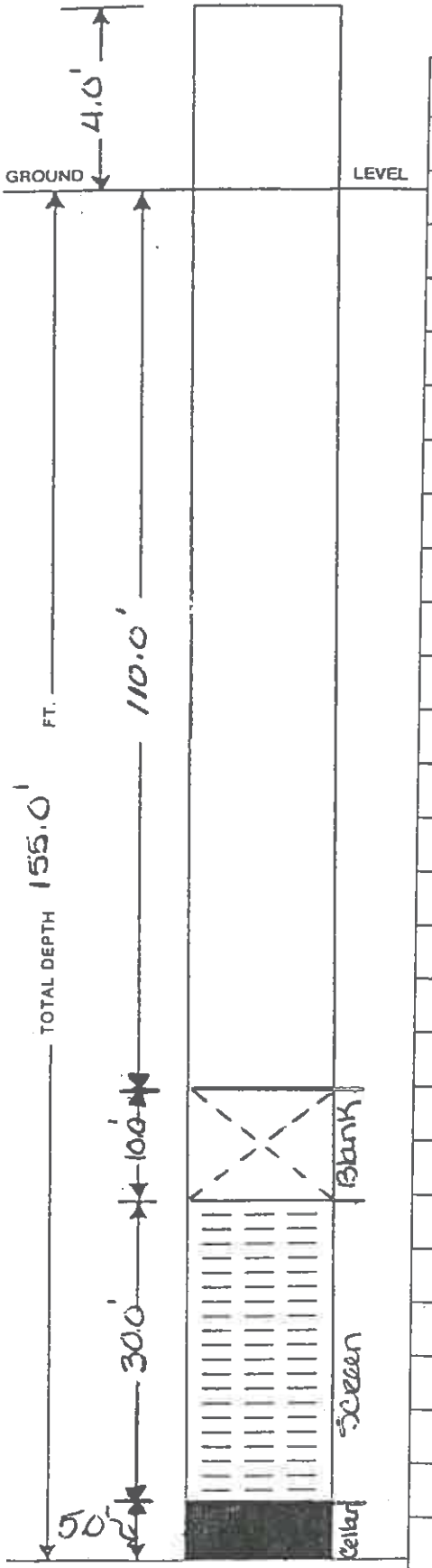
_____ ft.



DUPLICATE—Retain

A.C. SCHULTES, INC.
SINGLE CASED WELL

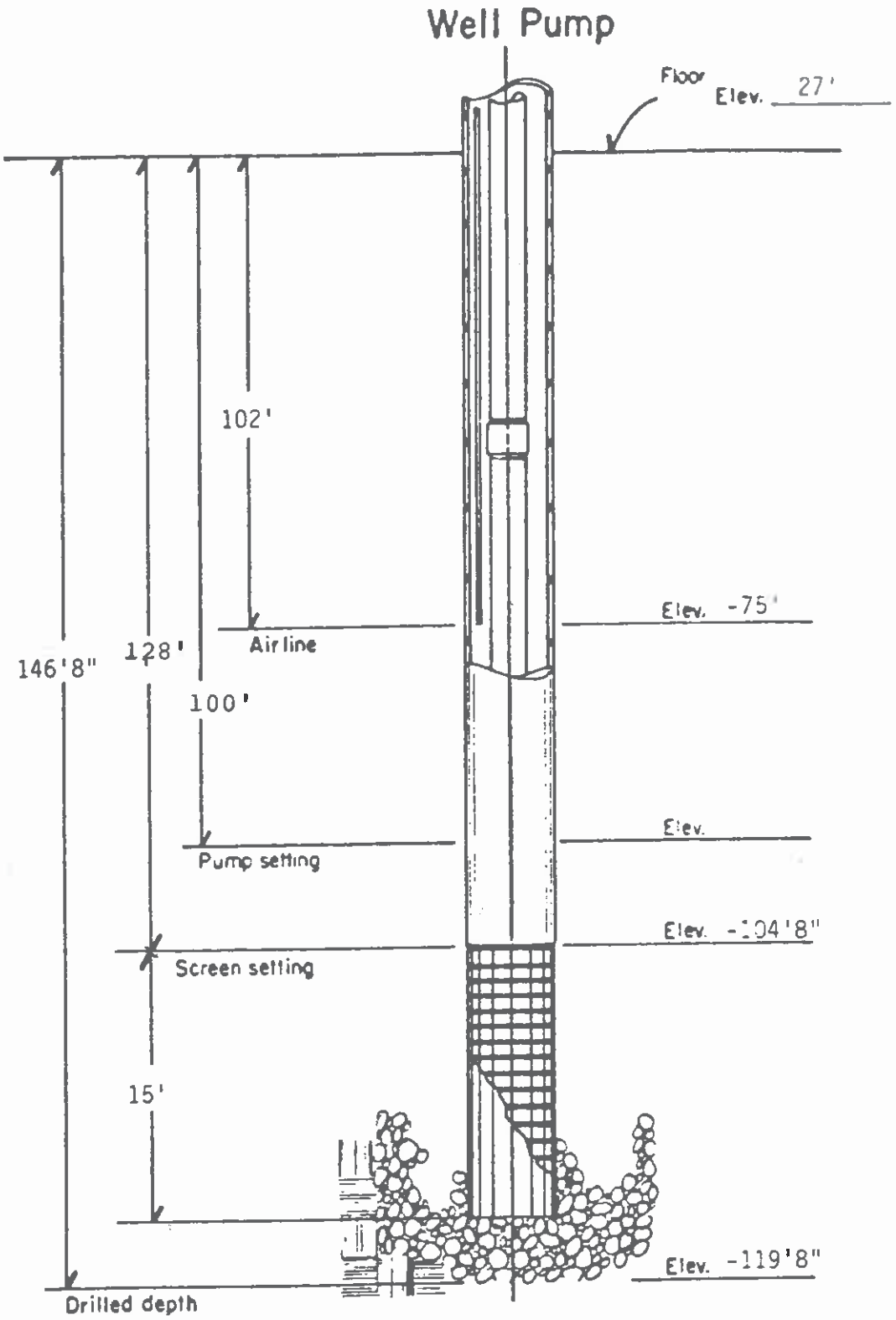
WELL 2-A



WELL LOG	FEET FROM GROUND SURFACE	NAME OF OWNER Great Neck North
Sand and stones	0 – 30'	Location Water Mill Road
Sand and gravel	30 – 65'	Well No. 2-R
Gravel and stones	65 – 70'	State Permit N-12796
Orange stone and stones	70 – 73'	Job No. D25109
Orange and white clay	73 – 105'	Test Pumped (Hrs.) 8
Hard white clay	105 – 122'	Capacity (GPM) 1016
Fine sand	122 – 125'	Static Level 11' 5"
Course sand with silty spots	125 – 151'	Pumping Level 65.0'
Sand and silty spots	151 – 160'	Datum Ground
White clay	160 – 164'	Specific Capacity 19
		Diameter of Casing 20" x 15"
		Depth of Well (Ground) 155.0'
		Depth to Gravel 121.0'
		Gravel Size 1 & 2
		Length of Casing & Screen 155.0'
		Screen Material Stainless
		Screen Mfg. Johnson
		Screen Dia. 16.0"
		Length of Screen 30.0'
		Top of Screen Fitting Welded
		Bottom of Screen Fitting Welded
		Slot Size .050
		Seal Material Cement
		Quantity 200 bags
		Depth of Seal Material 121.0'
		Drilling Rig D-11
		Date Well Completed 01/24/97
		Driller S. Steffen

Well Log

Well 9



Company CITIZENS

Well Log

Well #9

DEPTH FROM LAND SURFACE	FORMATION DESCRIPTION
0 ft. - 5 ft.	Fill
5 ft. - 14 ft.	Sand & Boulders
14 ft. - 20 ft.	Blue Clay
20 ft. - 22 ft.	Black Clay
22 ft. - 30 ft.	Brown Hard Clay
30 ft. - 45 ft.	Sand & Gravel Streaks Clay
45 ft. - 54 ft.	Hardpacked Sand & Streaks Gravel
54 ft. - 55 ft.	Sand Rock
55 ft. - 58 ft.	Hard White Clay
58 ft. - 63 ft.	Streaks of Sand Rock Hard White Clay
63 ft. - 64 ft.	Hard White Sand
64 ft. - 76 ft.	Coarse Sand & Streaks Clay
76 ft. - 77 ft.	Yellow & White Clay
77 ft. - 81 ft.	Fine Sand
81 ft. - 82 ft.	White Clay
82 ft. - 91 ft.	Fine Sand
91 ft. - 103 ft.	Hard White Clay
103 ft. - 122 ft.	Soft White Clay
122 ft. - 125 ft.	Hard Sandy Clay
125 ft. - 145 ft.	Sand and Large Gravel

Company CITIZENS

APPENDIX C— WELL DEVELOPMENT FORMS

WELL DEVELOPMENT RECORD

PROJECT NAME		WELL ID	START DATE & TIME
PROJECT NUMBER		DATE WELL INSTALLED	END DATE & TIME
LOCATION (City & State)		DEVELOPMENT CONTRACTOR	PAGE OF
SAMPLE ID	SAMPLE TIME	AOC NAME / NUMBER	LOGGED BY

MEASURING POINT (MP):	TOC TOR	SURFACE FINISH:	ROADBOX STICK-UP	WELL DIAMETER:	IN
SCREENED INTERVAL:	to FT (BGS)	DEVELOPMENT METHOD:		STICK-UP HT:	FT
INITIAL DTW:	FT (MP)	POST DEVELOPMENT DTW:	FT (MP)	TOC/TOR DIFF:	FT
INITIAL BOW:	FT (MP)	POST DEVELOPMENT BOW:	FT (MP)	SEDIMENT REMOVED:	FT
INIT HT OF WATER COL: INIT BOW - INIT DTW	FT	TOTAL VOLUME PURGED: RATE x TOTAL MIN PURGED (x .26 for ltrs)	GAL	PUMP TYPE:	
CALC GAL/VOLUME: COL HT x WELL DIA^2 x 0.041	GAL	APPROXIMATE RECHARGE RATE:	FT/MN	PID WELL HEAD:	PPM
FINAL RECOVERY DTW:	FT (MP)	FINAL RECOVERY ELAPSED TIME:	HRS:MNS	POST DEVELOP SAMPLE TAKEN:	Y N

PURGE DATA

TIME hr:mn	DTW ft (mp)	RATE ltrs or gals/mn	TEMP ± 3%°C	SPEC COND ± 3%ms/cm	DO >0.5mg/l:± 10%	PH ± 0.1 units	ORP ± 10mV	TURB >10 NTU:±10%	VOL PURGED (gals/interval)	TOTAL GALLONS	COMMENTS
	BEGIN PURGING.		PURGE WATER CONTAINERIZED FOR DISPOSAL? YES or NO								

NOTES

AMEC E&E PC
214-25 42nd Avenue
Suite 3R
Bayside, NY 11361
(347) 836-4445

SIGNED BY: _____

CHECKED BY: _____

APPENDIX D— HEALTH AND SAFETY

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Groundwater Monitoring Well Installation

Lockheed Martin Corporation
Former Unisys Facility
Lake Success, New York

Prepared for:

Lockheed Martin Corporation

Energy, Environment, Safety and Health
6801 Rockledge Drive
Bethesda, MD 20817

Prepared by:

AMEC E & E PC

214-25 42nd Avenue, Suite 3R
Bayside, NY 11365

(347) 836-4445

August 27, 2018 REV

Project No. 3612172359

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Lockheed Martin Corporation
Former Unisys Facility
Lake Success, New York

Prepared for:

Lockheed Martin Corporation

Prepared by:

AMEC E & E PC

214-25 42nd Avenue, Suite 3R
Bayside, NY 11365

(347) 836-4445

August 27, 2018

Project No. 3612172359

This Site-Specific Health and Safety Plan (SSHP) has been developed in accordance with Occupational Safety and Health Act (OSHA) 29 Code of Federal Regulations (CFR) 1910 and 1926, and AMEC Environment & Infrastructure (AMEC) Health, Safety and Environment (HSE) Policy and has been streamlined to avoid duplication of existing AMEC documents.

Prepared by:

Eric A. Weinstock, CPG, PG
Principal Scientist

Reviewed by:

w/ permission

Cynthia Sundquist, CSP/CIH
Group HSE Manager

Approved by:

William J. Weber, PE
Project Manager

SSHP EMERGENCY SUMMARY PLAN

This Emergency Summary Plan excerpts critical elements of the Site-Specific Health and Safety Plan (SSHP) to provide a quick reference during potential emergency situations. Detailed health and safety protocol are described in the SSHP. All field persons should have read and be familiar with the SSHP prior to work at the Site.

The Site Health and Safety Coordinator (SHSC), the AMEC Project Manager (PM), the Health, Safety and Environment (HSE) Department Coordinator, the AMEC Group HSE Manager, and WorkCare shall be notified immediately if worker exposure, accidents, or site conditions not anticipated in this document are encountered. The SHSC, injured employee, or their supervisor must contact the **WorkCare** 24/7 Hotline at 888-449-7787 in the event of accidents with injuries (emergency or non-emergency incidents).

RESPONDING EMERGENCY AGENCIES

Service	Telephone Number
Ambulance	911
Fire Department	911 or 516-466-4411
Police Department	911 or 516-482-4600

PROJECT EMERGENCY CALL LIST

Title	Name	Telephone Number
Project Manager	Eric Weinstock, PG	347-836-4343 (office (O)) 516-413-6643(mobile (M))
Project Principal	William Weber, PE	207-828-3381(O) 207-232-9802 (M)
Project Chemist	Chris Ricardi	207-828-3694 (O)
Project Geologist	Jazmin Logan	347-836-4239 (O) 347-351-2009 (M)
Emergency Coordinator	Eric Weinstock	347-836-4343 (office (O)) 516-413-6643(mobile (M))
After-Hours HazMat Response Line	Eric Weinstock	347-836-4343 (office (O)) 516-413-6643(mobile (M))
Site Health and Safety Coordinator (SHSC)	Laurie Gneiding	732-302-9500 ext. 125 (O) 732-556-8018 (M)
Corporate VP of HSE	Vladimir Ivensky, CIH, CSP	610-877-6144 (O) 267-736-0631 (M)
Eastern Group HSE Manager	Cindy Sundquist, CIH, CSP	207-828-3309 (O) 207-650-7593 (M)
Lake Success HSE Coordinator	Jazmin Logan	347-836-4239 (O) 347-351-2009 (M)
Client; Project Lead	Lockheed Martin Company; Glenda Clark	817-495-0246 (O) 817-901-9933 (M)
Project Coordinator	CDM Smith; Bill Glynn	617-452-6280 (O) 617-549-9344 (M)
OMM Project Coordinator	CDM Smith; Erika Parsons	617-452-6273 (O) 781-789-1263 (M)
OMM Specialist	CDM Smith; Jason Maskaly	860-294-6478 (M)
Workers' Compensation	Gabe Sandholm, HR Minneapolis, MN	612-252-3785 (O) 425-698-9156 (M)
AMEC WorkCare 24-hour HOTLINE		888-449-7787 (O)
Local Police – Village of Lake Success		911 and/or 516.482.4600
Local Ambulance – Manhasset-Lakeville Fire Department		911 and/or 516.466.4411
Local Fire Department – Manhasset-Lakeville Fire Department		911 and/or 516.466.4411
Local Hospital – North Shore University Hospital		516.562.0100
Local Weather Data – LaGuardia Airport		718.533.3400
National Response Center (all spills in reportable quantities)		800.424.8802
Local Police – Nassau County Police Department		911 and/or 516.573.6300
* In the event of an occupational accident or incident, please indicate to the medical facility that this is a Workers' Compensation case; that your employer is AMEC; and that the insurance administrator is Cigna Insurance.		

EMERGENCY TELEPHONE NUMBER LIST

Organization	Telephone Number

State OSHA	516-334-3344 (New York)
Poison Control Center	1-800-222-1222
National Response Center	1-800-424-8802
Region 2, USEPA	1-877-251-4575

EMERGENCY SUBCONTRACTOR'S TELEPHONE NUMBER LIST

Organization	Onsite H&S Representative/ Competent Person	Telephone Number
Cascade/ADT	Dennis Meyer	516-616-6026
NAEVA Geophys	Mark Weis	845-268-1800
American Engineering and Land Surveying	Steve Ravn	631-393-2867

EMERGENCY SUPPLIES AND EQUIPMENT LIST

Emergency Supplies and Equipment (check all that apply)	Location(s) on Project Site
☒ First Aid Kit	OU1 and OU2 Treatment Plants
☒ Fire Extinguisher	OU1 and OU2 Treatment Plants
☒ Mobile Phone ☐	All Field Personnel
☒ Traffic Cones	Field Vehicles
☐ Walkie Talkies	
☒ Water or Other Fluid	Field Vehicles
☒ Eye Wash/Quick Drench Station	OU1 and OU2 Treatment Plants
☒ Eye Wash Bottle	Field Vehicles
☒ Wash and Dry Towelettes	Field Vehicles
☒ Sunscreen (SPF 15 or higher)	Field Vehicles
☒ Insect Repellant	Field Vehicles
☒ Chemical Spill Kit	Field Vehicles
☐ *Other (specify):*	

Nearest Phone: Carry cellular phone

Nearest Water: Municipal water at the local fire hydrant or carry water while in the field.

Location(s) of First Aid Kit: Eyewash station located in at the drill site. A portable eyewash kit should be available in sampling kit for any sampling activities that involve the use of preservatives.

POTENTIAL PHYSICAL HAZARDS	POTENTIAL CHEMICAL HAZARDS	POTENTIAL RADIOLOGICAL HAZARDS	POTENTIAL BIOLOGICAL HAZARDS
Back injuries	Tetrachloroethene (PCE)	Radiation/radioactivity at or slightly above natural background levels	Insect bites and stings (Wasps, yellow jackets, ticks, etc.)
Cold/heat stress	1,2-Dichloroethene (1,2-DCE)		Poison ivy
Confined spaces entry	1,1-Dichloroethene (1,1-DCE)		Snakes
Discharge of static electricity	VC		
Electrical charge	Toluene		
Slips, trips, and falls	Trichloroethene (TCE)		
Falls from elevated surface	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)		
Fire and explosion	Chlorodifluoromethane (Freon 22)		
Vehicle traffic	PCBs		
Inclement weather and shut-down condition	Benzo(a)anthracene		
Noise	Benzo(a)pyrene		
Oxygen deficiency	Benzo(b)fluoranthene		
UV exposure	Benzo(k)fluoranthene		
	Chrysene		
	Dibenz(a)anthracene		
	Indeno(1,2,3-cd)pyrene		
	4,4'-DDT		
	4,4'-DDD		
	4,4'-DDE		
	Arsenic		
	Chromium		
	Copper		
	Lead		
	Mercury		
	Nickel		
	Silver		
	Zinc		
	Sodium Carbonate		
	Muriatic Acid		
	Sodium Hypochlorite		
	Calcium Hypochlorite		
	Phosphoric Acid		
	Sodium Sulfite		

CHEMICAL MATERIALS HANDLED AT THE SITE:

Conductivity Standard Solution	ABC Fire Extinguisher Powder
YSI 3161 Conductivity Calibrator	Gasoline, All Grades
ORP Calibration Solution	Motor Oil

pH 4.00 Calibration Solution	Hydrochloric Acid
pH 7.00 Calibration Solution	Nitric Acid 50-70%
pH 10.00 Calibration Solution	Micro-90 Cleaning Solution
Amco Clear: Turbidity Standard	Isobutylene Gas
Eye Saline Solution	Nitrogen Gas

REQUIRED AIR MONITORING EQUIPMENT:

- Photoionization Detector (PID) with 10.6 eV lamp

REQUIRED PERSONAL PROTECTIVE EQUIPMENT AND AIR MONITORING EQUIPMENT:

Level # and specified in Activity Hazard Analyses ([AHAs] see Appendix 4).

ACTION LEVELS AND ACTION

Monitoring well installation – Is exposure monitoring required for the completion of this project?
☒ YES ☐ NO If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
*Working by active drill rig	• Photoionization Detector (PID) with 10.6 eV lamp	Hourly	• VOCs ≥9ppm	Evacuate space if action levels are exceeded or if other self-perceived hazards are present; Contact PM and SHSC to discuss

Monitoring Well Sampling and Hydraulic Monitoring – Is exposure monitoring required for the completion of this project?
☒ YES ☐ NO If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
VOCs	• PID (10.6 eV lamp)	When initially accessing well; Periodic, if necessary, based on initial reading	≥9 ppm	Stop work; Let well vent until reading is below the action level; Contact PM and SHSC to discuss

Recovery and Diffusion Well Rehabilitation and Redevelopment – Is exposure monitoring required for the completion of this project? ☒ YES ☐ NO If yes, complete the following:				
Exposure Hazard	**Monitoring Equipment**	**Monitoring Frequency**	**Action Level**	**Required Action**
VOCs	• PID (10.6 eV lamp)	When initially accessing well; Periodic, if necessary, based on initial reading	≥9 ppm	Stop work; Let well vent until reading is below the action level; Contact PM and SHSC to discuss

SITE CONTROL for this project will consist of:

- Work fences, traffic cones and caution tape permit only authorized and certified personnel on Site.
- For work activities other than routine drilling and well installation tasks, the SHSC will coordinate access and control security at the work site. As the work dictates, the SHSC will establish a work area perimeter. The size of the perimeter will be based on the daily task activities and will be discussed with all project personnel during the tailgate meeting and then documented on the tailgate meeting form. Control zones will be demarcated by either visual or physical devices and will be monitored for effectiveness by the SHSC.
- Only authorized personnel will be allowed beyond the perimeter. Lockheed Martin Corporation (Lockheed Martin) and CDM Smith staff are responsible for obtaining the appropriate training necessary to enter construction or exclusion zones and will maintain their own training records. Other Site workers and visitors to the Site should be kept out of the work Site. If visitors need access to the Site, the SHSC or designee will escort the visitor at all times. All visitors will log in and out at the treatment facility.

IN CASE OF LIFE THREATENING INJURIES, CALL 911

USE AMBULANCE TO CLOSEST TRAUMA CENTER

NOTE: In case of any hazard exposure during and/or prior to medical attention, the hospital and any emergency response personnel shall be notified that patient and/or the patient's clothing may be contaminated.

Nearest Medical Facility: North Shore University Hospital

300 Community Drive, Manhasset, NY 11030

Emergency Phone Number: 516.562.0100 (information line)

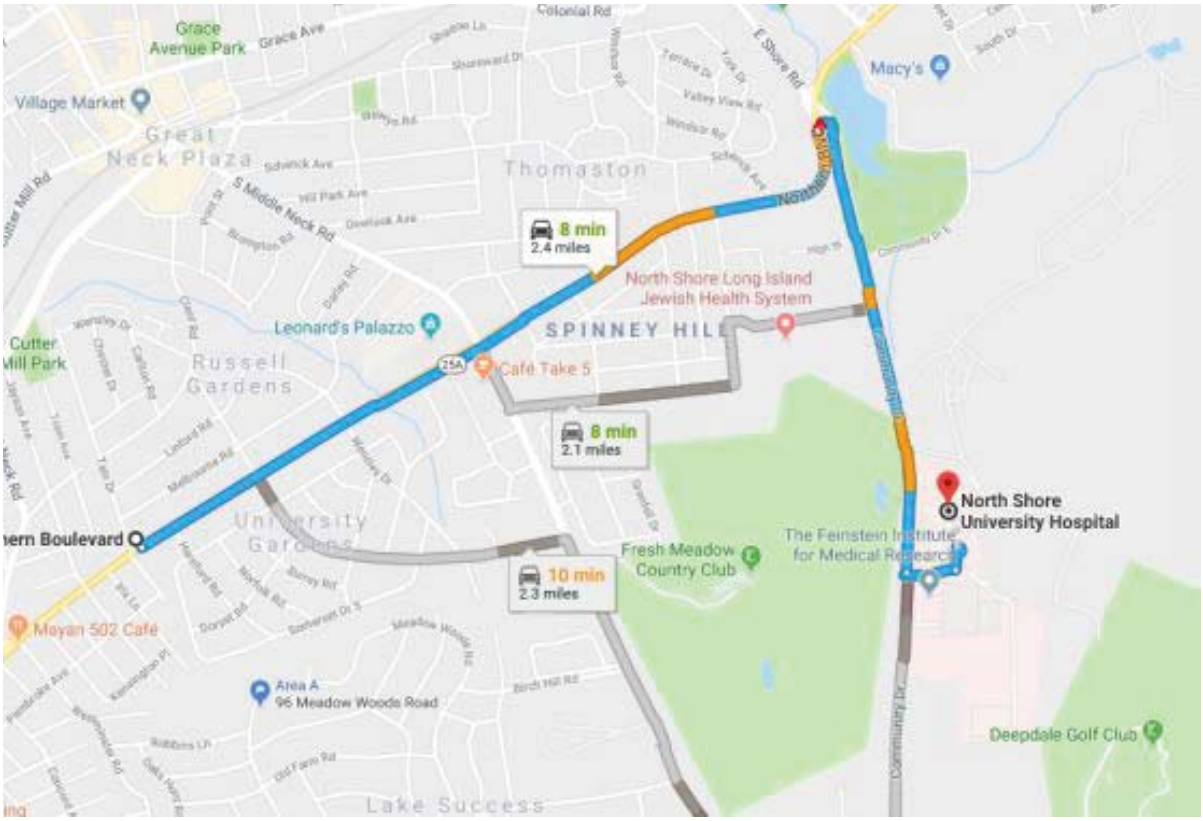
Information Phone Number: 516.562.0100

MEDICAL FACILITY ROUTES:

From Drill Site:

1. Take Tain Drive South
2. Turn LEFT Northern Boulevard
3. Turn RIGHT onto Community Drive
4. Turn LEFT onto to Hospital

Estimated distance: 2.4 miles Estimated time: 8 minutes



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ACRONYMS AND ABBREVIATIONS

1,1-DCE	1,1-Dichloroethene
1,2-DCE	1,2-Dichloroethene
AHA	activity hazard analysis
AMEC	AMEC E&E PC
ANSI	American National Standards Institute
BZ	Breathing Zone
CFR	Code of Federal Regulations
CHSM	Corporate Health and Safety Manual
CIH	Certified Industrial Hygienist
COPC	contaminants of potential concern
CPR	Cardiopulmonary Resuscitation
CW	clear well
dBA	Decibels (A-weighted scale)
DOT	Department of Transportation
DW	diffusion well
EGHSEM	Eastern Group Health, Safety and Environment Manager
EC	Emergency Coordinator
ECU	Emission Control Unit
EZ	Exclusion Zone
Freon 113	1,1,2-Trichloro-1,2,2-trifluoroethane
Freon 22	Chlorodifluoromethane
FM	Field Manager
FSP	Field Sampling Plan
ft	feet
GES	Groundwater & Environmental Services, Inc.
GWTS	Groundwater Treatment System
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBV	Hepatitis B Virus
HIV	Human Immunodeficiency Virus

HSE	Health, Safety, and Environment
IDLH	immediately dangerous to life or health
IDW	investigation-derived waste
IRM	interim remedial measure
Lockheed Martin	Lockheed Martin Company
MLWD	Manhasset-Lakeville Water District
NIOSH	National Institute for Occupational Safety and Health
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
OMM	Operations, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PARKS	New York State Office of Parks, Recreation and Historic Preservation
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PID	photoionization detector
PM	project manager
ppm	parts per million
PPZ	potassium permanganate-impregnated zeolite
RI	Remedial Investigation
ROC	Record of Change
ROD	Record of Decision
SDS	Safety Data Sheet (Formerly called Material Safety Data Sheets)
Site	Former Unisys Facility located in the Village of Lake Success, New York
SHSC	Site Health and Safety Coordinator
SOP	standard operating procedure
Sperry	Sperry Gyroscope Company
SSHP	Site Specific Health and Safety Plan
SVE	soil vapor extraction
SZ	support zone

TCE	Trichloroethene
TENORM	Technologically Enhanced Naturally Occurring Radioactive Material
Unisys	Unisys Corporation
USEPA	United States Environmental Protection Agency
V	field vehicle
VC	vinyl chloride
VP-HSE	Vice President of Health, Safety and Environment
VPGAC	vapor-phase granular-activated carbon
VOC	volatile organic compound

1.0 INTRODUCTION

1.1 SITE DESCRIPTION AND BACKGROUND

The former Unisys Corporation (Unisys) facility (Site) is located in the Village of Lake Success in the Town of North Hempstead in Nassau County, New York. The Site address is 1111 Marcus Avenue (formerly 365 Lakeville Road), Great Neck, New York (see Figure 1-1). The Site is bounded by Marcus Avenue to the north, the Triad Business Park to the east, Union Turnpike to the south, and Lakeville Road to the west. Figure 1-2 is a Site Layout Map.

The Site was formerly utilized for the manufacture of defense-related products between 1941 and 1995. Past manufacturing processes included the following: metal casting, chemical etching, degreasing, plating, painting, metal finishing, machining, electronic circuit board manufacture and assembly. Chemicals used during manufacturing at the plant included halogenated and non-halogenated hydrocarbon solvents, cutting oils, paints, fuel oils, acids and caustics, as well as inorganic plating compounds. The facility was originally designed and built by the United States Government and was operated under a contract to the Sperry Gyroscope Company (Sperry) from 1941 to 1951. In 1951, the property was sold to Sperry, which merged with Burroughs in 1986 to form the Unisys Corporation. In May 1995, Loral Corporation obtained the property from Unisys, and in March 1996, the property was acquired by Lockheed Martin Corporation (Lockheed Martin). The property was then sold by Lockheed Martin in early 2000 to i.park, Lake Success, LLP (i.park).

Between 1978 and November 1996, a series of on-site studies and remedial activities were undertaken to investigate volatile organic compound (VOC) contamination in soil and groundwater. The first studies traced the origin of the VOCs to a series of dry wells on the southeast corner of the main building.

In April 1993, a groundwater pump and treatment system was installed as an interim remedial measure (IRM) to remove VOCs in groundwater at the northern site boundary. In January 1994, a soil vapor extraction (SVE) system was installed in the dry well area to recover residual VOCs in the soil. In 1998, three dry wells were excavated to a depth of 30 feet (ft) and approximately 800 tons of contaminated soil were removed and disposed of off-site at an approved facility.

The Site has been classified by the New York State Department of Environmental Conservation (NYSDEC) as a Class 2 Site in the Registry of Inactive Hazardous Waste Disposal Sites in New

York State (Site No. 130045). To facilitate remediation activities prior to complete characterization of the Site, the NYSDEC has subdivided the Site into two operable units (OUs), designated asOU1 and OU2. OU1 encompasses soils and groundwater within the 94-acre on-site area, which is currently owned by i.park. In March 1997, the NYSDEC issued the OU1 Record of Decision (ROD) for remediation of on-site soils, sediments, and groundwater. Required remedial actions consisted of upgrades to an existing pumping and treatment system for groundwater and expansion of a SVE system for residual contamination in the vadose zone source area. OU2 encompasses the off-site area. Off-site groundwater has been impacted by former on-site operations. The OU2 Remedial Investigation (RI) was conducted under the NYSDEC Administrative Order on Consent No. W-1-0527-91-02. Characterization of off-site groundwater within OU2 has been on-going since the mid-1990s under purview of the NYSDEC. In an effort to minimize the off-site migration of impacted groundwater and enhance mass reduction, an IRM for off-site groundwater was implemented in 2004. This IRM consists of a pumping and treatment system designed to capture contaminant mass in an area of elevated VOC concentrations north of the Site.

The former Unisys property occupies 94 acres on which a main building and six smaller buildings (located south of the main building) existed. The smaller buildings formerly included the foundry building, environmental testing building, boiler building, garage, maintenance shop and Lakehouse building. The main building has since been converted to commercial rental space, as have most of the smaller buildings. The Lakehouse building has been razed. The balance of the property consists of paved areas (parking lots) and three storm water retention basins. The OU1 remediation system is located on-site and includes a groundwater treatment plant located in the northeast corner of the Site, three remedial wells (EW-1, RW-1RS and RW-1RD) and associated piping located on site along Marcus Avenue. The OU2 remediation system is located at 60 Tanners Road, Lake Success, New York. The system is housed in a former Manhasset-Lakeville Water District (MLWD) Building.

Treated water from the OU1 groundwater treatment system (GWTS) is conveyed to four off-site diffusion wells (DW-10, DW-11, DW-12, and DW-13 and future DW-14) located to the northeast on property owned by the New York State Office of Parks and Historic Preservation, along the Northern State Parkway between Lakeville Road and New Hyde Park Road. Treated water from the OU2 GWTS is conveyed to diffusion wells, DW-100, DW-101, and DW-102.

1.2 REMEDIAL SYSTEM DESCRIPTION

There are currently two remedial systems associated with the remedial action for the Site:

- the on-site OU1 GWTS and the OU1 SVE System
- the Off-Site IRM OU2 GWTS

The OU1 GWTS recovery wells are located along the northern perimeter of the Site, the groundwater treatment plant is located in the northeast portion of the Site, and the diffusion wells are located off-site on the New York State Office of Parks and Historic Preservation property on the south side of the Northern State Parkway in the vicinity of Exit 26S. The OU1 SVE System SVE wells are located adjacent to the southeast corner of the former main manufacturing building and the treatment equipment is located in the northeast portion of the Site. The Off-Site IRM OU2 GWTS recovery well is located on the Great Neck Union-Free School District property in the maintenance yard, the groundwater treatment plant is located at the end of Tanners Road on the MLWD property, and the diffusion wells are located on the New York State Department of Transportation (NYSDOT) property along the Long Island Expressway south service road, immediately east of the school district property.

The OU1 GWTS consists of the following major components:

- Three groundwater recovery wells (EW-1, RW-1RS, and RW-1RD)
- Two air strippers (AS-100 and AS-200) in series and associated clear wells (CWs) (CW-100 and CW-200)
- One 50-horsepower (hp) air blower
- One heat exchanger to heat the air stream prior to treatment
- Four emission control units (ECUs), which include two ECUs filled with vapor-phase granular-activated carbon (VPGAC) (VPGAC-1 and VPGAC-3) and two ECUs filled with potassium permanganate-impregnated zeolite (PPZ) (PPZ-2 and PPZ-4)
- Four operating diffusion wells (DW-10 through DW-13; DW-9 was abandoned). Diffusion well DW-13 was installed in 2008 to replace former diffusion well DW-9

The OU1 GWTS process is summarized below.

Groundwater impacted by VOCs is extracted from the subsurface Magothy aquifer and pumped through a subsurface pipeline to the OU1 GWTS for treatment prior to being recharged to the aquifer. Specifically, groundwater is extracted from three recovery wells and pumped through two

air strippers, which are arranged in series, to remove VOCs from the groundwater. The treated groundwater is then pumped through a subsurface pipeline to the diffusion wells, where it is reintroduced into the aquifer.

During the air stripping process, impacted water enters the air strippers at the top and air enters at the bottom. VOCs are transferred from the water to the counter-current air stream. The VOC-laden air stream (off-gas) is then treated by the four ECUs to remove VOCs prior to discharge to the atmosphere. The air stripper off-gas enters the two VPGAC-filled ECUs first, where most of the VOCs are removed, and then passes through the two PPZ-filled ECUs where the remaining VOCs (including vinyl chloride) are removed.

The OU1 SVE System consists of the following major components:

- Six SVE wells (VW-13, VW-14, VW-15, VW-17, VW-18 and VW-19; VW-14 and VW-19 remain offline)
- One 7.5-hp blower for SVE wells VW-13 and VW14
- One 10-hp blower for SVE wells VW-15, VW-17, VW-18 and VW-19
- Two knockout tanks for condensate collection
- One heat exchanger to heat the air stream prior to treatment
- Six ECUs, which include four ECUs filled with VPGAC (VPGAC-1 through VPGAC-4) and two ECUs filled with PPZ (PPZ-1 and PPZ-2)
- Four bottom-loading pneumatic submersible pumps for extraction of perched water from SVE wells VW-15, VW-17, VW-18 and VW-19
- One air compressor for operating the bottom-loading pneumatic submersible pumps

The OU1 SVE System process flow is summarized below.

During operation of the OU1 SVE System, soil vapor is extracted from SVE wells VW-13, VW-15, VW-17 and VW-18 and is treated by the six ECUs to remove VOCs prior to discharge to the atmosphere. The soil vapor stream is split into two parallel streams, each of which is forced through two VPGAC ECUs in series, removing most of the VOCs. After VPGAC treatment, the streams are combined and forced through two PPZ ECUs in series to remove remaining VOCs (including vinyl chloride [VC]) before discharge to the atmosphere.

Perched groundwater located above a low-permeability zone within the OU1 SVE System area is recovered and pumped to the OU1 SVE System treatment shed, where it is combined with

condensate water removed from the extracted soil vapor stream. The combined effluent is then pumped to the OU1 groundwater treatment plant. Currently, extracted perched groundwater and SVE condensate are pumped to Clearwell Number 1 and through the second air stripper tower in the OU1 GWTS. Treated water is then discharged with the OU1 GWTS treated water stream.

The Off-Site IRM GWTS consists of the following major components:

- One groundwater recovery well (RW-100)
- Two air strippers (AS-210 and AS-220) and associated clear wells (CW-210 and CW-220)
- One 75-hp air blower
- One duct heater to heat the air stream prior to treatment
- Five ECUs, which include three ECUs filled with VPGAC (VPGAC-1 through VPGAC-3) and two ECUs filled with PPZ (PPZ-1 and PPZ-2)
- Three diffusion wells; two of which continuously remain online (DW-100, DW-101 and DW-102)

The Off-Site IRM GWTS process is summarized below.

Groundwater impacted by VOCs is extracted from the subsurface Magothy aquifer and pumped through a subsurface dual-wall containment pipeline to the Off-Site IRM GWTS for treatment prior to being recharged to the aquifer. Specifically, groundwater is extracted from one recovery well (RW-100) and pumped through two air strippers, which are arranged in series, to remove VOCs from the groundwater. The treated groundwater is then pumped through a single-walled subsurface pipeline to the diffusion wells, where it is reintroduced into the aquifer.

During the air stripping process, impacted water enters the air strippers at the top and air enters at the bottom. VOCs are transferred from the water to the counter-current air stream. The VOC-laden air stream (off-gas) is then treated by the five ECUs to remove VOCs prior to discharge to the atmosphere. The air stripper off-gas enters the three VPGAC-filled ECUs first, where most of the VOCs are removed, and then passes through the two PPZ-filled ECUs where the remaining VOCs (including vinyl chloride) are removed.

1.3 SCOPE OF WORK/PLANNED SITE ACTIVITIES

The goal of the proposed work for Lockheed Martin is the installation of two additional offsite groundwater monitoring wells. This Site Specific Health and Safety Plan (SSHP) will cover

activities in the Project Area during the expected 2 month work period. Planned activities include drilling one pilot soil boring, collecting soil and groundwater samples and installing two groundwater monitoring wells. If additional tasks are added for this project, an activity hazard analysis (AHA) will be completed and added to this SSHP prior to field activity.

1.3.1 Drilling and Monitoring Well Installation

This activity involves drilling a soil boring to an estimated depth of between 200 to 220 feet below grade, collecting soil and groundwater samples and installing two groundwater monitoring wells at selected depths.

1.4 SCHEDULED PROJECT AREA PERSONNEL AND CONTRACTORS

Substitutions will be made with similarly qualified personnel; the Record of Change (ROC) must reflect all personnel changes.

Table 1-1 — Scheduled AMEC Project Area Personnel

Name	Company	Project Title
Bill Weber, PE	AMEC	Project Principal
Eric Weinstock, PG	AMEC	Project Manager
Jazmin Logan	AMEC	Field Geologist
Laurie Gneiding	AMEC	SHSC

* All personnel requiring access to controlled work areas must have completed the training and medical administrative control requirements. Project manager or appropriate task managers should review and approve their special training programs. Substitutions can be made with similarly qualified personnel. A Record of Change (ROC) will be completed to reflect all personnel changes.

1.5 PERSONNEL RESPONSIBILITIES

1.5.1 Site Health and Safety Coordinator

The Site Health and Safety Coordinator (SHSC) reports jointly to the Corporate Vice President of Health, Safety and Environment (VP-HSE), Eastern Group HSE Manager (EGHSEM) and the Field Manager (FM) for all aspects of the project and is the primary contact for health and safety during field activities. The SHSC has the authority to stop all work if conditions are judged to be hazardous to personnel or the public within the Project Area, and reports and investigates accidents and near misses. The SHSC or designee must carefully document the implementation of this SSHP by maintaining the project health and safety files.

The SHSC is responsible for the following activities:

- Establishes work zones, evacuation routes, and assembly areas
- Makes the day-to-day decision to modify levels of protection provided in the SSHP based on Project Area conditions or monitoring data
- Provides necessary support to the Emergency Coordinator ([EC] see Project or Field Manager below)

1.5.2 Corporate Vice President of Health, Safety and Environment

The VP-HSE is responsible for coordinating the implementation of health and safety procedures through supervision/direction of the SHSC, and is responsible for approval of all changes made to this SSHP. Alternatively, a local AMEC E&E PC (AMEC) Certified Industrial Hygienist (CIH) may review and approve the SSHP.

1.5.3 Eastern Group HSE Manager

The EGHSEM acts as the VP-HSE's designee and is responsible for providing overseeing healthy, safety and environment (HSE) Programs and Procedures in the Eastern Group.

1.5.4 Project Manager or Field Manager (PM or FM)

The Project Manager (PM) or FM is responsible for all field activities for enforcing safe work practices and for ensuring safety and health communication conducted for each visit to Site (either by the PM, FM, SHSC, or a rotation of field team members and subcontractor team members). If

available he/she serves as the EC in emergency situations. The PM or FM assumes (or assigns to a qualified person) the SHSC and EC duties and responsibilities when the SHSC is not at the Project Area.

The PM or FM is responsible for conducting accident and near-miss investigations and completing the First Aid Incident and/or Near Miss forms. The Supervisor of the person injured is responsible for completing the Supervisor's Report of Injury or Illness. Completed forms must be submitted to the EGHSEM within 24 hours of a significant incident.

1.5.5 Field Staff

All AMEC personnel are responsible for compliance with all applicable Safety and Health Regulations of the Occupational Safety and Health Act (OSHA) of 1970 (29 Code of Federal Regulations (CFR). 1926 and 1910), including all amendments and modifications thereto. In the event there is a conflict between the safety and health provisions of federal, state/provincial, or local regulations and AMEC SSHP or Subcontractor SSHP, the more stringent applicable provision shall prevail.

All AMEC personnel are responsible for taking all reasonable precautions to prevent injury to themselves and to their fellow employees and for being alert to potentially harmful situations. Technical staff members are expected to perform only those tasks that they believe can be done safely and to immediately report any accidents, near misses, and/or unsafe conditions to the SHSC or the FM.

1.5.6 Subcontractors

The AMEC Subcontractor is responsible for participating in and enforcing the safety and loss prevention programs established for the Project that will cover all Work performed by it and its sub subcontractors. Each Subcontractor shall designate a responsible member of its organization whose duties shall include loss and accident prevention and who shall have the responsibility and full authority to enforce the program. This person shall ensure that all Subcontractor and Sub-Subcontractor employees understand and comply with the health and safety programs. Subcontractor shall cooperate fully with AMEC, the AMEC Client, and all insurance carriers and loss prevention engineers on loss and accident prevention. Subcontractors shall perform all parts of

its contract while assuming total responsibility for complying with all applicable federal, state, and local health, safety, and environmental standards, regulations, rules or guidelines. Subcontractor acknowledges and agrees that with respect to the scope of its Work under this Subcontract, it shall comply with all obligations and assume all responsibilities imposed upon the "controlling contractor" as such term is defined and construed under all US OSHA rules and regulations.

1.5.7 Required On-Site Signage and Postings

The hospital route map, emergency call list, and Safety Data Sheets (SDSs) are kept with the SHSC and are kept at the Site.

2.0 HAZARD EVALUATION

Chemical, physical, and operational safety hazards anticipated during this project will be evaluated according to protocol described in Section 3.1, Administrative Controls. Appendix 1 provides a Project Area characterization overview of the contaminants of potential concern (COPCs); Appendix 2 provides chemical properties and exposure assessment data; and Appendix 3 summarizes the physical and operational safety hazards and control measures identified for this project. Appendix 4 presents AHAs. Further details of specific control measures for these hazards are presented in Section 3.0, Personnel Protection.

2.1 CHEMICAL EXPOSURE

The primary routes of entry for COPCs and hazardous materials at the Project Area include inhalation of vapors, skin contact with contaminated materials, and ingestion of materials from hand-to-mouth contact that could occur in the case of inadequate personal hygiene. To minimize these exposure pathways, the SHSC will periodically monitor for airborne contaminants in the work and perimeter areas. In addition, all required personal protective equipment (PPE) as specified in Appendix 4 will be worn, and personal hygiene will be carefully monitored.

Table 2-1 lists COPCs under investigation that may be present at the Project Area.

Table 2-1 — Potential Physical, Chemical, Radiological, and Biological Hazards

POTENTIAL PHYSICAL HAZARDS	POTENTIAL CHEMICAL HAZARDS	POTENTIAL RADIOLOGICAL HAZARDS	POTENTIAL BIOLOGICAL HAZARDS
Back injuries	Tetrachloroethene (PCE)	Radiation/radioactivity at or slightly above natural background levels	Insect bites and stings (Wasps, yellow jackets, ticks, etc.)
Cold/heat stress	1,2-Dichloroethene (1,2-DCE)		Poison ivy
UV exposure	1,1-Dichloroethene (1,1-DCE)		Snakes
Discharge of static electricity	VC		
Slips, trips, and falls	Trichloroethene (TCE)		
Electrical charge	Toluene		
Falls from elevated surface	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)		
Fire and explosion	Chlorodifluoromethane (Freon 22)		

POTENTIAL PHYSICAL HAZARDS	POTENTIAL CHEMICAL HAZARDS	POTENTIAL RADIOLOGICAL HAZARDS	POTENTIAL BIOLOGICAL HAZARDS
Vehicle traffic	PCBs		
Inclement weather and shut-down condition	Benzo(a)anthracene		
Noise	Benzo(a)pyrene		
Oxygen deficiency	Benzo(b)fluoranthene		
	Benzo(k)fluoranthene		
	Chrysene		
	Dibenz(a)anthracene		
	Indeno(1,2,3-cd)pyrene		
	4,4'-DDT		
	4,4'-DDD		
	4,4'-DDE		
	Arsenic		
	Chromium		
	Copper		
	Lead		
	Mercury		
	Nickel		
	Silver		
	Zinc		
	Sodium Carbonate		
	Muriatic Acid		
	Sodium Hypochlorite		
	Calcium Hypochlorite		
	Phosphoric Acid		
	Sodium Sulfite		

2.2 HAZARD COMMUNICATION

In addition to the COPCs, Table 2-2 lists the hazardous substances that may be brought onto the Site to supplement investigation activities.

Table 2-2 — Chemical Materials Handled at the Site

Gasoline
Motor oil
Hydrochloric acid
Isobutylene gas

These hazardous materials are subject to the Hazard Communication Standard (29 CFR 1910.1200). The hazardous materials container also must be correctly and clearly labeled with the name of the chemical (product identifier), signal word, hazard statement, pictogram(s), precautionary statement,

and name, address and telephone number of the chemical manufacturer, importer or other responsible party. If chemicals are transferred to a secondary container, that container will have the same labeling as the original container.

The above list must be updated by the SHSC, and SDSs must be obtained and filed for any additional hazardous substances brought onto the Project Area. For more information, see the HSE Response Standard Operating Procedures (SOPs), Hazard Communication Written Program, in Volume VI of the Corporate Health and Safety Manual (CHSM).

The SHSC must give all Project Area employees a hazard communication orientation about hazardous chemicals brought onto the Project Area. This briefing will include health and physical hazards, precautionary measures to be taken during normal operations and foreseeable emergencies, labeling practices, and location of SDSs.

The FM shall ask the Client for copies of SDSs for any hazardous materials in use at the Project Area. The SHSC shall orient AMEC employees/subcontractors as described above.

Due to the hazardous nature of some calibration gases used on site, it is critical that calibration of the multi gas meter be done in a well-ventilated area.

2.3 PHYSICAL OR OPERATING HAZARDS AND CONTROL MEASURES

Table 2-1 identifies physical or operating hazards identified or reasonably anticipated to be associated with Project Area work tasks are provided in Appendix 3, along with a summary of specific control measures.

2.4 HAZARD ANALYSIS OF EACH SITE WORK TASK

Safety analyses for each Site work tasks are provided in Appendix 4. The work tasks are listed in Section 1.3 - Scope of Work.

3.0 PERSONNEL PROTECTION

The prescribed methods and procedures used to protect personnel (Project Area workers and adjacent community) from overexposure to hazardous materials and hazardous conditions posed by Project Area operations are grouped into three primary categories: Administrative Controls, Engineering Controls, and PPE.

3.1 ADMINISTRATIVE CONTROLS

3.1.1 Medical Surveillance

Periodic Comprehensive Exam

All personnel requiring access to controlled work areas will have completed a pre-assignment medical examination and a periodic (usually annual) update examination prior to assignment, in accordance with the OSHA 29 CFR 1910.120(f). The exam must be performed by an Occupational Health Physician, who will provide written clearance for hazardous waste Project Area work and for respirator usage. Protocols for the baseline, periodic, and exit exams must be at least as stringent as those defined in the AMEC Medical Surveillance Program, Volume III of the CHSM.

Emergency Medical Treatment

Personnel who exhibit signs and symptoms of chemical or heat overexposure, or who have been injured on the job, also might seek medical services. See the Medical Emergency Response (Section 9.3) for specific information regarding emergency services and logs, reports, record keeping, and Section 3.1.5 (Logs, Reports, and Record-Keeping) for required report submittals.

Medical Clearance Record Keeping

Medical clearance documents are on file at the AMEC offices located in Clifton Park, New York, Portland, Maine, and Chelmsford, Massachusetts as well as with our Corporate Loss Prevention Manager in Minneapolis, MN. To ensure confidentiality, results of the medical exams, records are maintained at the Medical Care Provider's clinical offices.

3.1.2 Training

Comprehensive

All routine on-site general Project Area workers having the potential to receive exposures exceeding permissible limits will have completed the OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training. Three days of on-site supervised training must be completed upon initial assignment. Appropriate annual refresher (within 12 months) updates must be completed by all HAZWOPER personnel. Supervisors will have completed the above and an additional 8 hours of OSHA Management and Supervisory Training.

Occasional Project Area workers who are not expected to receive exposures exceeding permissible exposure limits require only 24 hours of OSHA HAZWOPER Training and 1 day of on-site training and supervision.

First Aid/CPR Instruction

Completed training in first aid/cardiopulmonary resuscitation (CPR) is required for AMEC field staff working at the Project Area.

Specialized

Prior to initiation of Project Area activities, the SHSC and PM/FM will conduct a health and safety "kickoff" meeting. Subcontractor representatives including Subcontractor's Safety Coordinator/Competent person are required to participate. At this meeting, pertinent Lockheed Martin SOPs, AMEC SOPs of the CHSM and the SSHP will be discussed, with special attention given to Project Area chemical and physical hazards, PPE, and emergency procedures. Upon completion of this briefing, all routine AMEC field personnel will be required to read and sign the acceptance sheet of this SSHP (Section 8).

Project Area visitors who do not attend this meeting will be required to undergo a specialized health and safety orientation, as documented in the field notebook.

Daily

Tailgate Safety Meetings

Tailgate safety meetings will be conducted each day or for all major changes of work tasks or conditions by the PM/FM, SHSC, or a rotation of AMEC and subcontractor team members. Topics of discussion will include work tasks and designated PPE, emergency procedures, evacuation routes, instruction in use of safety equipment (as required), prior safety problems, recognition of signs and symptoms of overexposure, importance of proper decontamination, and personal hygiene. These meetings must be documented in the field notebook or Tailgate Safety Meeting Checklist (Appendix 6).

Safety Inspections

All project sites and equipment including but not limited by any type of field and construction work will be inspected DAILY by the responsible subcontractor. All deficiencies discovered will be reported to AMEC immediately.

Safety Check in/Check Out and Lone Worker Device

Field staff will check in with the Project Scientist, PM, Project Chemist or member of Management Team (in that order of preference) when arriving and departing site. You must speak directly with one of these individuals. Priority should be given to perform check in/check out with the same individual unless not possible

Fire Extinguisher Usage

In accordance with 29 CFR 1910.157, all field personnel who are provided portable fire extinguishers for use should be familiar with general principles of use and the hazards of incipient (early stage) firefighting. AMEC personnel who have completed fire extinguisher training within the past year are permitted to use fire extinguisher at the Site. Fire extinguishers are stored in the OU1 and OU2 facilities.

DOT Hazardous Materials Shipment/Receipt (HM 126F)

In accordance with 49 CFR 172, Department of Transportation (DOT) HM126F training is required for all employees who handle, transport, or prepare to transport hazardous materials.

Equipment Operators

In accordance with state and federal OSHA regulations, operators of all heavy equipment (e.g., crane) must be trained for safe equipment operation. Proof of documentation will be requested by AMEC.

Training for Subcontractors

All personnel including subcontractors requiring access to controlled work areas must have completed the training and medical administrative control requirements. PM or appropriate task managers should review and approve their special training programs (confined-space entry, lockout/tagout, and fall protection).

3.1.3 Accident Prevention

The SHSC as well as all Site employees will inspect the work Site and/or Project Area daily to identify and correct any unsafe conditions. AMEC field personnel and subcontractors should inspect work area thoroughly before leaving the Site. Adherence to the Safe Work Practices (Section 3.1.4) and procedures outlined in this SSHP will assist with accident prevention.

3.1.4 Safe Work Practices

Personal Conduct

- Unauthorized personnel are not allowed on the project Site; the entire Site is considered an Exclusion Zone (EZ).
- A high standard of personal hygiene will be observed. Smoking, eating, drinking, chewing gum or tobacco, taking medication, and applying cosmetics will not be permitted within any restricted area or EZ.
- Personnel under the obvious influence of alcohol or controlled substances are not allowed in the Project Area; those taking medications must notify the SHSC.
- All Project Area personnel will familiarize themselves with these practices and the emergency procedures during daily tailgate and pre-work safety meetings.
- Workers who are passengers or drivers of vehicles (both in and out of the Project Area) will wear their seat belts any time the vehicle is in motion.
- No cellular phone use while driving is permitted.
- Field personnel will check in/check out with Project Scientist, PM, Project Chemist or member of Management Team (in that order of preference) when arriving and departing site. You must speak directly with one of these individuals. Priority should be given to perform

check in/check out with the same individual, unless not possible, immediately after arriving and departing the Site.

Personal Protection

- Personnel will avoid skin contact with contaminated or potentially contaminated media. If such contact occurs, the affected areas should be washed thoroughly with soap and water.
- Personnel will discard and replace any damaged or heavily-soiled protective clothing.
- Personnel should notify the SHSC of any defective monitoring, emergency, or other protective/safety equipment.
- A supply of potable water and electrolyte replacement solutions should be brought to the site. Equipment and Activities
- Owners/operators of heavy equipment will ensure that the equipment is in good working order by performing daily inspections and routine maintenance. Deficiencies affecting health and safety shall be corrected prior to equipment use.
- All unsafe conditions shall be corrected immediately. All unsafe conditions not in the scope of the project shall be reported to the PM/FM and the condition corrected.
- Loose-fitting clothing and loose long hair are prohibited near moving machinery.
- All internal combustion engines must have spark arrestors that meet the requirements for hazardous atmospheres if they are to be used in such areas.
- Do not fuel engines while vehicle is running.
- Where portable electric tools and appliances can be used (where there is no potential for flammable or explosive conditions), they will be equipped only with 3-wire grounded power and extension cords to prevent electrical shock. Use a ground fault circuit interrupter (GFCI) to prevent electrical shock.
- Store tools in clean, secure areas so they will not be damaged, lost, or stolen.
- When exiting a vehicle, shift into park, set the parking brake, and shut off the engine. Never leave a running vehicle UNATTENDED.

3.1.5 Logs, Reports, and Record Keeping

Submittal of Certifications

All AMEC employees' certificates are on file with their home AMEC offices. Field projects will not be allowed to take place in the absence of adequate documentation.

Site Monitoring, Reports, and Records

The health and safety field files maintained by the SHSC, or his/her designee, will be the primary form of record keeping and documentation of site health and safety activities. These documents

will be completed in sufficient detail to document the work performed; any unusual or significant circumstances under which the work was performed; any unanticipated/unplanned action taken to mitigate or to otherwise cope with unexpected field conditions; and pertinent comments about site-specific conditions that could have a bearing on the work performed. Documentation is required for all phases of work. See also the SHSC duties listed under Section 1.6, Personnel Responsibilities. Record keeping practices will follow 29 CFR 1910.20.

The health and safety records will contain the following documents:

- Signed acceptance sheet of this SSHP (signed by all routine on-Site personnel, Section 10.0)
- Confined Space Checklist (Appendix 5) (when completed)
- Confined Space Permit (Appendix 5) (when completed)
- Incident Analysis Report (Appendix 6)
- Near Miss Report (Appendix 6)
- Lockout/Tagout Log (Appendix 6)
- Daily Tailgate Meeting Checklist (Appendix 6)

Blank forms are provided in Section 10 and Appendix 5 of this SSHP. Daily tailgate meetings and additional health and safety meetings conducted at the Site for this project should be recorded in your field notebook or Tailgate Safety Meeting Checklist (Appendix 6).

3.2 ENGINEERING CONTROLS

3.2.1 Traffic Control

Traffic control measures will be implemented during work at the OU1 and OU2 Sites during OMM activities to assure that AMEC and its subcontractors travel safely while on the project Site and with minimal disturbance to Site tenants and neighbors.

The following traffic control measures will be implemented:

- Routine traffic in and out of the Site will generally occur on weekdays of Monday through Friday, between the hours of 7 a.m. and 6 p.m. At the site, truck deliveries outside these standard times may occur only with AMEC's prior authorization.
- All posted speed limits will be observed and complied with.

3.2.2 Barriers

Barriers and Signs

Barricades, traffic cones, and/or marking or caution tape will be erected at a safe distance from hazardous areas and moving equipment to prevent unauthorized access to work areas from vehicular and pedestrian traffic. Barriers will be appropriate for the level of work activities and anticipated traffic. Permitted confined spaces shall be clearly identified as such with appropriate signage.

3.2.3 Noise Reduction

Site activities in proximity to blowers, generators, pumps, and heavy equipment often expose workers to excessive noise. It is anticipated that situations may arise when noise levels may exceed the OSHA Action Level of 85 decibels (A-weighted scale) (dBA) in an 8-hour time-weighted average (TWA). If excessive noise levels occur, ear plugs with appropriate the Noise Reduction Ratings will be issued to all personnel and a system of hand signals understood by all will be implemented (see Section 4.4).

3.3 PERSONAL PROTECTIVE EQUIPMENT

3.3.1 Levels of Protection

Initial levels of protection for the Project Area may vary depending upon the task. All personnel entering controlled work zones will initially be required to wear the (USEPA)/OSHA Level of Protection as specified in the task specific AHA, Appendix 4.

Protection may be upgraded or downgraded depending upon monitoring data (compared with action levels) and Project Area conditions, as determined by the SHSC. The following outlines the minimum guidelines for each level of protection that is assigned or potentially assigned.

Level D PPE

- Work shirt and full-length pants or coveralls
- Outer Nitrile gloves and inner nitrile gloves
- American National Standards Institute (ANSI) standard safety-toe work boots
- ANSI standard hard hat (when working around heavy equipment or overhead “bump” hazards)

- ANSI standard safety glasses
- ANSI standard hearing protectors (when working in high noise areas, e.g., steam cleaners and heavy equipment)

Modified Level D PPE

- Level D equipment
- Tyvek® coverall or equivalent (upgrade to polyethylene [PE] or Saranex-coated Tyvek® as needed)
- Outer Nitrile gloves and inner nitrile gloves
- Boot covers or chemical-resistant boots

Level C PPE

- Modified Level D equipment, with taping of coverall to boots and gloves, as necessary
- National Institute for Occupational Safety and Health (NIOSH)-approved, half-face or full face air-purifying respirator with organic vapor/acid gas cartridges and particulate prefilters (P100 [respirator usage clearance is defined in SOP H-13, Respiratory Protection, Volume VI of the CHSM])

3.3.2 Chemical Cartridge Replacement Schedule

Based upon OSHA requirements and manufacturer recommendations, acid gas and organic vapor cartridges used with the air purifying respirator (e.g., MSA GMC with P100 filters) will be changed out daily. Contact the EGHSEM if respiratory protection is to be worn for Level C action limits. The used cartridges will be disposed of as part of the project investigation-derived waste (IDW).

3.3.3 PPE Donning/Doffing Procedure

The following procedures are given as a guide. Failure to adhere to these procedures may result in the PPE being ineffective against contaminants. These procedures may be altered by the SHSC if improvements can be made and these changes are warranted in the field. Also, some articles of PPE may not be necessary for all Project Area tasks.

PPE Donning Procedure (for Mod. Level D and greater)

- Inspect all protective gear before donning.
- Don Tyvek® coverall or equivalent, inner gloves and outer gloves, secure with tape, as required, leave pull tab. If coverall is loose, secure with tape to avoid capture in moving or rotating equipment.

- Don respirator. If not in Level C, maintain respirator in a sealed plastic bag at the Project Area in case of an upgrade.

PPE Doffing Procedure (see also SOP H-6, Personnel Decontamination, Volume VI, CHSM)

- Wash/rinse (if necessary) excess mud or other debris from outer boots, gloves, and clothing.
- Remove tape using pull tab and remove outer clothing in the order of boots, outer gloves, and coverall suits. Place disposable and reusable PPE in designated (separate) containers.
- Remove respirator (if applicable). Decontaminate and fit-check prior to reuse.
- Remove inner gloves.
- Wash face, neck, and hands.

3.3.4 PPE Failure/Chemical Exposure

In the event of PPE failure, worker and/or buddy will cease work, perform personal decontamination procedures, and exit to the support zone (SZ). Refer to the SDS and Section 7.0 (Emergency Actions) if emergency medical response is needed. If chemicals contact the eyes, irrigate for 15 minutes and consult a physician.

3.3.5 PPE Inspection, Storage, and Maintenance

Reusable PPE will be decontaminated, inspected, and maintained, as necessary, after each use. Personal equipment (e.g., respirators, leather safety-toe boots) shall be properly stored by the employee/subcontractor.

The SHSC will periodically inventory the disposable and reusable PPE at the Project Area and will replenish stocks in a timely manner.

4.0 PROJECT AREA CONTROL

4.1 PROJECT AREA SECURITY

Access will be limited to all controlled areas via the prescribed administrative (certifications) and engineering (barricades) controls. All Project Area staff and visitors will note arrival and departure times on a field log by SHSC. All equipment, tools, and property shall be secured at the end of each day.

4.2 VISITOR ACCESS

All Project Area visitors (except OSHA inspectors) must receive prior approval from the FM, PM, and Client, and may do so only for the purposes of observing Project Area conditions or operations. All visitors, regardless of their rank or professional level, will not be allowed into controlled work areas unless training and medical requirements have been met and documented.

4.3 WORK ZONES

Support Zone (SZ)

The SZ consists of the parking areas around the OU1 and OU2 treatment areas.

Exclusion Zone (EZ)

The EZ is defined around the immediate hazard area. The EZ consists of the OU1 and OU2 treatment areas, extraction and diffusion well sites, and monitoring well sites. The entire Site is controlled access and only authorized and certified personnel should be allowed on Site.

4.4 COMMUNICATIONS

When two or more field personnel are on site, the “buddy system” will be used during field activities involving potential exposure to hazardous or toxic materials, high risk tasks (e.g. confined space entry or when respiratory protection is used) and during any work within the EZ. Each person will observe his/her buddy for symptoms of chemical or heat overexposure and will provide first aid or emergency assistance when warranted. A mobile phone will be maintained at the Project Area for emergency use.

Table 4-1 identifies emergency hand and horn signals will be used as necessary where verbal communication is limited.

Table 4-1 — Emergency Hand and Horn Signals

Thumbs up	=	OK; understand
Thumbs down	=	No; negative
Grasping buddy's wrist	=	Leave Project Area now
Hands on top of head	=	Need assistance
Horn - one long blast	=	Evacuate Project Area
Horn - two short blasts	=	All clear, return to Project Area

5.0 AIR SURVEILLANCE

5.1 TYPE AND FREQUENCY OF MONITORING

Table 5-1 outlines the recommended frequency of air surveillance monitoring for all other work activities in an EZ.

Table 5-1 — Minimum Recommended Monitoring Frequencies

Type	Minimum Recommended Monitoring Frequency
Background:	Once per day in the work area and perimeter using direct-reading instruments, prior to any intrusive activities or equipment startup.
Perimeter:	At least twice per day using direct-reading instruments during intrusive activities.
Personnel:	At least twice per day in the breathing zone (BZ) of those with the highest anticipated exposure during intrusive activities.
Area:	At least twice per day in each work zone and at the onset of any new intrusive activities, or at new locations.
Environmental:	Periodic field-screening of selected samples per the Field Sampling Plan (FSP).

5.2 MONITORING INSTRUMENTS

The SHSC will maintain instrument manuals that specify calibration, general use, and troubleshooting procedures. All monitoring equipment will be field calibrated on a daily basis according to the manufacturer's instructions and will be recorded on the field notebook. Monitoring instruments and action levels are presented on Table 5-2.

Table 5-2 — Monitoring Instruments and Action Levels

Equipment	Contaminant	Work Activity	Action Level
PID (10.6 eV lamp)	VOCs	In confined space or when initially accessing a well; Periodic (5-minute intervals), if necessary, based on initial reading Confined space entry:	VOCs ≥ 9ppm

5.3 ACTION LEVELS

Action levels will be established for upgrading/downgrading PPE, work stoppages, and evacuation (see Appendix 7 for Justification of Action Levels calculations). The decision to upgrade/downgrade the level of PPE must be based upon instrument readings measured in the BZ

of Project Area personnel and comparison of the results to the information contained in Appendix 8. Record readings of multi-gas meters in the field notebook. Any work requiring level C or B PPE will require approval of the PM and office HSE Coordinator.

5.4 COMMUNITY AIR MONITORING PLAN (CAMP)

A community air monitoring plan (CAMP) in accordance with DER-10 will be implemented at the site. The CAMP requires real-time monitoring for VOCs and particulates (i.e., dust) at the downwind perimeter of each work area when certain intrusive activities (boring advancement, soil handling, and back filling) are in progress, on a periodic or continuous (15- minute) basis. The purpose of this work plan is to protect any downwind communities, including residences and businesses, from potential airborne contaminant releases and nuisance dust.

VOC and dust emission readings will be recorded by an Amec employee on site. Weekly CAMP monitoring reports will be submitted to NYSDEC.

5.4.1 VOC Monitoring

Wind direction will be assessed with a weather station and the location of upwind and downwind monitoring locations will be recorded on a map daily. VOCs will be monitored at both the upwind and downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive activity and soil excavation/handling. A third monitoring unit will be located in the direction of the nearest residence or sensitive receptor (i.e. daycare, school); whichever is closer. The monitoring work will be performed using equipment appropriate to measure the contaminants known or suspected to be present (MultiRAE PLUS with a photoionization detector (PID) with a 10.6 eV lamp or equivalent model). The equipment will be calibrated on daily basis prior to start of the field work as needed. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background (upwind) for the 15-minute average, work activities will be temporarily halted and monitoring will continue. When the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background (upwind), work activities can resume with continued monitoring.

If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background (upwind) but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level at the downwind perimeter of the work area or exclusion zone is below 5 ppm over background (upwind) for the 15-minute average. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less—but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down until the problem is evaluated and resolved.

5.4.2 Particulate Monitoring

Air monitoring for particulates (i.e., dust) will be performed continuously during intrusive and soil excavation/handling activities. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. Particulates will be measured using DustTrack II or equivalent model. The particulate monitoring equipment will be calibrated at the start of each day as necessary. A third monitoring unit will be located in the direction of the nearest residence or sensitive receptor (i.e. daycare, school); whichever is closer. Depending upon daily wind direction, upwind (background) and downwind dust monitors will be set up at approximately 4 to 5 feet above ground surface (i.e., breathing zone). The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

If after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 ug/m3 above the upwind level, work will be stopped and a re- evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

5.4.3 CAMP Reporting

Amec will provide the NYSDOH Project Manager with a weekly CAMP monitoring report (via email). The CAMP report will include a site figure depicting work areas; wind direction; location of CAMP stations and data. Any exceedances and Corrective Actions taken will be communicated to the DEC and DOH Project Mangers within one business day.

6.0 DECONTAMINATION PROCEDURES

Procedures for the decontamination of sampling tools and other related equipment are specified in the sampling plan.

6.1 PERSONNEL DECONTAMINATION

Personnel decontamination equipment and procedures are presented on Table 6-1.

Table 6-1 — Personnel Decontamination Equipment and Procedures

Equipment	Decontamination Solution	Procedures	
		Intermediate	Final
Long-handled, soft-bristled brushes Galvanized wash tubs or equivalent Pump-activated sprayer Garbage cans with plastic liners and drums with liners Plastic Sheeting Paper towels Duct tape	Alconox Tap water for rinsing	Dispose of or wash outer boot and glove with Alconox solution. Rinse outer boot and glove. Remove outer glove and store for later use. Enter TZ for sample management. Return to EZ wearing new or cleaned outer gloves.	Dispose of or wash outer boot and glove with Alconox solution. Rinse outer boot and glove. Remove and dispose of outer boots. Remove and dispose of outer gloves (if not cleaned to “like new” condition). Remove and dispose of coverall, if worn. Remove and dispose of inner gloves in designated receptacle. Field wash for personal hygiene. Exit to SZ.

Note: Intermediate decontamination is for periodic exits from the EZ during sample transport and management, or for short breaks. Final decontamination is performed before lunch, when taking cool down breaks, and when exiting the Project Area.

6.2 EQUIPMENT DECONTAMINATION

All equipment that will potentially contact samples will be decontaminated prior to, and following, sampling events according to procedures specified in the FSP. Temporary decontamination stations (bucket wash) will be located near work areas and will be positioned upwind or crosswind of operations.

6.3 EMERGENCY DECONTAMINATION

In the event of an accident or incident where work must cease and staff must exit the EZ, emergency decontamination should be performed to the greatest extent feasible. In an emergency, the primary concern is to prevent the loss of life or severe injury. If immediate medical attention is required to

save a life, decontamination should be delayed until the victim is stabilized. If the decontamination can be performed without interfering with essential life-saving techniques or first aid, or if a worker has been contaminated with an extremely toxic or corrosive material that could cause severe illness or loss of life, decontamination must be performed immediately. If an emergency due to a heat-related illness develops, protective equipment should be removed carefully from the victim as soon as possible.

Any time emergency decontamination methods must be used, an Incident Analysis Report (see Appendix 6) must be completed by the SHSC and submitted to the EGHSEM.

6.4 DISPOSAL PROCEDURES

All discarded materials that accumulate from Project Area activities (e.g., PPE, decontamination fluids, supplies, etc.) will be segregated by matrix and by source location and placed in labeled, DOT-approved, 55-gallon drums, and stored in a secure, designated location. Analytical results will be evaluated prior to disposal. All IDW will be handled, labeled, stored, inventoried, and disposed of in accordance with the procedures outlined in the Waste Management Plan, SOP or other appropriate document.

7.0 EMERGENCY ACTIONS

7.1 PREPLANNING AND GENERAL PROCEDURES

7.1.1 General Emergency Information

Project Area personnel should be constantly alert to recognize potentially unsafe work practices, hazardous work environments, and conditions that are immediately dangerous to life or health (IDLH), and they should be routinely reminded of signs and symptoms of chemical and heat overexposure. Emergency response procedures (this section) should be reviewed daily and updated, as necessary, following incidents. Prearrange access for emergency crews when necessary.

In the event of a large-scale spill, fire/explosion, or major emergency, the FM is expected to notify the PM; the PM notifies the Client, evacuates the area, and lets appropriately-trained emergency staff respond to the situation. The safety and well-being of Project Area personnel, visitors, and the adjacent community will be of utmost importance in determining the appropriate response to a given emergency. AMEC provides general employee training for Emergency Action and Fire Prevention in accordance with OSHA 29 CFR 1910.38.

7.1.2 Emergency Coordinator (EC)

The PM or FM will serve as the Emergency Coordinator (EC) during an actual emergency response situation. The PM or FM will serve as the primary EC at all times; first aid and rescue duties are shared between the first aid/CPR trained team members. A first aid kit should be stored at the Project Area in an accessible area. The EC will contact off-site emergency response agencies and will serve as the main spokesperson when the responders arrive at the Project Area.

7.1.3 Emergency Decontamination

For first aid of non-life-threatening injuries, evacuate to decontamination line and decontaminate as much as possible or practical; contaminated clothing should be removed. For life-threatening injuries/exposures, field decontaminate as much as possible for the person's own safety, wrap in a blanket or polyethylene sheeting, and immediately transport to the designated medical facility. Also, phone ahead and bring this SSHP for informational purposes and SDS access by medical staff.

7.1.4 Safe Refuge Area

The safe refuge area is a site-specific area determined by the EC and discussed in the tail-gate meeting at the beginning of the project and periodically once on-site. It will be set up in the SZ or at an off-site location in the event of a Project Area-wide evacuation. This area will be upwind, and the location and escape routes will be designated on Project Area control maps. It will contain emergency equipment, escape route maps, communications, and the Emergency Reference (call) List. This is required for all phases of work. In an emergency, the EC (PM or FM) will take a "head count" against the field notebook, initiate search/account for missing persons, notify the emergency crews (as applicable), and limit access into the hazardous emergency area to necessary rescue and response personnel in order to prevent additional injuries and possible exposures.

7.1.5 Emergency Equipment

Emergency equipment will be maintained in a field vehicle (V), in the SZ, with the exception of items marked by an asterisk that will be kept in the EZ. All items must be checked and maintained by the SHSC at least weekly and after each use. Table 7-1 identifies the types of emergency equipment to be used and their locations.

Table 7-1 — Emergency Equipment and Location

☒ First Aid Kit, V/EZ	☒ Fire Extinguisher	☒ Field Showers, FS or V
☐ SCBA, V/FS	☐ Escape Packs	☐ Alarms
☒ Spill Equipment, EZ	☒ Mobile or Cellular Phone, V/FS	☐ Fire Blanket
☐ Other:	☒ Hospital Route Map, V/FS	☒ Eyewash station

7.1.6 Evacuation Procedures

Expeditious evacuation routes to the Safe Refuge Area(s) will be established daily for all work area locations, with respect to the wind direction. Evacuation notification will be a continuous blast on a canned siren, vehicle horn, or direct verbal communication. Emergency drills should be performed periodically. Any additions to evacuation procedures require an update to this SSHP.

In the unlikely event that an evacuation is necessary, all personnel will immediately proceed to the predetermined Safe Refuge Area, decontaminating to the extent possible for personal safety, based on the emergency. The EC should then begin the Project Area security and control measures.

7.2 SITE-SPECIFIC RESPONSE SCENARIOS

Sections 7.2.1 through 7.2.3 describe weather-related emergencies, hazardous spills and/or discharges, and fire/explosion, respectively.

7.2.1 Weather-Related Emergencies

Exterior work will cease should any of the following weather conditions arise:

- Poor visibility
- Precipitation severe enough to impair safe movement/travel
- Lightning in the immediate area
- Excessive winds
- Other conditions as determined by the SHSC, PM, or FM

7.2.2 Spill and/or Discharge of Hazardous Materials

Training

Responses to incidental releases or spills of hazardous substances that can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area are not considered to be emergency responses under 29 CFR 1910.120(l) and do not require additional specialized training.

Spill Control and Response

In case of incidental spills or leaks, follow these steps:

1. Notify the SHSC and/or FM as soon as possible;
2. Select appropriate PPE and response equipment;
3. Contain the spill to the extent possible;
4. Neutralize or solidify the liquid per the SDS (Appendix 9);
5. Transfer the material to an appropriate compatible container;
6. Document with an Incident Analysis Report (see Appendix 6);
7. PM or FM will notify the Client.

7.2.3 Fire or Explosion

Sound the emergency alarm (continuous blast on a canned siren, vehicle horn, or direct oral communication) to summon the SHSC or EC, who then will decide whether to call the Fire Department for outside assistance. Small-scale fires (less than one-half of the responder's height) should be extinguished with an accessible ABC fire extinguisher by any team member who has received training within the past year. Trained emergency crews will be summoned to control any large-scale or potentially unmanageable incident. Any off-site responding agencies will be given the Site Layout Map (Figure 1-2) and briefed about site-specific hazards so they can be optimally helpful in an emergency situation. The SHSC or EC will evacuate all non-response personnel and visitors to the Safe Refuge Area; will notify the PM, as applicable, the Client, and the AMEC EGHSEM (see call list); and will complete the appropriate reports.

7.3 MEDICAL EMERGENCY RESPONSE

7.3.1 Hospital

In the event of a serious injury or an accident that occurs after hours, transport the victim to the North Shore University Hospital at 300 Community Drive, Manhasset, NY 11030.

Contact WorkCare first if not a medical emergency.

Figure 7-1 shows the hospital route from OU1. Figure 7-2 shows the hospital route from OU2.

Site Personnel Response Actions

Sound the emergency alarm (continuous blast on vehicle horn, or direct verbal communication) to summon the ECs who will assess the situation, first taking necessary precautions for personal safety. The EC will implement the AMEC Early Case Management Program.

The ECs will determine whether to transport the injured party to the North Shore University Hospital, or summon an ambulance by calling 911. The Project Area control measures will be implemented. Any off-site responding agencies will be informed about the site-specific hazards so they can be optimally helpful in an emergency situation.

The EC will direct the responding employees to follow the Emergency Decontamination procedures described in Section 6.3 and to provide first aid to the extent possible while awaiting medical

attention. In emergencies, the injuries and illnesses that may arise will vary from incident to incident; check Appendices 2 and 3 and the SDSs or contact the Poison Control Center for emergency first aid procedures. Medical treatment may range from bandaging of minor cuts and abrasions to lifesaving techniques; therefore, first aid/CPR training is required for all AMEC field staff. The SHSC will serve as the primary caregiver, but these duties are shared between qualified team members. It is essential that all Project Area personnel in need of emergency care receive treatment. Appropriate documentation and notification will be discussed later in this section.

7.3.2 Bloodborne Pathogen Exposure Control

Bloodborne pathogen exposure control procedures include exposure determination, and exposure control, summarized below.

Exposure Determination

First aid responders have the potential to be exposed to bloodborne pathogens. The potential for exposure to bloodborne pathogens outside of emergency response is not anticipated.

Exposure Control: Universal Precautions

Use the Center for Disease Control "Universal Precautions" as an approach to infection control, which assumes that all human blood and certain human body fluids are treated as if known to be infectious for Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and other bloodborne pathogens.

Exposure Control: Personal Protection Equipment

While rendering first aid where exposure to blood may occur, AMEC employees will don, at a minimum, blue nitrile gloves, or any chemical protective gloves available a the site, and safety glasses. Gloves will be available in the field first aid kit in a packet or are usually a part of the field sampling materials. Other suggested PPE in the event of a serious blood-producing injury includes Tyvek® coveralls, and nitrile outer gloves - all of which should be available in a field sampling kit. In addition, a disposable, one-way CPR mask to prevent direct contact between the rescuer and recipient also will be available in the first aid kit should the need arise.

Exposure Control: Personal Hygiene

A hand-washing facility must be present in the event of bloodborne pathogen exposure. Basins or buckets, water, soap (alconox), and paper towels are usually available in a field sampling kit.

Exposure Control: Hepatitis B Vaccination

First aid providers to job site injuries do not need to receive a pre-exposure HBV vaccine but are encouraged to do so. All first aid providers assisting in any exposure incident must be offered the full HBV immunization series no later than 24 hours after an incident.

Exposure Control: Exposure Incident Evaluation

All first aid incidents involving exposures must be reported to the EGHSEM before the end of the work shift in which the incident occurs. An Incident Analysis Report (see Appendix 6) must be completed describing the circumstances of the accident and response. Following a report of an exposure incident, AMEC shall provide to the exposed employee monitoring for HIV or HBV antibodies and medical counseling in cases of positive tests for HIV or HBV.

Exposure Control: Waste Disposal

Should biohazardous waste be generated as a result of a field-related injury, the "contaminated" waste and area will be cleaned to the extent possible with items provided in the packet, and arrangements for the pickup and final disposal of the waste will be made.

Exposure Control: HBV Vaccination Declination

For whatever reason (religious, personal, or otherwise), employees may decline or refuse the HBV vaccination by contacting the EGHSEM. In instances where the vaccination is required, the employee will be required to sign a HBV Vaccination Declination waiver (contact AMEC the EGHSEM for details) indicating that the employee has chosen at that time to refuse the vaccination, but may elect to receive it in the future at no expense to him/her.

7.4 ACCIDENT REPORTING AND RECORD KEEPING

At the onset of an employee work-related injury or illness the AMEC employees should notify the supervisor on duty. The employee is required to report all work-related injuries; plus all non-work related injuries that may affect his/her ability to safely perform their job. The injured/ill employee,

along with the supervisor on duty, should then implement the AMEC Early Case Management Program (see Table 7-2).

If the emergency involves an injury to an AMEC employee, the HSE Coordinator or Field Lead are to implement the AMEC Early Injury Case Management program. See procedures below:

Table 7-2 — AMEC Early Injury Case Management Program

<table>
<tr><th>NON-EMERGENCY INCIDENT</th><th>EMERGENCY INCIDENT</th></tr>
<tr><td>Steps 1 & 2 must be completed before seeking medical attention other than local first aid.

1. Provide first-aid as necessary. Report the situation to your immediate supervisor AND HSE coordinator (all incidents with the apparent starting event should be reported within 1 hour of occurrence).
2. Injured employee:</td><td>1. Provide emergency first aid. Supervisor on duty must immediately call 911 or local emergency number; no employee may respond to outside queries without prior authorization. Any outside media calls concerning this incident must be referred immediately to Lauren Gallagher at 602-757-3211.
2. Once medical attention is sought and provided, the supervisor must:</td></tr>
<tr><td colspan="2">Call WorkCare 24/7 Hotline* (888) II-XPRTS or (888) 449-7787</td></tr>
<tr><td>WorkCare will assess the situation and determine whether the incident requires further medical attention. During this process, WorkCare will perform the following:

• Explain the process to the caller.
• Determine the nature of the concern.
• Provide appropriate medical advice to the caller.
• Determine appropriate path forward with the caller.
• Maintain appropriate medical confidentiality.
• Help caller to execute path forward, including referral to the appropriate local medical facility.
• Send an email notification to the Corporate HSE Department.</td><td>WorkCare will be responsible for performing the following:

• Contact the treating physician.
• Request copies of all medical records from clinic.
• Send an email update to the Corporate HSE Department.</td></tr>
<tr><td colspan="2">3. IMMEDIATELY after contacting WorkCare send a brief email notification AND inform verbally (direct contact is required) ONE of HSE corporate representatives.
4. Make all other local notifications and client notifications.
5. Local Supervisor, HSE Coordinator, SSHO and any applicable safety committees to complete preliminary investigation, along with the initial Incident Report within 24 hours.
6. Corporate Loss Prevention Manager to complete Worker’s Compensation Insurance notifications as needed.
7. Corporate HSE to conduct further incident notifications, investigation, include in statistics, classify, and develop lessons learned materials.

* - NOTE: Step 2 is only applicable to the North-American operations and to incidents involving AMEC personnel. High potential near misses, subcontractors’ incidents, regulatory inspections, spills and property damages above $1,000 should be reported immediately, following directions from Step 3.</td></tr>
</table>

After the initial accident report to supervisor and WorkCare Care Management Team, the SHSC or other designated AMEC employee will immediately contact the immediately contact the PM, Supervisor, Unit Manager or office HSE Coordinator and conduct an investigation jointly with the PM or FM. The FM or PM will complete the Incident Analysis Report (Appendix 6). These completed reports must be transmitted to the EGHSEM within 24 hours of an occurrence; a fax is acceptable. The EGHSEM will submit the appropriate reports to the VP-HSE and company Loss Prevention Manager. The supervisor, unit manager, or HSE Coordinator (office or site) will verbally inform (directly contact, not voice mail, is required) ONE of the AMEC individuals listed on Figure 7-3 within two hours of the incident.

All near miss incidents will be reported in the Near Miss Database. The Loss Prevention Manager will ensure that the Worker's Compensation Insurance carrier is notified, and EGHSEM will conduct further incident investigation and develop internal communications.

The foreman or field supervisor of subcontracting crews will investigate and complete an injury/illness report (similar in content to the AMEC report) in accordance with their internal company policy. This report must be transmitted to the AMEC EGHSEM within 24 hours.

In case of environmental incidents, property damage, power disruption, or mandated work "shutdowns," an Incident Analysis Report (Appendix 6) will be prepared by the FM or PM. Any damage, loss, or theft of AMEC property (items/tools/equipment) will be reported to the PM or FM and an Incident Analysis Report completed as well.

Any release of information in these reports to unauthorized persons or agencies is prohibited unless it is first approved by the client. Certain agencies or persons, such as OSHA or OSHA Compliance Officers, can request this information and its release will be permitted. Review the Emergency Call List for additional contact names and phone numbers.

8.0 AMEC EMPLOYEE HEALTH AND SAFETY PLAN ACCEPTANCE

I have had access to the SSHP and opportunity to ask questions about this SSHP. I have received site-specific information and orientation regarding the identified hazards anticipated at the project sites. My signature certifies that I understand the procedures, equipment, and restrictions of this plan and agree to abide by them.

SIGNATURE*	PRINTED NAME	COMPANY	DATE

* This acceptance form is required for all routine Project Area staff.

9.0 NON-AMEC EMPLOYEE HEALTH AND SAFETY PLAN ACCEPTANCE

I have received site-specific information and orientation regarding HazCom and the identified hazards anticipated at the Project Area during a tailgate meeting by AMEC field personnel and had opportunities to ask questions about health and safety for this project. My signature certifies that I understand the procedures, equipment, and restrictions of this plan and agree to abide by them.

SIGNATURE*	PRINTED NAME	COMPANY	DATE

* This acceptance form is required for all routine subcontracting personnel.

10.0 LIMITATIONS

This Site-Specific Health and Safety Plan (SSHP) was prepared exclusively for the Former Unisys Facility in Great Neck, New York by AMEC E&E PC (AMEC). The quality of information contained herein is consistent with the level of effort involved in AMEC services and based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this SSHP. This SSHP is intended to be used by AMEC personnel providing drilling, sampling and operations/maintenance work only, to the terms and conditions of its contract with AMEC. Any other use of, or reliance on, this SSHP by any third party is at that party's sole risk. The information contained herein are relevant to the Facilities prior the development of this SSHP. The SSHP will be updated periodically as new information is obtained. In the event that changes in the nature, usage, or layout of the property or nearby properties are made, the information contained in this SSHP may not be valid. If additional information becomes available, it should be provided to AMEC so the SSHP can be modified as necessary.

APPENDIX 1 — SITE CHARACTERIZATION

Table 1 — Site Characterization

ANTICIPATED PHYSICAL STATE OF CONTAMINANTS		
☒ Liquid	☐ Sludge	☐ Unknown
☐ Solid	☒ Gas/Vapors	☐ Other
Treated groundwater and soil vapor from SVE system		

MATRIX		
☐ Surface soils	☐ Surface water	☐ Free product
☐ Soils at depth	☒ Groundwater	☒ Other
Treated groundwater and soil vapor from SVE system		

POTENTIAL HAZARDOUS PROPERTIES		
☐ Corrosive	☒ Flammable/Combustible	☐ Radioactive
☒ Toxic	☒ Volatile	☐ Reactive
☐ Inert	☒ Carcinogenic	☐ Unknown
☐ Asphyxiant	☐ Compressed gas	☐ Other
Note:		

CONTAINER/STORAGE SYSTEM INFORMATION		
☒ Tanks	☐ Landfills/Drums	☐ Subsurface
☒ Drums	☐ Impoundments	☐ Uncontainerized
☒ Pipes	☐ Size/Capacity	☐ In-service
☐ Quantity	☐ Surface	☒ Other
Treatment system tanks and pipes/pipelines. Drums containing spent bag filters.		

CONDITION OF CONTAINER/STORAGE SYSTEM (S)		
☒ Sound/Undamaged	☐ Confirmed leaks	☐ Other
☐ Deteriorated/Unsound	☐ Suspected leak	☐ Unknown
Note:		

Table 1 — Site Characterization (Continued)

ORIGIN OR INDUSTRIAL APPLICATION OF CHEMICALS OF CONCERN		
Industrial Process		
☒ Manufacturing	☒ Previously in use	☐ Painting/Coating
☐ Power Generation	☐ Maintenance/Repair	☐ Storage
☐ Quantity	☐ Surface	☐ Other
Former manufacturing site has been converted to light industrial tenants.		

Chemicals Used or Identified		
☐ Acids	☐ Metals	☐ Phenols
☐ Caustics	☐ Pesticides	☐ Paints
☐ Halogen	☐ PCBs	☒ Solvents
☐ Other		

Oils/Fuels		
☐ Fuel oil	☐ AVGAS	☒ Gasoline
☐ Waste oil	☐ Diesel	☐ Leaded
☒ Hydraulic oil	☐ MOGAS	☐ Jet fuel
☐ Other		
Note: Vehicle fuels and treatment plant fluids.		

Sludge		
☐ Metal sludge	☐ Oil sludge	☐ Septic sludge
☒ Other		
Note: May be periodic small quantities of sludges in treatment systems		

Solids		
☐ Asbestos	☐ Sandblast grit	☐ Landfill refuse
☐ Other		
Note:		

APPENDIX 2 — CHEMICAL HAZARD PROPERTIES AND EXPOSURE INFORMATION

Table 2 — Chemical Hazard Properties and Exposure Information

Chemical Name/Synonym	ACGIH® TLV® TWA	Notations	TLV® Basis	OSHA PEL	STEL (ST) or Ceiling	IDLH	IP (eV)	LEL/UEL	Route	Route/Systems** Symptoms
Acids										
Fuels										
Diesel Fuel	100 mg/m^3 (11 ppm)	Animal carcinogen Skin	Derm	None	None	None listed	None	1.1%5.9%	Inh Ing Con	Irrit eyes, nose, throat, dizz, drow, head, nav; dry cracked skin; chem pneu (aspir liq)
TPH (as gasoline)	300 ppm	Animal carcinogen	Irritation; kidney; CNS; reproductive	None	500 ppm	None listed	None listed	1.4%/ 7.6%	Inh Abs Ing Con	Irrit eyes, skin, muc memb; derm; head, ftg, blurred vision, dizz, slurred speech, conf, convuls; chem pneu (aspir); possible liver, kidney damage [carc]
VOC's										
1,1-Dichloroethene (1,1-DCE)	1 ppm	None	Irritation; liver damage; CNS; kidney, lung.	None	None	3,000 ppm	10.00 eV	6.5%/15.5%	Inh, Abs, Ing, Con	Irrit. Eyes, skin, throat; dizz, head, nau, dysp; liver, kidney dist. Pneu
1,2-Dichloroethene (1,2-DCE)	200 ppm	None	Irritation; liver damage; CNS; kidney, lung.	200 ppm	None	1,000 ppm	11.05 eV	5.6%/16%	Inh, Ing, Abs, Con	Irrit eyes, corn opac; CNS depress; nau, vomit; derm; liver, kidney CVS damage
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	1000 ppm	None	Skin, heart, CNS, CVS	1000 ppm	1250 ppm	2,000 ppm	11.99 eV	NA/NA	Inh, Ing. Con	Irrit skin, throat, drow, derm; CNS depress; in animals: card arrhynarco
Trichloroethene	10 ppm	None	Irritation; liver damage; CNS; kidney, lung	100 ppm	25 ppm ACGIH/ 200 ppm ceiling	1,000 ppm	9.69 eV	8%/10.5%	Inh. Ing.	Irrit eyes, skin, nau, vom. derm, vert, fatig, lass, gidd

Chemical Name/Synonym	ACGIH® TLV® TWA	Notations	TLV® Basis	OSHA PEL	STEL (ST) or Ceiling	IDLH	IP (eV)	LEL/UEL	Route	Route/Systems** Symptoms
4,4'-DDT	1.0 mg/m^3	None	Eyes, skin, CNS, kidney, liver, PNS	1.0 mg/m^3		500 mg/m^3	None	NA/NA	Inh, Abs, Ing, Con	Irrit eyes, skin; pares tongue, lips, face; tremor; anx, dizz, conf, mal, head, lass; convuls; paresis hands; vomit
4,4'-DDD	1.0 mg/m^3	None	Eyes, skin, CNS, kidney, liver, PNS	1.0 mg/m^3		500 mg/m^3	None	NA/NA	Inh, Abs, Ing, Con	Irrit eyes, skin; pares tongue, lips, face; tremor; anx, dizz, conf, mal, head, lass; convuls; paresis hands; vomit
4,4'-DDE	1.0 mg/m^3	None	Eyes, skin, CNS, kidney, liver, PNS	1.0 mg/m^3		500 mg/m^3	None	NA/NA	Inh, Abs, Ing, Con	Irrit eyes, skin; pares tongue, lips, face; tremor; anx, dizz, conf, mal, head, lass; convuls; paresis hands; vomit
Benzo(a)anthracene	0.2 mg/m^3	Human Carcinogen	Resp sys, skin, bladder, kidneys	0.2 mg/m^3	None	80 mg/m^3	None	NA/NA	Inh, Con	Derm, bron,
Benzo(a)pyrene	0.2 mg/m^3	Human Carcinogen	Resp sys, skin, bladder, kidneys	0.2 mg/m^3	None	80 mg/m^3	None	NA/NA	Inh, Con	Derm, bron,
Benzo(b)fluoranthene	0.2 mg/m^3	Human Carcinogen	Resp sys, skin, bladder, kidneys	0.2 mg/m^3	None	80 mg/m^3	None	NA/NA	Inh, Con	Derm, bron,
Benzo(k)fluoranthene	0.2 mg/m^3	Human Carcinogen	Resp sys, skin, bladder, kidneys	0.2 mg/m^3	None	80 mg/m^3	None	NA/NA	Inh, Con	Derm, bron,

Chemical Name/Synonym	ACGIH® TLV® TWA	Notations	TLV® Basis	OSHA PEL	STEL (ST) or Ceiling	IDLH	IP (eV)	LEL/UEL	Route	Route/Systems** Symptoms
Chlorodifluoromethane (Freon 22)	1000 ppm	None	Resp Syst, cardio syst, CNS, liver, kidneys, spleen	1000 ppm	1250 ppm	None	12.45 eV	NA/NA	Inh, Con	Irrit resp syst; conf, drows, ringing in ears; heart palp, card arrhy; asphy; liver, kidney, spleen inj
Chrysene	0.2 mg/m^3	Human Carcinogen	Resp sys, skin, bladder, kidneys	0.2 mg/m^3	None	80 mg/m^3	None	NA/NA	Inh, Con	Derm, bron,
Dibenz(a)anthracene	0.2 mg/m^3	Human Carcinogen	Resp sys, skin, bladder, kidneys	0.2 mg/m^3	None	80 mg/m^3	None	NA/NA	Inh, Con	Derm, bron,
Ideno(1,2,3-cd) pyrene	0.2 mg/m^3	Human Carcinogen	Resp sys, skin, bladder, kidneys	0.2 mg/m^3	None	80 mg/m^3	None	NA/NA	Inh, Con	Derm, bron,
Polychlorinated Biphenyls (PCBs)	0.5 mg/m^3	Human Carcinogen	Skin, eyes, liver, reprod system	0.5 mg/m^3	None	5 mg/m^3	None	NA/NA	Inh, Abs, Ing, Con	Irrit eyes, chloracne; liver dam; reprod eff
Tetrachloroethene (PCE)	25 ppm	Human Carcinogen	Eyes, skin, resp system, liver, kidneys, CNS	100 ppm	100 ppm	150 ppm	9.32 eV	NA/NA	Inh, Abs, Ing, Con	Irrit eyes, skin, nose, throat, resp sys; naus; flush face, neck; dizz, incur; headache, drows; skin erythema; liver dam
Toluene	20 ppm	Human Carcinogen	Eyes, skin, resp system, CNS, liver, kidneys	200 ppm	150 ppm	500 ppm	8.82 eV	1.1%/7.1%	Inh, Abs, Ing, Con	Irrit eyes, nose; lass, conf, euph, dizz, head; dil pupils, lacri; anx, mus fat, insom; paressthesia; derm; liver, kidney damage

Chemical Name/Synonym	ACGIH® TLV® TWA	Notations	TLV® Basis	OSHA PEL	STEL (ST) or Ceiling	IDLH	IP (eV)	LEL/UEL	Route	Route/Systems** Symptoms
Vinyl Chloride	1 ppm	Human Carcinogen	Liver, CNS, blood, resp syst, lymp syst	1 ppm	None	None	9.99 eV	3.6%/33.0%	Inh, Con	Lass; abdom pain; gastro bleeding; enlarged liver; pallor or cyanosis of extreme
Gases										
Metals										
Arsenic (inorganic compounds)	0.01 mg/m^3	Human carcinogen	Cancer (lung, skin); lung	0.01 mg/m^3	0.002 mg/m^3 [15 min]	5 mg/m^3	NA	NA/NA	Inh Abs Ing Con	Ulceration of nasal septum, derm, GI disturbances, peri neur, resp irrit, hyperpig of skin, [carc]
Chromium	0.5 mg/m^3	None	Irritation; dermatitis	1.0 mg/m^3	None	250 mg/m^3	NA	NA/NA	Inh Ing Con	Irrit eyes, skin; lung fib, sens derm
Copper	0.2 mg/m^3	None	Eyes, skin, resp system	0.1 mg/m^3	None	100 mg/m^3	NA	NA/NA	Inh, Con	Irrit eyes, upper resp syst; metal fume fever: chills, musc ache, naus, fever, dry throat, cough, lass
Lead	0.05 mg/m^3	Animal carcinogen	CNS; GI; blood; kidney; reproductive	0.05 mg/m^3	None	100 mg/m^3	NA	NA/NA	Inh Ing Con	Weak, lass, insom; facial pallor; pal eye, anor, low-wgt. malnut; constip, abdom pain, colic; anemia; gingival lead line; tremor; para wrist, ankles; encephalopathy; nephropathy; irrit eyes; hypertension

Chemical Name/Synonym	ACGIH® TLV® TWA	Notations	TLV® Basis	OSHA PEL	STEL (ST) or Ceiling	IDLH	IP (eV)	LEL/UEL	Route	Route/Systems** Symptoms
Mercury	0.025 mg/m^3	Skin	CNS; kidney; reproductive	0.1 mg/m^3	0.1 mg/m^3	10 mg/m^3	NA	NA/NA	Inh Abs Ing Con	Irrit eyes, skin; cough, chest pain, dysp, bron pneuitis; tremor, insom, irrity, indecision, head, ftg, weak, stomatitis, salv; GI dist, anor, low-wgt; prot
Nickel	1.5 mg/m^3 0.1 mg/m^3	None	Dermatitis; pneumocon; lung damage; lung and nasal cancer	1 mg/m^3	None	10 mg/m^3	NA	NA/NA	Inh Ing Con	Sens derm, allergic asthma, pneuitis; [carc]
Silver	0.01 mg/m^3	None	Nasal septum, skin, eyes	0.01 mg/m^3	None	10 mg/m^3	NA	NA/NA	Inh, Ing, Con	Blue-gray eyes, nasal septum, throat; irrit, ulcer skin; gastro disturb
Zinc	2 mg/m^3	None	Eyes, skin, resp system	15 mg/m^3	None	None	NA	NA/NA	Inh, Ing, Con	Irrit eyes, skin, upper resp system; cough
Sodium Carbonate	4.7 ppm	None	CNS, cardio system, thyroid, blood	10 ppm	None	50 ppm	13.60 eV	5.6%/40.0%	Inh, Abs, Ing, Con	Asphyxia; lass, headache, conf; naus, vom; thyroid, blood changes
Muriatic Acid	2 ppm	None	Eyes, skin, resp system	5 ppm	7 ppm	50 ppm	12.74 eV	NA/NA	Inh, Ing, Con	Irrit nose, throat, larynx; cough, choke; derm; solution: skin burns; liquid: frostbite
Sodium Hypochlorite	2 mg/m^3	None	Eyes, skin, resp system	2 mg/m^3	2 mg/m^3	None	NA	NA/NA	Inh. Ing. Abs, Con	Irrit eyes, skin; derm burns; irrit resp system; coughing, choke; ulcerations; inflam of eyes, skin

Chemical Name/Synonym	ACGIH® TLV® TWA	Notations	TLV® Basis	OSHA PEL	STEL (ST) or Ceiling	IDLH	IP (eV)	LEL/UEL	Route	Route/Systems** Symptoms
Calcium Hypochlorite	2 mg/m^3	None	Eyes, skin, resp system	2 mg/m^3	2 mg/m^3	None	NA	NA/NA	Inh. Ing. Abs, Con	Irrit eyes, skin; derm burns; irrit resp system; coughing, choke; ulcerations; inflam of eyes, skin
Phosphoric Acid	1 mg/m^3	None	Eyes, skin, resp system	1 mg/m^3	3 mg/m^3	1000 mg/m^3	NA	NA/NA	Inh, Ing, Con	Irrit eyes, skin, upper resp system; eye, skin, burns; dermatitis
Sodium Sulfite	5 mg/m^3	None	Eyes, skin, resp system	None	None	ND	NA	NA/NA	Inh, Ing, Con	Irrit eyes, skin, mucous membrane

Notes:
ACGIH® = American Conference of Governmental Industrial Hygienists
ppm = Parts per million
NE = None established
IP = Ionization potential
TLV® = ACGIH® Threshold Limit Values
OSHA = Occupational Safety and Health Administration
mg/m^3 = Milligrams per cubic meter
TWA = Time weighted average
PEL = OSHA Permissible Exposure Limit
ND = None determined
IDLH = Immediately dangerous to life and health
STEL = Short-term exposure limit
NIOSH = National Institute of Occupational Safety and Health
LEL = Lower explosive limit
TPH = Total petroleum hydrocarbons
PAH = Polyaromatic hydrocarbon
NA = Not applicable
UEL = Upper explosive limit
Sources: The above information was derived from NIOSH Pocket Guide to Chemical Hazards, (September 2005). ACGIH® Threshold Limit Values (2006).

**ROUTE/SYSTEMS ABBREVIATIONS:			
abdom=abdominal	dysfunc=dysfunction	lac=lacrimation	pulm=pulmonary
abdom=abdominal	dysp=dyspnea	lar=laryngeal	RBC=red blood cell
abnor=abnormal/abnormalities	emphy=emphysema	Lass=lassitude (weakness, exhaustion)	Repro=repoductive
album=albuminuria	equi=equilibrium	Leth=lethargy (drowsiness or indifference)	resp=respiratory
Abs=skin absorption	eosin=eosinophilia	leucyt=leukocytosis (increased blood leukocytes)	restless=restlessness
anes=anesthesia	epilep=epileptiform	leupen=leukopenia	retster=retrosternal (occurring behind the sternum)
anor=anorexia	epis=epistaxis (nosebleed)	li-head=lightheadedness	rhin=rhinorrhea (discharge of thin nasal mucus)
anos=anosmia (loss of the sense of smell)	eryt=erythema	liq=liquid	salv=salivation
appre=apprehension	euph=euphoria	local=localized	sens=sensitization
arrhy=arrhythmias	fail=failure	low-wgt=weight loss	sez=seizure
asphy=asphyxia	fasc=fasciculation	mal=malaise (vague feeling of discomfort)	short=shortness
aspir=aspiration	FEV=forced expiratory volume	malnut=malnutrition	sneez=sneezing
asphy=asphyxia	fibrl=fibrillation	ment=mental	sol=solid
BP=blood pressure	ftg=fatigue	methemo=methemoglobinemia	soln=solution
breath=breathing	func=function	monocy-=monocytosis (increased blood monocytes)	som=somnolence (sleepiness unnatural)
bron=bronchitis	GI=gastrointestinal	Molt=molten	subs=substernal (occurring beneath the sternum)
broncopneu=bronchopneumonia	gidd=giddiness	muc memb=mucous membrane	sweat=sweating
bronspas=bronchospasm	halu=hallucinations	musc=muscle	swell=swelling
BUN=blood urea nitrogen	head=headache	narci=narcosis	sys=system
[carc]=carcinogen	hema=hematuria (blood in the urine)	nau=nausea	pulm=pulmonary
card=cardiac	hemato=hematopoietic	nec=necrosis	RBC=red blood cell
chol=cholinesterase	hemog=hemoglobinuria	neph=nephritis	Repro=repoductive
cirr=cirrhosis	hemorr=hemorrhage	nerv=nervousness	resp=respiratory
CNS=central nervous system	hyperpig=hyperpigmentation	numb=numbness	restless=restlessness
Con=contact	hypox=hypoxemia (reduced oxygen in the blood)	opac=opacity	retster=retrosternal (occurring behind the sternum)

**ROUTE/SYSTEMS ABBREVIATIONS:			
conc=concentration	ict=icterus	palp=palpitations	rhin=rhinorrhea (discharge of thin nasal mucus)
conf=confusion	inco=incoordination	para=paralysis	salv=salivation
conj=conjunctivitis	incr=increase	pares=paresthesia	sens=sensitization
constip=constipation	inebri=inebriation	perf=perforation	sez=seizure
convuls=convulsions	inflam=inflammation	peri neur = peripheral neuropathy	short=shortness
corn=corneal	Ing=ingestion	periob=periorbital (situated around the eye)	sneez=sneezing
CVS=cardiovascular system	Inh=inhalation	phar=pharyngeal	sol=solid
cyan=cyanosis	inj=injury	photo=photophobia (abnormal visual intolerance to light)	soln=solution
decr=decrease	insom=insomnia	pig=pigmentation	som=somnolence (sleepiness unnatural)
depres=depressant	irreg=irregular	pneu=pneumonia	tacar=tachycardia
derm=dermatitis	irrit=irritant	pneuitis=pneumonitis	tend=tenderness
diarr=diarrhea	irrity=irritability	PNS=peripheral nervous system	terato=teratogenic
dist=disturbance	jaun=jaundice	polneur=polyneuropathy	throb=throbbing
dizz=dizziness	kera=keratitis (inflammation of the cornea)	prot=proteinuria	tight=tightness
trachbronc=tracheobronchitis	vap=vapor	vesic=vesiculation	weak=weakness
twitch=twitching	venfib=ventricular fibrillation	vis dist=visual disturbance	wheez=wheezing
uncon=unconsciousness	verti=vertigo (an illusion of movement)	vomit=vomiting	

- ACGIH® TLVs® and OSHA PELs are TWA concentrations that must not be exceeded during any 8-hour shift or a 40-hour workweek.
- Ceiling concentrations must not be exceeded during any part of the workday; if instantaneous monitoring is not feasible, the ceiling must be assessed as a 15-minute TWA exposure.
- IDLH represents the maximum concentration from which, in the event of respiratory failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing (e.g., severe irritation) or irreversible health effects.
- Skin designates the potential for dermal absorption; skin exposure should be prevented. The value only represents inhalation hazards.
- "ppm" is parts per million by volume and is not equivalent to a ppm by weight in soil value, e.g., mg/kg.
- IPs (given in electron volt [ev] units) are presented for photoionization (PID) usefulness evaluation. The PID lamp should have an eV value greater than the analyte it is detecting.

† Exceeds PID detection capabilities.

APPENDIX 3 — PHYSICAL AND OPERATION HAZARDS

Back Injuries Due to Improper Lifting

PREVENTIVE MEASURES

- Use proper lifting techniques.
- Lift with the legs, not the back.
- Keep loads close to the body and avoid twisting.
- Loads heavier than 50 pounds (lbs) require a second person or mechanical device for lifting.
- Use mechanical devices such as drum dollies, hand trucks, and tool hoists (for lifting augers) to lift or move heavy loads whenever possible.

Biological Agents

PREVENTIVE MEASURES

- Project work will not expose workers to infectious agents or wastes; however, responders to first aid incidents could contact bloodborne pathogens. Follow the Bloodborne Pathogen Control Plan in this Health and Safety Plan (HSP).¨
- Identify personnel who are highly sensitive or allergic to insect bites or stings during the "kickoff" meeting so that the appropriate emergency treatment can be made available on-site.
- Never try to capture wild or semi-wild animals-they may bite you or infect you with parasites.

Poison Ivy, Oak, and Sumac

- Review the Poison Ivy, Oak, and Sumac Field Guide during daily tailgate safety meetings. Worker must be familiar with the appearance of these poisonous plants.
- If there is accidental contact, carefully remove affected clothing and wash skin with soap and warm water as soon as possible.

Ticks

- Tick parasites are commonly encountered in thick vegetation.
    - Check yourself and coworkers regularly for feeding ticks.
    - If a tick is located, remove it with tweezers and place in a vial.
    - If irritation is felt or observed at the bite site, seek medical attention. Bring in removed tick, if possible.

Cold Stress

PREVENTIVE MEASURES

During tailgate safety meetings, train workers to recognize the signs and symptoms of cold stress illnesses:

- Frostbite - Skin color changes to white to reddish, pain followed by cold and numbness in the affected area(s); blisters may appear later.
- Hypothermia - Uncontrollable shivering, a sensation of feeling cold, a slowed and sometimes irregular heartbeat, a weakened pulse, and changes in blood pressure. More severe cases can result in slurred speech, memory lapses, incoherence, and drowsiness.

First Aid

- Frostbite - Cover the frozen body part, provide extra clothing and blankets, bring the victim indoors as soon as possible, place the frozen body part in warm water (~100°F) or re-warm with warm packs. Seek medical assistance as soon as possible.
- Hypothermia - Get victim out of wind, snow, and rain. Keep person awake. Remove any wet clothing and replace with dry, warm clothing. Wrap blanket around victim. If conscious, give victim sweet warm beverages. Seek medical attention as soon as possible.

Prevention

- Provide shelter away from rain, snow, or wind for breaks.
- Institute a work-rest schedule in accordance with the standard operating procedure (SOP).
- Increase fluid intake to prevent dehydration. Drink warm, sweet, caffeine-free, nonalcoholic drinks or soup periodically.

Electrocution

PREVENTIVE MEASURES

- Review engineering drawings with appropriate client contact and/or site personnel.
- Confirm exact location of lines with hand tools, not heavy equipment.
- Wear rubber, insulated protective gloves when hand digging or work on a rubber insulating mat.
- Do not work within 10 feet (ft) of high voltage electrical equipment having live exposed parts unless qualified, trained, and following safe work practices per 29 CFR 1910.331-335.
- Lock-out and tag controls that will be deactivated for maintenance or work on energized or de-energized equipment or circuits.
- Extension cords, power/electric tools, pumps, floodlights, and generators that lack double insulation must have grounding conductors that work.
- Use ground fault circuit interrupters (GFCIs) on all 120-volt, 120-amp circuits.
- Never work on-site when there is a threat of lightning storms.

Ergonomic Stress

PREVENTIVE MEASURES

- Lift carefully with load close to body with the legs taking most of the weight.
- Get help with lifts greater than 50 lbs.
- When working with a heavy tool or object, keep legs under the load and do not overreach or twist to the side.
- Reposition body to be more square to the load and work.
- Push loads, rather than pull, whenever feasible.
- Do not persist with lifting when the load is too heavy.
- Use a mechanical lifting aid or have a coworker assist with the lift.
- Rotate repetitive tasks to avoid soft-tissue fatigue.

Falls from Elevated Surfaces

PREVENTIVE MEASURES

- Protect employees from falling off surfaces that have a side or an edge that is 6 ft or more above a lower level.
- Provide a safety harness and shock-absorbing lifeline or adequate fall protection. Employees must wear them when working 6 ft or higher above the platform or main work deck.
- Install either a guardrail system or fall arrest system that conforms to 29 CFR 1926.502 (d) and is approved by the American National Standards Institute.

Fire and Explosion

PREVENTIVE MEASURES

- Make ABC fire extinguishers accessible in the work area.
- Store flammables in Underwriter's Laboratory and Occupational Safety and Health Administration (OSHA) approved metal safety cans equipped with spark arrestors.
- Keep exhaust equipment powered by internal combustion engines well away from flammables and combustibles.
- Secure hot work permits/approvals (Appendix 2) before welding or cutting.
- Store and use compressed gases in a safe manner.
- Never refuel equipment (e.g., generators) while it is in operation or hot enough to ignite fuel vapors.
- Conspicuously mark operations that pose fire hazards "No Smoking" or "Open Flames.
- Remove trash, weeds, and unnecessary combustibles from the Exclusion Zone (EZ).

Heat Stress

PREVENTIVE MEASURES

First Aid

- Perform emergency decontamination.
- Remove victim to cool area.
- Give cool fluids (only if conscious).
- Immediately reduce body temperature.
- Seek medical attention.

Prevention

- Provide shelter or shaded area for work tasks (as feasible) and break areas.
- Adjust work schedules by rotation of personnel or alternate job functions to minimize heat stress or overexertion at one task.
- Work during cooler hours of the day (or night), as feasible.
- To maintain normal body fluid levels, drink 16 ounces (oz) (2 cups) of water before each shift and about 8 oz (1 cup) every 15 to 20 minutes. Drink 2 gallons of water during an 8-hour period.
- Wear nonbinding cotton clothing (e.g., medical scrubs and cotton undergarments) under personal protective equipment (PPE) to absorb moisture and to help prevent heat rash.
- Where feasible, set up field “showers” or hose-down areas to cool down body.

Heavy Equipment and Vehicles

PREVENTIVE MEASURES

- Heavy equipment operators are to be continuously aware of workers on foot. Workers on foot must wear hard hats and safety vests.
- Always lower the bucket/blade to the ground when the operator leaves the equipment.
- Backup lights and alarms must be functional.
- Obey all site traffic signs and speed limits.
- Seat belts must be functional and in use during operation of the equipment and any site vehicles (including rentals).
- Operator shall regularly inspect the equipment for defective parts, such as brakes, controls, motor, chassis, drives, and hydraulic mechanisms. If stopped on an incline (>50%) with the engine running, the parking brake must be set.

Inclement Weather, Shut-down Conditions

PREVENTIVE MEASURES

- Poor visibility.
- Precipitation severe enough to impair safe movement or travel.
- Lightning in the immediate area.¨ Steady winds in excess of 40 mph.
- Other conditions as determined by the SHSC, FM, or EGHSEM or Corporate VP-HSE.
- Imminent threat of severe tropical storm or hurricane.
- Work will resume when the conditions are deemed safe by the SHSC.
- Complete an Incident Report within 24 hrs for all work shutdowns.

Noise

PREVENTIVE MEASURES

- Wear hearing protection when you have to raise your voice to speak to a worker at a distance of 2 ft and while standing within 20 to 25 ft from heavy equipment, pneumatic power tools, steam cleaners, and other equipment in operation that can generate more than 85 decibels (A-weighted scale) (dBA).
- Label equipment as a noise hazard if it generates, or is capable of generating, more than 85 dBA.

Oxygen Deficiency

PREVENTIVE MEASURES

- Test confined spaces for O_2 deficiency (19.5% oxygen by volume in air) before anyone enters. The on-site supervisor shall verify the results.
- Test atmospheres for Lower Explosive Limit (LEL)/O_2, carbon monoxide, and hydrocarbons when operating equipment powered by an internal combustion engine (rigs, backhoes, generators, etc.) in an enclosed space.

Slips, Trips, and Falls

PREVENTIVE MEASURES

- Clear work area of obstructions and debris before setting up. Alter work areas as necessary to provide a safe, reasonably level area.
- All walking and working surfaces shall continually be inspected and maintained to be free of slip, trip, and fall hazards.
- Keep drill platforms, stairs, and immediate work areas clear. Do not allow oil, grease, or excessive mud to accumulate in these areas.
- Channel the discharge of drilling fluids and foam away from the work area to prevent ponding or slippery conditions.
- Backfill open boreholes immediately, or cap and flag them. Barricade open excavations or cover them with steel traffic plates.
- Eliminate slip, trip, and fall hazards or identify them clearly with caution tape, barricades, or equivalent means.
- Store loose or light material and debris in designated areas or containers.
- Secure tools, materials, and equipment subject to displacement or falling.

Ultraviolet Exposure

PREVENTIVE MEASURES

- Wear appropriate clothing (long pants, shirt or tee shirt) and a hat to protect skin from prolonged sun exposure.
- Apply sunscreen (Sun Protection Factor [SPF]>15) prior to working outdoors in the sun and periodically thereafter.
- Wear polycarbonate safety glasses to protect eyes from ultraviolet exposure.¨ Use lip balm with SPF 15 or greater.
- Reduce sun exposure from 10 AM to 4 PM. Utilize shade protection especially during these hours.

APPENDIX 4 — ACTIVITY HAZARD ANALYSIS

APPENDIX 5 — CONFINED SPACE ENTRY PERMIT (WHEN COMPLETED)

APPENDIX 6 — FORMS

APPENDIX 7 — JUSTIFICATION OF ACTION LEVELS

JUSTIFICATION OF ACTION LEVELS

Operation, Maintenance and Monitoring of Remediation Systems – Is exposure monitoring required for the completion of this project?
☒ YES ☐ NO If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
*Confined Space Entry (e.g., well vault)	• Photoionization Detector (PID) with 10.6 eV lamp • Vinyl chloride 0.5/b Dräger tubes • LEL/ O_2/CO/H_2S Multi-Gas Meter	Periodic (5 minute intervals)	• O_2 ≤19.5% or ≥23.5%; • LEL ≥10%; • CO ≥10 ppm; • H_2S ≥0.5 ppm • VOCs ≥9ppm • 0.5 ppm on Dräger tube	Evacuate space if action levels are exceeded or if other self-perceived hazards are present; Contact PM and SHSC to discuss

Monitoring Well Sampling and Hydraulic Monitoring – Is exposure monitoring required for the completion of this project?
☒ YES ☐ NO If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
VOCs	• PID (10.6 eV lamp) • Vinyl chloride 0.5/b Dräger tubes	When initially accessing well; Periodic, if necessary, based on initial reading	≥9 ppm ≥0.5 ppm on Dräger tube	Stop work; Let well vent until reading is below the action level; Contact PM and SHSC to discuss

Recovery and Diffusion Well Rehabilitation and Redevelopment – Is exposure monitoring required for the completion of this project?
☒ YES ☐ NO If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
VOCs	• PID (10.6 eV lamp)	When initially accessing well; Periodic, if necessary, based on initial reading	≥9 ppm	Stop work; Let well vent until reading is below the action level; Contact PM and SHSC to discuss

*For Confined Space Entries, monitor for contaminants in the following order:

1. Oxygen
2. LEL
3. Volatiles

APPENDIX 8 — ACTION LEVELS AND ACTION

ACTION LEVELS AND ACTION

Operation, Maintenance and Monitoring of Remediation Systems – Is exposure monitoring required for the completion of this project?
☒ YES ☐ NO If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
*Confined Space Entry (e.g., well vault)	• Photoionization Detector (PID) with 10.6 eV lamp • Vinyl chloride 0.5/b Dräger tubes • LEL/ O_2/CO/H_2S Multi-Gas Meter	Periodic (5 minute intervals)	• O_2 ≤19.5% or ≥23.5%; • LEL ≥10%; • CO ≥10 ppm; • H_2S ≥0.5 ppm • VOCs ≥9ppm • 0.5 ppm on Dräger tube	Evacuate space if action levels are exceeded or if other self-perceived hazards are present; Contact PM and SHSC to discuss

Monitoring Well Sampling and Hydraulic Monitoring – Is exposure monitoring required for the completion of this project?
☒ YES ☐ NO If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
VOCs	• PID (10.6 eV lamp) • Vinyl chloride 0.5/b Dräger tubes	When initially accessing well; Periodic, if necessary, based on initial reading	≥9 ppm ≥0.5 ppm on Dräger tube	Stop work; Let well vent until reading is below the action level; Contact PM and SHSC to discuss

Recovery and Diffusion Well Rehabilitation and Redevelopment – Is exposure monitoring required for the completion of this project?
☒ YES ☐ NO If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level	Required Action
VOCs	• PID (10.6 eV lamp) • Vinyl chloride 0.5/b Dräger tubes	When initially accessing well; Periodic, if necessary, based on initial reading	≥9 ppm ≥0.5 ppm on Dräger tube	Stop work; Let well vent until reading is below the action level; Contact PM and SHSC to discuss
*Confined Space Entry (e.g., well vault)	PID (10.6 eV lamp); LEL/ O_2/CO/H_2S Multi-Gas Meter	Periodic (5 minute intervals)	• O_2 ≤19.5% or ≥23.5%; • LEL ≥10%; • CO ≥10 ppm; • H_2S ≥0.5 ppm • VOCs ≥9ppm	Evacuate space if action levels are exceeded or if other self-perceived hazards are present; Contact PM and SHSC to discuss

*For Confined Space Entries, monitor for contaminants in the following order:

1. Oxygen
2. LEL
3. Volatiles

APPENDIX 9 — SAFETY DATA SHEETS AND SELECTED CHEMICAL DATA SHEETS (ON-SITE)